Draft OES Review OES Decision FEMA Review FEMA Decision Withdrawn

Status: Draft

Application
AP-00831

Edit

Full Sub-Application (?tabset-2...

AP-00831: HMGP Sub-Application - General Criteria

GENERAL INFORMATION

Sub-Applicant Name(Entity) *

San Francisco Bay Area Rapid Transit District (BART)

Sub-Applicant Type *

Special District

Street Address *

City *

State *

CA

Zip *

County *

Multi-County

Region *

Multi-County

Subapplication Due Date

Apr 8, 2022

Add Contact Role

#	TITLE	FIRST NAME	LAST NAME	PHONE NUMBER	EMAIL	ROLES
1	Principal Grants Officer	Aileen	Hernandez	(510) 851-3164	ghernan@bart.gov	Primary Contact
2	Assistant General Manager, Office of Performance/Budget	Pamela	Herhold	(510) 464-6168	pherhol@bart.gov	Responsible Representative
3	Acting Manager of Grants and Funding Advocacy	Rob	Jaques	(510) 203-0895	rob.jaques@bart.gov	Primary Contact
4	Program Manager	Chung-Soo	Doo	(510) 381-5569	cdoo@bart.gov	Contributor
5	Deputy General Manager	Michael	Jones	(510) 464-6126	mjones8@bart.gov	Responsible Representative
6	General Manager	Robert	Powers	(510) 456-6060	rpowers@bart.gov	Responsible Representative

Role Name	Description
Responsible Representative (subapplication employee authorized to apply for, accept, and manage Federal grant funding)	Manage user roles, view subapplication, edit subapplication, send Maintenance and Match Commitment letters, manage Requests for Information(RFI), Submit the subapplication.
Primary Contact (subapplication employee)	View subapplication, edit subapplication, send Maintenance and Match Commitment letters, and manage Requests for Information(RFI).
Contributor (may be consultant)	View subapplication, and edit subapplication
Viewer	View the subapplication

US Congressional District(s) benefitting from mitigation *

Available

1
2
3
4
5
6
7

Selected

13

Assembly District(s) benefitting from mitigation *

Available

1
2
3
4
5
6
7

Selected

18

Senate District(s) benefitting from mitigation *

Available

1
2
3
4
5
6
7

Selected

9

Federal Information Processing Number (FIPS #) *

001-91000

Data Universal Numbering System (DUNS #) *

047409107

Is this a phased project? *

No

SUB-APPLICATION INFORMATION

Application Type	Examples:
Planning	Activities include developing a new hazard mitigation plan or updating a current mitigation plan.
Planning Related	Activities include: Updating or enhancing sections of the current FEMA-approved mitigation plan, integrating information from mitigation plans with other planning efforts, building capacity through delivery of technical assistance and training, evaluating adoption and/or implementation of ordinances that reduce risk or increase resilience.

Project	Activities involve construction and/or physical work. Examples: acquisition demolition/relocation, debris basin, structural elevation, structural seismic retrofit, hazardous fuels reduction, defensible space, generator(s) (If benefit cost analysis (BCA) feasible).
Advance Assistance	Activities can be used to develop mitigation strategies and obtain data to prioritize, select, and develop mitigation projects and complete applications. Examples: evaluation of facilities or areas to determine mitigation actions, collect data for BCA and environmental historical preservation compliance, conduct engineering designs and feasibility studies, conduct hydrologic and hydraulic studies and cost estimation.
5% Initiative	Activities are defined as mitigation actions that meet all HMGP requirements but may be difficult to evaluate against traditional program cost-effectiveness criteria. Examples such as early warning systems, post-disaster building code enforcement, public awareness and education for mitigation campaigns, hazard identification or mapping, new techniques/methods of mitigation, and generator(s) (if protecting a critical facility and if there is insufficient data to evaluate a generator project using a standard HMA-approved Benefit-Cost Analysis (BCA) method).

Subapplication Type * 

5% Initiative

5% Initiative	Examples:
Generator(s)/Other Power Source(s)	Installation of generator(s) or other power source(s) (such as a micro-grid) which provides a secondary source of power to a critical facility. Examples: police and fire station, hospitals, water and sewer treatment plant.
Post-Disaster Code Enforcement	Extraordinary post-disaster code enforcement projects to ensure disaster-resistant codes are implemented during disaster reconstruction after the normal costs of the building department are deducted. Example: Hiring staff to help process building permits to confirm post-disaster code is implemented, perform home construction plan review and field inspection of homes being built after a fire to ensure codes are followed.
Public Awareness and Education	Public awareness or education campaigns about mitigation. Example: Development of materials related to the various hazards that can impact a community and deliver trainings in the community.
Early Warning Systems	Equipment and systems for the purpose of warning citizens of impending hazards. Example: Installation of a camera system to detect and notify residents of fire risk.

