smart corridor
INTERSTATE 80
INTEGRATED CORRIDOR MOBILITY

I-80 ICM

MEMORANDUM OF UNDERSTANDING

INTERSTATE 80 CORRIDOR
MEMORANDUM OF UNDERSTANDING (MOU)

CALIFORNIA DEPARTMENT OF TRANSPORTATION (CALTRANS)
&
LOCAL AND REGIONAL AGENCIES

FOR INTEGRATED CORRIDOR MOBILITY STRATEGIES IN ALAMEDA AND CONTRA COSTA COUNTIES

This MOU is a compilation of the goals, policies, and procedures intended to be followed by the parties working together in a coordinated manner to enhance traffic operations along the Interstate 80 (I-80) corridor in Alameda and Contra Costa Counties. This MOU is intended to identify the overall commitment and responsibilities regarding ownership, operations, and maintenance of the various equipments installed as part of the I-80 Integrated Corridor Mobility (ICM) Project. The following entities are parties to this MOU:
California Department of Transportation (Caltrans), Alameda County Transportation Commission (ACTC), Contra Costa Transportation Authority (CCTA), West Contra Costa Transportation Advisory Committee (WCCTAC), Contra Costa County, AC Transit, WestCAT, Cities of Oakland, Emeryville, Albany, Berkeley, El Cerrito, Richmond, San Pablo, Pinole, and Hercules.

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I. BACKGROUND

Interstate 80, between the Carquinez Bridge and the San Francisco Oakland Bay Bridge, is one of the most congested corridors in the San Francisco Bay Area. Traffic demands on the freeway far exceed the roadway capacity, causing severe congestion, unreliable travel times, and traffic diversion to the local arterials. During the peak periods, the majority of the corridor operates with significant congestion and delays. The congestion on the roadway network contributes to an increase in incident rates, including rear-end collisions on both the freeway and local arterials.
Congestion and associated incidents in this corridor are expected to increase over the next 20 years. By 2015, delay for westbound I-80 will increase by 50% in the AM peak, while delay for eastbound I-80 will increase by 100% in the PM peak.

The San Pablo Avenue corridor is approximately 20 miles long and is the major travel corridor parallel to I-80. This corridor extends from 17th Street in downtown Oakland to Hercules, through the cities of Emeryville, Berkeley and Albany in Alameda County; and the cities of El Cerrito, Richmond, San Pablo, Pinole, Hercules, and unincorporated portions of Contra Costa County. There are approximately 85 traffic signals along the project corridor. San Pablo Avenue is State Route 123 from West McArthur Boulevard in Emeryville to Cutting Boulevard in Richmond.

The East Bay SMART Corridor Program, which includes San Pablo Avenue, is an existing multi-modal Advanced Transportation Management System (ATMS) along the corridor. The program, which took effect in 2003, is a cooperative effort by the California Department of Transportation (Caltrans), the Metropolitan Transportation Commission (MTC), the Alameda County Transportation Commission (Alameda CTC), Contra Costa Transportation Authority (CCTA) and 15 local agencies.

Components of the SMART Corridor include Closed Circuit TV (CCTV), Vehicle Detection System (VDS), Emergency Vehicle Preemption (EVP), and Transit Signal Priority (TSP). These technologies are used to improve the performance of transportation systems, by promoting efficient use of the existing roadway and transit systems. The goal of the SMART Corridor is to allow local agencies to better manage congestion and incidents, improve transportation safety, mobility and efficiency along San Pablo Avenue, and efficiently operate and manage emergency services and transit resources.

In order to improve the efficiency of the entire transportation corridor, the I-80 ICM project will expand and integrate the San Pablo Avenue portion of the SMART Corridor with new elements on San Pablo Avenue, I-80 and crossing arterials. The primary goal of the I-80 ICM project is to enhance the effectiveness of the existing transportation network, including the freeway, ramps, parallel arterials, and the crossing arterials in Alameda and Contra Costa Counties, as well as the transit service.

The Project provides tools for Caltrans and local agencies to manage traffic, including:

- Monitoring/measuring devices such as cameras, video detection systems and loop detectors;
- Communication links to a central location: signal interconnect, wireless modems;
- Traffic control devices;
- Intelligence in form of software and algorithms to respond to changing traffic conditions on ramps and freeway; and
- Tools to communicate traffic/transit information back to drivers

The Project includes five major components:

- Adaptive ramp metering;
- Incident management;
- Information to motorists regarding transit and traffic travel time;
- Improvements along San Pablo Avenue and other arterials; and
- System Integration.

The Project benefits include:

- More reliable travel time within the existing transportation network by optimizing the use of existing capacity.
- Improved safety and operation of the transportation network.
- Reduced traffic congestion by expediting incident clearance and recovery.
- Improved air quality associated with reduced traffic congestion, and.
- Enhanced real-time traveler information.

The I-80 ICM project is a $93 million project that is primarily funded with Corridor Mobility Improvement Account (CMIA) and Traffic Light Synchronization Program (TLSP) funds secured in 2007. Contra Costa Measure J is a contributing fund for project development. Other local funds, including Alameda County 2000 Measure B funds, are also programmed for this project.

This project is developed through a partnership among Caltrans, the ten municipalities along the corridor (Oakland, Emeryville, Albany, Berkeley, El Cerrito, Richmond, San Pablo, Pinole, Hercules, and Contra Costa County), AC Transit, WestCAT, Alameda County Transportation Commission, Contra Costa Transportation Authority, West Contra Costa Transportation Advisory Committee, Metropolitan Transportation Commission, and the California Highway Patrol (CHP).

II. DEFINITION AND EXPLANATION OF TERMS

Active Traffic Management (ATM) – The use of technology for real-time management of traffic flow and communication of travel information to drivers in an effort to reduce congestion and to increase throughput along a corridor.

Adaptive Ramp Metering (ARM) – The use of freeway mainline, ramp, and local street traffic volumes to adjust metering rates for traffic entering the freeway on a real-time basis.

Closed Circuit Television (CCTV) Cameras – Fixed and pan-tilt-zoom cameras mounted on poles to monitor freeway, on-ramp, and local street traffic flow conditions as a way to confirm actual conditions and to implement appropriate traffic management strategies.

Changeable Message Signs (CMS) – Technology to provide advisory traveler information such as incidents, events, construction, maintenance, road closures, parking availability and travel times so that travelers can make informed choices of their travel mode or route.

Corridor Steering Committee (CSC) - The I-80 CSC will be comprised of executive staff or designees of all member agencies to address any issues not resolved by the I-80 Technical Coordinating Committee (I-80 TCC).

Emergency Vehicle Preemption (EVP) – Devices on emergency vehicles communicate with devices at traffic signals to provide a green traffic signal phase for emergency vehicles approaching an intersection.

End-of-Queue Detection – Detection at the entrance to the on-ramp to monitor the length of queued vehicles waiting for the ramp meter and alerts the ramp meter controller if the queue is approaching the adjacent local intersection. Monitoring could be in terms of occupancy (on the loop) or volume differential (vehicles in vs. vehicles out).

Highway Advisory Radio (HAR) – Radio system used to convey real-time traveler information to drivers during incidents or special events.

Incident Condition – An operational scenario as agreed upon by partnering agencies such as loss of fifty-percent of the through lanes on the freeway for 30 minutes or more.

Information Display Boards (IDB) – Large electronic signs used to display real-time traveler information with color and graphic capability to more efficiently communicate with drivers than is possible using traditional Changeable Message Signs.

Trailblazer Signs –Devices that are located at critical decision points along potential local routes to efficiently guide traffic that has left the freeway along a dedicated route past an incident.

Lane Use Signs (LUS) – An ATM device used to display graphic or text information relative to each specific lane, facilitating clear communication with motorists and dynamic lane management as needed for incident management or planned highway work.

Microwave Vehicle Detection System (MVDS) – Uses microwave motion sensor to detect a moving vehicle.

I-80 Policy Advisory Committee (I-80 PAC) – A committee formed to provide guidance and direction on any issues that may arise that require additional input from communities within the I-80 corridor.

Signal Coordination – A traffic operations strategy of setting traffic signal timing plans and offsets such that a platoon of vehicles can travel along a corridor under a green phase as they approach each intersection. (See alos Signal Flush Plans)

Signal Flush Plans – Special traffic signal timing plans that would be implemented at local intersections during freeway incidents in which a large amount of traffic would be expected to leave the freeway and use local streets to bypass an incident. Flush plans provide a long green phase for major traffic route during an incident. Plans are stored in the local traffic signal controller and called out by a plan number. These could be a series of timing plans used for different incident severity, are triggered under specified traffic volume thresholds, and will only be in effect until congestion dissipates on the local streets. (See also Signal Coordination)

Signal Interconnect – Connecting traffic signals along a corridor using copper, fiber, or wireless media to enable data transfer and communication.
Signal Timing Plans – Parameters for allowing green timing for each movement.

I-80 Technical Coordinating Committee (I-80 TCC) – Committee comprising of technical staff from agencies in the I-80 ICM Corridor, responsible for day-to-day transportation service, operations and management of their respective systems within the I-80 corridor.

Transit Signal Priority (TSP) – Equipment installed on transit vehicles that communicates with equipment at the traffic signal to grant an early green or green extension.

Transportation Management Center (TMC) – Central facility at Caltrans or local agencies that houses software, workstations, and staff to operate the system.

Variable Advisory Speed Signs (VASS) – Device that provides timely information to motorists on suggested reduced speeds in advance of downstream congestion or changing conditions. Also used for End of Queue Warning on the freeway. VASS could also be used for speed harmonization. Speed harmonization is a strategy of dynamically and automatically adjusting speed limits approaching areas of traffic congestion, collision, or special events to help maintain traffic flow and reduce risk of collisions due to speed differentials.

III. PURPOSE OF MOU, PROJECT DESCRIPTION, AND PROJECT GOVERNANCE

PURPOSE OF MOU

This MOU serves the following purposes:

- Confirm support from all project partners, particularly local support for ramp metering and other freeway elements;
- Articulate key operations and maintenance (O&M) principles for continuing project development;
- Clarify ownership, O&M, and management responsibilities;
- Clarify the distribution of costs and funding sources;
- Outline the framework for multi-agency cooperation, collaboration, and conflict resolution;
- Identify which Smart Corridor devices will be made part of the I-80 ICM project; and
- Signify the ongoing commitment of the project partners to deliver the project and make it a success.

PROJECT DESCRIPTION

The I-80 ICM Project is located in Alameda and Contra Costa Counties, on a segment of I-80 approximately 20 miles long, from just north of the I-80/580/880 Interchange to just south of the Carquinez Bridge, on San Pablo Avenue from MacArthur Blvd. in Oakland to Cummings Skyway in Contra Costa County (portions of which are also designated as State Route 123), and on other local arterials along the corridor that connect I-80 and San Pablo Avenue. The I-80 ICM Project consists of five major components, as described below:

a. Adaptive Ramp Metering

Adaptive ramp metering (ARM) will be implemented at 44 on-ramps for both directions of the freeway during the weekday peak periods and weekends as needed (refer to Attachment A). ARM manages traffic volumes at the freeway on-ramps during recurring congestion and freeway incidents. Incident-related congestion can be managed through the use of more restrictive metering upstream and less restrictive metering downstream of the incident. The ARM algorithm can adjust metering rates at each on-ramp based on the prevailing or real-time corridor traffic conditions, both on the freeway and the adjacent local arterial.

b. Incident Management

During an incident, Active Traffic Management (ATM) strategies will be deployed to reduce delay and to prevent secondary incidents on the freeway, and to also manage incident traffic on local arterials. This will be accomplished through specific incident response plans (IRP), to be developed in coordination with the local agencies, that employ the I-80 ICM project elements (i.e. CMS, CCTV, LUS, VASS) and San Pablo Avenue East Bay SMART Corridor devices (i.e. CCTV and MVDS) to expedite incident detection, response, and clearance while also minimizing incident impacts via enhanced motorist information.

c. Transit and Traffic Motorist Information

Real-time information for the transportation network, including travel speeds, travel time and transit options, will be provided to motorists and transit passengers via IDBs, CMS, HAR, and 511. This will assist motorists to make timely, informed, and personal decisions earlier in their journey through the corridor, thus, enhancing motorists' trip quality and convenience. This can also at times reduce traffic demand within the corridor by encouraging travelers to use available transit options or to postpone their travel to times when congestion is lower.

d. Improvements along San Pablo Avenue Corridor and Other Arterials

The I-80 ICM Project includes upgraded traffic signal hardware, software and interconnect enhancements, and installation of arterial management components such as closed-circuit television (CCTV) cameras, trailblazer signs, CMS and communication and detection equipment on San Pablo Avenue from MacArthur Boulevard in Oakland to Cummings Skyway in Contra Costa County and local arterials. Other improvements include: extended transit signal priority along San Pablo Avenue Corridor and crossing arterials; extended emergency vehicle preemption; and installation of pedestrian push buttons and countdown signal heads at traffic signals in Pinole, minor traffic signal modification in El Cerrito, intersection striping improvements for transit near El Cerrito del Norte BART Station, and installation of two new traffic signals in Richmond.

e. System Integration

System integration provides for coordinated operations between all of the above project components and sharing of corridor traffic and transit

information among various agencies relative to I-80, San Pablo Avenue and other key local arterials.

GOVERNANCE

It is the intent that all technical and operational matters be resolved among the partnering agencies at the lowest working level. In general, the I-80 integrated corridor management activities will be directed through three bodies of governance, in the following order of hierarchy, from low to high:

Technical Coordinating Committee (I-80 TCC):

The I-80 TCC will be comprised of technical staff responsible for day-to-day transportation service, operations and management of their respective systems within the I-80 corridor. The I-80 TCC will consist of representatives from Caltrans/District 4, the California Highway Patrol (CHP), Metropolitan Transportation Commission (MTC), Alameda County Transportation Commission (Alameda CTC), AC Transit, Contra Costa Transportation Authority (CCTA), Contra Costa County (CCC), the West Contra Costa Transportation Advisory Committee (WCCTAC), WestCAT, and the Cities of Hercules, Pinole, San Pablo, Richmond, El Cerrito, Albany, Berkeley, Emeryville, and Oakland. The I-80 TCC will develop operational strategies needed for integrated corridor system management, ultimately to be adopted by the I-80 Corridor Steering Committee (CSC) as appropriate.

The I-80 TCC will ensure efficient monitoring and enhanced day-to-day freeway and arterial operations, incident management, and timely dissemination of real-time multimodal traffic data to travelers.

The I-80 TCC will directly interact, communicate, and exchange information and cooperatively assist in resolving issues. In the course of these activities, operational protocols will be developed to best serve ramp metering, incident management, signal operations, and transit service.

While Caltrans will be responsible for 24/7 emergency deployment of the ICM components, The I-80 TCC members will, on an ongoing basis, provide input and concurrence on operational strategies such as ramp metering rates or operational periods, flush plans, traffic signal modifications & coordination, and activation of trailblazer signs on local arterials during incidents or major events that affect transportation.

The I-80 TCC will meet monthly or as needed. At these meetings, the I-80 TCC will review available traffic data and recommend solutions to issues relating to the integrated corridor management, including ramp metering and incident response. For example, Caltrans' representative(s) will provide a status report on the operations of ramp metering in both counties. The status report will include a list of operational issues that were reported by the local agencies and how these issues were resolved. If needed, the Caltrans I-80 TCC representative will lead the I-80 TCC meetings and help formulate recommended changes to the daily operations of the system within the I-80 Corridor.

Corridor Steering Committee (I-80 CSC):
The I-80 CSC will be comprised of executive staff or designees from all member agencies. The I-80 CSC will meet as needed, to address issues unresolved by the I-80 TCC.

Policy Advisory Committee (I-80 PAC):
A Policy Advisory Committee (I-80 PAC) will provide guidance and direction on any issues that may arise that require additional input from communities within the corridor. The I-80 PAC will be comprised of three members: the Caltrans District 4 Director, one elected official from an Alameda County jurisdiction within the corridor appointed by the Alameda CTC, and one elected official appointed by WCCTAC. The I-80 PAC meetings will be held on an as-needed basis.

Table 1 below shows all of the partner agencies that will be represented by the three bodies.

Table 1: I-80 ICM Member Agencies

Member Agencies
California Department of Transportation (Caltrans)
California Highway Patrol (CHP)
Metropolitan Transportation Commission (MTC)
Alameda County Transportation Commission (Alameda CTC)
Contra Costa County
Contra Costa Transportation Authority (CCTA)
Western Contra Costa Transportation Advisory Committee (WCCTAC)
AC Transit
WestCAT
City of Albany
City of Berkeley
City of El Cerrito
City of Emeryville
City of Hercules
City of Oakland
City of Pinole
City of Richmond
City of San Pablo

IV. PROJECT GOALS & OBJECTIVES

The ICM strategies pursued herein shall:

1. Provide traffic operation on the corridor that is equitable and balanced for both the freeway and arterials.

2. Integrate transportation system management activities to enhance safety and mobility for all travel modes within the corridor.

3. Enhance overall transit travel time along corridor routes during normal operations.

4. Enhance trip reliability by providing consistent and predictable travel times on the freeway and local arterials.

5. Avoid impacts on local arterials while managing access at on-ramps during peak periods on weekdays and weekends.

6. Efficiently guide traffic naturally diverted to local arterials during major freeway incidents back to the freeway.

7. Cooperatively operate, manage and maintain all elements installed as part of the I-80 ICM project in an integrated and coordinated manner.

8. Cooperatively develop, implement, evaluate and revise strategies to ensure balanced benefits to local, regional, and inter-regional travelers.

9. Cooperatively identify and address any adverse impacts in a timely fashion.

10. Ensure on-going communication among partnering agencies for timely review and adjustment of activities as needed.

11. Ensure timely and appropriate communication with the public, media, and elected officials.

12. Monitor, evaluate, and report on project performance to ensure compliance with goals and objectives.

13. Facilitate cooperative activities that ensure the sustainability of benefits from the project.

V. OPERATIONS STRATEGIES AND PRINCIPLES

a. OPERATIONAL SCENARIOS & LEAD AGENCIES

Table 2 below illustrates the operational strategies that will initially be deployed as part of the I-80 ICM Project and the agencies that will take the lead in implementing the strategies.

Table 2 – Operational Strategies

Facility	Operational Strategy (Lead Agency or Agencies)	
	Normal Operations	*Incident Management / Special Events*
Freeway & Ramps	Adaptive Ramp Metering (Caltrans) Transit Priority (AC Transit & WestCAT)	Adaptive Ramp Metering (Caltrans) Lane Use Signals (Caltrans) Variable Advisory Speed Signs/ End-of-Queue Warning (Caltrans) Transit Priority (AC Transit & WestCAT)
San Pablo Avenue	Signal Coordination (Local & Caltrans) Transit Priority (AC Transit & WestCAT) Emergency Vehicle Preemption (1st Resp.)*	Flush Plans (Caltrans) Trailblazers (Caltrans) Transit Priority (AC Transit & WestCAT) Emergency Vehicle Preemption (1st Resp.)*
Crossing Arterials	Signal Coordination (Local & Caltrans) Transit Priority (AC Transit & WestCAT) Emergency Vehicle Preemption (1st Resp.)*	Flush Plans (Caltrans) Trailblazers (Caltrans) Transit Priority (AC Transit & WestCAT) Emergency Vehicle Preemption (1st Resp.)*

Note: The project will add and upgrade Emergency Vehicle Preemption (EVP) receivers along San Pablo Avenue and crossing arterials connecting to I-80, as shown in Attachment B, for use by first responders. Emergency vehicle response will continue to be operated by the first responders.

Normal Operations

Under normal conditions, ramp metering will function under adaptive control. This means that traffic conditions along the entire corridor (freeway, ramps, and local streets) will be considered when determining metering rates at each ramp. Each ramp will have an end-of-queue detector to monitor the queue length of vehicles waiting on the on-ramp using either occupancy or volume differential between end-of-queue detector and ramp output loop. If the end of queue approaches the cross street, the ramp meter controller will increase the metering rate up to the maximum rate in order to reduce the queue. If the queue is not dissipating, the ramp meter controller will change the meter to rest on green until the queue is dissipated. At ramp HOV bypass lanes, TSP will allow equipped buses to obtain priority by expediting or flushing out any queue ahead of the bus. Ramp metering will be operated by Caltrans.

On San Pablo Avenue and crossing arterials (connecting San Pablo Avenue to I-80), signal coordination and transit signal priority will be used to improve traffic flow throughout the corridor during normal operating conditions. Much of San Pablo Avenue already has traffic signal interconnect that allows for efficient signal timing coordination and progression. Additional signal interconnect on several crossing arterials will improve the flow of traffic between San Pablo Avenue and I-80. The I-80 ICM project will provide an update to the signal timing along the corridor for normal operating conditions. In the future, signal timing updates will be achieved through other programs, such as those administered by MTC. Local traffic signals will be controlled by the local agency during normal operations. As discussed below, Caltrans will have the ability to control certain signals if required during a special event or following an incident.

TSP exists along much of San Pablo Avenue and serves routes such as AC Transit 72 Rapid. This equipment is also used for emergency vehicle preemption. The I-80 ICM project will add TSP for San Pablo Avenue in the WestCAT service area, and for crossing arterials for AC Transit and WestCAT service areas.

Incident / Special Events Management

Incident conditions will be defined by the I-80 Technical Coordinating Committee (TCC) (e.g. blockage of 50% of freeway lanes for 30 minutes or more). Under incident conditions, ramp metering will continue to operate under an adaptive control as described above. Since freeway conditions rapidly change following an incident, the ramp meter rates could frequently adjust in reaction to the changes. Ramp metering at on-ramps will still be operated such that spillbacks onto the crossing arterials are avoided.

LUS will be turned on based on specific incident conditions. Red X's, yellow diagonal arrows, or text messages will be displayed to convey downstream conditions and guide traffic through the incident scene. Lane use signs will be operated by Caltrans.

VASS will display an advisory reduced speed to reflect downstream congestion or end-of-queue. Initially these signs will only be used for end-of-queue warning; however, the signs could be used for speed harmonization in the future. Speed harmonization is a strategy of dynamically and automatically adjusting speed limits approaching areas of traffic congestion, collision, or special events to help maintain traffic flow and reduce risk of collisions due to speed differentials. Variable advisory speed signs will be operated by Caltrans.

During incident conditions, San Pablo Avenue and crossing arterials may become congested due to traffic that (naturally) leaves the freeway to use the local streets to bypass the incident. The project will not actively divert freeway traffic on to local streets. Trailblazer signs placed on San Pablo Avenue and local arterials will advise drivers where to return back to the freeway after passing the incident location. These signs are

meant to discourage the use of other local streets that could lead to more severe congestion on the local network.

Traffic signal timing along a relevant incident route will be modified during an incident to help increase the throughput of traffic along that route, and to reduce recovery time to normal conditions. The incident timing is referred to as a "signal flush plan". Caltrans will be responsible for executing the appropriate flush plans on affected traffic signals (Caltrans and local agency owned) when an incident occurs. Caltrans and local agencies will develop the Incident Response Plan to help formulate acceptable timing plans that increases the throughput without adverse delays to local traffic including bicycles, pedestrians and transit. The timing plans will be preapproved so activation of them during incidents will be efficient.TSP and emergency vehicle preemption will still be operational during an incident.

The Incident Response Plan will identify a specific subset of devices (ramp metering, VASS, CMS, LUS, Trailblazer signs, IDB, and traffic signals) that will be used to manage the network during an incident. Each scenario will be dependent on many different parameters including time of day, location, incident severity, and expected incident duration. Local agencies will review and approve the use of each strategy. When an incident occurs, Caltrans will determine the scenario that is most appropriate for the incident and deploy the appropriate strategy.

b. OPERATING PRINCIPLES

The following primary guidelines will be used in directing day-to-day transportation management and operational activities along the corridor:

1. General

a. The project will not actively divert freeway traffic onto local streets in the event of an incident on the freeway.

b. The I-80 Technical Coordinating Committee (I-80 TCC) members shall actively participate in monitoring operations within their jurisdictions and in on-going communication relative to the corridor management operations.

c. Caltrans shall be responsible for 24/7 monitoring of ICM devices on the arterials and freeway, and during incidents, selecting and executing the appropriate pre-determined plans, protocols, and parameters in accordance with the IRP. Such activities will be undertaken from the Transportation Management Center (TMC) jointly operated by Caltrans and the California Highway Patrol (available via telephone at 510-286-

6915), located at 111 Grand Avenue, Oakland, and staffed on a 24/7 basis.

d. During normal conditions, each local agency shall have primary control and will be responsible for operating all the project devices within their jurisdiction. Refer to Attachment B for the project devices. Local agencies may also operate signals on San Pablo Avenue within Caltrans jurisdiction upon prior agreements and protocols developed for local needs.

e. Local jurisdictions shall provide contact information for a 24/7 dispatch and/or on-call personnel to be contacted for emergency activities or notification purposes.

f. For safety reasons, only under exigent and unforeseen circumstances such as being directed by law enforcement or in reaction to secondary accidents, Caltrans may be required to make short-term, spot decisions without first consulting with local agencies. Under such circumstances, Caltrans shall promptly notify the local jurisdictions of the actions taken as soon as possible and practicable.

2. Adaptive Ramp Metering

a. Ramp meters will be operating at the freeway on-ramps in both directions, during weekday and weekend peak periods. In addition, ramp meters may be activated during non-peak conditions, as needed, in response to prevailing traffic demand for special events or major incidents.

b. Ramp metering will be operated in adaptive fashion, considering traffic demands and capacity on both the freeway and local arterials. During the metering periods, the implemented system will automatically adjust metering rates to ensure that queues at on-ramps do not extend beyond local agency-specified maximum end-of-queue locations, or shall rest on green for as long a time as necessary.

c. End of queue detection will be used to monitor and contain the queues within the on-ramps, and when absolutely needed on the appropriate turn-lanes, as approved by local jurisdictions, on the local arterials specifically dedicated for freeway entry. Once queues extend beyond the end of queue detector, the ramp meter rate will increase or rest on green to avoid queuing that obstructs local traffic flow.

d. Ramp metering rates will be based on the Adaptive Ramp Metering Algorithm which will consider parameters such as end of queue detection, communication failures, etc.

e. If the ramp metering implementation or ramp metering plan modification does not perform as expected so that there would be excessive delays and queues impacting traffic operations on the local arterial, or results in excessive complaints, Caltrans will consider other options, such as, changing ramp metering rates or operating on-ramps on temporary "rest on green".

f. Caltrans shall promptly respond to requests to modify ramp metering rates from local agencies for initial diagnosis of the issue. If the response times are not met or the operational issue results in significant or adverse impacts, the matter shall be referred to the I-80 TCC for immediate resolution.

g. The metering rates will be developed to avoid delays to buses either at on-ramps or crossing arterials. For buses that are bound for the freeway, transit signal priority will be provided for the HOV by-pass lane ramp metering signal.

3. Local Arterials

a. Under normal conditions, local agencies will have, within their jurisdictions, control of the ICM devices and traffic signals which will be coordinated upon project implementation.

b. Under incident conditions, pre-approved Incident Response Plans (IRPs) will be implemented by Caltrans. Caltrans will assume control of the ICM devices until the incident is cleared. Typical daily signal operations will be resumed immediately upon incident clearance and stabilization of traffic conditions.

c. The IRPs will be evaluated periodically to assess their effectiveness and need for adjustments. Any adjustments to the IRPs will be subject to approval by the TCC.

d. Trailblazer signs installed on local arterials will direct motorists that have naturally diverted to the local streets, due to an incident on I-80, back to the freeway at appropriate location(s) downstream of the incident. Trailblazer signs will be activated only at locations where signal flush plans are turned on.

e. TSP will be utilized at crossing arterials adjacent to on-ramps to provide priority for transit vehicles along those routes.

4. Public Outreach, Response to Inquiries and Complaints

a. Caltrans shall address any and all public inquiries, complaints, and concerns in a timely manner via telephone hotline, e-mail, or correspondence, on an on-going basis, related to freeway operations or related to IRP.

b. On local streets, the local jurisdiction will address any and all public inquiries, complaints, and concerns in a timely manner via telephone hotline, e-mail, or correspondence, on an on-going basis.

c. Caltrans and local agencies will coordinate responses, as appropriate.