Hazard Identification or Mapping	Hazard identification or mapping and related equipment for the implementation of mitigation activities. Example: Development of maps and data to will assist in the identification of necessary erosion control measures, slope stabilization, structural protection, and flood and debris flow hazard and risk analyses.
GIS for Mitigation	Acquisition of GIS software, hardware, and data whose primary aim is mitigation.
New Techniques Methods	The use, evaluation, and application of new, unproven mitigation techniques, technologies, methods, procedures, or products

Project Type *

Early Warning Systems

Hazard *

Earthquake

Next

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AP-00831: HMGP Sub-Application-Scope of Work

PROJECT INFORMATION

Project/Plan Title * 56/100

BART's Earthquake Early Warning System Thresholds Update

Brief Summary * 1741/2500

The BART Earthquake Early Warning (EEW) System Thresholds Update Project is a feasible and cost-effective mitigation activity eligible to receive FEMA HMGP funding. The Project will be managed by BART, a heavy-rail public transit system serving the San Francisco Bay Area. BART operates on 131 miles of track, with 50 stations in five counties (San Francisco, San Mateo, Alameda, Contra Costa, and Santa Clara). BART carries over 400,000 weekday passenger trips (prior to COVID-19 pandemic). BART has sustained multiple natural disasters, including the 1989 Loma Prieta earthquake. The main hazard of concern to BART are earthquakes. A U.S. Geological Survey statistical analysis has predicted a high probability of one or more major earthquakes impacting the Bay Area within the next 30 years. Unlike Loma Prieta, which was centered more than 50 miles south of San Francisco, future earthquakes could be close or directly under the BART system. BART has developed an Earthquake Emergency Plan to prepare for potential future earthquakes. The Plan highlights

BART's EEW system as one of various preventative methods to reduce impacts of earthquakes in the Bay Area. The EEW System Thresholds Update Project is a stand-alone activity. The Project will update thresholds of the current EEW system to capture significant earthquakes more accurately and to reduce false alarms. The updated EEW system will reduce derailment of BART's trains, injuries to customers and staff, impact to BART's operations, and damage to BART's assets. BART has 219 types of assets, including passenger stations, trackway, substations, switching stations, Train Control Rooms, and shops/yards. The updated EEW System will reduce damages worth millions of dollars.

Activity Location Latitude *

+37.797090

Activity Location Longitude *

-122.265190

Has a full subapplication for this project been submitted to OES previously *

No

Does another Federal entity have primary funding authority for this project *

No

Has physical project work already started? *

No

Has the project been previously funded under any other federally-administered grant program? *

No

Describe how the proposed project is eligible for FEMA HMGP funding as defined by the eligible activities contained in the FEMA Hazard Mitigation Assistance Guidance document *

968/2000

BART is requesting funds from the 5% Initiative for the Earthquake Early Warning (EEW) System Thresholds Update Project. The Project is a feasible and cost-effective mitigation for the purpose of warning citizens of impending hazards. The Project is eligible for the 5% Initiative as the work is consistent with the goals and objectives of the Hazard Mitigation Grant Program and meets all related requirements. The Project work does not involve construction and performing a standard BCA to prove-cost effectiveness would be difficult. The Project's feasibility is demonstrated through conformance with accepted standards and best practices for EEW systems, as required per Hazard Mitigation Assistance Guidance, Part III. E.1. The Project will improve BART's earthquake resiliency and sub-application details demonstrate there is a reasonable expectation that future damage or loss of life or injury will be reduced or prevented by the implementation of the Project.

Is the Project located in a special Flood Hazard Area? *

No

PROJECT ALTERNATIVES

No Action *

516/2500

If the proposed mitigation action is not implemented, BART will continue to operate the EEW system with data obtained in 2012 that is now outdated. BART's current EEW system may then not provide warnings or provide

obtained in 2012 that is now outdated. BART's current EEW system may then not provide warnings or provide various unnecessary warnings. BART would not be adequately equipped to reduce the risk to life or structures due to a significant earthquake. The current thresholds may also cause multiple unnecessary service delays as a result of trains slowing down and BART's subsequent necessary track inspections.

Proposed Action *

2380/2500

The Project will update current seismic thresholds of BART's Earthquake Early Warning (EEW) system to improve performance. The current thresholds were last updated in 2012. The EEW has improved BART's earthquake resilience as it has prevented derailment of trains and injuries to customers. BART adopted the ShakeAlert system, powered by the United States Geological Survey (USGS), in 2012. In 2018, BART upgraded to the new ShakeAlert 2.0 system. The ShakeAlert system can identify and characterize an earthquake a few seconds after it begins. This can be done by detecting the first energy to radiate from an earthquake, the Primary (P) wave energy, which rarely causes damage. Using P-wave information, ShakeAlert first estimates the location and the magnitude of the earthquake. Once received the earthquake information from the ShakeAlert system, the EEW sends earthquake commands to all BART trains through the Train Control Server (TCS) and BART's Operating Control Center (OCC) Manager. The trains can be slowed or stopped before the Secondary (S)-wave arrives, bringing the strong shaking that usually causes most of the damage. BART has two servers receiving a continuous stream of messages from more than one hundred seismic stations located throughout Northern California, it receives actual shaking data from each seismic station once per second. The threshold for an alarm is roughly 5.0, and 4.0 for seismic stations closer to the Bay Area, on the Richter scale. When the alarm is triggered, the system automatically sends a speed restriction command to trains, which then automatically begin slowing down to 27 mph. Trains in Automatic Operation moving at 70 mph take 20 seconds to slow to 27 mph. This system removes human response time and can even slow trains down before the shaking occurs depending on how far away the quake is centered. Early warning depends on where the earthquake occurs. The farther away the shaking occurs, the more advance warning the system receives. The system can provide as much as a 50 seconds early warning for earthquakes at or beyond extremes of the

monitored region. For quakes centered within the BART region, there is no early warning but the system has the advantage of obtaining an automated response to slow the trains instead of requiring human actions. See the attached illustration named "EEW Visual" for reference.

Second Action Alternative *

980/2500

The second alternative action is to continue to use current thresholds, but this action increases the risk of injuries to people and damage to BART's assets. BART did not select this action as the EEW system is an important part of the agency's mitigation measures. BART has spent the last decade implementing mitigation measures to reduce the impact of potential major earthquakes. For example, BART has been implementing multiple projects to retrofit high traffic portions of the train system under the Earthquake Safety Program, funded in part by regional Measure AA, a $980 million general obligation BART bond approved by voters in 2004. See uploaded document named "Earthquake Safety Program Technical Information" for reference. BART has identified the EEW System Thresholds Update Project as an important mitigation activity for life safety, and to increase BART's operation effectiveness to continue to provide San Francisco Bay Area residents reliable transit services.

Provide a detailed narrative of the hazards to be mitigated against and the impact the hazards present to the community and/or property *

2139/2500

The Project will mitigate the impact of earthquakes. Earthquakes occur when two tectonic plates slip past each other beneath the earth's surface, causing sudden and rapid shaking of the surrounding ground. Earthquakes

originate on fault planes below the surface, where two or more plates meet. Major faults cross through Bay Area counties. In March 2015, the USGS released an update to its 2008 earthquake probabilities for California faults using forecast model called the Uniform California Earthquake Rupture Forecast 3 (UCERF3). The model provides detailed assessment on the likelihood of each fault segment producing M6.7, M7.0 and M8.0 and greater earthquakes. These probabilities are based on data such as fault length; how much energy the faults release annually through fault slip; and, known historical return periods for the fault. Notable faults that may produce a M6.7 earthquake are the Northern San Andreas (6.4% probability in 30 years), Hayward (14.3% probability in 30 years), and Calaveras (7.4% probability in 30 years). Every point within the Bay Area is within 30 miles of an active fault, and 97 of the 101 cities in the Bay Area are within ten miles of an active fault. Uploaded maps (3 in total) show the location of active faults relative to the BART system. In 2000, BART hired a team of consultants led by Bechtel Infrastructure and HNTB to evaluate all the facilities and components in the BART system. Completed in 2002, the Seismic Vulnerability Study was the most comprehensive evaluation of BART facilities since original construction of the system - done between 1972 and 1976. It involved one and one-half years of engineering and statistical analyses, which included developing scenario earthquakes, computer models, damage predictions, upgrade options, and cost-benefit analyses. The study incorporated information from the 1994 Northridge, California and 1995 Kobe, Japan earthquakes. The Seismic Vulnerability Study Report confirmed that the BART system was vulnerable to damage that would leave it with significant life safety, and operability impacts, if mitigation actions were not implemented.

Provide a detailed description of the area and population that will be impacted by this project. * 2485/2500

BART is a heavy-rail public transit system that connects the San Francisco Peninsula with communities in the East Bay and South Bay. BART service currently extends south to Millbrae, northeast to Richmond, east to Antioch and Dublin/Pleasanton, and southeast to Berryessa/North San Jose, please see uploaded BART system map for details. BART operates in five counties (San Francisco, San Mateo, Alameda, Contra Costa, and Santa Clara) with 131 miles of track and 50 stations, and carries approximately 405,000 trips on an average weekday (prior to the COVID-19 pandemic). For nearly 50 years, BART has been providing fast reliable transportation to Bay Area residents. The San Francisco Bay Area had approximately 7.77 million residents in 2020, based on U.S. Census Bureau data. BART provides transportation to offices, shopping centers, tourist attractions, entertainment venues, universities, and other destinations. With a high cost of commuting by car, particularly as gas prices are at a historically high price, and fixed capacity constraints of the San Francisco Bay Bridge, BART provides vital and equitable access to downtown San Francisco. San Francisco is a core regional job center and driver of the Bay Area's economy. BART is the transit backbone of the Bay Area, carrying more than 50% of the area's transit riders and 25% of California's passenger miles traveled on transit. BART provides transportation services to diverse communities. Based on the 2020 BART Customer Satisfaction Study, BART riders are more likely to identify as African American and less likely to identify as White or Asian/Pacific Islander. In aggregate, BART riders who identify as non-white comprise 75% of current riders. Also, more than half of BART riders live in households earning less than $50,000.

Like transit agencies across the nation, BART saw a dramatic decline in ridership due to the impacts of the pandemic. Despite this, BART continued to offer regular service for essential workers. BART's near term (through FY24) ridership forecasts show a slow recovery month to month. Long-term (FY25-FY32) ridership forecasts assume the pandemic will have permanent impacts on ridership. BART has bracketed a range of reasonable outcomes for planning scenarios, with a plan to update the outlook as the agency obtains more information. Currently, BART is assuming ridership returns at 80% pre-pandemic expectations. BART posts ridership reports at www.bart.gov/about/reports/ridership.

Number of People or Project(s)Impacted by the Action *

400,000

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AP-00831: HMGP Sub-Application-Scope of Work Continued

PROBLEM STATEMENT

Describe the problem to be mitigated *

2185/2500

BART's rail public transit system operates in an earthquake hazard area as major faults cross through it. BART's service area has experienced various disasters over the past decades, and one of the most damaging disasters was the 1989 Loma Prieta earthquake. The BART system of 1989 had not been tested by the toughest of tests – a major earthquake. On October 17, 1989, and in the weeks that followed, the BART system had to adjust and modify operations. The day of the earthquake BART's Central Control had to put all trains on hold while initial damage assessments were conducted. The plan was to inch each train along, separately, to its next station so passengers could get off safely. In those days without widespread internet use or cellphones, people in the trains had little grasp of the magnitude of what had happened. BART staff helped customers to get off the trains and out-of-the stations safely, but many customers did not know how they would get home. BART staff worked around the clock to be up and running on a 24-hour emergency schedule to serve the public less than 12 hours after the quake hit. BART provided critical services to Bay Area residents while the Bay Bridge was out-of-service due to the impact of the quake. BART carried more than 10 million passengers to their jobs and home around the clock in the month that followed. Since then, BART has employed a two-pronged approach to prepare for another inevitable future major earthquake: an Earthquake Safety Program to strengthen the most vulnerable parts of the transit system and the EEW system. The Earthquake Safety Program addresses needs of the original system completed in the 70s. The EEW system provides extra lead time to allow trains to slow down, possibly