VI. EQUIPMENT OWNERSHIP & MAINTENANCE

The I-80 ICM project utilizes various equipment installed throughout the corridor, which are located within different jurisdictional rights-of-way. Table 5 in Section VIII provides a summary of ownership and maintenance responsibilities by type of equipment and right-of-way. Attachment B provides the location of each type of equipment to be utilized, grouped by operational strategy. Attachment B also delineates the ownership and operations responsibilities.

VII. PROJECT DEVELOPMENT PRINCIPLES

a. Project Documents

The following documents have been prepared to design the project:

Project Report:
Defines the purpose and need for the project, identifies the alternative selected, describes how that alternative was decided upon, and describes how consensus was reached among stakeholders.

Environmental Document:
For a capital project to proceed, it must receive official federal, state, and environmental approvals as well as consensus from all the stakeholders and the public.

Corridor Systems Management Plan (CSMP):
Overall corridor operational conditions, existing and future conditions, list of future projects, and recommendations.

Concept of Operations Report (Con Ops):
Concept for proposed system, user-oriented operational description, operational needs, system overview, operational and support environment, operational scenarios, summary of impacts.

Ramp Metering Plan (RMP):
Ramp Meeting operational plans, including metering rates.

Traffic Operations Analysis Report (TOAR):
Existing traffic conditions, proposed alternatives, traffic forecasts, modeling results.

The following documents will govern the implementation of the project:

Project Implementation Plan
Document identifying the staging and commissioning of each I-80 ICM project element (TOS, TLSP, ARM, and ATM).

Operations and Maintenance (O&M) Plan:
Operational scenarios and cost of operations, maintenance and management for each city along the corridor.

Incident Response Plan (IRP):
Overall incident response plan that defines various incident scenarios and procedures for managing traffic congestion during incidents, including signal flush plans.

System Integration Plan:
Specifies the procedures, methods and strategies to implement the required project elements based on project documents and system requirements.

Configuration Management Plan:
Details the process to establish and maintain the integrity and control of software and hardware products.

Outreach Plan:
Outlines strategies to disseminate periodic project information and updates to various stakeholders.

b. Construction

The project will be constructed in six contracts – four construction contracts, one material procurement contract, and one systems integration contract. While local business preference is not allowed for State-funded construction contracts, such as these, outreach will be conducted to encourage local participation.

PHASING AND IMPLEMENTATION SCHEDULE
For delivery purposes, the I-80 ICM project has been split into six contracts as shown in Table 3 below.

TABLE 3 – SCHEDULE OF CONSTRUCTION CONTRACT DELIVERY

I-80 ICM Construction Contracts	Tentative Construction Schedule		Implementing Agency for Construction & Procurement Contracts
	Start	End	
Project 1: Software Development / System Integration	March 2012	January 2015*	Alameda CTC
Project 2: Specialty Materials Procurement	October 2012	April 2014	Alameda CTC
Project 3: Traffic Operation Systems	April 2011	May 2012	Alameda CTC
Project 4: Adaptive Ramp Metering	May 2012	December 2013	Caltrans
Project 5: Active Traffic Management	May 2012	April 2014	Caltrans
Project 6: San Pablo Corridor Arterial and Transit Improvement Project	May 2011	December 2013	Alameda CTC

* Includes a 1-year rollout, implementation and commissioning period

The public will be notified as appropriate of imminent construction activities.

c. System Integration

The Project deploys a number of components and equipment that need to communicate with each other and with the TMC. In order to achieve such automated data flow, various components of the project are linked via a data network. The disaggregate components will be controlled and communicated utilizing a custom application (software) that will be developed by the System Integrator. The System Integrator working with the I-80 TCC will be responsible for developing a System Integration Plan for automated communications and interaction between the various devices and the TMC.

Phase I of System Integration integrates devices on San Pablo Avenue (existing devices from East Bay SMART Corridor and new devices installed under the project) and Phase II will address the I-80 devices and the interaction with San Pablo Avenue components system. System Integration provides for coordinated operations and sharing of corridor traffic and transit information among various agencies relative to I-80, San Pablo Avenue Corridor and other key local arterials. Software is provided to enable operations of all I-80 project elements from Caltrans TMC and share information with local agency TMC.

d. Implementation & Initial System Evaluation

Project Implementation is outlined in the Project Implementation Plan with input provided by the I-80 TCC. It is expected that Adaptive Ramp Metering and Active Traffic Management components of the projects listed on Table 3 will be activated at the same time, in early 2014.

After the devices are installed, system components will be tested individually and then collectively prior to performing a full rollout. Following full roll-out, driver behavior is expected to adjust and eventually settle into a repetitive, predictive pattern. The system will then be monitored extensively and minor fine tuning of signal timing and ramp metering algorithms will be performed as appropriate. The monitoring activities will include evaluating impacts of the project on transit operations and the magnitude of traffic diversion to local streets. Strategic transit enhancements, such as relocation of bus stops, etc., changes to the signal flush plans, and use of the trailblazer signs may be implemented to address such impacts. A study will be done to document conditions before and after the project is implemented, recommend changes, if necessary, and report on the project benefits.

e. Regular Operations & Maintenance

The regular operations and maintenance will be in accordance with the Project Operations and Maintenance Plan (O&M) developed for the project with input provided by the I-80 TCC. The O&M Plan addresses staffing, training, performance monitoring and reporting, and data ownership.

f. Configuration and Change Management

The configuration and change management will be in accordance with the Project Configuration Management Plan developed for the project with input provided by the I-80 TCC. The Configuration Management Plan details the process to establish and maintain the integrity and control of software and hardware products.

VIII. COSTS & FUNDING

The project is funded by various fund sources for the different phases of the project – Project Development, Construction, and Operation & Maintenance phases. Funding for each phase is outlined as follows:

a. Project Development Phase:

The following table (Table 4) breaks down funding for the project development phase:

Table 4 – Project Development Funding Sources

Fund Source	Funding Agency	Amount
CMAQ (Fed)	Federal	$ 3,243,000
STIP (CCC)	State	$ 954,000
CMA TIP	Alameda CTC	$ 1,080,000
Measure J	CCTA	$ 4,876,000
WCCTAC	WCCTAC	$ 47,000
2000 Measure B	Alameda CTC	$ 1,800,000
TFCA	BAAQMD	$ 1,155,000
Total		**$ 13,155,000**

b. Construction Phase:

The construction of freeway portion of I-80 ICM project is funded by $55.3 million from California State Proposition 1B Bond funds - Corridor Mobility Improvement Account (CMIA). The construction of San Pablo Avenue components is funded by $21.4 million from California State Proposition 1B Bond funds - Traffic Light Synchronization Program (TLSP) Account.

c. Operations & Maintenance (O&M) Phase:

Caltrans is responsible for funding, operating and maintaining the equipment in State right-of-way, except for traffic signals subject to other maintenance agreements and EVP receivers at Caltrans-maintained traffic signals. Caltrans shall maintain TSP receivers at HOV ramp meter bypass lanes.

- Caltrans is responsible for funding the 24/7 monitoring of the I-80 ICM from the TMC.

- Within Alameda County outside of State right-of-way, cities will be responsible for operations and maintenance of the equipment. Alameda CTC will provide funding for operating and maintaining ICM equipment.
- Within Contra Costa County outside of State right-of-way, local jurisdictions will be responsible for operations and maintenance of ICM equipment, and may choose to contract with Contra Costa County for maintenance. Local jurisdictions will not be responsible for funding the operations and maintenance of ICM equipment in perpetuity. CCTA will secure $2,000,000 in funding for operating and maintaining ICM equipment. This amount is estimated to fund about 15 years of operations and maintenance. CCTA will seek additional funding beyond the $2 million from regional and other sources.
- Funding for East Bay SMART Corridor devices that are not used for deploying I-80 ICM strategies will continue to be funded under the terms of the existing O&M Agreement between Alameda CTC and the local agencies.
- Cities / Contra Costa County will be responsible for funding, operating and maintaining existing and upgraded traffic signals within their right-of-way.
- Cities / Contra Costa County will be responsible for funding, operating and maintaining non-ICM equipment requested by local agencies within their right-of-way. This includes speed feedback signs (Pinole) and Changeable Message Signs on local arterials (Oakland).
- Funding for the TSP equipment in transit vehicles will be provided as part of the I-80 ICM project. Installation, Operation and maintenance of TSP equipment in the transit vehicles, and funding for installation, operations and maintenance of such equipment, will be the responsibility of the respective transit agency.

The foregoing is summarized in Table 5 below:

Table 5 - O&M and Funding Responsibility Table

Grouping	ROW	Equipment	O&M Responsibility	Funding Responsibility
East Bay SMART Corridor Equipment - Used for ICM Strategy	Caltrans	CCTV	Caltrans	Caltrans
		MVDS	Caltrans	Caltrans
		TSP	Caltrans	Caltrans
	Non-Caltrans	CCTV	Cities/County *	Alameda CTC or CCTA
		MVDS	Cities/County *	Alameda CTC or CCTA
		TSP	Cities/County *	CCTA/Alameda CTC*
East Bay SMART Corridor Equipment - NOT used for ICM Strategy	Caltrans	CCTV	NONE	NONE
		MVDS	NONE	NONE
		TSP	NONE	NONE
	Non-Caltrans	CCTV	Cities/County	Cities/County
		MVDS	NONE	NONE
		TSP	Cities**	Cities**
I-80 ICM Equipment - Used for ICM Strategy	Caltrans	CCTV	Caltrans	Caltrans
		MVDS	NONE	NONE
		TRAILBLAZERS	Caltrans	Caltrans
		TRAFFIC SIGNAL	Caltrans	Caltrans
		TSP	Caltrans	Caltrans
		EVP	Caltrans	Caltrans
	Non-Caltrans	CCTV	Cities/County (CC only) *	CCTA***
		MVDS	Cities/County (CC only) *	CCTA***
		TRAILBLAZERS	Cities/County	Alameda CTC or CCTA
		TRAFFIC SIGNAL	Cities/County	Cities/County
		TSP	Cities/County	Alameda CTC or CCTA
		EVP	Cities/County	Cities/County

I-80 ICM Equipment - Other/ Requested by Cities	Caltrans	Ramp Meter HOV TSP	Caltrans	Caltrans
	Non-Caltrans	OAKLAND: PTZ cameras Arterial CMS Intersection Detection (VID, Magnetometer), Video Encoders	Oakland	Oakland
		BERKELEY: Intersection Video Detection	Berkeley	Berkeley
		RICHMOND: Intersection Video Detection	Richmond	Richmond
		PINOLE: Speed feedback signs	Pinole	Pinole

NOTES:
* Contra Costa cities may contract with Contra Costa County for maintenance of these devices.
** No TSPs in Contra Costa County that are not used for I-80 ICM Strategy.
*** No new CCTV or MVDS in Alameda County.

Refer to Attachment C for detailed estimates of operations and maintenance costs in each jurisdiction. Responsibility for funding O&M costs is detailed in Table 5 above. The estimates are provided to document assumptions on how the O&M costs are derived.

IX. FUTURE MOU MODIFICATIONS

This MOU is a legally non-binding document. However, revisions to this MOU may be requested by the I-80 TCC and approved by the CSC. Revisions may also be recommended by the CSC. In either case, implementation of changes to the MOU would require a written amendment by all the partnering agencies that are signatories of this MOU. This MOU expires after ten years from the date of its execution, unless extended by partnering agencies pursuant to an approved amendment.

X. NEED FOR ADDITIONAL AGREEMENTS

New maintenance agreements or amendments to existing maintenance agreements between Caltrans and affected jurisdictions will be developed and executed as necessary to address maintenance arrangements, liabilities, or any other legal issues.

The parties to this MOU specifically repudiate the division of liability and indemnification outlined in Government Code section 895.2, and will address these topics in future agreements, as necessary.

Signature Page to include signature lines for the following partnering agencies:

Caltrans	City of Emeryville
Alameda CTC	City of Oakland
CCTA	City of San Pablo
WCCTAC	City of Richmond
Contra Costa County	City of Pinole
City of Albany	City of Hercules
City of El Cerrito	AC Transit
WestCAT	City of Berkeley

ATTACHMENT A

Ramp Metering Locations

Location	Lane Configuration		City
EASTBOUND			
Powell St.	2		Emeryville
Ashby Ave./Potter St.	2		Berkeley
University Ave.	2		Berkeley
Gilman St.	2		Berkeley
Buchanan St.	1		Albany
Central Ave.	2		Richmond
Carlson Blvd.	2		Richmond
Cutting Blvd. (loop ramp)	1		Richmond
Cutting Blvd.	2		Richmond
San Pablo Ave.	2		Richmond
San Pablo Dam Rd.	1		San Pablo
El Portal Dr.	2		Richmond
Eastbound Hilltop Dr. (loop ramp)	1		Richmond
Westbound Hilltop Dr.	1+1*		Richmond
Eastbound Fitzgerald/ Richmond Pkwy. (loop ramp)	2		Pinole
Westbound Fitzgerald/Richmond Parkway	1		Richmond
Southbound Appian Way (loop ramp)	1		Pinole
Northbound Appian Way	2		Pinole
Pinole Valley Rd.	1		Pinole
John Muir Pkwy. (SR-4)	By another project		
Willow Ave.	By another project		
Cummings Skyway	By another project		

Note: * Denotes TSP for HOV By-pass Lane

Ramp Metering Locations

Location	Configuration		City
WESTBOUND			
San Pablo Ave. / Pomona St.	1		CC County
Cummings Skyway	1		CC County
Willow Ave.	By another project		
John Muir Parkway (SR-4)	2+1*		Hercules
Pinole Valley Rd.	2		Pinole
Appian Way	2		Pinole
Fitzgerald Dr./Richmond Parkway	1		Richmond
Westbound Hilltop Dr. (loop ramp)	1+1*		Richmond
Hilltop Dr.	1+1*		Richmond
El Portal Dr.	2		CC County
San Pablo Dam Rd.	2		San Pablo
Solano Ave.	1		Richmond
Barrett Ave.	2		Richmond
Potrero Ave.	2		Richmond
Carlson Blvd.	2		Richmond
Central Ave.	1		Richmond
Buchanan St.	2		Albany
Gilman St.	1+1*		Berkeley
University Ave. (loop)	1+1*		Berkeley
Ashby Ave. & Frontage Rd.	2+1*		Berkeley
Powell St./Frontage Rd.	2		Emeryville
Powell St.	1		Emeryville

Note: * Denotes TSP for HOV By-pass Lane

ATTACHMENT B

ATTACHMENT C

Cameras

INTERSTATE 80 CORRIDOR ICM MOU: ATTACHMENT B
CLOSED-CIRCUIT TELEVISION (CCTV) CAMERA LOCATIONS
2/16/2012

No.	Main Street	Cross Street	Vicinity	Used by I-80 ICM Project?	Video Encoder?	ROW (Maintaining Agency, if different)	Operating Agency - Normal	Operating Agency - Incidents
EXISTING SMART CORRIDOR CCTV CAMERA LOCATIONS (USED FOR I-80 INCIDENT MANAGEMENT)								
1	San Pablo Ave	John Muir Pkwy	Hercules	Yes	Yes	Hercules	Hercules	Caltrans
2	San Pablo Ave	Richmond Pkwy	Richmond	Yes	Yes	Richmond	Richmond	Caltrans
3	San Pablo Ave	San Pablo Dam Rd	San Pablo	Yes	Yes	San Pablo	San Pablo	Caltrans
4	San Pablo Dam Rd	I-80 SB Ramps	San Pablo	Yes	Yes	Caltrans	Caltrans	Caltrans
5	San Pablo Ave	Cutting Blvd	El Cerrito	Yes	Yes	Caltrans	Caltrans	Caltrans
6	San Pablo Ave	Portero Ave	El Cerrito	Yes	Yes	Caltrans	Caltrans	Caltrans
7	Central Ave	I-80 NB ramps	Richmond	Yes	Yes	Caltrans	Caltrans	Caltrans
8	San Pablo Ave	Central Ave	El Cerrito	Yes	Yes	Caltrans	Caltrans	Caltrans
9	Buchanan St	I-80 NB Ramps	Albany	Yes	Yes	Caltrans	Caltrans	Caltrans
10	San Pablo Ave	Buchanan St	Albany	Yes	Yes	Caltrans	Caltrans	Caltrans
11	San Pablo Ave	Gilman St	Berkeley	Yes	Yes	Caltrans	Berkeley	Caltrans
12	San Pablo Ave	University Ave	Berkeley	Yes	Yes	Caltrans	Berkeley	Caltrans
13	San Pablo Ave	Ashby Ave	Berkeley	Yes	Yes	Caltrans	Berkeley	Caltrans
14	San Pablo Ave	Powell St / Stanford Ave	Oakland	Yes	Yes	Oakland	Oakland	Caltrans
15	San Pablo Ave	W. Grand Ave	Oakland	Yes	No	Oakland	Oakland	Caltrans
EXISTING SMART CORRIDOR CCTV CAMERA LOCATIONS (*NOT* USED FOR I-80 INCIDENT MANAGEMENT)								
1	San Pablo Ave	Church Ln	San Pablo	No	Yes	Richmond	Richmond	**Not Used**
2	San Pablo Ave	Macdonald Ave	Richmond	No	Yes	Richmond	Richmond	**Not Used**
3	University Ave	6th St	Berkeley	No	Yes	Berkeley	Berkeley	**Not Used**
4	Ashby Ave	7th St	Berkeley	No	Yes	Caltrans (Berkeley)	Berkeley	**Not Used**
5	Powell St	Christie Ave	Emeryville	No	Yes	Emeryville	Emeryville	**Not Used**
6	San Pablo Ave	40th St	Emeryville	No	Yes	Caltrans	Caltrans	**Not Used**
7	W. Grand Ave	Mandela Pkwy	Oakland	No	Yes	Oakland	Oakland	**Not Used**
NEW I-80 ICM PTZ CCTV LOCATIONS (VIDEO ENCODER AT CALTRANS-MAINTAINED LOCATIONS)								
1	San Pablo Ave	MacArthur Blvd	Oakland	Yes	No	Caltrans (CCTV O&M by Oakland)	Oakland	**Not Used**
2	I-80 EB on-ramp	Powell St	Emeryville	Yes	Yes	Caltrans	Caltrans	Caltrans
3	I-80 WB on/off ramps	Frontage Road/ Captian Dr	Emeryville	Yes	Yes	Caltrans	Caltrans	Caltrans
4	I-80 EB on/off ramps	Ashby	Berkeley	Yes	Yes	Caltrans	Caltrans	Caltrans
5	I-80 WB on-ramp	University	Berkeley	Yes	Yes	Caltrans	Caltrans	Caltrans
6	I-80 EB on/off ramps	Gilman	Berkeley	Yes	Yes	Caltrans	Caltrans	Caltrans
7	I-80 WB on/off ramp	Buchanan St	Albany	Yes	Yes	Caltrans	Caltrans	Caltrans
8	I-80 WB on/off ramp	Central Ave	Richmond	Yes	Yes	Caltrans	Caltrans	Caltrans
9	I-80 WB on-ramp	Potrero	El Cerrito	Yes	Yes	Caltrans	Caltrans	Caltrans
10	I-80 WB on-ramp	Cutting	Richmond	Yes	Yes	Caltrans	Caltrans	Caltrans
11	I-80 WB on/off ramps	Carlson	Richmond	Yes	Yes	Caltrans	Caltrans	Caltrans
12	I-80 EB on/off ramps	Carlson	Richmond	Yes	Yes	Caltrans	Caltrans	Caltrans
13	I-80 EB on/off ramps	San Pablo Ave	Richmond	Yes	Yes	Caltrans	Caltrans	Caltrans
14	I-80 EB on/off ramps	San Pablo Dam Rd	San Pablo	Yes	Yes	Caltrans	Caltrans	Caltrans
15	I-80 WB on-ramp	El Portal	San Pablo	Yes	Yes	Caltrans	Caltrans	Caltrans
16	I-80 EB on/off ramps	El Portal	San Pablo	Yes	Yes	Caltrans	Caltrans	Caltrans

Cameras

INTERSTATE 80 CORRIDOR ICM MOU: ATTACHMENT B
CLOSED-CIRCUIT TELEVISION (CCTV) CAMERA LOCATIONS
2/16/2012

No.	Main Street	Cross Street	Vicinity	Used by I-80 ICM Project?	Video Encoder?	ROW (Maintaining Agency, if different)	Operating Agency - Normal	Operating Agency - Incidents
17	I-80 WB on/off ramps	Hilltop	Richmond	Yes	Yes	Caltrans	Caltrans	Caltrans
18	I-80 EB on/off ramps	Hilltop	Richmond	Yes	Yes	Caltrans	Caltrans	Caltrans
19	I-80 WB on/off ramps	Richmond Parkway	Richmond	Yes	Yes	Caltrans	Caltrans	Caltrans
20	I-80 EB on/off ramps	Richmond Parkway	Pinole	Yes	Yes	Caltrans	Caltrans	Caltrans
21	I-80 EB on/off ramps	Appian	Pinole	Yes	Yes	Caltrans	Caltrans	Caltrans
22	I-80 WB on/off ramps	Appian	Pinole	Yes	Yes	Caltrans	Caltrans	Caltrans
23	I-80 WB on/off ramps	Pinole Valley Rd	Pinole	Yes	Yes	Caltrans	Caltrans	Caltrans
24	I-80 WB on-ramp	Willow	Hercules	Yes	Yes	Caltrans	Caltrans	Caltrans
25	I-80 EB on/off ramps	Willow	Hercules	Yes	Yes	Caltrans	Caltrans	Caltrans
26	I-80 WB on-ramp	Cummings Skyway	Conta Costa County	Yes	Yes	Caltrans	Caltrans	Caltrans
27	San Pablo Ave	20th	Oakland	Yes	No	Oakland	Oakland	**Not Used**
28	San Pablo Ave	30th	Oakland	Yes	No	Oakland	Oakland	**Not Used**
29	San Pablo Ave	35th	Oakland	Yes	No	Oakland	Oakland	**Not Used**
30	Grand	Harrison	Oakland	Yes	No	Oakland	Oakland	**Not Used**
31	Grand	Broadway	Oakland	Yes	No	Oakland	Oakland	**Not Used**
32	Grand	MacArthur Blvd	Oakland	Yes	No	Oakland	Oakland	**Not Used**
33	Grand	Lake Park	Oakland	Yes	No	Oakland	Oakland	**Not Used**
34	San Pablo Ave	El Portal	San Pablo	Yes	Yes	San Pablo	San Pablo	Caltrans
35	San Pablo Ave	Hilltop	Richmond	Yes	Yes	Richmond	Richmond	Caltrans
36	San Pablo Ave	Appian	Pinole	Yes	Yes	Pinole	Pinole	Caltrans
37	San Pablo Ave	Pinole Valley Rd	Pinole	Yes	Yes	Pinole	Pinole	Caltrans
38	San Pablo Ave	Willow Ave	Conta Costa County	Yes	Yes	Conta Costa County	Conta Costa County	Caltrans
39	San Pablo Ave	Cummings	Conta Costa County	Yes	Yes	Conta Costa County	Conta Costa County	Caltrans
OAKLAND VIDEO ENCODER LOCATIONS (VIDEO DETECTION CAMERAS)								
1	W. Grand Ave	Mandela Pkwy	Oakland	No	Yes	Oakland	Oakland	**Not Used**
2	W. Grand Ave	Adeline St	Oakland	No	Yes	Oakland	Oakland	**Not Used**
3	W. Grand Ave	Broadway	Oakland	No	Yes	Oakland	Oakland	**Not Used**
4	Grand Ave	Webster St	Oakland	No	Yes	Oakland	Oakland	**Not Used**
5	Grand Ave	Valdez St	Oakland	No	Yes	Oakland	Oakland	**Not Used**
6	Grand Ave	MacArthur Blvd	Oakland	No	Yes	Oakland	Oakland	**Not Used**
7	MacArthur Blvd	Lakeshore Ave	Oakland	No	Yes	Oakland	Oakland	**Not Used**
8	Lakeshore Ave	Lake Park	Oakland	No	Yes	Oakland	Oakland	**Not Used**
9	Grand Ave	Lake Park	Oakland	No	Yes	Oakland	Oakland	**Not Used**

Vehicle Detection

INTERSTATE 80 CORRIDOR ICM MOU: ATTACHMENT B
VEHICLE DETECTION LOCATIONS (COUNT STATIONS)
2/16/2012

No.	Main Street	Cross Street	Vicinity	Used by I-80 ICM Project?	ROW (Maintaining Agency, if different)	Operating Agency - Normal	Operating Agency - Incidents
EXISTING SMART CORRIDOR MICROWAVE VEHICLE DETECTION STATIONS							
1	John Muir Pkwy	east of San Pablo Ave	Hercules	Yes	Contra Costa County	Contra Costa County	Caltrans
2	San Pablo Ave	southof Sycamore	Hercules	Yes	Hercules	Hercules	Caltrans
3	San Pablo Ave	south of Del Monte	Pinole	Yes	Pinole	Pinole	Caltrans
4	San Pablo Ave	south of Richmond Pkwy	Richmond	Yes	Richmond	Richmond	Caltrans
4	Richmond Pkwy	west of I-80	Richmond	Yes	Richmond	Richmond	Caltrans
6	San Pablo Ave	south of Robert H. Miller	Richmond	Yes	Richmond	Richmond	Caltrans
7	San Pablo Ave	south of El Portal	San Pablo	Yes	San Pablo	San Pablo	Caltrans
8	San Pablo Ave	south of Barrett	Richmond	Yes	Richmond	Richmond	Caltrans
9	San Pablo Ave	south of Eastshore / Hill	El Cerrito	Yes	Caltrans	Caltrans	Caltrans
10	San Pablo Ave	south of Portero	El Cerrito	Yes	Caltrans	Caltrans	Caltrans
11	Portero Ave	east of I-80	El Cerrito	Yes	El Cerrito	El Cerrito	Caltrans
12	Central Ave	east of I-80	El Cerrito	Yes	El Cerrito	El Cerrito	Caltrans
13	San Pablo Ave	south of Fairmont	Albany	Yes	Caltrans	Caltrans	Caltrans
14	San Pablo Ave	south of Buchanan	Albany	Yes	Caltrans	Caltrans	Caltrans
15	Buchanan Ave	east of I-80	Albany	Yes	Albany	Albany	Caltrans
16	San Pablo Ave	south of Gilman	Berkeley	Yes	Caltrans	Berkeley	Caltrans
17	Gilman	east of I-80	Berkeley	Yes	Berkeley	Berkeley	Caltrans
18	San Pablo Ave	south of University	Berkeley	Yes	Caltrans	Berkeley	Caltrans
19	University Ave	east of I-80	Berkeley	Yes	Berkeley	Berkeley	Caltrans
20	San Pablo Ave	south of Ashby	Berkeley	Yes	Caltrans	Berkeley	Caltrans
21	Ashby Ave	east of I-80	Berkeley	Yes	Caltrans	Berkeley	Caltrans
22	San Pablo Ave	south of Powell / Stanford	Emeryville	Yes	Caltrans	Caltrans	Caltrans
23	Powell	east of I-80	Emeryville	Yes	Emeryville	Emeryville	Caltrans
NEW I-80 ICM MICROWAVE VEHICLE DETECTION STATIONS							
1	San Pablo Dam Rd	east of San Pablo Ave	San Pablo	Yes	San Pablo	San Pablo	Caltrans
2	El Portal Dr	east of Mission Bell Dr	San Pablo	Yes	San Pablo	San Pablo	Caltrans
3	Hilltop Dr	south of Hillview Dr	Richmond	Yes	Richmond	Richmond	Caltrans
4	Richmond Pkwy	east of Lakeside Dr	Richmond	Yes	Richmond	Richmond	Caltrans
4	Appian Way	north of Mann Dr	Pinole	Yes	Pinole	Pinole	Caltrans
6	San Pablo Ave	west of Oakridge Rd	Pinole	Yes	Pinole	Pinole	Caltrans
7	Pinole Valley Rd	south of Henry Ave	Pinole	Yes	Pinole	Pinole	Caltrans
8	San Pablo Ave	south of Victoria Crescent	Hercules	Yes	Hercules	Hercules	Caltrans
9	San Pablo Ave	west of Cummings Skwy	Conta Costa County	Yes	Conta Costa County	Conta Costa County	Caltrans
10	San Pablo Ave	east of Cummins Skwy	Conta Costa County	Yes	Conta Costa County	Conta Costa County	Caltrans

INTERSTATE 80 CORRIDOR ICM MOU: ATTACHMENT B
EMERGENCY VEHICLE DETECTION (EVP)/ TRANSIT SIGNAL PRIORITY (TSP) INTERSECTIONS
2/16/2012

No.	Main Street	Cross Street	Vicinity	ROW (Maintaining Agency, if different)	Transit Agency User
NEW I-80 ICM TSP INTERSECTIONS					
1	San Pablo Ave	Willow Rd	Hercules	Contra Costa County	WestCAT Regional
2	Willow Rd	Hawthorne Dr	Hercules	Hercules	WestCAT Regional
3	San Pablo Ave	Victoria Crescent E	Hercules	Contra Costa County	WestCAT Regional
4	San Pablo Ave	John Muir Pkwy (SR 4)	Hercules	Contra Costa County	WestCAT Regional
5	San Pablo Ave	Transit Center	Hercules	Hercules	WestCAT Regional
6	San Pablo Ave	Sycamore Ave	Hercules	Hercules	WestCAT Regional
7	Sycamore Ave	Willow Rd	Hercules	Hercules	WestCAT Regional
8	San Pablo Ave	Hercules Ave	Hercules	Hercules	WestCAT Regional
9	San Pablo Ave	John St	Pinole	Pinole	WestCAT Regional
10	San Pablo Ave	Pinole Valley Rd	Pinole	Pinole	WestCAT Regional
11	San Pablo Ave	Fernandez Ave	Pinole	Pinole	WestCAT Regional
12	San Pablo Ave	Tennent Ave	Pinole	Pinole	WestCAT Regional
13	Pinole Valley Rd	Tennent Ave	Pinole	Pinole	WestCAT Regional
14	Pinole Valley Rd	Henry Ave	Pinole	Pinole	WestCAT Regional
15	Pinole Valley Rd	Kaiser Entrance	Pinole	Pinole	WestCAT Regional
16	San Pablo Ave	Oak Ridge Ln	Pinole	Pinole	WestCAT Regional
17	San Pablo Ave	Appian Way	Pinole	Pinole	WestCAT Regional
18	San Pablo Ave	Sunnyview Dr	Pinole	Pinole	WestCAT Regional
19	San Pablo Ave	Pinole Shores	Pinole	Pinole	WestCAT Regional
20	San Pablo Ave	Del Monte Dr	Pinole	Pinole	WestCAT Regional
21	San Pablo Ave	Tara Hills Dr	Pinole	Pinole	WestCAT Regional
22	San Pablo Ave	Shamrock Dr	Pinole	Pinole	WestCAT Regional
23	San Pablo Ave	Crestwood Dr	Pinole	Contra Costa County	WestCAT Regional
24	San Pablo Ave	Kay Rd	Pinole	Contra Costa County	WestCAT Regional
25	San Pablo Ave	Richmond Pkwy	Richmond	Richmond	WestCAT Regional AC Transit 72R
26	Richmond Pkwy	Lakeside Dr	Richmond	Richmond	WestCAT Regional AC Transit 72R
27	Richmond Pkwy	Bella Vista Entrance	Richmond	Richmond	WestCAT Regional AC Transit 72R
28	San Pablo Ave	Hilltop Dr	Richmond	Richmond	AC Transit 72R
29	San Pablo Ave	Robert Miller Dr	Richmond	Richmond	AC Transit 72R
30	San Pablo Ave	Rivers St	San Pablo	San Pablo	AC Transit 72R
NEW I-80 ICM TSP FOR RAMP METER HOV LANES					
1	John Muir Parkway (SR-4)	I-80 WB on-ramp	Hercules	Caltrans	WestCAT Regional
2	Hilltop Dr	I-80 WB on-ramp	Richmond	Caltrans	AC Transit Transbay service
3	Hilltop Dr	I-80 EB on-ramp	Richmond	Caltrans	AC Transit Transbay service
4	Hilltop Dr	I-80 WB on-ramp (loop)	Richmond	Caltrans	AC Transit Transbay service
5	Gilman St	I-80 WB on-ramp	Berkeley	Caltrans	AC Transit Transbay service
6	University Ave (loop)	I-80 WB on-ramp	Berkeley	Caltrans	AC Transit Transbay service
7	Ashby Ave	I-80 WB on-ramp	Berkeley	Caltrans	AC Transit Transbay service
NEW I-80 ICM EVP ONLY INSTALLATIONS (*CALTRANS RESPONSIBLE FOR MAINTAINENCE OF EVP EQUIPMENT BUT NOT REPLACEMENT)					
1	Willow Ave	I-80 WB Off Ramp	Hercules	Caltrans*	None at this time
2	Pinole Valley Rd	San Pablo Ave	Pinole	Pinole	None at this time
3	Appian Way	Canyon Dr	Pinole	Pinole	None at this time
4	Appian Way	I-80 WB Off Ramp	Pinole	Caltrans*	None at this time
5	Appian Way	I-80 EB On Ramp	Pinole	Caltrans*	None at this time
6	Richmond Pkwy	I-80 EB Off Ramp	Richmond	Caltrans*	None at this time
7	Richmond Pkwy	I-80 WB On Ramp (HOV)	Richmond	Caltrans*	None at this time
8	Hilltop Dr	Blume Dr	Richmond	Richmond	None at this time
9	Hilltop Dr	Shane Dr	Richmond	Richmond	None at this time
10	Hilltop Dr	Robert Miller Dr	Richmond	Richmond	None at this time
11	Hilltop Dr	Hillview Dr	Richmond	Richmond	None at this time
12	Hilltop Dr	Research Dr	Richmond	Richmond	None at this time
13	Hilltop Dr	I-80 EB Off Ramp	Richmond	Caltrans*	None at this time

INTERSTATE 80 CORRIDOR ICM MOU: ATTACHMENT B
EMERGENCY VEHICLE DETECTION (EVP)/ TRANSIT SIGNAL PRIORITY (TSP) INTERSECTIONS
2/16/2012

No.	Main Street	Cross Street	Vicinity	ROW (Maintaining Agency, if different)	Transit Agency User
14	Hilltop Dr	I-80 WB Off Ramp	Richmond	Caltrans*	None at this time
15	El Portal Dr	Rollingwood Lane	San Pablo	San Pablo	None at this time
16	El Portal Dr	Road 20	San Pablo	San Pablo	None at this time
17	El Portal Dr	I-80 EB On Ramp	San Pablo	Caltrans*	None at this time
18	El Portal Dr	I-80 WB Off Ramp	San Pablo	Caltrans*	None at this time
19	San Pablo Dam Rd	Ventura Ave	San Pablo	San Pablo	None at this time
20	San Pablo Dam Rd	Contra Costa Ave	San Pablo	San Pablo	None at this time
21	San Pablo Dam Rd	I-80 EB On Ramp/Amador St	San Pablo	Caltrans*	None at this time
22	San Pablo Dam Rd	I-80 WB Off Ramp	San Pablo	Caltrans*	None at this time
23	McBryde Ave	Amador St (NEW SIGNAL)	Richmond	Caltrans (Richmond)	None at this time
24	McBryde Ave	I-80 WB Off Ramp (NEW SIGNAL)	Richmond	Caltrans (Richmond)	None at this time
25	Cutting Blvd	I-80 HOV Ramp	Richmond	Caltrans*	None at this time
26	Cutting Blvd	I-80 WB Off Ramp	Richmond	Caltrans*	None at this time
27	Potrero Ave	I-80 EB Off Ramp	El Cerrito	Caltrans*	None at this time
28	Central Ave	Carlson Blvd	El Cerrito	El Cerrito	None at this time
29	Central Ave	San Luis Ave/Pierce St	Richmond	Richmond	None at this time
30	Central Ave	I-80 EB Off Ramp	Richmond	Caltrans*	None at this time
31	Central Ave	San Joaquin St/Jacuzzi St	Richmond	Caltrans*	None at this time
32	Fairmount Ave	San Pablo Ave	El Cerrito	Caltrans*	None at this time
33	Buchanan St	I-80 Eastbound Ramps	Albany	Caltrans*	None at this time
34	Buchanan St	I-80 Westbound Ramps	Albany	Caltrans*	None at this time
35	Gilman St	Eight St	Berkeley	Berkeley	None at this time
36	Gilman St	Sixth St	Berkeley	Berkeley	None at this time
37	University Ave	Ninth St	Berkeley	Berkeley	None at this time
38	University Ave	Sixth St	Berkeley	Berkeley	None at this time
39	Ashby Ave	Seventh St	Berkeley	Caltrans (Berkeley)	None at this time
40	Grand Ave	Lake Park/I-580 Off Ramp	Oakland	Oakland	None at this time
41	Grand Ave	Macarthur Blvd	Oakland	Oakland	None at this time
42	West Grand Ave	El Embaracadero	Oakland	Oakland	None at this time
43	West Grand Ave	Valdez St	Oakland	Oakland	None at this time
44	West Grand Ave	Webster St	Oakland	Oakland	None at this time
45	West Grand Ave	Broadway	Oakland	Oakland	None at this time
46	West Grand Ave	Market St	Oakland	Oakland	None at this time
47	West Grand Ave	Adeline St	Oakland	Oakland	None at this time
48	West Grand Ave	Poplar St	Oakland	Oakland	None at this time
49	West Grand Ave	Mandela Pkwy	Oakland	Oakland	None at this time
EXISTING EAST BAY SMART CORRIDOR TSP INSTALLATIONS (*CALTRANS RESPONSIBLE FOR MAINTAINENCE OF EVP EQUIPMENT BUT NOT REPLACEME					
1	San Pablo Ave	Rumrill Rd	San Pablo	San Pablo	AC Transit (72R)
2	San Pablo Ave	El Portal Dr	San Pablo	San Pablo	AC Transit (72R)
3	San Pablo Ave	International Market Pl	San Pablo	San Pablo	AC Transit (72R)
4	San Pablo Ave	23rd St	San Pablo	San Pablo	AC Transit (72R)
5	San Pablo Ave	Van Ness St	San Pablo	San Pablo	AC Transit (72R)
6	San Pablo Ave	Church Ln	San Pablo	San Pablo	AC Transit (72R)
7	San Pablo Ave	Vale Rd	San Pablo	San Pablo	AC Transit (72R)
8	San Pablo Ave	San Pablo Dam Rd	San Pablo	San Pablo	AC Transit (72R)
9	San Pablo Ave	Food Maxx Entr	San Pablo	San Pablo	AC Transit (72R)
10	San Pablo Ave	Rheem Ave	San Pablo	San Pablo	AC Transit (72R)
11	San Pablo Ave	McBryde Ave	Richmond	Richmond	AC Transit (72R)
12	San Pablo Ave	Esmond Ave	Richmond	Richmond	AC Transit (72R)
13	San Pablo Ave	Garvin Ave	Richmond	Richmond	AC Transit (72R)
14	San Pablo Ave	Solano Ave	Richmond	Richmond	AC Transit (72R)
15	San Pablo Ave	Clinton Ave	Richmond	Richmond	AC Transit (72R)
16	San Pablo Ave	Sierra Ave	Richmond	Richmond	AC Transit (72R)
17	San Pablo Ave	Barrett Ave	Richmond	Richmond	AC Transit (72R)

INTERSTATE 80 CORRIDOR ICM MOU: ATTACHMENT B
EMERGENCY VEHICLE DETECTION (EVP)/ TRANSIT SIGNAL PRIORITY (TSP) INTERSECTIONS
2/16/2012

No.	Main Street	Cross Street	Vicinity	ROW (Maintaining Agency, if different)	Transit Agency User
18	San Pablo Ave	EB 80 Ramps / Roosevelt	Richmond	Richmond	AC Transit (72R)
19	San Pablo Ave	MacDonald Ave	Richmond	Richmond	AC Transit (72R)
20	San Pablo Ave	Conlon Ave	El Cerrito	El Cerrito	AC Transit (72R)
21	San Pablo Ave	Knott Ave	El Cerrito	El Cerrito	AC Transit (72R)
22	San Pablo Ave	Cutting Blvd	El Cerrito	Caltrans*	AC Transit (72R)
23	San Pablo Ave	Hill St / Eastshore Blvd	El Cerrito	Caltrans*	AC Transit (72R)
24	San Pablo Ave	Potrero Ave	El Cerrito	Caltrans*	AC Transit (72R)
25	San Pablo Ave	Manila Ave / Bayview Ave	El Cerrito	Caltrans*	AC Transit (72R)
26	San Pablo Ave	Schmidt Ln	El Cerrito	Caltrans*	AC Transit (72R)
27	San Pablo Ave	Moeser Ln	El Cerrito	Caltrans*	AC Transit (72R)
28	San Pablo Ave	Stockton Ave	El Cerrito	Caltrans*	AC Transit (72R)
29	San Pablo Ave	Central Ave	El Cerrito	Caltrans*	AC Transit (72R)
30	San Pablo Ave	Fairmount Ave	El Cerrito	Caltrans*	AC Transit (72R)
31	San Pablo Ave	Carlson Blvd	El Cerrito	Caltrans*	AC Transit (72R)
32	San Pablo Ave	Brighton Ave	Albany	Caltrans*	AC Transit (72R)
33	San Pablo Ave	Clay St	Albany	Caltrans*	AC Transit (72R)
34	San Pablo Ave	Washington Ave	Albany	Caltrans*	AC Transit (72R)
35	San Pablo Ave	Solano Ave	Albany	Caltrans*	AC Transit (72R)
36	San Pablo Ave	Buchanan St	Albany	Caltrans*	AC Transit (72R)
37	San Pablo Ave	Marin Ave	Albany	Caltrans*	AC Transit (72R)
38	San Pablo Ave	Monroe St	Albany	Caltrans*	AC Transit (72R)
39	San Pablo Ave	Gilman St	Berkeley	Caltrans (Berkeley)	AC Transit (72R)
40	San Pablo Ave	Cedar St	Berkeley	Caltrans (Berkeley)	AC Transit (72R)
41	San Pablo Ave	Delaware St	Berkeley	Caltrans (Berkeley)	AC Transit (72R)
42	San Pablo Ave	University Ave	Berkeley	Caltrans (Berkeley)	AC Transit (72R)
43	San Pablo Ave	Addison St	Berkeley	Caltrans (Berkeley)	AC Transit (72R)
44	San Pablo Ave	Allston Way	Berkeley	Caltrans (Berkeley)	AC Transit (72R)
45	San Pablo Ave	Dwight Way	Berkeley	Caltrans (Berkeley)	AC Transit (72R)
46	San Pablo Ave	Grayson St	Berkeley	Caltrans (Berkeley)	AC Transit (72R)
47	San Pablo Ave	Heinz	Berkeley	Caltrans (Berkeley)	AC Transit (72R)
48	San Pablo Ave	Ashby Ave (SR 13)	Berkeley	Caltrans (Berkeley)	AC Transit (72R)
49	San Pablo Ave	65th St	Oakland	Caltrans (Oakland)	AC Transit (72R)
50	San Pablo Ave	Alcatraz Ave	Oakland	Caltrans (Oakland)	AC Transit (72R)
51	San Pablo Ave	63rd St	Oakland	Caltrans (Oakland)	AC Transit (72R)
52	San Pablo Ave	Powell St / Stanford Ave	Oakland	Caltrans (Oakland)	AC Transit (72R)
53	San Pablo Ave	53rd St	Emeryville	Caltrans*	AC Transit (72R)
54	San Pablo Ave	47th St	Emeryville	Caltrans*	AC Transit (72R)
55	San Pablo Ave	45th St	Emeryville	Caltrans*	AC Transit (72R)
56	San Pablo Ave	Park Ave	Emeryville	Caltrans*	AC Transit (72R)
57	San Pablo Ave	40th St	Emeryville	Caltrans*	AC Transit (72R)
58	San Pablo Ave	Adeline St / MacArthur	Emeryville	Caltrans*	AC Transit (72R)
59	San Pablo Ave	36th St	Oakland	Oakland	AC Transit (72R)
60	San Pablo Ave	35th St	Oakland	Oakland	AC Transit (72R)
61	San Pablo Ave	31st St / Market St / 30th St	Oakland	Oakland	AC Transit (72R)
62	San Pablo Ave	27th St	Oakland	Oakland	AC Transit (72R)
63	San Pablo Ave	West St / 25th St	Oakland	Oakland	AC Transit (72R)
64	San Pablo Ave	West Grand Ave	Oakland	Oakland	AC Transit (72R)

Trailblazers

INTERSTATE 80 CORRIDOR ICM MOU: ATTACHMENT B
TRAILBLAZER SIGNS
2/16/2012

No.	Main Street	Cross Street	Vicinity	ROW (Maintaining Agency, if different)	Operating Agency - Normal	Operating Agency - Incidents
1	San Pablo Ave - northbound	south of W. Grand Ave	Oakland	Oakland	Not Applicable	Caltrans
2	San Pablo Ave - southbound	north of 23rd St	Oakland	Oakland	Not Applicable	Caltrans
3	San Pablo Ave - northbound	north of Aileen St	Emeryville	Caltrans	Not Applicable	Caltrans
4	San Pablo Ave - southbound	north of Stanford St	Oakland	Caltrans	Not Applicable	Caltrans
5	San Pablo Ave - northbound	south of Carrison St	Berkeley	Caltrans	Not Applicable	Caltrans
6	San Pablo Ave - southbound	south of Burnett St	Berkeley	Caltrans	Not Applicable	Caltrans
7	San Pablo Ave - northbound	north of Addison St	Berkeley	Caltrans	Not Applicable	Caltrans
8	San Pablo Ave - southbound	north of University Ave	Berkeley	Caltrans	Not Applicable	Caltrans
9	San Pablo Ave - northbound	south of Gilman Ave	Berkeley	Caltrans	Not Applicable	Caltrans
10	San Pablo Ave - southbound	north of Gilman Ave	Berkeley	Caltrans	Not Applicable	Caltrans
11	San Pablo Ave - northbound	south of Marin Ave	Albany	Caltrans	Not Applicable	Caltrans
12	San Pablo Ave - southbound	north of Buchanan St	Albany	Caltrans	Not Applicable	Caltrans
13	San Pablo Ave - northbound	south of Central Ave	El Cerrito	Caltrans	Not Applicable	Caltrans
14	San Pablo Ave - southbound	north of Central Ave	El Cerrito	Caltrans	Not Applicable	Caltrans
15	San Pablo Ave - northbound	north of Hill St	El Cerrito	Caltrans	Not Applicable	Caltrans
16	San Pablo Ave - southbound	north of Hill St	El Cerrito	Caltrans	Not Applicable	Caltrans
17	San Pablo Ave - northbound	north of Barrett Ave	Richmond	Richmond	Not Applicable	Caltrans
18	San Pablo Ave - southbound	south of Clinton Ave	Richmond	Richmond	Not Applicable	Caltrans
19	San Pablo Ave - northbound	south of San Pablo Dam Rd	San Pablo	San Pablo	Not Applicable	Caltrans
20	San Pablo Ave - southbound	north of San Pablo Dam Rd	San Pablo	San Pablo	Not Applicable	Caltrans
21	San Pablo Ave - northbound	south of El Portal Dr	San Pablo	San Pablo	Not Applicable	Caltrans
22	San Pablo Ave - southbound	north of El Portal Dr	San Pablo	San Pablo	Not Applicable	Caltrans
23	San Pablo Ave - northbound	south of Hilltop Dr	Richmond	Richmond	Not Applicable	Caltrans
24	San Pablo Ave - southbound	north of Hilltop Dr	Richmond	Richmond	Not Applicable	Caltrans
25	San Pablo Ave - northbound	south of Richmond Pkwy	Richmond	Richmond	Not Applicable	Caltrans
26	San Pablo Ave - southbound	south of Kay Rd	Richmond	Richmond	Not Applicable	Caltrans
27	San Pablo Ave - northbound	west of Appian Way	Pinole	Pinole	Not Applicable	Caltrans
28	San Pablo Ave - southbound	east of Laurel Ave	Pinole	Pinole	Not Applicable	Caltrans
29	San Pablo Ave - northbound	south of Tennent Ave	Pinole	Pinole	Not Applicable	Caltrans
30	San Pablo Ave - southbound	north of Tennent Ave	Pinole	Pinole	Not Applicable	Caltrans
31	San Pablo Ave - northbound	south of John Muir Pkwy	Hercules	Hercules	Not Applicable	Caltrans
32	San Pablo Ave - southbound	north of John Muir Pkwy	Hercules	Hercules	Not Applicable	Caltrans

Trailblazers

INTERSTATE 80 CORRIDOR ICM MOU: ATTACHMENT B
TRAILBLAZER SIGNS
2/16/2012

No.	Main Street	Cross Street	Vicinity	ROW (Maintaining Agency, if different)	Operating Agency - Normal	Operating Agency - Incidents
33	San Pablo Ave - northbound	wouth of Willow Ave	Hercules	Hercules	Not Applicable	Caltrans
34	Parker Ave - southbound	north of San Pablo Ave	Hercules	Contra Costa County	Not Applicable	Caltrans
35	San Pablo Ave - northbound	west of Cummings Skwy	Contra Costa County	Contra Costa County	Not Applicable	Caltrans
36	San Pablo Ave - southbound	east of Cummings Skwy	Contra Costa County	Contra Costa County	Not Applicable	Caltrans

Traffic Signals

INTERSTATE 80 CORRIDOR ICM MOU: ATTACHMENT B
TRAFFIC SIGNAL IMPROVEMENTS BY I-80 ICM PROJECT
2/16/2012

No.	Main Street/ Cross Street	Vicinity	NEW GPRS Modem	NEW Ethernet Module	NEW Ethernet Switch	NEW Intersection Detection	ROW (Maintaining Agency, if different)	Operating Agency - Normal	Operating Agency - Incidents
Freeway ramps Controllers (Controller and Equipment Upgrades)									
1	San Pablo Ave / Pomona St/ I-80 WB Ramps	Crockett	---	---	---	---	Caltrans	Caltrans	Caltrans
2	Willow Ave / I-80 EB Ramps	Hercules	---	---	---	---	Caltrans	Caltrans	Caltrans
3	Willow Ave / I-80 WB Ramps	Hercules	Yes	Yes	---	---	Caltrans	Caltrans	Caltrans
4	Pinole Valley Rd / I-80 EB Ramps	Pinole	---	---	---	---	Caltrans	Caltrans	Caltrans
5	Pinole Valley Rd / I-80 WB Ramps	Pinole	Yes	Yes	---	---	Caltrans	Caltrans	Caltrans
6	Appian Way / I-80 EB Ramps	Pinole	---	---	---	---	Caltrans	Caltrans	Caltrans
7	Appian Way / I-80 WB Ramps	Pinole	Yes	Yes	---	---	Caltrans	Caltrans	Caltrans
8	Richmond Pkwy / I-80 EB Ramps	Pinole	Yes	Yes	---	---	Caltrans	Caltrans	Caltrans
9	Richmond Pkwy / I-80 HOV Ramps	Richmond	---	---	---	---	Caltrans	Caltrans	Caltrans
10	Richmond Pkwy / I-80 WB Ramps	Richmond	---	---	---	---	Caltrans	Caltrans	Caltrans
11	Hilltop Dr / I-80 EB Ramps	Richmond	---	---	---	---	Caltrans	Caltrans	Caltrans
12	Hilltop Dr / I-80 WB Ramps	Richmond	Yes	Yes	---	---	Caltrans	Caltrans	Caltrans
13	El Portal Dr / I-80 EB Ramps	San Pablo	---	---	---	---	Caltrans	Caltrans	Caltrans
14	El Portal Dr / I-80 WB Off-ramp	San Pablo	Yes	Yes	---	---	Caltrans	Caltrans	Caltrans
15	San Pablo Dam Rd / I-80 WB & EB Ramps (one controller)	San Pablo	Yes	Yes	---	---	Caltrans	Caltrans	Caltrans
16	San Pablo Ave/ Roosevelt/ I-80 EB Ramps	Richmond	Yes	Yes	---	---	Caltrans	Caltrans	Caltrans
17	Barrett Ave / I-80 WB Ramps	Richmond	---	---	---	---	Caltrans	Caltrans	Caltrans
18	Cutting Blvd / I-80 HOV Ramps	Richmond	---	---	---	---	Caltrans	Caltrans	Caltrans
19	Cutting Blvd / I-80 WB Off-ramp	Richmond	Yes	Yes	---	---	Caltrans	Caltrans	Caltrans
20	Carlson Blvd/ I-80 EB Ramps	Richmond	---	---	---	---	Caltrans	Caltrans	Caltrans
21	Carlson Blvd/ I-80 WB Ramps	Richmond	Yes	Yes	---	---	Caltrans	Caltrans	Caltrans
22	Eastshore Blvd / Potrero Ave / I-80 Ramps	El Cerrito	Yes	Yes	---	---	Caltrans	Caltrans	Caltrans
23	Central Ave / I-80 EB Ramps	El Cerrito	---	---	---	---	Caltrans	Caltrans	Caltrans
24	Central Ave / I-80 WB Ramps	El Cerrito	Yes	Yes	---	---	Caltrans	Caltrans	Caltrans
25	Buchanan St / I-80 EB Ramps	Albany	Yes	Yes	---	---	Caltrans	Caltrans	Caltrans
26	Buchanan St / I-80 WB Ramps	Albany	---	---	---	---	Caltrans	Caltrans	Caltrans
27	Frontage Rd / I-80 WB Ramps	Emeryville	---	---	---	---	Caltrans	Caltrans	Caltrans
28	Powell St / I-80 EB Ramps	Emeryville	---	---	---	---	Caltrans	Caltrans	Caltrans
29	Powell St / Frontage Rd / I-80 WB On-ramp	Emeryville	Yes	Yes	---	---	Caltrans	Caltrans	Caltrans
San Pablo Avenue (Controller Upgrades and Equipment Upgrades)									
1	San Pablo Ave / Hercules Ave	Hercules	---	---	---	---	Hercules	Hercules	Caltrans
2	San Pablo Ave / Pinole Valley Rd	Pinole	---	---	---	---	Pinole	Pinole	Caltrans
3	San Pablo Ave / Tennent Ave	Pinole	---	---	---	---	Pinole	Pinole	Caltrans
4	San Pablo Ave / Appian Way	Pinole	---	---	---	---	Pinole	Pinole	Caltrans
5	San Pablo Ave / Sunnyview Dr	Pinole	---	---	---	---	Pinole	Pinole	Caltrans
6	San Pablo Ave / Pinole Shores Rd	Pinole	---	---	---	---	Pinole	Pinole	Caltrans
7	San Pablo Ave / Crestwood Dr	Pinole	---	---	---	---	Contra Costa County	Contra Costa County	Caltrans
8	San Pablo Ave / Kay Rd	Pinole	---	---	---	---	Contra Costa County	Contra Costa County	Caltrans
9	San Pablo Ave / Richmond Pkwy	Richmond	---	---	---	---	Richmond	Richmond	Caltrans