Trigger event for loss avoidance analysis * 1119/2500

Since the BART EEW system was implemented, no major earthquake has occurred in the San Francisco Bay Area, although the United States Geological Survey (USGS) predicts there will be major earthquakes in this area. The most recent major earthquake nearby was the South Napa Earthquake of 2014, which cost a loss of about $40 million dollars. The USGS estimates there is a 72% chance of one or more magnitude 6.7 or larger earthquakes in the next 30 years on one of the Bay Area's faults. Every point within the Bay Area is within 30 miles of an active fault, and 97 of the 101 cities in the Bay area are within ten miles of an active fault. Most of BART's facilities are in areas with high shaking potential. Earthquakes pose the largest threat to BART's system and require the bulk of the agency's hazard mitigation efforts. BART's 2002 Seismic Risk Analysis Report and BART's System Wide Seismic Vulnerability Study Report showed that the system, and specific facilities and components of the original system, built in the 1970s were vulnerable to damage and could have significant life safety and operability impacts.

SOLUTION DESCRIPTION

What is the mitigation action? * 1422/2500

The Early Earthquake Warning (EEW) system allows the train to stop or reduce speed upon the detection of an earthquake. The seismic thresholds feeding the EEW system have to be carefully selected in order to avoid unnecessary stop or slow down actions which may negatively affect BART's service and riders. The seismic thresholds were last updated in 2012. This Project will conduct experimental studies to select and update the thresholds. BART will utilize consultants/contractors to evaluate the current BART EEW system thresholds by performing numerical studies with a series of computer simulations, as well as a series of experimental studies with a BART train. The experimental studies will be performed with a shake-table, which allows to apply the real earthquake to the test specimens, which include ballast track, piers supporting aerial girder, and BART train. Comparing the results of experimental and numerical studies with the current BART EEW system thresholds, the project will provide recommendations for the update. Once the thresholds are updated, the EEW system will be able to receive information and more accurately send earthquake commands to BART trains through the Train Control Server (TCS) and BART's Operating Control Center (OCC) Manager. With updated thresholds, the TCS will receive a warning before a shake arrival. The OCC will then switch to manual mode and the trains will reduce speed.

How will this action provide protection from future natural hazards? * 1086/2500

Once the seismic thresholds are updated, BART's EEW system will be capable of accurately providing a warning to BART's Train Control Server (TCS). BART's trains are operated automatically by the TCS, and BART's Operating Control Center (OCC) monitors these operations. With updated thresholds, the mitigation action, the TCS will receive a warning before a shake arrival. The OCC will then switch to manual mode and the trains will reduce speed. Each train has approximately eight to ten cars, and each car costs approximately $2.5 million. The OCC will monitor the potential of a car derailment, and injury to riders and/or staff, and mitigate any impact with an appropriate response. For example, if there is a magnitude 7 earthquake at Monterey, CA and the entire Bay Area shakes, similarly to the 1989 Loma Prieta earthquake, BART's EEW system will automatically provide an earthquake warning 20-25 seconds prior to the shake to the TCS, BART's OCC will then change from automatic mode to manual mode, and all of BART's trains will start to automatically reduce their speed or stop.

HAZARD MITIGATION PLAN INFORMATION

Local Hazard Mitigation Plan Status *

Adopted

What is name/title of the plan? * 28/100

Local Hazard Mitigation Plan

What type of LHMP? *

Local Single Jurisdictional Multihazard Mitigation Plan

Applicable Hazard Mitigation Plan Expiry Date *

Aug 18, 2022

Does the project comply with the local hazard mitigation plan? *

Yes

Does the project comply with the current California state hazard mitigation plan? *

Yes

SCOPE OF WORK DOCUMENTATION

Document Name	Description
Scope of Work Documentation	Please upload documents that support your Scope of Work (SOW)

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AP-00831: HMGP Sub-Application - Work Schedule

WORK SCHEDULE

The intent of the work schedule is to provide a realistic appraisal of the time and components required to complete the project.
The work schedule should mirror the Scope of Work and Cost Estimate.

-Describe each of the major work elements and milestones in the description.
-Project Close-Out should be included which must be 3 months in duration.
-A GANTT chart may be provided as supplemental documentation.
-Total project duration must not exceed a 36 month period of performance.

Add Schedule Line Item

#	TASK NAME	DESCRIPTION	START MONTH	DURATION (MONTHS)
1	Pre-Award	Pre-Award activities		
2	Consultant Procurement	Review the proposal from consultants/contractors. And select a consultant/contractor for the project.	0	3
3	Initial Numerical Simulations	Developing detailed numerical models, which include modeling of the train, the wheelset trucks, primary and secondary suspension systems, the support aerial structures and ballast. Evaluating the different intensity measures and thresholds with the numerical models. According to the results of these analyses, intensity measures and thresholds for the test will be considered.	4	5
4	Ballast Stability Test	Full-scale testing of a segment of BART ballast track will be conducted to investigate the seismic response at the top of rails to estimate the ground motion input data for the numerical analysis and shake table testing of train.	9	6
5	Aerial Structure Test	A reduced-scale model of bridge bents will be tested on the shaking table to study the ground motion amplification in BART aerial structures.	15	6
6	Train Car Test	For the overturning stability investigation of train vehicles, a 70 feet long train car will be tested. Experimental results of ballast stability tests and elevated structure tests and the numerical simulations of aerial structures from previous phases will be used to compute the input motion applied to the shaking tables.	21	6
7	Final Numerical Simulations and Final Report	Numerical models developed in Task 3 will be updated using the shaking table test results and the threshold considered will be revised, as needed. Earthquake thresholds to be employed in the BART EEW will be recommended in the final report.	27	7
8	Closeout	Project Closeout line item	34	3

Total Duration

36

WORK SCHEDULE DOCUMENTATION

Document Name	Description
Work Schedule Documentation	Please provide documentation to support your Work Schedule if needed.