Traffic Signals

INTERSTATE 80 CORRIDOR ICM MOU: ATTACHMENT B
TRAFFIC SIGNAL IMPROVEMENTS BY I-80 ICM PROJECT
2/16/2012

No.	Main Street/ Cross Street	Vicinity	NEW GPRS Modem	NEW Ethernet Module	NEW Ethernet Switch	NEW Intersection Detection	ROW (Maintaining Agency, if different)	Operating Agency - Normal	Operating Agency - Incidents
10	San Pablo Ave / Hilltop Dr	Richmond	---	---	---	---	Richmond	Richmond	Caltrans
11	San Pablo Ave / Robert Miller Dr	Richmond	---	---	---	---	Richmond	Richmond	Caltrans
12	San Pablo Ave / McBryde Ave	Richmond	---	---	---	---	Richmond	Richmond	Caltrans
13	San Pablo Ave / Esmond Ave	Richmond	---	---	---	---	Richmond	Richmond	Caltrans
14	San Pablo Ave / Garvin Ave	Richmond	---	---	---	---	Richmond	Richmond	Caltrans
15	San Pablo Ave / Solano Ave	Richmond	---	---	---	---	Richmond	Richmond	Caltrans
16	San Pablo Ave / Clinton Ave	Richmond	---	---	---	---	Richmond	Richmond	Caltrans
17	San Pablo Ave / Sierra Ave (Ped Signal between Clinton and I-80)	Richmond	---	---	---	---	Richmond	Richmond	Caltrans
18	San Pablo Ave / Barrett Ave	Richmond	---	---	---	---	Richmond	Richmond	Caltrans
19	San Pablo Ave / MacDonald Ave	Richmond	---	---	---	---	Richmond	Richmond	Caltrans
20	San Pablo Ave / Cutting Blvd	El Cerrito	---	Yes	---	---	Caltrans	Caltrans	Caltrans
21	San Pablo Ave / Hill St / Eastshore Blvd	El Cerrito	---	Yes	---	---	Caltrans	Caltrans	Caltrans
22	San Pablo Ave / Potrero Ave	El Cerrito	---	Yes	---	---	Caltrans	Caltrans	Caltrans
23	San Pablo Ave / Manila Ave / Bayview Ave	El Cerrito	---	Yes	---	---	Caltrans	Caltrans	Caltrans
24	San Pablo Ave / Schmidt Ln	El Cerrito	---	Yes	---	---	Caltrans	Caltrans	Caltrans
25	San Pablo Ave / Moeser Ln	El Cerrito	---	Yes	---	---	Caltrans	Caltrans	Caltrans
26	San Pablo Ave / Stockton Ave	El Cerrito	---	Yes	---	---	Caltrans	Caltrans	Caltrans
27	San Pablo Ave / Central Ave	El Cerrito	---	Yes	---	---	Caltrans	Caltrans	Caltrans
28	San Pablo Ave / Fairmount Ave	El Cerrito	---	Yes	---	---	Caltrans	Caltrans	Caltrans
29	San Pablo Ave / Carlson Blvd	El Cerrito	---	Yes	---	---	Caltrans	Caltrans	Caltrans
30	San Pablo Ave / Brighton Ave	Albany	---	Yes	---	---	Caltrans	Caltrans	Caltrans
31	San Pablo Ave / Clay St	Albany	---	Yes	---	---	Caltrans	Caltrans	Caltrans
32	San Pablo Ave / Washington Ave	Albany	---	Yes	---	---	Caltrans	Caltrans	Caltrans
33	San Pablo Ave / Solano Ave	Albany	---	Yes	---	---	Caltrans	Caltrans	Caltrans
34	San Pablo Ave / Buchanan St	Albany	---	Yes	---	---	Caltrans	Caltrans	Caltrans
35	San Pablo Ave / Marin Ave	Albany	---	Yes	---	---	Caltrans	Caltrans	Caltrans
36	San Pablo Ave / Monroe St	Albany	---	Yes	---	---	Caltrans	Caltrans	Caltrans
37	San Pablo Ave / Gilman St	Berkeley	---	---	---	---	Berkeley	Berkeley	Caltrans
38	San Pablo Ave / Cedar St	Berkeley	---	---	---	---	Berkeley	Berkeley	Caltrans
39	San Pablo Ave / Delaware St	Berkeley	---	---	---	---	Berkeley	Berkeley	Caltrans
40	San Pablo Ave / University Ave	Berkeley	---	---	---	---	Berkeley	Berkeley	Caltrans
41	San Pablo Ave / Addison St	Berkeley	---	---	---	---	Berkeley	Berkeley	Caltrans
42	San Pablo Ave / Allston Way	Berkeley	---	---	---	---	Berkeley	Berkeley	Caltrans
43	San Pablo Ave / Dwight Way	Berkeley	---	---	---	---	Berkeley	Berkeley	Caltrans
44	San Pablo Ave / Grayson St	Berkeley	---	---	---	---	Berkeley	Berkeley	Caltrans
45	San Pablo Ave/ Heinz Ave	Berkeley	---	---	---	---	Berkeley	Berkeley	Caltrans
46	San Pablo Ave / Ashby Ave (SR 13)	Berkeley	---	---	---	---	Berkeley	Berkeley	Caltrans
47	San Pablo Ave / 65th St	Oakland	Yes	Yes	---	---	Caltrans	Caltrans	Caltrans
48	San Pablo Ave / Alcatraz Ave	Oakland	---	---	---	---	Oakland	Oakland	Caltrans
49	San Pablo Ave / 63rd St	Oakland	---	---	---	---	Oakland	Oakland	Caltrans

Traffic Signals

INTERSTATE 80 CORRIDOR ICM MOU: ATTACHMENT B
TRAFFIC SIGNAL IMPROVEMENTS BY I-80 ICM PROJECT
2/16/2012

No.	Main Street/ Cross Street	Vicinity	NEW GPRS Modem	NEW Ethernet Module	NEW Ethernet Switch	NEW Intersection Detection	ROW (Maintaining Agency, if different)	Operating Agency - Normal	Operating Agency - Incidents
50	San Pablo Ave / Stanford Ave	Oakland	---	---	---	---	Oakland	Oakland	Caltrans
51	San Pablo Ave / 53rd St	Emeryville	---	Yes	---	---	Caltrans	Caltrans	Caltrans
52	San Pablo Ave / 47th St	Emeryville	---	Yes	---	---	Caltrans	Caltrans	Caltrans
53	San Pablo Ave / 45th St	Emeryville	---	Yes	---	---	Caltrans	Caltrans	Caltrans
54	San Pablo Ave / Park Ave	Emeryville	---	Yes	---	---	Caltrans	Caltrans	Caltrans
55	San Pablo Ave / 40th St	Emeryville	---	Yes	---	---	Caltrans	Caltrans	Caltrans
56	San Pablo Ave / Adeline St	Emeryville	---	Yes	---	---	Caltrans	Caltrans	Caltrans
ICM Routes (Controller and Equipment Upgrades, New signals)									
1	Willow Ave / Sycamore	Hercules	---	---	---	---	Hercules	Hercules	Caltrans
2	Willow Ave / Hawthorne Dr	Hercules	---	---	---	---	Hercules	Hercules	Caltrans
3	Appian Way/ Fitzgerald	Pinole	---	---	---	---	Pinole	Pinole	Caltrans
4	Appian Way/ Tara Hills	Pinole	Yes	Yes	---	---	Pinole	Pinole	Caltrans
5	Richmond Pkwy / I-80 EB Ramps	Pinole	---	---	---	---	Caltrans	Caltrans	Caltrans
6	Richmond Pkwy / Bella Vista Entr	Richmond	---	---	---	---	Richmond	Richmond	Caltrans
7	Richmond Pkwy / Lakeside Dr	Richmond	---	---	---	---	Richmond	Richmond	Caltrans
8	Hilltop Dr / Blume Dr	Richmond	---	---	---	---	Richmond	Richmond	Richmond
9	Hilltop Dr / Shane Dr	Richmond	---	---	---	---	Richmond	Richmond	Richmond
10	Hilltop Dr / Robert Miller Dr	Richmond	---	---	---	---	Richmond	Richmond	Richmond
11	Hilltop Dr / Hillview Dr	Richmond	---	---	---	---	Richmond	Richmond	Richmond
12	Hilltop Dr / Research Dr	Richmond	---	---	---	---	Richmond	Richmond	Richmond
13	McBryde / I-80 WB off-ramp (*NEW SIGNAL)	Richmond	Yes	Yes	---	3 Video Cam	Richmond	Richmond	Caltrans
14	McBryde/ Amador (*NEW SIGNAL)	Richmond	Yes	Yes	---	4 Video Cam	Richmond	Richmond	Caltrans
15	Central Ave / San Luis St / Pierce St	Richmond	---	---	---	---	Richmond	Richmond	Caltrans
16	Gilman St / 6th St (*SIGNAL RECONSTRUCTION)	Berkeley	---	---	---	4 Video Cam	Berkeley	Berkeley	Caltrans
17	Gilman St / 8th St	Berkeley	---	---	---	4 Video Cam	Berkeley	Berkeley	Caltrans
18	University Ave / 6th St	Berkeley	---	---	---	---	Berkeley	Berkeley	Caltrans
19	University Ave/ 9th St	Berkeley	---	---	---	4 Video Cam	Berkeley	Berkeley	Caltrans
20	Ashby Ave / 7th St	Berkeley	---	---	---	---	Berkeley	Berkeley	Caltrans
21	Ashby Ave / 9th St	Berkeley	---	---	---	---	Berkeley	Berkeley	Caltrans
22	West Grand Ave/ Maritime	Oakland	Yes	Yes	---	---	Caltrans	Caltrans	Caltrans
23	West Grand Ave/ 880 ramps/ Frontage	Oakland	Yes	Yes	---	---	Caltrans	Caltrans	Caltrans
24	West Grand Ave / Mandela Pkwy	Oakland	---	Yes	Yes	4 Video Cam	Oakland	Oakland	Caltrans
25	West Grand Ave / Poplar St	Oakland	---	Yes	Yes	4 Video Cam	Oakland	Oakland	Caltrans
26	West Grand Ave / Adeline St	Oakland	---	Yes	Yes	4 Video Cam	Oakland	Oakland	Caltrans
27	West Grand Ave / Market St	Oakland	---	Yes	Yes	2 Video Cam	Oakland	Oakland	Caltrans
28	W. Grand Ave - MLK, Jr Wy	Oakland	---	Yes	Yes	2 Mag Lanes	Oakland	Oakland	Oakland
29	W. Grand Ave - Northgate Ave	Oakland	---	Yes	Yes	---	Oakland	Oakland	Oakland
30	W. Grand Ave - Broadway	Oakland	---	Yes	Yes	4 Video Cam	Oakland	Oakland	Oakland
31	Grand Ave - Webster St	Oakland	---	Yes	Yes	3 Video Cam	Oakland	Oakland	Oakland
32	Grand Ave - Valdez St	Oakland	---	Yes	Yes	3 Video Cam	Oakland	Oakland	Oakland
33	Grand Ave - El Embarcadero	Oakland	---	Yes	Yes	---	Oakland	Oakland	Oakland

Traffic Signals

INTERSTATE 80 CORRIDOR ICM MOU: ATTACHMENT B
TRAFFIC SIGNAL IMPROVEMENTS BY I-80 ICM PROJECT
2/16/2012

No.	Main Street/ Cross Street	Vicinity	NEW GPRS Modem	NEW Ethernet Module	NEW Ethernet Switch	NEW Intersection Detection	ROW (Maintaining Agency, if different)	Operating Agency - Normal	Operating Agency - Incidents
34	Grand Ave - MacArthur Blvd	Oakland	---	Yes	Yes	2 Video Cam 3 Mag Lanes	Oakland	Oakland	Oakland
35	Lake Shore Ave - MacArthur Blvd	Oakland	---	Yes	Yes	2 Video Cam 3 Mag Lanes	Oakland	Oakland	Oakland
36	Lake Shore Ave - Lake Park Ave	Oakland	---	Yes	Yes	3 Video Cam 3 Mag Lanes	Oakland	Oakland	Oakland
37	Grand Ave - Lake Park Ave	Oakland	---	Yes	Yes	4 Video Cam	Oakland	Oakland	Oakland
NEW FIELD MASTERS (Controller and Equipment Upgrades)									
1	Richmond Pkwy / Lakeside Dr	Richmond	Yes	Yes	---	---	Richmond	Richmond	Caltrans
2	Hilltop Dr / Robert Miller Dr	Richmond	Yes	Yes	---	---	Richmond	Richmond	Caltrans
3	El Portal Dr / Church Ln / Rollingwood Dr	San Pablo	Yes	Yes	---	---	San Pablo	San Pablo	Caltrans
4	San Pablo Dam Rd / Ventura Ave	San Pablo	Yes	Yes	---	---	San Pablo	San Pablo	Caltrans
5	San Pablo Ave / Knott Ave	El Cerrito	Yes	Yes	---	---	El Cerrito	El Cerrito	Caltrans
EXISTING CONTROLLER TO REMAIN (GPRS MODEM AND ETHERNET MODULE UPGRADE ONLY)									
1	San Pablo Ave- Cummings	CC County	Yes	Yes	---	---	CC County	CC County	Caltrans
2	San Pablo Ave- Refinery	CC County	Yes	Yes	---	---	CC County	CC County	Caltrans
3	Parker-2nd	CC County	Yes	Yes	---	---	CC County	CC County	Caltrans
4	Parker-4th	CC County	Yes	Yes	---	---	CC County	CC County	Caltrans
5	San Pablo Ave-Parker-Willow	CC County	Yes	Yes	---	---	CC County	CC County	Caltrans
6	Pinole Valley- Henry	Pinole	Yes	Yes	---	---	Pinole	Pinole	Caltrans
7	Fitzgerald/ Best Buy	Pinole	Yes	Yes	---	---	Pinole	Pinole	Caltrans
8	Central Ave/ Carlson Ave	El Cerrito	Yes	Yes	---	---	El Cerrito	El Cerrito	Caltrans
6	Powell St / Christie Ave	Emeryville	Yes	Yes	---	---	Emeryville	Emeryville	Caltrans
7	53rd / Hollis (support for Powell- Beudry)	Emeryville	Yes	Yes	---	---	Emeryville	Emeryville	Caltrans

Speed feedback

INTERSTATE 80 CORRIDOR ICM MOU: ATTACHMENT B
SPEED FEEDBACK SIGNS- PINOLE
2/16/2012

No.	Main Street	Cross Street	Vicinity	ROW (Maintaining Agency, if different)	Operating Agency - Normal	Operating Agency - Incidents
1	San Pablo Ave - eastbound	west of Del Monte Dr	Pinole	Pinole	NA	NA
2	San Pablo Ave - westbound	east of Sunnyview Dr	Pinole	Pinole	NA	NA

Arterial CMS

INTERSTATE 80 CORRIDOR ICM MOU: ATTACHMENT B
ARTERIAL CHANGEABLE MESSAGE SIGNS (CMS)- OAKLAND
2/16/2012

No.	Main Street	Cross Street	Vicinity	ROW (Maintaining Agency, if different)	Operating Agency - Normal	Operating Agency - Incidents
1	San Pablo Ave - northbound	north of 34th St	Oakland	Oakland	Oakland	Caltrans
2	San Pablo Ave - southbound	south of 35th St	Oakland	Oakland	Oakland	Caltrans
3	W. Grand Ave - eastbound	east of Chestnut St	Oakland	Oakland	Oakland	Caltrans
4	Lake Park Ave - westbound	east of Lakeshore Ave	Oakland	Oakland	Oakland	Caltrans

Ramp Meters

INTERSTATE 80 CORRIDOR ICM MOU: ATTACHMENT B
ADAPTIVE RAMP METERING LOCATIONS
2/16/2012

No.	Main Street	Cross Street	Vicinity	ROW (Maintaining Agency, if different)	Operating Agency - Normal	Operating Agency - Incidents
NEW I-80 ICM RAMP METERING CONTROLLERS (EASTBOUND I-80)						
1	I-80 eastbound on-ramp	Powell St.	Emeryville	Caltrans	Caltrans	Caltrans
2	I-80 eastbound on-ramp	Ashby Ave./Potter St.	Berkeley	Caltrans	Caltrans	Caltrans
3	I-80 eastbound on-ramp	University Ave.	Berkeley	Caltrans	Caltrans	Caltrans
4	I-80 eastbound on-ramp	Gilman St.	Berkeley	Caltrans	Caltrans	Caltrans
5	I-80 eastbound on-ramp	Buchanan St.	Albany	Caltrans	Caltrans	Caltrans
6	I-80 eastbound on-ramp	Central Ave.	Richmond	Caltrans	Caltrans	Caltrans
7	I-80 eastbound on-ramp	Carlson Blvd.	Richmond	Caltrans	Caltrans	Caltrans
8	I-80 eastbound on-ramp	Cutting Blvd. (loop ramp)	Richmond	Caltrans	Caltrans	Caltrans
9	I-80 eastbound on-ramp	Cutting Blvd.	Richmond	Caltrans	Caltrans	Caltrans
10	I-80 eastbound on-ramp	San Pablo Ave.	Richmond	Caltrans	Caltrans	Caltrans
11	I-80 eastbound on-ramp	San Pablo Dam Rd.	San Pablo	Caltrans	Caltrans	Caltrans
12	I-80 eastbound on-ramp	El Portal Dr.	San Pablo	Caltrans	Caltrans	Caltrans
13	I-80 eastbound on-ramp	Westbound Hilltop Dr.	Richmond	Caltrans	Caltrans	Caltrans
14	I-80 eastbound on-ramp	Eastbound Hilltop Dr. (loop ramp)	Richmond	Caltrans	Caltrans	Caltrans
15	I-80 eastbound on-ramp	Eastbound Fitzgerald/Richmond Parkway	Pinole	Caltrans	Caltrans	Caltrans
16	I-80 eastbound on-ramp	Eastbound Fitzgerald/ Richmond Pkwy. (loop ramp)	Pinole	Caltrans	Caltrans	Caltrans
17	I-80 eastbound on-ramp	Northbound Appian Way	Pinole	Caltrans	Caltrans	Caltrans
18	I-80 eastbound on-ramp	Southbound Appian Way (loop ramp)	Pinole	Caltrans	Caltrans	Caltrans
19	I-80 eastbound on-ramp	Pinole Valley Rd.	Pinole	Caltrans	Caltrans	Caltrans
20	I-80 eastbound on-ramp	John Muir Pkwy. (SR-4)	Hercules	Caltrans	Caltrans	Caltrans
21	I-80 eastbound on-ramp	Willow Ave.	Hercules	Caltrans	Caltrans	Caltrans
22	I-80 eastbound on-ramp	Cummings Skyway	Contra Costa County	Caltrans	Caltrans	Caltrans
NEW I-80 ICM RAMP METERING CONTROLLERS (WESTBOUND I-80)						
1	I-80 westbound on-ramp	San Pablo Ave. / Pomona St.	Crockett (CC County)	Caltrans	Caltrans	Caltrans

Ramp Meters

INTERSTATE 80 CORRIDOR ICM MOU: ATTACHMENT B
ADAPTIVE RAMP METERING LOCATIONS
2/16/2012

No.	Main Street	Cross Street	Vicinity	ROW (Maintaining Agency, if different)	Operating Agency - Normal	Operating Agency - Incidents
2	I-80 westbound on-ramp	Cummings Skyway	Contra Costa County	Caltrans	Caltrans	Caltrans
3	I-80 westbound on-ramp	Willow Ave.	Hercules	Caltrans	Caltrans	Caltrans
4	I-80 westbound on-ramp	John Muir Parkway (SR-4)	Hercules	Caltrans	Caltrans	Caltrans
5	I-80 westbound on-ramp	Pinole Valley Rd.	Pinole	Caltrans	Caltrans	Caltrans
6	I-80 westbound on-ramp	Appian Way	Pinole	Caltrans	Caltrans	Caltrans
7	I-80 westbound on-ramp	Fitzgerald Dr./Richmond Parkway	Pinole	Caltrans	Caltrans	Caltrans
8	I-80 westbound on-ramp	Hilltop Dr.	Richmond	Caltrans	Caltrans	Caltrans
9	I-80 westbound on-ramp	Westbound Hilltop Dr. (loop ramp)	Richmond	Caltrans	Caltrans	Caltrans
10	I-80 westbound on-ramp	El Portal Dr.	San Pablo	Caltrans	Caltrans	Caltrans
11	I-80 westbound on-ramp	San Pablo Dam Rd.	San Pablo	Caltrans	Caltrans	Caltrans
12	I-80 westbound on-ramp	Solano Ave.	Richmond	Caltrans	Caltrans	Caltrans
13	I-80 westbound on-ramp	Barrett Ave.	Richmond	Caltrans	Caltrans	Caltrans
14	I-80 westbound on-ramp	Potrero Ave.	Richmond	Caltrans	Caltrans	Caltrans
15	I-80 westbound on-ramp	Carlson Blvd.	Richmond	Caltrans	Caltrans	Caltrans
16	I-80 westbound on-ramp	Central Ave.	Richmond	Caltrans	Caltrans	Caltrans
17	I-80 westbound on-ramp	Buchanan St.	Albany	Caltrans	Caltrans	Caltrans
18	I-80 westbound on-ramp	Gilman St.	Berkeley	Caltrans	Caltrans	Caltrans
19	I-80 westbound on-ramp	University Ave. (loop)	Berkeley	Caltrans	Caltrans	Caltrans
20	I-80 westbound on-ramp	Ashby Ave. & Frontage Rd.	Berkeley	Caltrans	Caltrans	Caltrans
21	I-80 westbound on-ramp	Powell St./Frontage Rd.	Emeryville	Caltrans	Caltrans	Caltrans
22	I-80 westbound on-ramp	Powell St.	Emeryville	Caltrans	Caltrans	Caltrans

ATM Signs

INTERSTATE 80 CORRIDOR ICM MOU: ATTACHMENT B
ACTIVE TRAFFIC MANGEMENT (ATM) FREEWAY SIGNS
2/16/2012

No.	Main Street	Cross Street	Vicinity	LUS	VASS	VMS	IDB	ROW (Maintaining Agency, if different)	Operating Agency - Normal	Operating Agency - Incidents
NEW I-80 ICM ATM SIGNS (WESTBOUND I-80)										
1	I-80 westbound	Powell/ Frontage Hook ramp (SS 3-2)	Emeryville	Y	Y	---	---	Caltrans	Caltrans	Caltrans
2	I-80 westbound	Ashby Ave (SS 6-2)	Berkeley	Y	Y	---	---	Caltrans	Caltrans	Caltrans
3	I-80 westbound	bet. Ashby Ave and University Ave (SS8-1)	Berkeley	Y	Y	---	---	Caltrans	Caltrans	Caltrans
4	I-80 westbound	University Ave (SS 9-2)	Berkeley	Y	Y	Y	---	Caltrans	Caltrans	Caltrans
5	I-80 westbound	bet. Univeristy Ave and Gilman Ave (SS 12-1)	Berkeley	Y	Y	Y	---	Caltrans	Caltrans	Caltrans
6	I-80 westbound	Gilman Ave (SS 13-1)	Berkeley	---	---	---	Y	Caltrans	Caltrans	Caltrans
7	I-80 westbound	bet. Gilman Ave and Buchanan Ave (SS 13-2)	Berkeley	Y	Y	---	---	Caltrans	Caltrans	Caltrans
8	I-80 westbound	Cleveland Ave (SS 16-1)	Albany	Y	Y	---	---	Caltrans	Caltrans	Caltrans
9	I-80 westbound	Central Ave (SS 18-1)	Richmond	Y	Y	Y	---	Caltrans	Caltrans	Caltrans
10	I-80 westbound	bet. Central Ave and Carlson Ave (SS 21-1)	Richmond	Y	Y	---	---	Caltrans	Caltrans	Caltrans
11	I-80 westbound	bet. Carlson Ave and Potrero Ave (SS 23-1)	Richmond	Y	Y	---	---	Caltrans	Caltrans	Caltrans
12	I-80 westbound	bet. Potrero Ave and Cutting Blvd (SS 25-1)	Richmond	Y	Y	Y	---	Caltrans	Caltrans	Caltrans
13	I-80 westbound	Cutting Blvd (SS26-1)	Richmond	---	---	---	Y	Caltrans	Caltrans	Caltrans
14	I-80 westbound	bet. Solano and Barret	Richmond	---	Y	---	---	Caltrans	Caltrans	Caltrans
15	I-80 westbound	bet. San Pablo Dam Rd and McBryde	San Pablo	---	Y	---	---	Caltrans	Caltrans	Caltrans
16	I-80 westbound	bet. El Portal and San Pablo Dam Rd	San Pablo	---	Y	---	---	Caltrans	Caltrans	Caltrans
17	I-80 westbound	bet. Hilltop Dr and El Portal	San Pablo	---	Y	---	---	Caltrans	Caltrans	Caltrans
18	I-80 westbound	bet. Richmond Pkwy and Hilltop Dr	Richmond	---	Y	---	---	Caltrans	Caltrans	Caltrans
19	I-80 westbound	bet. Appian Way and Richmond Pkwy	Pinole	---	Y	---	---	Caltrans	Caltrans	Caltrans
20	I-80 westbound	bet. Pinole Valley Rd and Appian Way	Pinole	---	Y	---	---	Caltrans	Caltrans	Caltrans
21	I-80 westbound	bet. SR-4 and Pinole Valley Rd	Pinole	---	Y	---	---	Caltrans	Caltrans	Caltrans
22	I-80 westbound	bet. Willow Ave and SR-4	Hercules	---	Y	---	---	Caltrans	Caltrans	Caltrans
23	I-80 westbound	bet. California St OC and Willow (SS 56-1)	Contra Costa County	---	---	---	Y	Caltrans	Caltrans	Caltrans
24	I-80 westbound	bet. Cummings and California OC	Contra Costa County	---	Y	---	---	Caltrans	Caltrans	Caltrans
NEW I-80 ICM ATM SIGNS (EASTBOUND I-80)										
1	I-80 eastbound	bet. I-80/ I-880/ I-580 Interchange and Powell St	Emeryville	---	Y	---	---	Caltrans	Caltrans	Caltrans
2	I-80 eastbound	Powell St (SS 3-1)	Emeryville	---	---	---	Y	Caltrans	Caltrans	Caltrans
3	I-80 eastbound	bet. Powell St and Ashby Ave (SS 3-2 back)	Emeryville	---	Y	---	---	Caltrans	Caltrans	Caltrans
4	I-80 eastbound	bet. Powell St and Ashby Ave	Berkeley	---	Y	---	---	Caltrans	Caltrans	Caltrans
5	I-80 eastbound	bet. Ashby Ave and University Ave (SS 8-1 back)	Berkeley	---	Y	---	---	Caltrans	Caltrans	Caltrans
6	I-80 eastbound	bet. Ashby Ave and University Ave	Berkeley	---	Y	---	---	Caltrans	Caltrans	Caltrans
7	I-80 eastbound	bet. University Ave and Gilman Ave (SS 12-1 back)	Berkeley	---	Y	---	---	Caltrans	Caltrans	Caltrans
8	I-80 eastbound	bet. Gilman Ave and Buchanan Ave (SS 13-2 back)	Albany	---	Y	---	---	Caltrans	Caltrans	Caltrans
9	I-80 eastbound	Cleveland Ave (SS 16-1 back)	Albany	---	Y	---	---	Caltrans	Caltrans	Caltrans
10	I-80 eastbound	Cleveland Ave	Albany	---	Y	---	---	Caltrans	Caltrans	Caltrans
11	I-80 eastbound	Central Ave (SS 18-1 back)	Richmond	---	Y	---	---	Caltrans	Caltrans	Caltrans
12	I-80 eastbound	bet. Central Ave and Carlson Ave (SS 21-1 back)	Richmond	---	Y	---	---	Caltrans	Caltrans	Caltrans
13	I-80 eastbound	bet. Carlson Ave and Potrero Ave (SS 23-1 back)	Richmond	---	Y	---	---	Caltrans	Caltrans	Caltrans
14	I-80 eastbound	bet. Carlson Ave and Potrero Ave	Richmond	---	Y	---	---	Caltrans	Caltrans	Caltrans
15	I-80 eastbound	bet. Potrero Ave and Cutting Blvd (SS 25-1 back)	Richmond	---	Y	---	---	Caltrans	Caltrans	Caltrans

ATM Signs

INTERSTATE 80 CORRIDOR ICM MOU: ATTACHMENT B
ACTIVE TRAFFIC MANGEMENT (ATM) FREEWAY SIGNS
2/16/2012

No.	Main Street	Cross Street	Vicinity	LUS	VASS	VMS	IDB	ROW (Maintaining Agency, if different)	Operating Agency - Normal	Operating Agency - Incidents
16	I-80 eastbound	bet. Potrero Ave and Cutting Blvd	Richmond	---	Y	---	---	Caltrans	Caltrans	Caltrans
17	I-80 eastbound	MacDonald Ave	Richmond	---	Y	---	---	Caltrans	Caltrans	Caltrans
18	I-80 eastbound	El Portal Dr	San Pablo	---	Y	---	---	Caltrans	Caltrans	Caltrans
19	I-80 eastbound	bet. El Portal Dr and Hilltop Dr (SS 37-1)	San Pablo	---	Y	---	Y	Caltrans	Caltrans	Caltrans
20	I-80 eastbound	bet. Hilltop Dr and Richmond Blvd	San Pablo	---	Y	---	---	Caltrans	Caltrans	Caltrans
21	I-80 eastbound	bet. Richmond Pkwy and Appian Way	Pinole	---	Y	---	---	Caltrans	Caltrans	Caltrans
22	I-80 eastbound	bet. Appian Way and Pinole Valley Rd	Pinole	---	Y	---	---	Caltrans	Caltrans	Caltrans
23	I-80 eastbound	bet. Pinole Valley Rd and SR-4 (SS 50-1)	Hercules	---	Y	---	Y	Caltrans	Caltrans	Caltrans
24	I-80 eastbound	bet. Willow Ave and California St OC (S 55-1)	Hercules	---	Y	---	---	Caltrans	Caltrans	Caltrans
25	I-80 eastbound	bet. Willow Ave and California St OC (S 56-1)	Contra Costa County	---	Y	---	---	Caltrans	Caltrans	Caltrans

ENTIRE SAN PABLO CORRIDOR ARTERIAL AND TRANSIT IMPROVEMENT PROJECT

Device	Number of Devices	Oakland	Emeryville	Berkeley	Albany	CCCounty	El Cerrito	San Pablo	Richmond	Pinole	Hercules	WestCAT	AC Transit
Existing SMART Corridor cameras (used by project)	15	2	0	3	2	0	3	2	2	0	1	0	0
New closed-circuit television (CCTV) cameras	39	8	2	3	1	3	1	4	9	6	2	0	0
New video encoders	35	10	2	3	1	1	1	3	8	4	2	0	0
Existing SMART Corridor Vehicle Detection Stations (used by project)	23	0	2	6	3	1	4	1	4	1	1	0	0
New Vehicle Detection Stations	10	0	0	0	0	2	0	2	2	3	1	0	0
Existing SMART Corridor TSP intersections	64	10	6	10	7	0	12	10	9	0	0	0	0
New TSP intersections (including ramp metering locations)	37	0	0	3	0	5	0	1	8	14	6	0	0
New EVP-only intersections	49	10	0	5	2	0	3	8	16	4	1	0	0
New Trailblazer Signs	36	3	1	6	2	3	4	4	6	4	3	0	0
New Traffic Signal	2	0	0	0	0	0	0	0	2	0	0	0	0
Traffic Signal Controller Upgrades (existing signal)	127	20	9	16	9	1	14	5	33	15	5	0	0
New Wireless GPRS modem (traffic signal controllers)	36	4	3	0	1	5	4	4	8	6	1	0	0
New Controller communications: Ethernet switch	14	14	0	0	0	0	0	0	0	0	0	0	0
New Controller communications: Ethernet module	72	17	9	0	8	5	14	4	8	6	1	0	0
New Intersection Vehicle Detection: Video Image Detection camera	53	35	0	11	0	0	0	0	7	0	0	0	0
New Intersection Vehilce Detection: Magnetometer	16	16	0	0	0	0	0	0	0	0	0	0	0
New Speed Feedback Signs	2	0	0	0	0	0	0	0	0	2	0	0	0
New Arterial Changeable Message Sign (CMS): single sided	2	2	0	0	0	0	0	0	0	0	0	0	0
New Arterial Changeable Message Sign (CMS): double-sided	1	1	0	0	0	0	0	0	0	0	0	0	0
Exisiting TSP emitters	40	0	0	0	0	0	0	0	0	0	0	0	40
New multi-mode (GPS-InfraRed) TSP Emitters	80	0	0	0	0	0	0	0	0	0	0	40	40
Traffic Signal System Software Maintenance/Upgrades		10%	10%	10%	0%	10%	10%	10%	10%	10%	10%		
TOTAL NUMBER OF DEVICES	**753**	**152**	**34**	**66**	**36**	**26**	**60**	**48**	**122**	**65**	**24**	**40**	**80**
TOTAL NUMBER OF NEW FIELD DEVICES	**548**	**130**	**23**	**41**	**22**	**24**	**39**	**40**	**83**	**49**	**17**	**40**	**40**
Delta Percent Increase of New Devices	100%	23.72%	4.20%	7.48%	4.01%	4.38%	7.12%	7.30%	15.15%	8.94%	3.10%	7.30%	7.30%
Total Maintenance Costs	$ 320,122.00	$ 64,657.50	$ 12,694.50	$ 27,924.00	$ 11,103.50	$ 12,601.00	$ 21,607.50	$ 20,860.50	$ 50,114.50	$ 26,206.00	$ 12,353.00	$ 20,000.00	$ 40,000.00
Total Operating Costs	$ 224,435.04	$ 37,415.07	$ 12,965.93	$ 17,446.04	$ 8,446.36	$ 17,485.49	$ 14,550.92	$ 23,054.48	$ 50,859.65	$ 32,122.54	$ 10,088.55		
TOTAL O&M COST	$ 544,557.04	$ 102,072.57	$ 25,660.43	$ 45,370.04	$ 19,549.86	$ 30,086.49	$ 36,158.42	$ 43,914.98	$ 100,974.15	$ 58,328.54	$ 22,441.55	$ 20,000.00	$ 40,000.00
Net Increase in Maintenance Costs - New Devices	$ 251,612.00	$ 53,554.50	$ 10,444.50	$ 18,157.00	$ 9,525.50	$ 9,601.00	$ 19,115.50	$ 17,532.50	$ 39,786.50	$ 22,456.00	$ 11,439.00	$ 20,000.00	$ 20,000.00
Net Increase in Operating Costs - New Devices	$ 224,435.04	$ 37,415.07	$ 12,965.93	$ 17,446.04	$ 8,446.36	$ 17,485.49	$ 14,550.92	$ 23,054.48	$ 50,859.65	$ 32,122.54	$ 10,088.55		
NET INCREASE IN TOTAL O&M COST	$ 476,047.04	$ 90,969.57	$ 23,410.43	$ 35,603.04	$ 17,971.86	$ 27,086.49	$ 33,666.42	$ 40,586.98	$ 90,646.15	$ 54,578.54	$ 21,527.55	$ 20,000.00	$ 20,000.00
TOTAL CALTRANS CONTRIBUTION TO INCREASED O&M COST	$ 188,435.05	$ 6,157.43	$ 17,013.18	$ 23,365.93	$ 17,613.86	$ 3,902.12	$ 25,032.99	$ 17,835.87	$ 45,018.17	$ 21,794.49	$ 10,701.00	$ -	$ -
TOTAL NON-CALTRANS REGIONAL CONTRIBUTION* TO INCREASED O&M COSTS	$ 137,239.50	$ 2,672.00	$ 358.00	$ 716.00	$ 358.00	$ 23,184.36	$ 8,633.43	$ 22,751.11	$ 35,955.98	$ 31,784.05	$ 10,826.56	$ -	$ -
TOTAL LOCAL CONTRIBUTION TO INCREASED O&M COSTS	$ 150,372.49	$ 82,140.13	$ 6,039.25	$ 11,521.11	$ -	$ -	$ -	$ -	$ 9,672.00	$ 1,000.00	$ -	$ 20,000.00	$ 20,000.00
TOTAL ESTIMATED CONSTRUCTION COST	$ 5,525,613.00	$ 1,653,243.00	$ 152,450.00	$ 488,535.00	$ 158,600.00	$ 224,050.00	$ 268,120.00	$ 355,450.00	$ 1,178,265.00	$ 473,400.00	$ 193,500.00	$ 190,000.00	$ 190,000.00

*** Non-Caltrans Regional Contribution paid by regional MPO or CMAs**

Notes:
THIS ATTACHMENT IS SHOWN FOR COST ESTIMATING PURPOSES AND PROVIDES BACKGROUND ON HOW THE O&M COSTS WERE ESTIMATED.

Total Number of Devices = sum of above quantities; this includes upgrades
Total Number of New Devices = does not include upgrades to existing devices.
Software Maintenance/Upgrades = based on percent of total new devices in each agency
Staffing Costs are assumed included in current staffing levels
50% of San Pablo Avenue Collocation costs already being paid by local agencies

BENEFITS TO LOCAL AGENCIES
- Ability to remotely monitor and revise signal timing without sending staff to field cabinet. Saves staff time.
- Ability to remotely view signal timing information in other jurisdictions. Improves efficiency.
- Creates tools that enable local agencies and Caltrans to improve traffic flow on local streets during major freeway incidents.

SUMMARY OF ACRONYMS

ATM	Active Traffic Management
CCTV	Closed Circuit Television
CMS	Changeable Message Sign
CT	Caltrans
CTC	(Alameda) County Transportation Commission
EVP	Emergency Vehicle Preemption
GPRS	General Packet Radio System
HW	Hardware
IP	Internet Protocol
MVDS	Microwave Vehicle Detection System
O&M	Operations and Maintenance
SIC	Signal Interconnect Cable
TS	Traffic Signal
TSP	Transit Signal Priority
VID	Video Image Detection

CALTRANS MAINTAINED

Device	Number of Devices	Oakland	Emeryville	Berkeley	Albany	CCCounty	El Cerrito	San Pablo	Richmond	Pinole	Hercules	WestCAT	AC Transit
Existing SMART Corridor cameras (used by project)	10	0	0	3	2	0	3	1	1	0	0	0	0
New closed-circuit television (CCTV) cameras	25	0	2	3	1	1	1	3	8	4	2	0	0
New video encoders	25	0	2	3	1	1	1	3	8	4	2	0	0
Existing SMART Corridor Vehicle Detection Stations (used by project)	9	0	1	4	2	0	2	0	0	0	0	0	0
New Vehicle Detection Stations	0	0	0	0	0	0	0	0	0	0	0	0	0
Existing SMART Corridor TSP intersections	23	0	6	0	7	0	10	0	0	0	0	0	0
New TSP intersections (including ramp metering locations)	7	0	0	3	0	0	0	0	3	0	1	0	0
New EVP-only intersections	19	0	0	0	2	0	2	4	8	2	1	0	0
New Trailblazer Signs	14	1	1	6	2	0	4	0	0	0	0	0	0
New Traffic Signal	0	0	0	0	0	0	0	0	0	0	0	0	0
Traffic Signal Controller Upgrades (existing signal)	56	3	9	0	9	1	13	3	10	6	2	0	0
New Wireless GPRS modem (traffic signal controllers)	17	3	1	0	1	0	2	2	4	3	1	0	0
New Controller communications: Ethernet switch	0	0	0	0	0	0	0	0	0	0	0	0	0
New Controller communications: Ethernet module	40	3	7	0	8	0	12	2	4	3	1	0	0
New Intersection Vehicle Detection: Video Image Detection camera	0	0	0	0	0	0	0	0	0	0	0	0	0
New Intersection Vehilce Detection: Magnetometer	0	0	0	0	0	0	0	0	0	0	0	0	0
New Speed Feedback Signs	0	0	0	0	0	0	0	0	0	0	0	0	0
New Arterial Changeable Message Sign (CMS): single sided	0	0	0	0	0	0	0	0	0	0	0	0	0
New Arterial Changeable Message Sign (CMS): double-sided	0	0	0	0	0	0	0	0	0	0	0	0	0
Exisiting TSP emitters	0	0	0	0	0	0	0	0	0	0	0	0	0
New multi-mode (GPS-InfraRed) TSP Emitters	0	0	0	0	0	0	0	0	0	0	0	0	0
Software Maintenance/Upgrades	CALTRANS	10%											
TOTAL NUMBER OF DEVICES	**245**	**10**	**29**	**22**	**35**	**3**	**50**	**18**	**46**	**22**	**10**	**0**	**0**
TOTAL NUMBER OF NEW FIELD DEVICES	**170**	**7**	**19**	**15**	**22**	**2**	**32**	**14**	**35**	**16**	**8**	**0**	**0**
Delta Percent Increase of New Devices	31.02%	1.28%	3.47%	2.74%	4.01%	0.36%	5.84%	2.55%	6.39%	2.92%	1.46%	0.00%	0.00%
Total Maintenance Costs	$ 79,013.50	$ 3,038.50	$ 8,727.50	$ 10,724.50	$ 10,745.50	$ 945.00	$ 15,825.00	$ 5,304.00	$ 14,205.50	$ 6,373.50	$ 3,124.50	$ -	$ -
Total Operating Costs	$ 120,061.55	$ 3,868.93	$ 10,535.68	$ 11,633.43	$ 8,446.36	$ 3,207.12	$ 11,449.99	$ 12,945.87	$ 32,976.67	$ 16,920.99	$ 8,076.50		
TOTAL O&M COST	$ 199,075.05	$ 6,907.43	$ 19,263.18	$ 22,357.93	$ 19,191.86	$ 4,152.12	$ 27,274.99	$ 18,249.87	$ 47,182.17	$ 23,294.49	$ 11,201.00	$ -	$ -
Net Increase in Maintenance Costs - New Devices	$ 68,373.50	$ 2,288.50	$ 6,477.50	$ 11,732.50	$ 9,167.50	$ 695.00	$ 13,583.00	$ 4,890.00	$ 12,041.50	$ 4,873.50	$ 2,624.50	$ -	$ -
Net Increase in Operating Costs - New Devices	$ 120,061.55	$ 3,868.93	$ 10,535.68	$ 11,633.43	$ 8,446.36	$ 3,207.12	$ 11,449.99	$ 12,945.87	$ 32,976.67	$ 16,920.99	$ 8,076.50		
NET INCREASE IN TOTAL O&M COST	$ 188,435.05	$ 6,157.43	$ 17,013.18	$ 23,365.93	$ 17,613.86	$ 3,902.12	$ 25,032.99	$ 17,835.87	$ 45,018.17	$ 21,794.49	$ 10,701.00	$ -	$ -
TOTAL CALTRANS CONTRIBUTION TO INCREASED O&M COST	$ 188,435.05	$ 6,157.43	$ 17,013.18	$ 23,365.93	$ 17,613.86	$ 3,902.12	$ 25,032.99	$ 17,835.87	$ 45,018.17	$ 21,794.49	$ 10,701.00	$ -	$ -
TOTAL NON-CALTRANS REGIONAL CONTRIBUTION* TO INCREASED O&M COSTS	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
TOTAL LOCAL CONTRIBUTION TO INCREASED O&M COSTS	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
TOTAL ESTIMATED CONSTRUCTION COST	$ 1,505,080.00	$ 45,060.00	$ 143,860.00	$ 243,000.00	$ 158,600.00	$ 29,090.00	$ 241,850.00	$ 116,100.00	$ 310,560.00	$ 144,365.00	$ 72,595.00	$ -	$ -

*** Non-Caltrans Regional Contribution paid by regional MPO or CMAs**

Total Number of Devices = sum of above quantities.
Total Number of New Devices = does not include upgrades to existing devices.
Software Maintenance/Upgrades = based on percent of total devices in each agency
Individual agencies quantities are linked to this table

LOCAL MAINTAINED

Device	Number of Devices	Oakland	Emeryville	Berkeley	Albany	CCCounty	El Cerrito	San Pablo	Richmond	Pinole	Hercules	WestCAT	AC Transit
Existing SMART Corridor cameras (used by project)	5	2	0	0	0	0	0	1	1	0	1	0	0
New closed-circuit television (CCTV) cameras	14	8	0	0	0	2	0	1	1	2	0	0	0
New video encoders	10	10	0	0	0	0	0	0	0	0	0	0	0
Existing SMART Corridor Vehicle Detection Stations (used by project)	14	0	1	2	1	1	2	1	4	1	1	0	0
New Vehicle Detection Stations	10	0	0	0	0	2	0	2	2	3	1	0	0
Existing SMART Corridor TSP intersections	41	10	0	10	0	0	2	10	9	0	0	0	0
New TSP intersections	30	0	0	0	0	5	0	1	5	14	5	0	0
New EVP-only intersections	30	10	0	5	0	0	1	4	8	2	0	0	0
New Trailblazer Signs	22	2	0	0	0	3	0	4	6	4	3	0	0
New Traffic Signal	2	0	0	0	0	0	0	0	2	0	0	0	0
Traffic Signal Controller Upgrades (existing signal)	71	17	0	16	0	0	1	2	23	9	3	0	0
New Wireless GPRS modem (traffic signal controllers)	19	1	2	0	0	5	2	2	4	3	0	0	0
New Controller communications: Ethernet switch	14	14	0	0	0	0	0	0	0	0	0	0	0
New Controller communications: Ethernet module	32	14	2	0	0	5	2	2	4	3	0	0	0
New Intersection Vehicle Detection: Video Image Detection camera	53	35	0	11	0	0	0	0	7	0	0	0	0
New Intersection Vehilce Detection: Magnetometer	16	16	0	0	0	0	0	0	0	0	0	0	0
New Speed Feedback Signs	2	0	0	0	0	0	0	0	0	2	0	0	0
New Arterial Changeable Message Sign (CMS): single sided	2	2	0	0	0	0	0	0	0	0	0	0	0
New Arterial Changeable Message Sign (CMS): double-sided	1	1	0	0	0	0	0	0	0	0	0	0	0
Exisiting TSP emitters	40	0	0	0	0	0	0	0	0	0	0	0	40
New multi-mode (GPS-InfraRed) TSP Emitters	80	0	0	0	0	0	0	0	0	0	0	40	40
Software Maintenance/Upgrades		10%	10%	10%	0%	10%	10%	10%	10%	10%	10%	NA	NA
TOTAL NUMBER OF DEVICES	**508**	**142**	**5**	**44**	**1**	**23**	**10**	**30**	**76**	**43**	**14**	**40**	**80**
TOTAL NUMBER OF NEW FIELD DEVICES	**378**	**123**	**4**	**26**	**0**	**22**	**7**	**26**	**48**	**33**	**9**	**40**	**40**
Delta Percent Increase of New Devices	68.98%	22.45%	0.73%	4.74%	0.00%	4.01%	1.28%	4.74%	8.76%	6.02%	1.64%	7.30%	7.30%
Total Maintenance Costs	$ 181,108.50	$ 61,619.00	$ 3,967.00	$ 17,199.50	$ 358.00	$ 11,656.00	$ 5,782.50	$ 15,556.50	$ 35,909.00	$ 19,832.50	$ 9,228.50	$ 20,000.00	$ 40,000.00
Total Operating Costs	$ 104,373.49	$ 33,546.13	$ 2,430.25	$ 5,812.61	$ -	$ 14,278.36	$ 3,100.93	$ 10,108.61	$ 17,882.98	$ 15,201.55	$ 2,012.06		
TOTAL O&M COST	$ 345,481.99	$ 95,165.13	$ 6,397.25	$ 23,012.11	$ 358.00	$ 25,934.36	$ 8,883.43	$ 25,665.11	$ 53,791.98	$ 35,034.05	$ 11,240.56	$ 20,000.00	$ 40,000.00
Net Increase in Maintenance Costs - New Devices	$ 143,238.50	$ 51,266.00	$ 3,967.00	$ 6,424.50	$ 358.00	$ 8,906.00	$ 5,532.50	$ 12,642.50	$ 27,745.00	$ 17,582.50	$ 8,814.50	$ 20,000.00	$ 20,000.00
Net Increase in Operating Costs - New Devices	$ 104,373.49	$ 33,546.13	$ 2,430.25	$ 5,812.61	$ -	$ 14,278.36	$ 3,100.93	$ 10,108.61	$ 17,882.98	$ 15,201.55	$ 2,012.06		
NET INCREASE IN TOTAL O&M COST	$ 287,611.99	$ 84,812.13	$ 6,397.25	$ 12,237.11	$ 358.00	$ 23,184.36	$ 8,633.43	$ 22,751.11	$ 45,627.98	$ 32,784.05	$ 10,826.56	$ 20,000.00	$ 20,000.00
TOTAL CALTRANS CONTRIBUTION TO INCREASED O&M COST	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
TOTAL NON-CALTRANS REGIONAL CONTRIBUTION* TO INCREASED O&M COSTS	$ 137,239.50	$ 2,672.00	$ 358.00	$ 716.00	$ 358.00	$ 23,184.36	$ 8,633.43	$ 22,751.11	$ 35,955.98	$ 31,784.05	$ 10,826.56	$ -	$ -
TOTAL LOCAL CONTRIBUTION TO INCREASED O&M COSTS	$ 150,372.49	$ 82,140.13	$ 6,039.25	$ 11,521.11	$ -	$ -	$ -	$ -	$ 9,672.00	$ 1,000.00	$ -	$ 20,000.00	$ 20,000.00
TOTAL ESTIMATED CONSTRUCTION COST	$ 4,020,533.00	$ 1,608,183.00	$ 8,590.00	$ 245,535.00	$ -	$ 194,960.00	$ 26,270.00	$ 239,350.00	$ 867,705.00	$ 329,035.00	$ 120,905.00	$ 190,000.00	$ 190,000.00

*** Non-Caltrans Regional Contribution paid by regional MPO or CMAs**

Total Number of Devices = sum of above quantities
Total Number of New Devices = does not include upgrades to existing devices.
Software Maintenance/Upgrades = based on percent of total devices in each agency
Individual agencies quantities are linked to this table

LOCAL SAN PABLO CORRIDOR ARTERIAL AND TRANSIT IMPROVEMENT (CONTRA COSTA REGION

Device	Number of Devices	CCCounty	El Cerrito	San Pablo	Richmond	Pinole	Hercules	WestCAT
Existing SMART Corridor cameras (used by project)	3	0	0	1	1	0	1	0
New closed-circuit television (CCTV) cameras	6	2	0	1	1	2	0	0
New video encoders	0	0	0	0	0	0	0	0
Existing SMART Corridor Vehicle Detection Stations (used by project)	10	1	2	1	4	1	1	0
New Vehicle Detection Stations	10	2	0	2	2	3	1	0
Existing SMART Corridor TSP intersections	21	0	2	10	9	0	0	0
New TSP intersections (including ramp metering locations)	30	5	0	1	5	14	5	0
New EVP-only intersections	15	0	1	4	8	2	0	0
New Trailblazer Signs	20	3	0	4	6	4	3	0
New Traffic Signal	2	0	0	0	2	0	0	0
Traffic Signal Controller Upgrades (existing signal)	38	0	1	2	23	9	3	0
Wireless GPRS modem (traffic signal controllers)	16	5	2	2	4	3	0	0
Controller communications: Ethernet switch	0	0	0	0	0	0	0	0
Controller communications: Ethernet module	16	5	2	2	4	3	0	0
New Intersection Vehicle Detection: Video Image Detection camera	7	0	0	0	7	0	0	0
New Intersection Vehilce Detection: Magnetometer	0	0	0	0	0	0	0	0
Speed Feedback Signs	2	0	0	0	0	2	0	0
New Arterial Changeable Message Sign (CMS): single sided	0	0	0	0	0	0	0	0
New Arterial Changeable Message Sign (CMS): double-sided	0	0	0	0	0	0	0	0
Exisiting TSP emitters	0	0	0	0	0	0	0	0
New multi-mode (GPS-InfraRed) TSP Emitters	40	0	0	0	0	0	0	40
Software Maintenance/Upgrades								

TOTAL NUMBER OF DEVICES	**236**	**23**	**10**	**30**	**76**	**43**	**14**	**40**
TOTAL NUMBER OF NEW FIELD DEVICES	**185**	**22**	**7**	**26**	**48**	**33**	**9**	**40**
Delta Percent Increase of New Devices	33.76%	4.01%	1.28%	4.74%	8.76%	6.02%	1.64%	7.30%

Total Maintenance Costs	$ 97,965.00	$ 11,656.00	$ 5,782.50	$ 15,556.50	$ 35,909.00	$ 19,832.50	$ 9,228.50	$ 20,000.00
Total Operating Costs	$ 62,584.50	$ 14,278.36	$ 3,100.93	$ 10,108.61	$ 17,882.98	$ 15,201.55	$ 2,012.06	
TOTAL O&M COST	$ 180,549.50	$ 25,934.36	$ 8,883.43	$ 25,665.11	$ 53,791.98	$ 35,034.05	$ 11,240.56	$ 20,000.00

Net Increase in Maintenance Costs - New Devices	$ 81,223.00	$ 8,906.00	$ 5,532.50	$ 12,642.50	$ 27,745.00	$ 17,582.50	$ 8,814.50	$ 20,000.00
Net Increase in Operating Costs - New Devices	$ 62,584.50	$ 14,278.36	$ 3,100.93	$ 10,108.61	$ 17,882.98	$ 15,201.55	$ 2,012.06	
NET INCREASE IN TOTAL O&M COST	$ 163,807.50	$ 23,184.36	$ 8,633.43	$ 22,751.11	$ 45,627.98	$ 32,784.05	$ 10,826.56	$ 20,000.00

TOTAL CALTRANS CONTRIBUTION TO INCREASED O&M COST	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -

TOTAL NON-CALTRANS REGIONAL CONTRIBUTION* TO INCREASED O&M COSTS	$ 133,135.50	$ 23,184.36	$ 8,633.43	$ 22,751.11	$ 35,955.98	$ 31,784.05	$ 10,826.56	$ -

TOTAL LOCAL CONTRIBUTION TO INCREASED O&M COSTS	$ 30,672.00	$ -	$ -	$ -	$ 9,672.00	$ 1,000.00	$ -	$ 20,000.00

*** Non-Caltrans Regional Contribution paid by regional MPO or CMAs**

* This table is a subset of the information shown on the Local Summary.