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PROJECT SITE(S)

Have all specific sites where project work will be conducted been identified? *

Yes

What is the percentage level of design? *

0

If you do not know all of the specific projects where work will be completed, or if your design level is below 60% this will need to be a Phased Project. You will need to submit a new NOI. Contact your HMA Grants Specialist or send an email to hma@caloes.ca.gov (mailto:hma@caloes.ca.gov), referencing this subapplication by the AP # and request a conversation about phasing the project.

SITE INVENTORY

Please complete the site inventory for all project sites, please ensure to add the required photos to each project site as uploaded files.

#	SITE NAME	SITE ADDRESS

Add Project Site

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AP-00831: HMGP Sub-Application - Project Cost Estimate

PROJECT COST ESTIMATE

Add Cost Estimate Line Item

#	COST TYPE	ITEM NAME	UNIT QUANTITY	UNIT OF MEASURE	UNIT COST	COST ESTIMATE TOTAL	PRE AWARD COST	COST ESTIMATE NARRATIVE
1	Contractor/Consultant - Design/Engineering	Initial Numerical Simulations	1	Lump Sum	$65,000.00	$65,000.00	false	This includes developing the detailed numerical models, and developing interim technical report for review.
2	Contractor/Consultant - Design/Engineering	Ballast Stability	1	Lump Sum	$90,000.00	$90,000.00	false	This includes conducting a full-scale testing of a segment of BART ballast track, and developing interim technical report for review.

#	COST TYPE	ITEM NAME	UNIT QUANTITY	UNIT OF MEASURE	UNIT COST	COST ESTIMATE TOTAL	PRE AWARD COST	COST ESTIMATE NARRATIVE
3	Contractor/Consultant - Design/Engineering	Aerial Structure	1	Lump Sum	$165,000.00	$165,000.00	false	This includes conducting a test of a reduced-scale model of bridge bents on the shaking table, and developing interim technical report for review.
4	Contractor/Consultant - Design/Engineering	Train Car Test	1	Lump Sum	$240,000.00	$240,000.00	false	This includes conducting a overturning stability test of a train vehicle on shake tables, and developing interim technical report for review.
5	Contractor/Consultant - Design/Engineering	Final Numerical Simulations and Final Report	1	Lump Sum	$40,000.00	$40,000.00	false	This includes updating the numerical models using the shaking table test results, and developing the final technical report for review.

#	COST TYPE	ITEM NAME	UNIT QUANTITY	UNIT OF MEASURE	UNIT COST	COST ESTIMATE TOTAL	PRE AWARD COST	COST ESTIMATE NARRATIVE
6	Force Acct. Labor - Project Mgmt	Project Management (PM)	1	Lump Sum	$50,000.00	$50,000.00	false	This cost is for work directly chargeable to the project and excludes administrative expenses to administer a grant award. Project Management includes administration, coordination and management for the engineering planning, and procurement of consultant services, as needed. Project Management involves managing work with consultant, executing the scope of work within assigned budget and schedule.
						$650,000.00		

PROJECT SITE COST ESTIMATE

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AP-00831: HMGP Sub-Application - Project Cost Estimate

PROJECT COST ESTIMATE

Add Cost Estimate Line Item

#	COST TYPE	ITEM NAME	UNIT QUANTITY	UNIT OF MEASURE	UNIT COST	COST ESTIMATE TOTAL	PRE AWARD COST	COST ESTIMATE NARRATIVE
1	Contractor/Consultant - Design/Engineering	Initial Numerical Simulations	1	Lump Sum	$65,000.00	$65,000.00	false	This includes developing the detailed numerical models, and developing interim technical report for review.
2	Contractor/Consultant - Design/Engineering	Ballast Stability	1	Lump Sum	$90,000.00	$90,000.00	false	This includes conducting a full-scale testing of a segment of BART ballast track, and developing interim technical report for review.

#	COST TYPE	ITEM NAME	UNIT QUANTITY	UNIT OF MEASURE	UNIT COST	COST ESTIMATE TOTAL	PRE AWARD COST	COST ESTIMATE NARRATIVE
3	Contractor/Consultant - Design/Engineering	Aerial Structure	1	Lump Sum	$165,000.00	$165,000.00	false	This includes conducting a test of a reduced-scale model of bridge bents on the shaking table, and developing interim technical report for review.
4	Contractor/Consultant - Design/Engineering	Train Car Test	1	Lump Sum	$240,000.00	$240,000.00	false	This includes conducting a overturning stability test of a train vehicle on shake tables, and developing interim technical report for review.
5	Contractor/Consultant - Design/Engineering	Final Numerical Simulations and Final Report	1	Lump Sum	$40,000.00	$40,000.00	false	This includes updating the numerical models using the shaking table test results, and developing the final technical report for review.