Total Number of Devices = sum of above quantities
Total Number of New Devices = does not include upgrades to existing devices.
Software Maintenance/Upgrades = based on percent of total devices in each agency
Individual agencies quantities are linked to this table

Maintenance Costs -- OAKLAND (CT ROW)

Device	Number of Devices	Unit Capital Cost	Unit Maintenance Cost/Year	Total Cost/Year	Life (Years)	Maintenance Cost Notes	Devices that Increase Inventory	Paid by Caltrans	Paid by Alameda CTC	Net Contribution by City
Existing SMART Corridor cameras (used by project)	0	$9,300	$336	$0	10	Same as new CCTV Camera	$0			$0
New closed-circuit television (CCTV) cameras	0	$23,000	$336	$0	10	Alameda CTC Cost Data	$0			$0
New video encoders	0	$3,590	$359	$0	10	10% of Capital cost	$0			$0
Existing SMART Corridor Vehicle Detection Stations (used by project)	0	$14,080	$358	$0	10	same as New MVDS	$0			$0
New Vehicle Detection Stations	0	$14,080	$358	$0	10	Alameda CTC Cost Data	$0			$0
Existing SMART Corridor TSP intersections	0	$5,060	$403	$0	10	Alameda CTC Cost Data	$0			$0
New TSP intersections (including ramp metering locations)	0	$5,060	$403	$0	10	Alameda CTC Cost Data	$0			$0
New EVP-only intersections	0	$5,060	$403	$0	10	Same as EVP/TSP intersection	$0			$0
New Trailblazer Signs	1	$24,675	$1,000	$1,000	10	Per Skyline; includes GPRS cost	$1,000	$1,000		$0
New Traffic Signal	0	$200,000	$3,000	$0	10	Based on City of Concord	$0			$0
Traffic Signal Controller Upgrades (existing signal)	3	$2,500	$250	$750	10	10% of Capital cost	No increase in maint cost.			
Wireless GPRS modem (traffic signal controllers)	3	$2,820	$282	$846	3	10% of Capital cost	$846	$846		$0
Controller communications: Ethernet switch	0	$4,060	$406	$0	10	10% of Capital cost	$0			$0
Controller communications: Ethernet module	3	$1,475	$148	$443	10	10% of Capital cost	$443	$443		$0
New Intersection Vehicle Detection: Video Image Detection camera	0	$11,785	$336	$0	10	Estimated same as CCTV camera	$0			$0
New Intersection Vehilce Detection: Magnetometer	0	$8,438	$844	$0	10	10% of Capital cost	$0			$0
Speed Feedback Signs	0	$12,875	$500	$0	15	Compared to trailblazer	$0			$0
New Arterial Changeable Message Sign (CMS): single sided	0	$160,333	$1,500	$0	10	Compared to trailblazer	$0			$0
New Arterial Changeable Message Sign (CMS): double-sided	0	$246,782	$2,000	$0	10	Compared to trailblazer	$0			$0
Exisiting TSP emitters	0	$1,000	$500	$0	10	AC Transit Data	$0			$0
New multi-mode (GPS-InfraRed) TSP Emitters	0	$4,750	$0	$0	10	Assumed to be same as existing	$0			$0
Traffic Signal Software Maintenance/Upgrades *	0.00%	$500,000	$27,500	$0	5	Actual bids	$0			$0
Estimated Annual Maintenance Cost (Subtotal)				**$3,039**		**Total Increase due to ICM Devices**	**$2,289**	**$2,289**	**$0**	**$0**

TOTAL ESTIMATED CONSTRUCTION COST	**$ 45,060.00**

* Local ROW cost only- no increase in maintenance cost if traffic signal system is existing

Operating Costs

Device	Quantity	Capital Cost	Unit Operation Cost	Total Cost/Year	Notes	Devices that Increase Inventory	Paid by Caltrans	Paid by Alameda CTC	Net Contribution by City
San Pablo Corridor Collocation	1.28%		$122,512	$1,565	Estimated Cost	$1,565	$1,565		$0
Wireless GPRS modem	3		$768	$2,304	$64 per month	$2,304	$2,304		$0
Point-Point T1 line for each camera	0		$2,100	$0	$175 per month	$0			$0
Field Devices Electricity (new traffic signal, new CCTV cameras)	0		$660	$0	Alameda CTC Cost Data	$0			$0
IT/Staffing Assistance* - Maintenance Staff	1.28%			$0	Internal based on each Agencies' O&M policy	$0			$0
IT/Staffing Assistance* - Operation Staff	1.28%			$0	Internal based on each Agencies' O&M policy	$0			$0
Estimated Annual Operating Cost (Subtotal)				**$3,869**	**Total Increase due to ICM Devices**	**$3,869**	**$3,869**	**$0**	**$0**

*Provided by Alameda CTC or City Traffic Signal Coordinator for all agencies

Total Estimated Annual Operation and Maintenance Cost	**$6,907**	**Total Increase due to ICM Devices**	**$6,157**	**$6,157**	**$0**	**$0**

Maintenance Costs -- OAKLAND (LOCAL ROW)

Device	Number of Devices	Unit Capital Cost	Unit Maintenance Cost/Year	Total Cost/Year	Life (Years)	Maintenance Cost Notes	Devices that Increase Inventory	Paid by Caltrans	Paid by Alameda CTC	Net Contribution by City
Existing SMART Corridor cameras (used by project)	2	$9,300	$336	$672	10	Same as new CCTV Camera	$672		$672	$0
New closed-circuit television (CCTV) cameras	8	$23,000	$336	$2,688	10	Alameda CTC Cost Data	$2,688		$0	$2,688
New video encoders	10	$3,590	$359	$3,590	10	10% of Capital cost	$3,590			$3,590
Existing SMART Corridor Vehicle Detection Stations (used by project)	0	$14,080	$358	$0	10	same as New MVDS	$0		$0	$0
New Vehicle Detection Stations	0	$14,080	$358	$0	10	Alameda CTC Cost Data	$0		$0	$0
Existing SMART Corridor TSP intersections**	10	$5,060	$403	$4,025	10	Alameda CTC Cost Data	$0		$0	$0
New TSP intersections	0	$5,060	$403	$0	10	Alameda CTC Cost Data	$0			$0
New EVP-only intersections	10	$5,060	$403	$4,025	10	Same as EVP/TSP intersection	$4,025			$4,025
New Trailblazer Signs	2	$24,675	$1,000	$2,000	10	Per Skyline; includes GPRS cost	$2,000		$2,000	$0
New Traffic Signal	0	$200,000	$3,000	$0	10	Based on City of Concord	$0			$0
Traffic Signal Controller Upgrades (existing signal)	17	$2,500	$250	$4,250	10	10% of Capital cost	No increase in maint cost.			
Wireless GPRS modem (traffic signal controllers)	1	$2,820	$282	$282	3	10% of Capital cost	$282			$282
Controller communications: Ethernet switch	14	$4,060	$406	$5,684	10	10% of Capital cost	$5,684			$5,684
Controller communications: Ethernet module	14	$1,475	$148	$2,065	10	10% of Capital cost	$2,065			$2,065
New Intersection Vehicle Detection: Video Image Detection camera	35	$11,785	$336	$11,760	10	Estimated same as CCTV camera	$11,760			$11,760
New Intersection Vehilce Detection: Magnetometer	16	$8,438	$844	$13,500	10	10% of Capital cost	$13,500			$13,500
Speed Feedback Signs	0	$12,875	$500	$0	15	Compared to trailblazer	$0			$0
New Arterial Changeable Message Sign (CMS): single sided	2	$160,333	$1,500	$3,000	10	Compared to trailblazer	$3,000			$3,000
New Arterial Changeable Message Sign (CMS): double-sided	1	$246,782	$2,000	$2,000	10	Compared to trailblazer	$2,000			$2,000
Exisiting TSP emitters	0	$1,000	$500	$0	10	AC Transit Data	$0			$0
New multi-mode (GPS-InfraRed) TSP Emitters	0	$4,750	$0	$0	10	Assumed to be same as existing	$0			$0
Traffic Signal Software Maintenance/Upgrades *	10.00%	$500,000	$27,500	$2,750	5	Actual bids	$0			$0
Estimated Annual Maintenance Cost (Subtotal)				**$61,619**		**Total Increase due to ICM Devices**	**$51,266**	**$0**	**$2,672**	**$48,594**

TOTAL ESTIMATED CONSTRUCTION COST	**$ 1,608,183.00**

* Local ROW cost only- no increase in maintenance cost if traffic signal system is existing
Oakland has existing signal system
** Maintenance of existing SMART Corridor TSP remains responsibility of Cities per previous maintenance agreement

Operating Costs

Device	Quantity	Capital Cost	Unit Operation Cost	Total Cost/Year	Notes	Devices that Increase Inventory	Paid by Caltrans	Paid by Alameda CTC	Net Contribution by City
San Pablo Corridor Collocation	22.45%		$122,512	$27,498	Estimated Cost	$27,498			$27,498
Wireless GPRS modem	1		$768	$768	$64 per month	$768			$768
Point-Point T1 line for each camera	0		$2,100	$0	$175 per month	$0			$0
Field Devices Electricity (new traffic signal, new CCTV cameras)	8		$660	$5,280	Alameda CTC Cost Data	$5,280			$5,280
IT/Staffing Assistance* - Maintenance Staff	22.45%			$0	Internal based on each Agencies' O&M policy	$0			$0
IT/Staffing Assistance* - Operation Staff	22.45%			$0	Internal based on each Agencies' O&M policy	$0			$0
Estimated Annual Operating Cost (Subtotal)				**$33,546**	**Total Increase due to ICM Devices**	**$33,546**	**$0**	**$0**	**$33,546**

*Provided by Alameda CTC or City Traffic Signal Coordinator for all agencies

Total Estimated Annual Operation and Maintenance Cost	**$95,165**	**Total Increase due to ICM Devices**	**$84,812**	**$0**	**$2,672**	**$82,140**

Maintenance Costs -- EMERYVILLE (CT ROW)

Device	Number of Devices	Unit Capital Cost	Unit Maintenance Cost/Year	Total Cost/Year	Life (Years)	Maintenance Cost Notes	Devices that Increase Inventory	Paid by Caltrans	Paid by Alameda CTC	Net Contribution by City
Existing SMART Corridor cameras (used by project)	0	$9,300	$336	$0	10	Same as new CCTV Camera	$0			$0
New closed-circuit television (CCTV) cameras	2	$23,000	$336	$672	10	Alameda CTC Cost Data	$672	$672		$0
New video encoders	2	$3,590	$359	$718	10	10% of Capital cost	$718	$718		$0
Existing SMART Corridor Vehicle Detection Stations (used by project)	1	$14,080	$358	$358	10	same as New MVDS	$358	$358		$0
New Vehicle Detection Stations	0	$14,080	$358	$0	10	Alameda CTC Cost Data	$0			$0
Existing SMART Corridor TSP intersections	6	$5,060	$403	$2,415	10	Alameda CTC Cost Data	$2,415	$2,415		$0
New TSP intersections (including ramp metering locations)	0	$5,060	$403	$0	10	Alameda CTC Cost Data	$0			$0
New EVP-only intersections	0	$5,060	$403	$0	10	Same as EVP/TSP intersection	$0			$0
New Trailblazer Signs	1	$24,675	$1,000	$1,000	10	Per Skyline; includes GPRS cost	$1,000	$1,000		$0
New Traffic Signal	0	$200,000	$3,000	$0	10	Based on City of Concord	$0			$0
Traffic Signal Controller Upgrades (existing signal)	9	$2,500	$250	$2,250	10	10% of Capital cost	No increase in maint cost.			
Wireless GPRS modem (traffic signal controllers)	1	$2,820	$282	$282	3	10% of Capital cost	$282	$282		$0
Controller communications: Ethernet switch	0	$4,060	$406	$0	10	10% of Capital cost	$0			$0
Controller communications: Ethernet module	7	$1,475	$148	$1,033	10	10% of Capital cost	$1,033	$1,033		$0
New Intersection Vehicle Detection: Video Image Detection camera	0	$11,785	$336	$0	10	Estimated same as CCTV camera	$0			$0
New Intersection Vehilce Detection: Magnetometer	0	$8,438	$844	$0	10	10% of Capital cost	$0			$0
Speed Feedback Signs	0	$12,875	$500	$0	15	Compared to trailblazer	$0			$0
New Arterial Changeable Message Sign (CMS): single sided	0	$160,333	$1,500	$0	10	Compared to trailblazer	$0			$0
New Arterial Changeable Message Sign (CMS): double-sided	0	$246,782	$2,000	$0	10	Compared to trailblazer	$0			$0
Exisiting TSP emitters	0	$1,000	$500	$0	10	AC Transit Data	$0			$0
New multi-mode (GPS-InfraRed) TSP Emitters	0	$4,750	$0	$0	10	Assumed to be same as existing	$0			$0
Traffic Signal Software Maintenance/Upgrades *	0.00%	$500,000	$27,500	$0	5	Actual bids	$0			$0
Estimated Annual Maintenance Cost (Subtotal)				**$8,728**		**Total Increase due to ICM Devices**	**$6,478**	**$6,478**	**$0**	**$0**

TOTAL ESTIMATED CONSTRUCTION COST	**$**	**143,860.00**

* Local ROW cost only- no increase in maintenance cost if traffic signal system is existing

Operating Costs

Device	Quantity	Capital Cost	Unit Operation Cost	Total Cost/Year	Notes	Devices that Increase Inventory	Paid by Caltrans	Paid by Alameda CTC	Net Contribution by City
San Pablo Corridor Collocation	3.47%		$122,512	$4,248	Estimated Cost	$4,248	$4,248		$0
Wireless GPRS modem	1		$768	$768	$64 per month	$768	$768		$0
Point-Point T1 line for each camera	2		$2,100	$4,200	$175 per month	$4,200	$4,200		$0
Field Devices Electricity (new traffic signal, new CCTV cameras)	2		$660	$1,320	Alameda CTC Cost Data	$1,320	$1,320		$0
IT/Staffing Assistance* - Maintenance Staff	3.47%			$0	Internal based on each Agencies' O&M policy	$0			$0
IT/Staffing Assistance* - Operation Staff	3.47%			$0	Internal based on each Agencies' O&M policy	$0			$0
Estimated Annual Operating Cost (Subtotal)				**$10,536**	**Total Increase due to ICM Devices**	**$10,536**	**$10,536**	**$0**	**$0**

*Provided by Alameda CTC or City Traffic Signal Coordinator for all agencies

Total Estimated Annual Operation and Maintenance Cost	**$19,263**	**Total Increase due to ICM Devices**	**$17,013**	**$17,013**	**$0**	**$0**

Maintenance Costs -- EMERYVILLE (LOCAL ROW)

Device	Number of Devices	Unit Capital Cost	Unit Maintenance Cost/Year	Total Cost/Year	Life (Years)	Maintenance Cost Notes	Devices that Increase Inventory	Paid by Caltrans	Paid by Alameda CTC	Net Contribution by City
Existing SMART Corridor cameras (used by project)	0	$9,300	$336	$0	10	Same as new CCTV Camera	$0		$0	$0
New closed-circuit television (CCTV) cameras	0	$23,000	$336	$0	10	Alameda CTC Cost Data	$0		$0	$0
New video encoders	0	$3,590	$359	$0	10	10% of Capital cost	$0			$0
Existing SMART Corridor Vehicle Detection Stations (used by project)	1	$14,080	$358	$358	10	same as New MVDS	$358		$358	$0
New Vehicle Detection Stations	0	$14,080	$358	$0	10	Alameda CTC Cost Data	$0		$0	$0
Existing SMART Corridor TSP intersections	0	$5,060	$403	$0	10	Alameda CTC Cost Data	$0		$0	$0
New TSP intersections	0	$5,060	$403	$0	10	Alameda CTC Cost Data	$0			$0
New EVP-only intersections	0	$5,060	$403	$0	10	Same as EVP/TSP intersection	$0			$0
New Trailblazer Signs	0	$24,675	$1,000	$0	10	Per Skyline; includes GPRS cost	$0		$0	$0
New Traffic Signal	0	$200,000	$3,000	$0	10	Based on City of Concord	$0			$0
Traffic Signal Controller Upgrades (existing signal)	0	$2,500	$250	$0	10	10% of Capital cost	No increase in maint cost.			
Wireless GPRS modem (traffic signal controllers)	2	$2,820	$282	$564	3	10% of Capital cost	$564			$564
Controller communications: Ethernet switch	0	$4,060	$406	$0	10	10% of Capital cost	$0			$0
Controller communications: Ethernet module	2	$1,475	$148	$295	10	10% of Capital cost	$295			$295
New Intersection Vehicle Detection: Video Image Detection camera	0	$11,785	$336	$0	10	Estimated same as CCTV camera	$0			$0
New Intersection Vehilce Detection: Magnetometer	0	$8,438	$844	$0	10	10% of Capital cost	$0			$0
Speed Feedback Signs	0	$12,875	$500	$0	15	Compared to trailblazer	$0			$0
New Arterial Changeable Message Sign (CMS): single sided	0	$160,333	$1,500	$0	10	Compared to trailblazer	$0			$0
New Arterial Changeable Message Sign (CMS): double-sided	0	$246,782	$2,000	$0	10	Compared to trailblazer	$0			$0
Exisiting TSP emitters	0	$1,000	$500	$0	10	AC Transit Data	$0			$0
New multi-mode (GPS-InfraRed) TSP Emitters	0	$4,750	$0	$0	10	Assumed to be same as existing	$0			$0
Traffic Signal Software Maintenance/Upgrades *	10.00%	$500,000	$27,500	$2,750	5	Actual bids	$2,750			$2,750
Estimated Annual Maintenance Cost (Subtotal)				**$3,967**		**Total Increase due to ICM Devices**	**$3,967**	**$0**	**$358**	**$3,609**

TOTAL ESTIMATED CONSTRUCTION COST	**$**	**8,590.00**

* Local ROW cost only- no increase in maintenance cost if traffic signal system is existing
New signal system for Emeryville being installed by project.

Operating Costs

Device	Quantity	Capital Cost	Unit Operation Cost	Total Cost/Year	Notes	Devices that Increase Inventory	Paid by Caltrans	Paid by Alameda CTC	Net Contribution by City
San Pablo Corridor Collocation	0.73%		$122,512	$894	Estimated Cost	$894			$894
Wireless GPRS modem	2		$768	$1,536	$64 per month	$1,536			$1,536
Point-Point T1 line for each camera	0		$2,100	$0	$175 per month	$0			$0
Field Devices Electricity (new traffic signal, new CCTV cameras)	0		$660	$0	Alameda CTC Cost Data	$0			$0
IT/Staffing Assistance* - Maintenance Staff	0.73%			$0	Internal based on each Agencies' O&M policy	$0			$0
IT/Staffing Assistance* - Operation Staff	0.73%			$0	Internal based on each Agencies' O&M policy	$0			$0
Estimated Annual Operating Cost (Subtotal)				**$2,430**	**Total Increase due to ICM Devices**	**$2,430**	**$0**	**$0**	**$2,430**

*Provided by Alameda CTC or City Traffic Signal Coordinator for all agencies

Total Estimated Annual Operation and Maintenance Cost	**$6,397**	**Total Increase due to ICM Devices**	**$6,397**	**$0**	**$358**	**$6,039**

Maintenance Costs -- BERKELEY (CT ROW)

Device	Number of Devices	Unit Capital Cost	Unit Maintenance Cost/Year	Total Cost/Year	Life (Years)	Maintenance Cost Notes	Devices that Increase Inventory	Paid by Caltrans	Paid by Alameda CTC	Net Contribution by City
Existing SMART Corridor cameras (used by project)	3	$9,300	$336	$1,008	10	Same as new CCTV Camera	$1,008	$1,008		$0
New closed-circuit television (CCTV) cameras	3	$23,000	$336	$1,008	10	Alameda CTC Cost Data	$1,008	$1,008		$0
New video encoders	3	$3,590	$359	$1,077	10	10% of Capital cost	$1,077	$1,077		$0
Existing SMART Corridor Vehicle Detection Stations (used by project)	4	$14,080	$358	$1,432	10	same as New MVDS	$1,432	$1,432		$0
New Vehicle Detection Stations	0	$14,080	$358	$0	10	Alameda CTC Cost Data	$0			$0
Existing SMART Corridor TSP intersections	0	$5,060	$403	$0	10	Alameda CTC Cost Data	$0			$0
New TSP intersections (including ramp metering locations)	3	$5,060	$403	$1,208	10	Alameda CTC Cost Data	$1,208	$1,208		$0
New EVP-only intersections	0	$5,060	$403	$0	10	Same as EVP/TSP intersection	$0			$0
New Trailblazer Signs	6	$24,675	$1,000	$6,000	10	Per Skyline; includes GPRS cost	$6,000	$6,000		$0
New Traffic Signal	0	$200,000	$3,000	$0	10	Based on City of Concord	$0			$0
Traffic Signal Controller Upgrades (existing signal)	0	$2,500	$250	$0	10	10% of Capital cost	No increase in maint cost.			
Wireless GPRS modem (traffic signal controllers)	0	$2,820	$282	$0	3	10% of Capital cost	$0			$0
Controller communications: Ethernet switch	0	$4,060	$406	$0	10	10% of Capital cost	$0			$0
Controller communications: Ethernet module	0	$1,475	$148	$0	10	10% of Capital cost	$0			$0
New Intersection Vehicle Detection: Video Image Detection camera	0	$11,785	$336	$0	10	Estimated same as CCTV camera	$0			$0
New Intersection Vehilce Detection: Magnetometer	0	$8,438	$844	$0	10	10% of Capital cost	$0			$0
Speed Feedback Signs	0	$12,875	$500	$0	15	Compared to trailblazer	$0			$0
New Arterial Changeable Message Sign (CMS): single sided	0	$160,333	$1,500	$0	10	Compared to trailblazer	$0			$0
New Arterial Changeable Message Sign (CMS): double-sided	0	$246,782	$2,000	$0	10	Compared to trailblazer	$0			$0
Exisiting TSP emitters	0	$1,000	$500	$0	10	AC Transit Data	$0			$0
New multi-mode (GPS-InfraRed) TSP Emitters	0	$4,750	$0	$0	10	Assumed to be same as existing	$0			$0
Traffic Signal Software Maintenance/Upgrades *	0.00%	$500,000	$27,500	$0	5	Actual bids	$0			$0
Estimated Annual Maintenance Cost (Subtotal)				**$10,725**		**Total Increase due to ICM Devices**	**$11,733**	**$11,733**	**$0**	**$0**

TOTAL ESTIMATED CONSTRUCTION COST	**$**	**243,000.00**

* Local ROW cost only- no increase in maintenance cost if traffic signal system is existing

Operating Costs

Device	Quantity	Capital Cost	Unit Operation Cost	Total Cost/Year	Notes	Devices that Increase Inventory	Paid by Caltrans	Paid by Alameda CTC	Net Contribution by City
San Pablo Corridor Collocation	2.74%		$122,512	$3,353	Estimated Cost	$3,353	$3,353		$0
Wireless GPRS modem	0		$768	$0	$64 per month	$0	$0		$0
Point-Point T1 line for each camera	3		$2,100	$6,300	$175 per month	$6,300	$6,300		$0
Field Devices Electricity (new traffic signal, new CCTV cameras)	3		$660	$1,980	Alameda CTC Cost Data	$1,980	$1,980		$0
IT/Staffing Assistance* - Maintenance Staff	2.74%			$0	Internal based on each Agencies' O&M policy	$0			$0
IT/Staffing Assistance* - Operation Staff	2.74%			$0	Internal based on each Agencies' O&M policy	$0			$0
Estimated Annual Operating Cost (Subtotal)				**$11,633**	**Total Increase due to ICM Devices**	**$11,633**	**$11,633**	**$0**	**$0**

*Provided by Alameda CTC or City Traffic Signal Coordinator for all agencies

Total Estimated Annual Operation and Maintenance Cost	**$22,358**	**Total Increase due to ICM Devices**	**$23,366**	**$23,366**	**$0**	**$0**

Maintenance Costs -- BERKELEY (LOCAL ROW)

Device	Number of Devices	Unit Capital Cost	Unit Maintenance Cost/Year	Total Cost/Year	Life (Years)	Maintenance Cost Notes	Devices that Increase Inventory	Paid by Caltrans	Paid by Alameda CTC	Net Contribution by City
Existing SMART Corridor cameras (used by project)	0	$9,300	$336	$0	10	Same as new CCTV Camera	$0		$0	$0
New closed-circuit television (CCTV) cameras	0	$23,000	$336	$0	10	Alameda CTC Cost Data	$0		$0	$0
New video encoders	0	$3,590	$359	$0	10	10% of Capital cost	$0			$0
Existing SMART Corridor Vehicle Detection Stations (used by project)	2	$14,080	$358	$716	10	same as New MVDS	$716		$716	$0
New Vehicle Detection Stations	0	$14,080	$358	$0	10	Alameda CTC Cost Data	$0		$0	$0
Existing SMART Corridor TSP intersections**	10	$5,060	$403	$4,025	10	Alameda CTC Cost Data	$0	$0	$0	$0
New TSP intersections	0	$5,060	$403	$0	10	Alameda CTC Cost Data	$0			$0
New EVP-only intersections	5	$5,060	$403	$2,013	10	Same as EVP/TSP intersection	$2,013			$2,013
New Trailblazer Signs	0	$24,675	$1,000	$0	10	Per Skyline; includes GPRS cost	$0		$0	$0
New Traffic Signal	0	$200,000	$3,000	$0	10	Based on City of Concord	$0			$0
Traffic Signal Controller Upgrades (existing signal)	16	$2,500	$250	$4,000	10	10% of Capital cost	No increase in maint cost.			
Wireless GPRS modem (traffic signal controllers)	0	$2,820	$282	$0	3	10% of Capital cost	$0			$0
Controller communications: Ethernet switch	0	$4,060	$406	$0	10	10% of Capital cost	$0			$0
Controller communications: Ethernet module	0	$1,475	$148	$0	10	10% of Capital cost	$0			$0
New Intersection Vehicle Detection: Video Image Detection camera	11	$11,785	$336	$3,696	10	Estimated same as CCTV camera	$3,696			$3,696
New Intersection Vehilce Detection: Magnetometer	0	$8,438	$844	$0	10	10% of Capital cost	$0			$0
Speed Feedback Signs	0	$12,875	$500	$0	15	Compared to trailblazer	$0			$0
New Arterial Changeable Message Sign (CMS): single sided	0	$160,333	$1,500	$0	10	Compared to trailblazer	$0			$0
New Arterial Changeable Message Sign (CMS): double-sided	0	$246,782	$2,000	$0	10	Compared to trailblazer	$0			$0
Exisiting TSP emitters	0	$1,000	$500	$0	10	AC Transit Data	$0			$0
New multi-mode (GPS-InfraRed) TSP Emitters	0	$4,750	$0	$0	10	Assumed to be same as existing	$0			$0
Traffic Signal Software Maintenance/Upgrades *	10.00%	$500,000	$27,500	$2,750	5	Actual bids	$0			$0
Estimated Annual Maintenance Cost (Subtotal)				**$17,200**		**Total Increase due to ICM Devices**	**$6,425**	**$0**	**$716**	**$5,709**

TOTAL ESTIMATED CONSTRUCTION COST	**$ 245,535.00**

* Local ROW cost only- no increase in maintenance cost if traffic signal system is existing
Berkeley has existing signal system
** Maintenance of existing SMART Corridor TSP remains responsibility of Cities per previous maintenance agreement

Operating Costs

Device	Quantity	Capital Cost	Unit Operation Cost	Total Cost/Year	Notes	Devices that Increase Inventory	Paid by Caltrans	Paid by Alameda CTC	Net Contribution by City
San Pablo Corridor Collocation	4.74%		$122,512	$5,813	Estimated Cost	$5,813			$5,813
Wireless GPRS modem	0		$768	$0	$64 per month	$0			$0
Point-Point T1 line for each camera	0		$2,100	$0	$175 per month	$0			$0
Field Devices Electricity (new traffic signal, new CCTV cameras)	0		$660	$0	Alameda CTC Cost Data	$0			$0
IT/Staffing Assistance* - Maintenance Staff	4.74%			$0	Internal based on each Agencies' O&M policy	$0			$0
IT/Staffing Assistance* - Operation Staff	4.74%			$0	Internal based on each Agencies' O&M policy	$0			$0
Estimated Annual Operating Cost (Subtotal)				**$5,813**	**Total Increase due to ICM Devices**	**$5,813**	**$0**	**$0**	**$5,813**

*Provided by Alameda CTC or City Traffic Signal Coordinator for all agencies

Total Estimated Annual Operation and Maintenance Cost	**$23,012**	**Total Increase due to ICM Devices**	**$12,237**	**$0**	**$716**	**$11,521**

Maintenance Costs -- ALBANY (CT ROW)

Device	Number of Devices	Unit Capital Cost	Unit Maintenance Cost/Year	Total Cost/Year	Life (Years)	Maintenance Cost Notes	Devices that Increase Inventory	Paid by Caltrans	Paid by Alameda CTC	Net Contribution by City
Existing SMART Corridor cameras (used by project)	2	$9,300	$336	$672	10	Same as new CCTV Camera	$672	$672		$0
New closed-circuit television (CCTV) cameras	1	$23,000	$336	$336	10	Alameda CTC Cost Data	$336	$336		$0
New video encoders	1	$3,590	$359	$359	10	10% of Capital cost	$359	$359		$0
Existing SMART Corridor Vehicle Detection Stations (used by project)	2	$14,080	$358	$716	10	same as New MVDS	$716	$716		$0
New Vehicle Detection Stations	0	$14,080	$358	$0	10	Alameda CTC Cost Data	$0			$0
Existing SMART Corridor TSP intersections	7	$5,060	$403	$2,818	10	Alameda CTC Cost Data	$2,818	$2,818		$0
New TSP intersections (including ramp metering locations)	0	$5,060	$403	$0	10	Alameda CTC Cost Data	$0	$0		$0
New EVP-only intersections	2	$5,060	$403	$805	10	Same as EVP/TSP intersection	$805	$805		$0
New Trailblazer Signs	2	$24,675	$1,000	$2,000	10	Per Skyline; includes GPRS cost	$2,000	$2,000		$0
New Traffic Signal	0	$200,000	$3,000	$0	10	Based on City of Concord	$0			$0
Traffic Signal Controller Upgrades (existing signal)	9	$2,500	$250	$2,250	10	10% of Capital cost	No increase in maint cost.			
Wireless GPRS modem (traffic signal controllers)	1	$2,820	$282	$282	3	10% of Capital cost	$282	$282		$0
Controller communications: Ethernet switch	0	$4,060	$406	$0	10	10% of Capital cost	$0			$0
Controller communications: Ethernet module	8	$1,475	$148	$1,180	10	10% of Capital cost	$1,180	$1,180		$0
New Intersection Vehicle Detection: Video Image Detection camera	0	$11,785	$336	$0	10	Estimated same as CCTV camera	$0			$0
New Intersection Vehilce Detection: Magnetometer	0	$8,438	$844	$0	10	10% of Capital cost	$0			$0
Speed Feedback Signs	0	$12,875	$500	$0	15	Compared to trailblazer	$0			$0
New Arterial Changeable Message Sign (CMS): single sided	0	$160,333	$1,500	$0	10	Compared to trailblazer	$0			$0
New Arterial Changeable Message Sign (CMS): double-sided	0	$246,782	$2,000	$0	10	Compared to trailblazer	$0			$0
Exisiting TSP emitters	0	$1,000	$500	$0	10	AC Transit Data	$0			$0
New multi-mode (GPS-InfraRed) TSP Emitters	0	$4,750	$0	$0	10	Assumed to be same as existing	$0			$0
Traffic Signal Software Maintenance/Upgrades *	0.00%	$500,000	$27,500	$0	5	Actual bids	$0			$0
Estimated Annual Maintenance Cost (Subtotal)				**$10,746**		**Total Increase due to ICM Devices**	**$9,168**	**$9,168**	**$0**	**$0**

TOTAL ESTIMATED CONSTRUCTION COST	**$ 158,600.00**

* Local ROW cost only- no increase in maintenance cost if traffic signal system is existing

Operating Costs

Device	Quantity	Capital Cost	Unit Operation Cost	Total Cost/Year	Notes	Devices that Increase Inventory	Paid by Caltrans	Paid by Alameda CTC	Net Contribution by City
San Pablo Corridor Collocation	4.01%		$122,512	$4,918	Estimated Cost	$4,918	$4,918		$0
Wireless GPRS modem	1		$768	$768	$64 per month	$768	$768		$0
Point-Point T1 line for each camera	1		$2,100	$2,100	$175 per month	$2,100	$2,100		$0
Field Devices Electricity (new traffic signal, new CCTV cameras)	1		$660	$660	Alameda CTC Cost Data	$660	$660		$0
IT/Staffing Assistance* - Maintenance Staff	4.01%			$0	Internal based on each Agencies' O&M policy	$0			$0
IT/Staffing Assistance* - Operation Staff	4.01%			$0	Internal based on each Agencies' O&M policy	$0			$0
Estimated Annual Operating Cost (Subtotal)				**$8,446**	**Total Increase due to ICM Devices**	**$8,446**	**$8,446**	**$0**	**$0**

*Provided by Alameda CTC or City Traffic Signal Coordinator for all agencies

Total Estimated Annual Operation and Maintenance Cost	**$19,192**	**Total Increase due to ICM Devices**	**$17,614**	**$17,614**	**$0**	**$0**

Maintenance Costs -- ALBANY (LOCAL ROW)

Device	Number of Devices	Unit Capital Cost	Unit Maintenance Cost/Year	Total Cost/Year	Life (Years)	Maintenance Cost Notes	Devices that Increase Inventory	Paid by Caltrans	Paid by Alameda CTC	Net Contribution by City
Existing SMART Corridor cameras (used by project)	0	$9,300	$336	$0	10	Same as new CCTV Camera	$0		$0	$0
New closed-circuit television (CCTV) cameras	0	$23,000	$336	$0	10	Alameda CTC Cost Data	$0		$0	$0
New video encoders	0	$3,590	$359	$0	10	10% of Capital cost	$0			$0
Existing SMART Corridor Vehicle Detection Stations (used by project)	1	$14,080	$358	$358	10	same as New MVDS	$358		$358	$0
New Vehicle Detection Stations	0	$14,080	$358	$0	10	Alameda CTC Cost Data	$0		$0	$0
Existing SMART Corridor TSP intersections	0	$5,060	$403	$0	10	Alameda CTC Cost Data	$0		$0	$0
New TSP intersections	0	$5,060	$403	$0	10	Alameda CTC Cost Data	$0			$0
New EVP-only intersections	0	$5,060	$403	$0	10	Same as EVP/TSP intersection	$0			$0
New Trailblazer Signs	0	$24,675	$1,000	$0	10	Per Skyline; includes GPRS cost	$0		$0	$0
New Traffic Signal	0	$200,000	$3,000	$0	10	Based on City of Concord	$0			$0
Traffic Signal Controller Upgrades (existing signal)	0	$2,500	$250	$0	10	10% of Capital cost	No increase in maint cost.			
Wireless GPRS modem (traffic signal controllers)	0	$2,820	$282	$0	3	10% of Capital cost	$0			$0
Controller communications: Ethernet switch	0	$4,060	$406	$0	10	10% of Capital cost	$0			$0
Controller communications: Ethernet module	0	$1,475	$148	$0	10	10% of Capital cost	$0			$0
New Intersection Vehicle Detection: Video Image Detection camera	0	$11,785	$336	$0	10	Estimated same as CCTV camera	$0			$0
New Intersection Vehilce Detection: Magnetometer	0	$8,438	$844	$0	10	10% of Capital cost	$0			$0
Speed Feedback Signs	0	$12,875	$500	$0	15	Compared to trailblazer	$0			$0
New Arterial Changeable Message Sign (CMS): single sided	0	$160,333	$1,500	$0	10	Compared to trailblazer	$0			$0
New Arterial Changeable Message Sign (CMS): double-sided	0	$246,782	$2,000	$0	10	Compared to trailblazer	$0			$0
Exisiting TSP emitters	0	$1,000	$500	$0	10	AC Transit Data	$0			$0
New multi-mode (GPS-InfraRed) TSP Emitters	0	$4,750	$0	$0	10	Assumed to be same as existing	$0			$0
Traffic Signal Software Maintenance/Upgrades *	0.00%	$500,000	$27,500	$0	5	Actual bids	$0			$0
Estimated Annual Maintenance Cost (Subtotal)				**$358**		**Total Increase due to ICM Devices**	**$358**	**$0**	**$358**	**$0**

TOTAL ESTIMATED CONSTRUCTION COST	$ -

* Local ROW cost only- no increase in maintenance cost if traffic signal system is existing
Albany does not have signal system and will not be installing signal system as part of project

Operating Costs

Device	Quantity	Capital Cost	Unit Operation Cost	Total Cost/Year	Notes	Devices that Increase Inventory	Paid by Caltrans	Paid by Alameda CTC	Net Contribution by City
San Pablo Corridor Collocation	0.00%		$122,512	$0	Estimated Cost	$0			$0
Wireless GPRS modem	0		$768	$0	$64 per month	$0			$0
Point-Point T1 line for each camera	0		$2,100	$0	$175 per month	$0			$0
Field Devices Electricity (new traffic signal, new CCTV cameras)	0		$660	$0	Alameda CTC Cost Data	$0			$0
IT/Staffing Assistance* - Maintenance Staff	0.00%			$0	Internal based on each Agencies' O&M policy	$0			$0
IT/Staffing Assistance* - Operation Staff	0.00%			$0	Internal based on each Agencies' O&M policy	$0			$0
Estimated Annual Operating Cost (Subtotal)				**$0**	**Total Increase due to ICM Devices**	**$0**	**$0**	**$0**	**$0**

*Provided by Alameda CTC or City Traffic Signal Coordinator for all agencies

Total Estimated Annual Operation and Maintenance Cost	**$358**	**Total Increase due to ICM Devices**	**$358**	**$0**	**$358**	**$0**

Maintenance Costs -- CONTRA COSTA COUNTY (CT ROW)

Device	Number of Devices	Unit Capital Cost	Unit Maintenance Cost/Year	Total Cost/Year	Life (Years)	Maintenance Cost Notes	Devices that Increase Inventory	Paid by Caltrans	Paid by CCTA	Net Contribution by County
Existing SMART Corridor cameras (used by project)	0	$9,300	$336	$0	10	Same as new CCTV Camera	$0			$0
New closed-circuit television (CCTV) cameras	1	$23,000	$336	$336	10	Alameda CTC Cost Data	$336	$336		$0
New video encoders	1	$3,590	$359	$359	10	10% of Capital cost	$359	$359		$0
Existing SMART Corridor Vehicle Detection Stations (used by project)	0	$14,080	$358	$0	10	same as New MVDS	$0			$0
New Vehicle Detection Stations	0	$14,080	$358	$0	10	Alameda CTC Cost Data	$0			$0
Existing SMART Corridor TSP intersections	0	$5,060	$403	$0	10	Alameda CTC Cost Data	$0			$0
New TSP intersections (including ramp metering locations)	0	$5,060	$403	$0	10	Alameda CTC Cost Data	$0			$0
New EVP-only intersections	0	$5,060	$403	$0	10	Same as EVP/TSP intersection	$0			$0
New Trailblazer Signs	0	$24,675	$1,000	$0	10	Per Skyline; includes GPRS cost	$0			$0
New Traffic Signal	0	$200,000	$3,000	$0	10	Based on City of Concord	$0			$0
Traffic Signal Controller Upgrades (existing signal)	1	$2,500	$250	$250	10	10% of Capital cost	No increase in maint cost.			
Wireless GPRS modem (traffic signal controllers)	0	$2,820	$282	$0	3	10% of Capital cost	$0			$0
Controller communications: Ethernet switch	0	$4,060	$406	$0	10	10% of Capital cost	$0			$0
Controller communications: Ethernet module	0	$1,475	$148	$0	10	10% of Capital cost	$0			$0
New Intersection Vehicle Detection: Video Image Detection camera	0	$11,785	$336	$0	10	Estimated same as CCTV camera	$0			$0
New Intersection Vehilce Detection: Magnetometer	0	$8,438	$844	$0	10	10% of Capital cost	$0			$0
Speed Feedback Signs	0	$12,875	$500	$0	15	Compared to trailblazer	$0			$0
New Arterial Changeable Message Sign (CMS): single sided	0	$160,333	$1,500	$0	10	Compared to trailblazer	$0			$0
New Arterial Changeable Message Sign (CMS): double-sided	0	$246,782	$2,000	$0	10	Compared to trailblazer	$0			$0
Exisiting TSP emitters	0	$1,000	$500	$0	10	AC Transit Data	$0			$0
New multi-mode (GPS-InfraRed) TSP Emitters	0	$4,750	$0	$0	10	Assumed to be same as existing	$0			$0
Traffic Signal Software Maintenance/Upgrades *	0.00%	$500,000	$27,500	$0	5	Actual bids	$0			$0
Estimated Annual Maintenance Cost (Subtotal)				**$945**		**Total Increase due to ICM Devices**	**$695**	**$695**	**$0**	**$0**

TOTAL ESTIMATED CONSTRUCTION COST	**$ 29,090.00**

* Local ROW cost only- no increase in maintenance cost if traffic signal system is existing

Operating Costs

Device	Quantity	Capital Cost	Unit Operation Cost	Total Cost/Year	Notes	Devices that Increase Inventory	Paid by Caltrans	Paid by CCTA	Net Contribution by County
San Pablo Corridor Collocation	0.36%		$122,512	$447	Estimated Cost	$447	$447		$0
Wireless GPRS modem	0		$768	$0	$64 per month	$0	$0		$0
Point-Point T1 line for each camera	1		$2,100	$2,100	$175 per month	$2,100	$2,100		$0
Field Devices Electricity (new traffic signal, new CCTV cameras)	1		$660	$660	Alameda CTC Cost Data	$660	$660		$0
IT/Staffing Assistance* - Maintenance Staff	0.36%			$0	Internal based on each Agencies' O&M policy	$0			$0
IT/Staffing Assistance* - Operation Staff	0.36%			$0	Internal based on each Agencies' O&M policy	$0			$0
Estimated Annual Operating Cost (Subtotal)				**$3,207**	**Total Increase due to ICM Devices**	**$3,207**	**$3,207**	**$0**	**$0**

*Provided by Alameda CTC or City Traffic Signal Coordinator for all agencies

Total Estimated Annual Operation and Maintenance Cost	**$4,152**	**Total Increase due to ICM Devices**	**$3,902**	**$3,902**	**$0**	**$0**

Maintenance Costs -- CONTRA COSTA COUNTY (LOCAL ROW)

Device	Number of Devices	Unit Capital Cost	Unit Maintenance Cost/Year	Total Cost/Year	Life (Years)	Maintenance Cost Notes	Devices that Increase Inventory	Paid by Caltrans	Paid by CCTA	Net Contribution by County
Existing SMART Corridor cameras (used by project)	0	$9,300	$336	$0	10	Same as new CCTV Camera	$0		$0	$0
New closed-circuit television (CCTV) cameras	2	$23,000	$336	$672	10	Alameda CTC Cost Data	$672		$672	$0
New video encoders	0	$3,590	$359	$0	10	10% of Capital cost	$0			$0
Existing SMART Corridor Vehicle Detection Stations (used by project)	1	$14,080	$358	$358	10	same as New MVDS	$358		$358	$0
New Vehicle Detection Stations	2	$14,080	$358	$716	10	Alameda CTC Cost Data	$716		$716	$0
Existing SMART Corridor TSP intersections	0	$5,060	$403	$0	10	Alameda CTC Cost Data	$0		$0	$0
New TSP intersections	5	$5,060	$403	$2,013	10	Alameda CTC Cost Data	$2,013		$2,013	$0
New EVP-only intersections	0	$5,060	$403	$0	10	Same as EVP/TSP intersection	$0			$0
New Trailblazer Signs	3	$24,675	$1,000	$3,000	10	Per Skyline; includes GPRS cost	$3,000		$3,000	$0
New Traffic Signal	0	$200,000	$3,000	$0	10	Based on City of Concord	$0			$0
Traffic Signal Controller Upgrades (existing signal)	0	$2,500	$250	$0	10	10% of Capital cost	No increase in maint cost.			
Wireless GPRS modem (traffic signal controllers)	5	$2,820	$282	$1,410	3	10% of Capital cost	$1,410		$1,410	$0
Controller communications: Ethernet switch	0	$4,060	$406	$0	10	10% of Capital cost	$0			$0
Controller communications: Ethernet module	5	$1,475	$148	$738	10	10% of Capital cost	$738		$738	$0
New Intersection Vehicle Detection: Video Image Detection camera	0	$11,785	$336	$0	10	Estimated same as CCTV camera	$0			$0
New Intersection Vehilce Detection: Magnetometer	0	$8,438	$844	$0	10	10% of Capital cost	$0			$0
Speed Feedback Signs	0	$12,875	$500	$0	15	Compared to trailblazer	$0			$0
New Arterial Changeable Message Sign (CMS): single sided	0	$160,333	$1,500	$0	10	Compared to trailblazer	$0			$0
New Arterial Changeable Message Sign (CMS): double-sided	0	$246,782	$2,000	$0	10	Compared to trailblazer	$0			$0
Exisiting TSP emitters	0	$1,000	$500	$0	10	AC Transit Data	$0			$0
New multi-mode (GPS-InfraRed) TSP Emitters	0	$4,750	$0	$0	10	Assumed to be same as existing	$0			$0
Traffic Signal Software Maintenance/Upgrades *	10.00%	$500,000	$27,500	$2,750	5	Actual bids	$0			$0
Estimated Annual Maintenance Cost (Subtotal)				**$11,656**		**Total Increase due to ICM Devices**	**$8,906**	**$0**	**$8,906**	**$0**

TOTAL ESTIMATED CONSTRUCTION COST	**$ 194,960.00**

* Local ROW cost only- no increase in maintenance cost if traffic signal system is existing Contra Costa County has existing signal system.

Operating Costs

Device	Quantity	Capital Cost	Unit Operation Cost	Total Cost/Year	Notes	Devices that Increase Inventory	Paid by Caltrans	Paid by CCTA	Net Contribution by County
San Pablo Corridor Collocation	4.01%		$122,512	$4,918	Estimated Cost	$4,918		$4,918	$0
Wireless GPRS modem	5		$768	$3,840	$64 per month	$3,840		$3,840	$0
Point-Point T1 line for each camera	2		$2,100	$4,200	$175 per month	$4,200		$4,200	$0
Field Devices Electricity (new traffic signal, new CCTV cameras)	2		$660	$1,320	Alameda CTC Cost Data	$1,320		$1,320	$0
IT/Staffing Assistance* - Maintenance Staff	4.01%			$0	Internal based on each Agencies' O&M policy	$0			$0
IT/Staffing Assistance* - Operation Staff	4.01%			$0	Internal based on each Agencies' O&M policy	$0			$0
Estimated Annual Operating Cost (Subtotal)				**$14,278**	**Total Increase due to ICM Devices**	**$14,278**	**$0**	**$14,278**	**$0**

*Provided by Alameda CTC or City Traffic Signal Coordinator for all agencies

Total Estimated Annual Operation and Maintenance Cost	**$25,934**	**Total Increase due to ICM Devices**	**$23,184**	**$0**	**$23,184**	**$0**

Maintenance Costs -- EL CERRITO (CT ROW)

Device	Number of Devices	Unit Capital Cost	Unit Maintenance Cost/Year	Total Cost/Year	Life (Years)	Maintenance Cost Notes	Devices that Increase Inventory	Paid by Caltrans	Paid by CCTA	Net Contribution by City
Existing SMART Corridor cameras (used by project)	3	$9,300	$336	$1,008	10	Same as new CCTV Camera	$1,008	$1,008		$0
New closed-circuit television (CCTV) cameras	1	$23,000	$336	$336	10	Alameda CTC Cost Data	$336	$336		$0
New video encoders	1	$3,590	$359	$359	10	10% of Capital cost	$359	$359		$0
Existing SMART Corridor Vehicle Detection Stations (used by project)	2	$14,080	$358	$716	10	same as New MVDS	$716	$716		$0
New Vehicle Detection Stations	0	$14,080	$358	$0	10	Alameda CTC Cost Data	$0			$0
Existing SMART Corridor TSP intersections	10	$5,060	$403	$4,025	10	Alameda CTC Cost Data	$4,025	$4,025		$0
New TSP intersections (including ramp metering locations)	0	$5,060	$403	$0	10	Alameda CTC Cost Data	$0			$0
New EVP-only intersections	2	$5,060	$403	$805	10	Same as EVP/TSP intersection	$805	$805		$0
New Trailblazer Signs	4	$24,675	$1,000	$4,000	10	Per Skyline; includes GPRS cost	$4,000	$4,000		$0
New Traffic Signal	0	$200,000	$3,000	$0	10	Based on City of Concord	$0			$0
Traffic Signal Controller Upgrades (existing signal)	13	$2,500	$250	$3,250	10	10% of Capital cost	No increase in maint cost.			
Wireless GPRS modem (traffic signal controllers)	2	$2,820	$282	$564	3	10% of Capital cost	$564	$564		$0
Controller communications: Ethernet switch	0	$4,060	$406	$0	10	10% of Capital cost	$0			$0
Controller communications: Ethernet module	12	$1,475	$148	$1,770	10	10% of Capital cost	$1,770	$1,770		$0
New Intersection Vehicle Detection: Video Image Detection camera	0	$11,785	$336	$0	10	Estimated same as CCTV camera	$0			$0
New Intersection Vehilce Detection: Magnetometer	0	$8,438	$844	$0	10	10% of Capital cost	$0			$0
Speed Feedback Signs	0	$12,875	$500	$0	15	Compared to trailblazer	$0			$0
New Arterial Changeable Message Sign (CMS): single sided	0	$160,333	$1,500	$0	10	Compared to trailblazer	$0			$0
New Arterial Changeable Message Sign (CMS): double-sided	0	$246,782	$2,000	$0	10	Compared to trailblazer	$0			$0
Exisiting TSP emitters	0	$1,000	$500	$0	10	AC Transit Data	$0			$0
New multi-mode (GPS-InfraRed) TSP Emitters	0	$4,750	$0	$0	10	Assumed to be same as existing	$0			$0
Traffic Signal Software Maintenance/Upgrades *	0.00%	$500,000	$27,500	$0	5	Actual bids	$0			$0
Estimated Annual Maintenance Cost (Subtotal)				**$15,825**		**Total Increase due to ICM Devices**	**$13,583**	**$13,583**	**$0**	**$0**

TOTAL ESTIMATED CONSTRUCTION COST	**$ 241,850.00**

* Local ROW cost only- no increase in maintenance cost if traffic signal system is existing

Operating Costs

Device	Quantity	Capital Cost	Unit Operation Cost	Total Cost/Year	Notes	Devices that Increase Inventory	Paid by Caltrans	Paid by CCTA	Net Contribution by City
San Pablo Corridor Collocation	5.84%		$122,512	$7,154	Estimated Cost	$7,154	$7,154		$0
Wireless GPRS modem	2		$768	$1,536	$64 per month	$1,536	$1,536		$0
Point-Point T1 line for each camera	1		$2,100	$2,100	$175 per month	$2,100	$2,100		$0
Field Devices Electricity (new traffic signal, new CCTV cameras)	1		$660	$660	Alameda CTC Cost Data	$660	$660		$0
IT/Staffing Assistance* - Maintenance Staff	5.84%			$0	Internal based on each Agencies' O&M policy	$0			$0
IT/Staffing Assistance* - Operation Staff	5.84%			$0	Internal based on each Agencies' O&M policy	$0			$0
Estimated Annual Operating Cost (Subtotal)				**$11,450**	**Total Increase due to ICM Devices**	**$11,450**	**$11,450**	**$0**	**$0**

*Provided by Alameda CTC or City Traffic Signal Coordinator for all agencies

Total Estimated Annual Operation and Maintenance Cost	**$27,275**	**Total Increase due to ICM Devices**	**$25,033**	**$25,033**	**$0**	**$0**

Maintenance Costs -- EL CERRITO (LOCAL ROW)

Device	Number of Devices	Unit Capital Cost	Unit Maintenance Cost/Year	Total Cost/Year	Life (Years)	Maintenance Cost Notes	Devices that Increase Inventory	Paid by Caltrans	Paid by CCTA	Net Contribution by City
Existing SMART Corridor cameras (used by project)	0	$9,300	$336	$0	10	Same as new CCTV Camera	$0		$0	$0
New closed-circuit television (CCTV) cameras	0	$23,000	$336	$0	10	Alameda CTC Cost Data	$0		$0	$0
New video encoders	0	$3,590	$359	$0	10	10% of Capital cost	$0			$0
Existing SMART Corridor Vehicle Detection Stations (used by project)	2	$14,080	$358	$716	10	same as New MVDS	$716		$716	$0
New Vehicle Detection Stations	0	$14,080	$358	$0	10	Alameda CTC Cost Data	$0		$0	$0
Existing SMART Corridor TSP intersections	2	$5,060	$403	$805	10	Alameda CTC Cost Data	$805		$805	$0
New TSP intersections	0	$5,060	$403	$0	10	Alameda CTC Cost Data	$0			$0
New EVP-only intersections	1	$5,060	$403	$403	10	Same as EVP/TSP intersection	$403		$403	$0
New Trailblazer Signs	0	$24,675	$1,000	$0	10	Per Skyline; includes GPRS cost	$0		$0	$0
New Traffic Signal	0	$200,000	$3,000	$0	10	Based on City of Concord	$0			$0
Traffic Signal Controller Upgrades (existing signal)	1	$2,500	$250	$250	10	10% of Capital cost	No increase in maint cost.			
Wireless GPRS modem (traffic signal controllers)	2	$2,820	$282	$564	3	10% of Capital cost	$564		$564	$0
Controller communications: Ethernet switch	0	$4,060	$406	$0	10	10% of Capital cost	$0			$0
Controller communications: Ethernet module	2	$1,475	$148	$295	10	10% of Capital cost	$295		$295	$0
New Intersection Vehicle Detection: Video Image Detection camera	0	$11,785	$336	$0	10	Estimated same as CCTV camera	$0			$0
New Intersection Vehilce Detection: Magnetometer	0	$8,438	$844	$0	10	10% of Capital cost	$0			$0
Speed Feedback Signs	0	$12,875	$500	$0	15	Compared to trailblazer	$0			$0
New Arterial Changeable Message Sign (CMS): single sided	0	$160,333	$1,500	$0	10	Compared to trailblazer	$0			$0
New Arterial Changeable Message Sign (CMS): double-sided	0	$246,782	$2,000	$0	10	Compared to trailblazer	$0			$0
Exisiting TSP emitters	0	$1,000	$500	$0	10	AC Transit Data	$0			$0
New multi-mode (GPS-InfraRed) TSP Emitters	0	$4,750	$0	$0	10	Assumed to be same as existing	$0			$0
Traffic Signal Software Maintenance/Upgrades *	10.00%	$500,000	$27,500	$2,750	5	Actual bids	$2,750		$2,750	$0
Estimated Annual Maintenance Cost (Subtotal)				**$5,783**		**Total Increase due to ICM Devices**	**$5,533**	**$0**	**$5,533**	**$0**

TOTAL ESTIMATED CONSTRUCTION COST	**$ 26,270.00**

* Local ROW cost only- no increase in maintenance cost if traffic signal system is existing
New signal system for El Cerrito being provided by project.

* Sidewalk is El Cerrito right-of-way.