#	COST TYPE	ITEM NAME	UNIT QUANTITY	UNIT OF MEASURE	UNIT COST	COST ESTIMATE TOTAL	PRE AWARD COST	COST ESTIMATE NARRATIVE
6	Force Acct. Labor - Project Mgmt	Project Management (PM)	1	Lump Sum	$50,000.00	$50,000.00	false	This cost is for work directly chargeable to the project and excludes administrative expenses to administer a grant award. Project Management includes administration, coordination and management for the engineering planning, and procurement of consultant services, as needed. Project Management involves managing work with consultant, executing the scope of work within assigned budget and schedule.
						$650,000.00		

PROJECT SITE COST ESTIMATE

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COST REVIEW

Total Project Cost

$650,000.00

Non-Federal Cost Share (Match)

$162,500.00

Non-Federal Cost Share(Match) Percentage

25

Federal Share Request

$487,500.00

COST REVIEW DOCUMENTATION

Document Name	Description
Cost Estimate - Supporting Documentation	Provide supporting documentation to substantiate your cost estimate, including documentation that demonstrates the pre-award costs inccurred within the authorized period for pre-award. The pre-award period is after the disaster declaration date and before the FEMA award date. For example, documentation could include contractor quotes, RS Means, and similar project information. Reference: 2015 HMA Guidance, Part IV H.3.2.1 and Part IV H.4.3

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MAINTENANCE & REPORTING COMMITMENT

This acknowledgment of Maintenance & Reporting Commitment is to confirm the Subapplicant/Subrecipient is committed to perform the necessary maintenance for the entire useful life of the project, once completed. The entity responsible for maintenance is allocating the annual budget amount that will allow maintenance to occur as needed to ensure the project building/facility/area remains in good repair and operational.

To justify Hazard Mitigation Assistance funding, California is required to report to FEMA on the performance of completed mitigation measures. This acknowledgment of Reporting Commitment confirms that the Subapplicant/Subrecipient is committed to report on the performance of funded mitigation measures when tested by natural hazard events for the entire useful life of this project.

Process: Complete the fields below. The information provided here will automatically populate a templated Maintenance & Reporting Commitment letter to be signed by a Responsible Representative identified by you below. The Responsible Representative

must be a high-level person from the subapplicant entity who is authorized to commit the entity to request and receive grant funding. The Responsible Representative cannot be a contractor or a consultant. After you click the “Add Responsible Representative” button to provide the contact information for the Responsible Representative, click “Send for Signature.” The individual will receive an email notification from DocuSign with a link to access and sign the commitment letter. The Signature Status below will reflect “Sent For Signature.” Once signed, the letter will automatically upload to the subapplication.

Maintenance & Reporting Commitment Letter Date *

Apr 6, 2022

Subapplicant Name *

San Francisco Bay Area Rapid Transit District (BART)

Subapplicant Mailing Street

Subapplicant Mailing City

Subapplicant Mailing State

Subapplicant Mailing Postal Code *

Disaster Number *

Rolling Application

Control number

AP-00831

Entity Responsible *

San Francisco Bay Area Rapid Transit District

Number of years of maintenance

10

Project Building/Facility/Area *

Software

Annual Maintenence Amount *

$50,000.00

What are the Past Maintenance Tasks Involved? * 330/2500

Since the EEW system was implemented by BART, the agency has provided maintenance. The past maintenance tasks include checking BART's computer systems for EEW dashboard updates, monitoring sites within the BART system to ensure information is correct, and updating monitoring sites based on lessons learned from minor earthquakes.

What are the Future Maintenance Tasks Involved? * 616/2500

Future maintenance tasks include continuing to monitor BART's EEW computer systems and dashboards, updating the software algorithm based on updates of ground motion prediction equations from USGS. BART will perform real-time monitoring of the EEW system computer server and of USGS' computer server. Every three months, BART will conduct earthquake drills to check the rail operations system. Please see the organization charts uploaded (3 in total) to better understand BART's structure and the various departments involved in maintaining the EEW system, the specific departments involved are denoted by a red line.

Future Maintenance Schedule *

BART will perform real-time monitoring of BART's computer server and of USGS' computer server. BART will a

Future Cost of Maintenance *

$500,000.00

Source of Future Maintenance Funds *

BART Funds

RESPONSIBLE REPRESENTATIVE CONFIRMATION

Add Responsible Representative

#	TITLE	FIRST NAME	LAST NAME	PHONE NUMBER	EMAIL	SIGNATURE STATUS

Document Name

M & R COMMITMENT SUPPORTING DOCUMENTS

Document Name	Description
Maintenance & Reporting Commitment Documentation	Please upload documents that support your Maintenance & Reporting Commitment, if needed.

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HMGP Sub-Application – Maintenance Commitment

Project Maintenance Letter

Date: 4/6/2022	Company Name: San Francisco Bay Area Rapid Transit District (BART)
Company Mailing Street:	Company Mailing City:
Company Mailing State:	Company Mailing Postal Code:
Disaster Number: Rolling Application	Control Number: AP-00831
Entity Responsible: San Francisco Bay Area Rapid Transit District	Number of Years of Maintenance: 10
Project Building/Facility/Area: Software	Annual Maintenance Amount: $50,000.00

What are the Past Maintenance Tasks Involved?

Since the EEW system was implemented by BART, the agency has provided maintenance. The past maintenance tasks include checking BART's computer systems for EEW dashboard updates, monitoring sites within the BART system to ensure information is correct, and updating monitoring sites based on lessons learned from minor earthquakes.

What are the Future Maintenance Tasks Involved?

Future maintenance tasks include continuing to monitor BART's EEW computer systems and dashboards, updating the software algorithm based on updates of ground motion prediction equations from USGS. BART will perform real-time monitoring of the EEW system computer server and of USGS' computer server. Every three months, BART will conduct earthquake drills to check the rail operations system. Please see the organization charts uploaded (3 in total) to better understand BART's structure and the various departments involved in maintaining the EEW system, the specific departments involved are denoted by a red line.

Future Maintenance Schedule:	Future Cost of Maintenance:
BART will perform real-time monitoring of BART's computer server and of USGS' computer server. BART will also check rail operations system with quarterly drills.	$500,000.00

Source of Future Maintenance Funds:

BART Funds

Confirmation

Contact First Name: Robert	Contact Last Name: Powers
Contact Phone Number: (510) 456-6060	Contact Email: rpowers@bart.gov
Contact Title: General Manager	

This is to confirm that the Subapplicant is committed to perform the necessary maintenance for the entire useful life of this project, once completed. The Entity Responsible for maintenance is allocating the annual budget amount that will allow maintenance to occur as needed to ensure the Project Building/Facility/Area remains in good repair and operational.

To justify Hazard Mitigation Assistance funding, California is required to report to FEMA on the performance of completed mitigation measures. This is to confirm that the subapplicant is committed to report on the performance of funded mitigation measures when tested by natural hazard events for the entire useful life of this project.

DocuSigned by:

Robert Powers

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Signature

Draft OES Review OES Decision FEMA Review FEMA Decision Withdrawn

Status: Draft

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MATCH COMMITMENT LETTER

As a part of the Hazard Mitigation Grant Program process, a Non-Federal Share (Match) of at least 25% of the total project amount is required. This acknowledgment is to confirm the Subapplicant/Subrecipient commitment to meet the Non-Federal Share (Match) funding requirement.

Process: Complete the fields below. The information provided here will automatically populate a templated Match Commitment letter to be signed by a Responsible Representative identified by you below. The Responsible Representative must be a high-level person from the subapplicant entity who is authorized to commit the entity to request and receive grant funding. The Responsible Representative cannot be a contractor or a consultant. By sending this document for signature, you are acknowledging the requirements outlined here. After you click the “Add Responsible Representative” button to provide the contact information for the Responsible Representative, click “Send for Signature.” The individual will receive an email notification from DocuSign with a link to access and sign the commitment letter. The Signature Status below will reflect “Sent For Signature.” Once signed, the letter will automatically upload to the subapplication.

Please be Advised:
If additional federal funds are requested, an additional Non-Federal Share (Match) funding commitment letter will be required.
If a funding source is from outside the Subapplicant entity, upload documentation supporting the funding commitment and availability of funding.

Match Commitment Letter Date *

Apr 6, 2022

Sub-Applicant Name(Entity) *

San Francisco Bay Area Rapid Transit District (BART)

Control Number *

AP-00831

Non-Federal Cost Share Source *

Available

- Private Non-Profit Funding
- State Agency Funding
- Other Agency Funding

Selected

- Local Agency Funding

Name of Funding Source(s) *

BART Operating Funds

Funding Type *

BART Operating Funds

Federal Share Amount Requested *

$487,500.00

Non-Federal Share (Match) Commitment *

$162,500.00

Non-Federal Share (Match) Availability Start Date *

Jul 1, 2023

Is there an expiration date of the Non-Federal Share (Match)? *

No

CONFIRMATION

Add Responsible Representative

#	TITLE	FIRST NAME	LAST NAME	PHONE NUMBER	EMAIL	SIGNATURE STATUS

Document Name

SUPPORTING DOCUMENTATION

Document Name	Description
Match Commitment Documentation	Documentation supporting the commitment and availability of funding.

HMGP Sub-Application – Match Commitment

Project Match Commitment Letter

Date: 4/6/2022	Sub-Applicant Name: San Francisco Bay Area Rapid Transit District (BART)
Control Number: AP-00831	Non-Federal Cost Share Source: Local Agency Funding
Name of Funding Source(s): BART Operating Funds	Funding Type: BART Operating Funds
Federal Share Amount Requested: $487,500.00	Non-Federal Share (Match) Commitment: $162,500.00
Non-Federal Share (Match) Availability Start Date: 7/1/2023	Is there an expiration date of the Non- Federal Share (Match)? No
Non-Federal Share (Match) Expiration Date:	

Cal OES
GOVERNOR'S OFFICE OF EMERGENCY SERVICES

Confirmation

Contact First Name: Robert	Contact Last Name: Powers
Contact Phone Number: (510) 456-6060	Contact Email: rpowers@bart.gov
Contact Title: General Manager	

The individual signing the match commitment must have authority to commit funds and resources on behalf of the subapplicant for this project.

By sending this document for signature, you are acknowledging the requirements outlined above.

Please be Advised:
If additional federal funds are requested, an additional local match fund commitment letter will be required.

If a funding source is from outside the subapplicant entity, upload documentation supporting the commitment and availability of funding.

DocuSigned by:
Robert Powers
BAA357BD7E1A4FF...
Signature

Draft OES Review OES Decision FEMA Review FEMA Decision Withdrawn

Status: Draft

Application
AP-00831

Edit

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AP-00831: HMGP Sub-Application - Benefit Cost Analysis

COST EFFECTIVENESS NARRATIVE

Provide a detailed narrative explaining the project's cost effectiveness? * 941/2500

The Project cost is less than $1 million and will reduce the risk of injuries to BART's passengers and of damages to the agency's trains, property, and structures. Each BART train has up to ten cars, and each car costs approximately $2.5 million. In peak service hours, a ten-car-train can hold up to 2000 passengers. By FEMA and Cal OES investing $650,000 to improve the earthquake thresholds of BART's EEW system, BART will mitigate the impact of small and more significant earthquakes, saving millions of dollars to the agency. Earthquakes, such as Loma Prieta, can bring the Bay Area operations to a halt. Millions of people rely on BART to get to and from employment, education, and health care facilities. Stopping or reducing BART's services could also have significant impact to the economic stability of the Bay Area after an earthquake. Hence, the Project will also improve San Francisco Bay Area's resilience after an earthquake.

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AP-00831: Grant Management Cost Application

HMGP GRANT MANAGEMENT COST APPLICATION

Subrecipient Grant Management costs are available at no more than 5% of the final project cost to subrecipients who apply and can meet all Federal grant requirements. Subrecipients must provide a detailed budget of the management cost request per 2 CFR 200.403, which is subject to Cal OES/FEMA approval. Reimbursement is based on documented actual cost.

For further clarification, grant management is different than project management. Grant management activities are to manage the grant (Subapplication Development, Quarterly Reporting, Reimbursement Submission). Project management is to manage the actual physical project itself (construction oversight, project scheduling and coordination, project meetings).

FEMA Definition of Management Costs: Any indirect cost, any direct administrative cost, and any other administrative expenses associated with a specific project under a major disaster, emergency, or disaster preparedness or mitigation activity or measure.

Directions: For each applicable category, provide a total estimated cost. Refer to the Management Cost examples below for costs that may be included. For the Narrative field, include a detailed description of work for each cost, including methodology used to estimate each cost. example, if your cost estimate includes your agency's time, include estimated hours, personnel titles, and salary/hourly wages plus benefits for a hourly cost. Additionally, describe how these costs will be used through the life of the grant.

Total Federal Cost Share

$487,500.00

Maximum Eligible Management Cost

$32,500.00

MANAGEMENT COST BUDGET BREAKDOWN

A. Pre-Award: Subapplication development, community outreach, meetings related to Subapplication development.

Add Line Item

#	EXPENSE NAME	AMOUNT	DESCRIPTION

B. Staff Time - Salary or hourly employee time to manage technical monitoring, quarterly reporting, technical assistance, and the reimbursement and close-out process.

Add Line Item

#	POSITION	HOURLY RATE	HOURS	AMOUNT	DESCRIPTION
1	Financial Analyst	$80.00	144	$11,520.00	Financial Analyst will support setting up the grant in electronic tracking systems, reporting financial data on a monthly and quarterly basis, preparing monthly and quarterly expense reports, and preparing quarterly reimbursements and close-out request.
2	Principal Structural Engineer	$100.00	152	$15,200.00	Principal Structural Engineer will manage technical monitoring, technical assistance, reviews of financial information, and preparation for grant reimbursements and close-out processes.
3	Principal Grants Officer	$80.00	72	$5,760.00	Grants Officer will provide support to respond to RFIs from Cal OES and FEMA, track and submit quarterly reports and invoices to Cal OES' Hazard Mitigation Point of Contact, provide technical assistance for grant monitoring, coordinate and submit close-out documents.
				$32,480.00	

C. Travel - Cost to attend professional development training course directly related to implementation of the Hazard Mitigation Grant.

Add Line Item

#	EXPENSE NAME	AMOUNT	DESCRIPTION

D. Equipment - Cost directly related to implementation of Hazard Mitigation Grant.

Add Line Item

#	EXPENSE NAME	AMOUNT	DESCRIPTION

E. Supplies - Supply cost directly related to implementation of the Hazard Mitigation Grant, such as printer materials and office supplies.

Add Line Item

#	EXPENSE NAME	AMOUNT	DESCRIPTION

E. Indirect Cost - Depreciation or use allowances on buildings and equipment, costs to operate and maintain facilities, general administration and accounting administration.

Add Line Item

#	EXPENSE NAME	AMOUNT	DESCRIPTION

F. Other - Any other administrative expenses not captured in the categories above.

Add Line Item

#	EXPENSE NAME	AMOUNT	DESCRIPTION

Total Management Cost Requested *

$32,480.00

Maximum Management Cost Allowed (Requested ≤ Allowed)

$32,500.00

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AP-00831: HMGP Subapplication - Environmental Information

EHP

Floodplains - Is the project within or will it modify a floodplain? *

No

Wetlands - Does the primary site alternative and/or its practicable alternative require a Section 10 of the Rivers and Harbors Act or a CWA Section 404 permit? *

No

Viewshed - Is the proposed project located in or adjacent to a residential or historic district? *

No

Existing habitat - Identify and describe any existing, observed in the field, or known or expected to exist flora and fauna species at the project site and immediately surrounding the site. *

15/2500

Not applicable.

Endangered/threatened species and/or critical habitat - Are any endangered/threatened species known to exist at the site or in the immediate vicinity? *

No

Migratory flyway or migration barrier - Is the proposed project new construction or extension of an existing tower of 30' in height or more? *

No

Invasive Species – Will the project include construction? *

No

Minority (or) low-income populations – Will the proposed project impact minority and low-income populations as identified in Executive Order 12898? *

No

Farmland – Will a project alternative convert or impact important farmland? *

No

Historic and Cultural Characteristics – Are there any listed, eligible or potentially eligible historic/archaeological resources (in) the (Area of Potential Effects)? *

No

Are there any hazardous, toxic substances at the site? *

No

Roadway and Access - Will the project include road construction and/or vehicular access? *

No

EHP DOCUMENTATION

Document Name	Description
FEMA Environmental Checklist	Provide the completed FEMA Environmental Checklist.

Previous

Submit

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