Operating Costs

Device	Quantity	Capital Cost	Unit Operation Cost	Total Cost/Year	Notes	Devices that Increase Inventory	Paid by Caltrans	Paid by CCTA	Net Contribution by City
San Pablo Corridor Collocation	1.28%		$122,512	$1,565	Estimated Cost	$1,565		$1,565	$0
Wireless GPRS modem	2		$768	$1,536	$64 per month	$1,536		$1,536	$0
Point-Point T1 line for each camera	0		$2,100	$0	$175 per month	$0			$0
Field Devices Electricity (new traffic signal, new CCTV cameras)	0		$660	$0	Alameda CTC Cost Data	$0			$0
IT/Staffing Assistance* - Maintenance Staff	1.28%			$0	Internal based on each Agencies' O&M policy	$0			$0
IT/Staffing Assistance* - Operation Staff	1.28%			$0	Internal based on each Agencies' O&M policy	$0			$0
Estimated Annual Operating Cost (Subtotal)				**$3,101**	**Total Increase due to ICM Devices**	**$3,101**	**$0**	**$3,101**	**$0**

*Provided by Alameda CTC or City Traffic Signal Coordinator for all agencies

Total Estimated Annual Operation and Maintenance Cost	**$8,883**	**Total Increase due to ICM Devices**	**$8,633**	**$0**	**$8,633**	**$0**

Maintenance Costs -- SAN PABLO AREA (CT ROW)

Device	Number of Devices	Unit Capital Cost	Unit Maintenance Cost/Year	Total Cost/Year	Life (Years)	Maintenance Cost Notes	Devices that Increase Inventory	Paid by Caltrans	Paid by CCTA	Net Contribution by City
Existing SMART Corridor cameras (used by project)	1	$9,300	$336	$336	10	Same as new CCTV Camera	$336	$336		$0
New closed-circuit television (CCTV) cameras	3	$23,000	$336	$1,008	10	Alameda CTC Cost Data	$1,008	$1,008		$0
New video encoders	3	$3,590	$359	$1,077	10	10% of Capital cost	$1,077	$1,077		$0
Existing SMART Corridor Vehicle Detection Stations (used by project)	0	$14,080	$358	$0	10	same as New MVDS	$0			$0
New Vehicle Detection Stations	0	$14,080	$358	$0	10	Alameda CTC Cost Data	$0			$0
Existing SMART Corridor TSP intersections	0	$5,060	$403	$0	10	Alameda CTC Cost Data	$0			$0
New TSP intersections (including ramp metering locations)	0	$5,060	$403	$0	10	Alameda CTC Cost Data	$0			$0
New EVP-only intersections	4	$5,060	$403	$1,610	10	Same as EVP/TSP intersection	$1,610	$1,610		$0
New Trailblazer Signs	0	$24,675	$1,000	$0	10	Per Skyline; includes GPRS cost	$0			$0
New Traffic Signal	0	$200,000	$3,000	$0	10	Based on City of Concord	$0			$0
Traffic Signal Controller Upgrades (existing signal)	3	$2,500	$250	$750	10	10% of Capital cost	No increase in maint cost.			
Wireless GPRS modem (traffic signal controllers)	2	$2,820	$282	$564	3	10% of Capital cost	$564	$564		$0
Controller communications: Ethernet switch	0	$4,060	$406	$0	10	10% of Capital cost	$0			$0
Controller communications: Ethernet module	2	$1,475	$148	$295	10	10% of Capital cost	$295	$295		$0
New Intersection Vehicle Detection: Video Image Detection camera	0	$11,785	$336	$0	10	Estimated same as CCTV camera	$0			$0
New Intersection Vehilce Detection: Magnetometer	0	$8,438	$844	$0	10	10% of Capital cost	$0			$0
Speed Feedback Signs	0	$12,875	$500	$0	15	Compared to trailblazer	$0			$0
New Arterial Changeable Message Sign (CMS): single sided	0	$160,333	$1,500	$0	10	Compared to trailblazer	$0			$0
New Arterial Changeable Message Sign (CMS): double-sided	0	$246,782	$2,000	$0	10	Compared to trailblazer	$0			$0
Exisiting TSP emitters	0	$1,000	$500	$0	10	AC Transit Data	$0			$0
New multi-mode (GPS-InfraRed) TSP Emitters	0	$4,750	$0	$0	10	Assumed to be same as existing	$0			$0
Traffic Signal Software Maintenance/Upgrades *	0.00%	$500,000	$27,500	$0	10	Actual bids	$0			$0
Estimated Annual Maintenance Cost (Subtotal)				**$5,304**		**Total Increase due to ICM Devices**	**$4,890**	**$4,890**	**$0**	**$0**

TOTAL ESTIMATED CONSTRUCTION COST	**$ 116,100.00**

* Local ROW cost only- no increase in maintenance cost if traffic signal system is existing

Operating Costs

Device	Quantity	Capital Cost	Unit Operation Cost	Total Cost/Year	Notes	Devices that Increase Inventory	Paid by Caltrans	Paid by CCTA	Net Contribution by City
San Pablo Corridor Collocation	2.55%		$122,512	$3,130	Estimated Cost	$3,130	$3,130		$0
Wireless GPRS modem	2		$768	$1,536	$64 per month	$1,536	$1,536		$0
Point-Point T1 line for each camera	3		$2,100	$6,300	$175 per month	$6,300	$6,300		$0
Field Devices Electricity (new traffic signal, new CCTV cameras)	3		$660	$1,980	Alameda CTC Cost Data	$1,980	$1,980		$0
IT/Staffing Assistance* - Maintenance Staff	2.55%			$0	Internal based on each Agencies' O&M policy	$0			$0
IT/Staffing Assistance* - Operation Staff	2.55%			$0	Internal based on each Agencies' O&M policy	$0			$0
Estimated Annual Operating Cost (Subtotal)				**$12,946**	**Total Increase due to ICM Devices**	**$12,946**	**$12,946**	**$0**	**$0**

*Provided by Alameda CTC or City Traffic Signal Coordinator for all agencies

Total Estimated Annual Operation and Maintenance Cost	**$18,250**	**Total Increase due to ICM Devices**	**$17,836**	**$17,836**	**$0**	**$0**

Maintenance Costs -- SAN PABLO (LOCAL ROW)

Device	Number of Devices	Unit Capital Cost	Unit Maintenance Cost/Year	Total Cost/Year	Life (Years)	Maintenance Cost Notes	Devices that Increase Inventory	Paid by Caltrans	Paid by CCTA	Net Contribution by City
Existing SMART Corridor cameras (used by project)	1	$9,300	$336	$336	10	Same as new CCTV Camera	$336		$336	$0
New closed-circuit television (CCTV) cameras	1	$23,000	$336	$336	10	Alameda CTC Cost Data	$336		$336	$0
New video encoders	0	$3,590	$359	$0	10	10% of Capital cost	$0			$0
Existing SMART Corridor Vehicle Detection Stations (used by project)	1	$14,080	$358	$358	10	same as New MVDS	$358		$358	$0
New Vehicle Detection Stations	2	$14,080	$358	$716	10	Alameda CTC Cost Data	$716		$716	$0
Existing SMART Corridor TSP intersections	10	$5,060	$403	$4,025	10	Alameda CTC Cost Data	$4,025		$4,025	$0
New TSP intersections	1	$5,060	$403	$403	10	Alameda CTC Cost Data	$403		$403	$0
New EVP-only intersections	4	$5,060	$403	$1,610	10	Same as EVP/TSP intersection	$1,610		$1,610	$0
New Trailblazer Signs	4	$24,675	$1,000	$4,000	10	Per Skyline; includes GPRS cost	$4,000		$4,000	$0
New Traffic Signal	0	$200,000	$3,000	$0	10	Based on City of Concord	$0			$0
Traffic Signal Controller Upgrades (existing signal)	2	$2,500	$250	$500	10	10% of Capital cost	No increase in maint cost.			
Wireless GPRS modem (traffic signal controllers)	2	$2,820	$282	$564	3	10% of Capital cost	$564		$564	$0
Controller communications: Ethernet switch	0	$4,060	$406	$0	10	10% of Capital cost	$0			$0
Controller communications: Ethernet module	2	$1,475	$148	$295	10	10% of Capital cost	$295		$295	$0
New Intersection Vehicle Detection: Video Image Detection camera	0	$11,785	$336	$0	10	Estimated same as CCTV camera	$0			$0
New Intersection Vehilce Detection: Magnetometer	0	$8,438	$844	$0	10	10% of Capital cost	$0			$0
Speed Feedback Signs	0	$12,875	$500	$0	15	Compared to trailblazer	$0			$0
New Arterial Changeable Message Sign (CMS): single sided	0	$160,333	$1,500	$0	10	Compared to trailblazer	$0			$0
New Arterial Changeable Message Sign (CMS): double-sided	0	$246,782	$2,000	$0	10	Compared to trailblazer	$0			$0
Exisiting TSP emitters	0	$1,000	$500	$0	10	AC Transit Data	$0			$0
New multi-mode (GPS-InfraRed) TSP Emitters	0	$4,750	$0	$0	10	Assumed to be same as existing	$0			$0
Traffic Signal Software Maintenance/Upgrades *	10.00%	$500,000	$27,500	$2,750	5	Actual bids	$0			$0
Estimated Annual Maintenance Cost (Subtotal)				**$15,557**		**Total Increase due to ICM Devices**	**$12,643**	**$0**	**$12,643**	**$0**

TOTAL ESTIMATED CONSTRUCTION COST	**$ 239,350.00**

* Local ROW cost only- no increase in maintenance cost if traffic signal system is existing
San Pablo has existing signal system.

Operating Costs

Device	Quantity	Capital Cost	Unit Operation Cost	Total Cost/Year	Notes	Devices that Increase Inventory	Paid by Caltrans	Paid by CCTA	Net Contribution by City
San Pablo Corridor Collocation	4.74%		$122,512	$5,813	Estimated Cost	$5,813		$5,813	$0
Wireless GPRS modem	2		$768	$1,536	$64 per month	$1,536		$1,536	$0
Point-Point T1 line for each camera	1		$2,100	$2,100	$175 per month	$2,100		$2,100	$0
Field Devices Electricity (new traffic signal, new CCTV cameras)	1		$660	$660	Alameda CTC Cost Data	$660		$660	$0
IT/Staffing Assistance* - Maintenance Staff	4.74%			$0	Internal based on each Agencies' O&M policy	$0			$0
IT/Staffing Assistance* - Operation Staff	4.74%			$0	Internal based on each Agencies' O&M policy	$0			$0
Estimated Annual Operating Cost (Subtotal)				**$10,109**	**Total Increase due to ICM Devices**	**$10,109**	**$0**	**$10,109**	**$0**

*Provided by Alameda CTC or City Traffic Signal Coordinator for all agencies

Total Estimated Annual Operation and Maintenance Cost	**$25,665**	**Total Increase due to ICM Devices**	**$22,751**	**$0**	**$22,751**	**$0**

Maintenance Costs -- RICHMOND (CT ROW)

Device	Number of Devices	Unit Capital Cost	Unit Maintenance Cost/Year	Total Cost/Year	Life (Years)	Maintenance Cost Notes	Devices that Increase Inventory	Paid by Caltrans	Paid by CCTA	Net Contribution by City
Existing SMART Corridor cameras (used by project)	1	$9,300	$336	$336	10	Same as new CCTV Camera	$336	$336		$0
New closed-circuit television (CCTV) cameras	8	$23,000	$336	$2,688	10	Alameda CTC Cost Data	$2,688	$2,688		$0
New video encoders	8	$3,590	$359	$2,872	10	10% of Capital cost	$2,872	$2,872		$0
Existing SMART Corridor Vehicle Detection Stations (used by project)	0	$14,080	$358	$0	10	same as New MVDS	$0			$0
New Vehicle Detection Stations	0	$14,080	$358	$0	10	Alameda CTC Cost Data	$0			$0
Existing SMART Corridor TSP intersections	0	$5,060	$403	$0	10	Alameda CTC Cost Data	$0			$0
New TSP intersections (including ramp metering locations)	3	$5,060	$403	$1,208	10	Alameda CTC Cost Data	$1,208	$1,208		$0
New EVP-only intersections	8	$5,060	$403	$3,220	10	Same as EVP/TSP intersection	$3,220	$3,220		$0
New Trailblazer Signs	0	$24,675	$1,000	$0	10	Per Skyline; includes GPRS cost	$0			$0
New Traffic Signal	0	$200,000	$3,000	$0	10	Based on City of Concord	$0			$0
Traffic Signal Controller Upgrades (existing signal)	10	$2,500	$250	$2,500	10	10% of Capital cost	No increase in maint cost.			
Wireless GPRS modem (traffic signal controllers)	4	$2,820	$282	$1,128	3	10% of Capital cost	$1,128	$1,128		$0
Controller communications: Ethernet switch	0	$4,060	$406	$0	10	10% of Capital cost	$0			$0
Controller communications: Ethernet module	4	$1,475	$148	$590	10	10% of Capital cost	$590	$590		$0
New Intersection Vehicle Detection: Video Image Detection camera	0	$11,785	$336	$0	10	Estimated same as CCTV camera	$0	$0		$0
New Intersection Vehilce Detection: Magnetometer	0	$8,438	$844	$0	10	10% of Capital cost	$0			$0
Speed Feedback Signs	0	$12,875	$500	$0	15	Compared to trailblazer	$0			$0
New Arterial Changeable Message Sign (CMS): single sided	0	$160,333	$1,500	$0	10	Compared to trailblazer	$0			$0
New Arterial Changeable Message Sign (CMS): double-sided	0	$246,782	$2,000	$0	10	Compared to trailblazer	$0			$0
Exisiting TSP emitters	0	$1,000	$500	$0	10	AC Transit Data	$0			$0
New multi-mode (GPS-InfraRed) TSP Emitters	0	$4,750	$0	$0	10	Assumed to be same as existing	$0			$0
Traffic Signal Software Maintenance/Upgrades *	0.00%	$500,000	$27,500	$0	5	Actual bids	$0			$0
Estimated Annual Maintenance Cost (Subtotal)				**$14,206**		**Total Increase due to ICM Devices**	**$12,042**	**$12,042**	**$0**	**$0**

TOTAL ESTIMATED CONSTRUCTION COST	**$ 310,560.00**

* Local ROW cost only- no increase in maintenance cost if traffic signal system is existing

Operating Costs

Device	Quantity	Capital Cost	Unit Operation Cost	Total Cost/Year	Notes	Devices that Increase Inventory	Paid by Caltrans	Paid by CCTA	Net Contribution by City
San Pablo Corridor Collocation	6.39%		$122,512	$7,825	Estimated Cost	$7,825	$7,825		$0
Wireless GPRS modem	4		$768	$3,072	$64 per month	$3,072	$3,072		$0
Point-Point T1 line for each camera	8		$2,100	$16,800	$175 per month	$16,800	$16,800		$0
Field Devices Electricity (new traffic signal, new CCTV cameras)	8		$660	$5,280	Alameda CTC Cost Data	$5,280	$5,280		$0
IT/Staffing Assistance* - Maintenance Staff	6.39%			$0	Internal based on each Agencies' O&M policy	$0			$0
IT/Staffing Assistance* - Operation Staff	6.39%			$0	Internal based on each Agencies' O&M policy	$0			$0
Estimated Annual Operating Cost (Subtotal)				**$32,977**	**Total Increase due to ICM Devices**	**$32,977**	**$32,977**	**$0**	**$0**

*Provided by Alameda CTC or City Traffic Signal Coordinator for all agencies

Total Estimated Annual Operation and Maintenance Cost	**$47,182**	**Total Increase due to ICM Devices**	**$45,018**	**$45,018**	**$0**	**$0**

Maintenance Costs -- RICHMOND (LOCAL ROW)

Device	Number of Devices	Unit Capital Cost	Unit Maintenance Cost/Year	Total Cost/Year	Life (Years)	Maintenance Cost Notes	Devices that Increase Inventory	Paid by Caltrans	Paid by CCTA	Net Contribution by City
Existing SMART Corridor cameras (used by project)	1	$9,300	$336	$336	10	Same as new CCTV Camera	$336		$336	$0
New closed-circuit television (CCTV) cameras	1	$23,000	$336	$336	10	Alameda CTC Cost Data	$336		$336	$0
New video encoders	0	$3,590	$359	$0	10	10% of Capital cost	$0			$0
Existing SMART Corridor Vehicle Detection Stations (used by project)	4	$14,080	$358	$1,432	10	same as New MVDS	$1,432		$1,432	$0
New Vehicle Detection Stations	2	$14,080	$358	$716	10	Alameda CTC Cost Data	$716		$716	$0
Existing SMART Corridor TSP intersections	9	$5,060	$403	$3,623	10	Alameda CTC Cost Data	$3,623		$3,623	$0
New TSP intersections	5	$5,060	$403	$2,013	10	Alameda CTC Cost Data	$2,013		$2,013	$0
New EVP-only intersections	8	$5,060	$403	$3,220	10	Same as EVP/TSP intersection	$3,220		$3,220	$0
New Trailblazer Signs	6	$24,675	$1,000	$6,000	10	Per Skyline; includes GPRS cost	$6,000		$6,000	$0
New Traffic Signal	2	$200,000	$3,000	$6,000	10	Based on City of Concord	$6,000			$6,000
Traffic Signal Controller Upgrades (existing signal)	23	$2,500	$250	$5,750	10	10% of Capital cost	No increase in maint cost.			
Wireless GPRS modem (traffic signal controllers)	4	$2,820	$282	$1,128	3	10% of Capital cost	$1,128		$1,128	$0
Controller communications: Ethernet switch	0	$4,060	$406	$0	10	10% of Capital cost	$0			$0
Controller communications: Ethernet module	4	$1,475	$148	$590	10	10% of Capital cost	$590		$590	$0
New Intersection Vehicle Detection: Video Image Detection camera	7	$11,785	$336	$2,352	10	Estimated same as CCTV camera	$2,352			$2,352
New Intersection Vehilce Detection: Magnetometer	0	$8,438	$844	$0	10	10% of Capital cost	$0			$0
Speed Feedback Signs	0	$12,875	$500	$0	15	Compared to trailblazer	$0			$0
New Arterial Changeable Message Sign (CMS): single sided	0	$160,333	$1,500	$0	10	Compared to trailblazer	$0			$0
New Arterial Changeable Message Sign (CMS): double-sided	0	$246,782	$2,000	$0	10	Compared to trailblazer	$0			$0
Exisiting TSP emitters	0	$1,000	$500	$0	10	AC Transit Data	$0			$0
New multi-mode (GPS-InfraRed) TSP Emitters	0	$4,750	$0	$0	10	Assumed to be same as existing	$0			$0
Traffic Signal Software Maintenance/Upgrades *	10.00%	$500,000	$27,500	$2,750	5	Actual bids	$0			$0
Estimated Annual Maintenance Cost (Subtotal)				**$35,909**		**Total Increase due to ICM Devices**	**$27,745**	**$0**	**$19,393**	**$8,352**

TOTAL ESTIMATED CONSTRUCTION COST	**$**	**867,705.00**

* Local ROW cost only- no increase in maintenance cost if traffic signal system is existing Richmond has existing signal system.

Operating Costs

Device	Quantity	Capital Cost	Unit Operation Cost	Total Cost/Year	Notes	Devices that Increase Inventory	Paid by Caltrans	Paid by CCTA	Net Contribution by City
San Pablo Corridor Collocation	8.76%		$122,512	$10,731	Estimated Cost	$10,731		$10,731	$0
Wireless GPRS modem	4		$768	$3,072	$64 per month	$3,072		$3,072	$0
Point-Point T1 line for each camera	1		$2,100	$2,100	$175 per month	$2,100		$2,100	$0
Field Devices Electricity (new traffic signal, new CCTV cameras)	3		$660	$1,980	Alameda CTC Cost Data	$1,980		$660	$1,320
IT/Staffing Assistance* - Maintenance Staff	8.76%			$0	Internal based on each Agencies' O&M policy	$0			$0
IT/Staffing Assistance* - Operation Staff	8.76%			$0	Internal based on each Agencies' O&M policy	$0			$0
Estimated Annual Operating Cost (Subtotal)				**$17,883**	**Total Increase due to ICM Devices**	**$17,883**	**$0**	**$16,563**	**$1,320**

*Provided by Alameda CTC or City Traffic Signal Coordinator for all agencies

Total Estimated Annual Operation and Maintenance Cost	**$53,792**	**Total Increase due to ICM Devices**	**$45,628**	**$0**	**$35,956**	**$9,672**

Maintenance Costs -- PINOLE (CT ROW)

Device	Number of Devices	Unit Capital Cost	Unit Maintenance Cost/Year	Total Cost/Year	Life (Years)	Maintenance Cost Notes	Devices that Increase Inventory	Paid by Caltrans	Paid by CCTA	Net Contribution by City
Existing SMART Corridor cameras (used by project)	0	$9,300	$336	$0	10	Same as new CCTV Camera	$0			$0
New closed-circuit television (CCTV) cameras	4	$23,000	$336	$1,344	10	Alameda CTC Cost Data	$1,344	$1,344		$0
New video encoders	4	$3,590	$359	$1,436	10	10% of Capital cost	$1,436	$1,436		$0
Existing SMART Corridor Vehicle Detection Stations (used by project)	0	$14,080	$358	$0	10	same as New MVDS	$0			$0
New Vehicle Detection Stations	0	$14,080	$358	$0	10	Alameda CTC Cost Data	$0			$0
Existing SMART Corridor TSP intersections	0	$5,060	$403	$0	10	Alameda CTC Cost Data	$0			$0
New TSP intersections (including ramp metering locations)	0	$5,060	$403	$0	10	Alameda CTC Cost Data	$0			$0
New EVP-only intersections	2	$5,060	$403	$805	10	Same as EVP/TSP intersection	$805	$805		$0
New Trailblazer Signs	0	$24,675	$1,000	$0	10	Per Skyline; includes GPRS cost	$0			$0
New Traffic Signal	0	$200,000	$3,000	$0	10	Based on City of Concord	$0			$0
Traffic Signal Controller Upgrades (existing signal)	6	$2,500	$250	$1,500	10	10% of Capital cost	No increase in maint cost.			
Wireless GPRS modem (traffic signal controllers)	3	$2,820	$282	$846	3	10% of Capital cost	$846	$846		$0
Controller communications: Ethernet switch	0	$4,060	$406	$0	10	10% of Capital cost	$0			$0
Controller communications: Ethernet module	3	$1,475	$148	$443	10	10% of Capital cost	$443	$443		$0
New Intersection Vehicle Detection: Video Image Detection camera	0	$11,785	$336	$0	10	Estimated same as CCTV camera	$0			$0
New Intersection Vehilce Detection: Magnetometer	0	$8,438	$844	$0	10	10% of Capital cost	$0			$0
Speed Feedback Signs	0	$12,875	$500	$0	15	Compared to trailblazer	$0			$0
New Arterial Changeable Message Sign (CMS): single sided	0	$160,333	$1,500	$0	10	Compared to trailblazer	$0			$0
New Arterial Changeable Message Sign (CMS): double-sided	0	$246,782	$2,000	$0	10	Compared to trailblazer	$0			$0
Exisiting TSP emitters	0	$1,000	$500	$0	10	AC Transit Data	$0			$0
New multi-mode (GPS-InfraRed) TSP Emitters	0	$4,750	$0	$0	10	Assumed to be same as existing	$0			$0
Traffic Signal Software Maintenance/Upgrades *	0.00%	$500,000	$27,500	$0	5	Actual bids	$0			$0
Estimated Annual Maintenance Cost (Subtotal)				**$6,374**		**Total Increase due to ICM Devices**	**$4,874**	**$4,874**	**$0**	**$0**

TOTAL ESTIMATED CONSTRUCTION COST	**$ 144,365.00**

* Local ROW cost only- no increase in maintenance cost if traffic signal system is existing

Operating Costs

Device	Quantity	Capital Cost	Unit Operation Cost	Total Cost/Year	Notes	Devices that Increase Inventory	Paid by Caltrans	Paid by CCTA	Net Contribution by City
San Pablo Corridor Collocation	2.92%		$122,512	$3,577	Estimated Cost	$3,577	$3,577		$0
Wireless GPRS modem	3		$768	$2,304	$64 per month	$2,304	$2,304		$0
Point-Point T1 line for each camera	4		$2,100	$8,400	$175 per month	$8,400	$8,400		$0
Field Devices Electricity (new traffic signal, new CCTV cameras)	4		$660	$2,640	Alameda CTC Cost Data	$2,640	$2,640		$0
IT/Staffing Assistance* - Maintenance Staff	2.92%			$0	Internal based on each Agencies' O&M policy	$0			$0
IT/Staffing Assistance* - Operation Staff	2.92%			$0	Internal based on each Agencies' O&M policy	$0			$0
Estimated Annual Operating Cost (Subtotal)				**$16,921**	**Total Increase due to ICM Devices**	**$16,921**	**$16,921**	**$0**	**$0**

*Provided by Alameda CTC or City Traffic Signal Coordinator for all agencies

Total Estimated Annual Operation and Maintenance Cost	**$23,294**	**Total Increase due to ICM Devices**	**$21,794**	**$21,794**	**$0**	**$0**

Maintenance Costs -- PINOLE (LOCAL ROW)

Device	Number of Devices	Unit Capital Cost	Unit Maintenance Cost/Year	Total Cost/Year	Life (Years)	Maintenance Cost Notes	Devices that Increase Inventory	Paid by Caltrans	Paid by CCTA	Net Contribution by City
Existing SMART Corridor cameras (used by project)	0	$9,300	$336	$0	10	Same as new CCTV Camera	$0		$0	$0
New closed-circuit television (CCTV) cameras	2	$23,000	$336	$672	10	Alameda CTC Cost Data	$672		$672	$0
New video encoders	0	$3,590	$359	$0	10	10% of Capital cost	$0			$0
Existing SMART Corridor Vehicle Detection Stations (used by project)	1	$14,080	$358	$358	10	same as New MVDS	$358		$358	$0
New Vehicle Detection Stations	3	$14,080	$358	$1,074	10	Alameda CTC Cost Data	$1,074		$1,074	$0
Existing SMART Corridor TSP intersections	0	$5,060	$403	$0	10	Alameda CTC Cost Data	$0		$0	$0
New TSP intersections	14	$5,060	$403	$5,635	10	Alameda CTC Cost Data	$5,635		$5,635	$0
New EVP-only intersections	2	$5,060	$403	$805	10	Same as EVP/TSP intersection	$805		$805	$0
New Trailblazer Signs	4	$24,675	$1,000	$4,000	10	Per Skyline; includes GPRS cost	$4,000		$4,000	$0
New Traffic Signal	0	$200,000	$3,000	$0	10	Based on City of Concord	$0			$0
Traffic Signal Controller Upgrades (existing signal)	9	$2,500	$250	$2,250	10	10% of Capital cost	No increase in maint cost.			
Wireless GPRS modem (traffic signal controllers)	3	$2,820	$282	$846	3	10% of Capital cost	$846		$846	$0
Controller communications: Ethernet switch	0	$4,060	$406	$0	10	10% of Capital cost	$0			$0
Controller communications: Ethernet module	3	$1,475	$148	$443	10	10% of Capital cost	$443		$443	$0
New Intersection Vehicle Detection: Video Image Detection camera	0	$11,785	$336	$0	10	Estimated same as CCTV camera	$0			$0
New Intersection Vehilce Detection: Magnetometer	0	$8,438	$844	$0	10	10% of Capital cost	$0			$0
Speed Feedback Signs	2	$12,875	$500	$1,000	15	Compared to trailblazer	$1,000			$1,000
New Arterial Changeable Message Sign (CMS): single sided	0	$160,333	$1,500	$0	10	Compared to trailblazer	$0			$0
New Arterial Changeable Message Sign (CMS): double-sided	0	$246,782	$2,000	$0	10	Compared to trailblazer	$0			$0
Exisiting TSP emitters	0	$1,000	$500	$0	10	AC Transit Data	$0			$0
New multi-mode (GPS-InfraRed) TSP Emitters	0	$4,750	$0	$0	10	Assumed to be same as existing	$0			$0
Traffic Signal Software Maintenance/Upgrades *	10.00%	$500,000	$27,500	$2,750	5	Actual bids	$2,750		$2,750	$0
Estimated Annual Maintenance Cost (Subtotal)				**$19,833**		**Total Increase due to ICM Devices**	**$17,583**	**$0**	**$16,583**	**$1,000**

TOTAL ESTIMATED CONSTRUCTION COST	**$**	**329,035.00**

* Local ROW cost only- no increase in maintenance cost if traffic signal system is existing
New signal system workstation for Pinole (connected to County signal system) being provided by project.

Operating Costs

Device	Quantity	Capital Cost	Unit Operation Cost	Total Cost/Year	Notes	Devices that Increase Inventory	Paid by Caltrans	Paid by CCTA	Net Contribution by City
San Pablo Corridor Collocation	6.02%		$122,512	$7,378	Estimated Cost	$7,378		$7,378	$0
Wireless GPRS modem	3		$768	$2,304	$64 per month	$2,304		$2,304	$0
Point-Point T1 line for each camera	2		$2,100	$4,200	$175 per month	$4,200		$4,200	$0
Field Devices Electricity (new traffic signal, new CCTV cameras)	2		$660	$1,320	Alameda CTC Cost Data	$1,320		$1,320	$0
IT/Staffing Assistance* - Maintenance Staff	6.02%			$0	Internal based on each Agencies' O&M policy	$0			$0
IT/Staffing Assistance* - Operation Staff	6.02%			$0	Internal based on each Agencies' O&M policy	$0			$0
Estimated Annual Operating Cost (Subtotal)				**$15,202**	**Total Increase due to ICM Devices**	**$15,202**	**$0**	**$15,202**	**$0**

*Provided by Alameda CTC or City Traffic Signal Coordinator for all agencies

Total Estimated Annual Operation and Maintenance Cost	**$35,034**	**Total Increase due to ICM Devices**	**$32,784**	**$0**	**$31,784**	**$1,000**

Maintenance Costs -- HERCULES (CT ROW)

Device	Number of Devices	Unit Capital Cost	Unit Maintenance Cost/Year	Total Cost/Year	Life (Years)	Maintenance Cost Notes	Devices that Increase Inventory	Paid by Caltrans	Paid by CCTA	Net Contribution by City
Existing SMART Corridor cameras (used by project)	0	$9,300	$336	$0	10	Same as new CCTV Camera	$0			$0
New closed-circuit television (CCTV) cameras	2	$23,000	$336	$672	10	Alameda CTC Cost Data	$672	$672		$0
New video encoders	2	$3,590	$359	$718	10	10% of Capital cost	$718	$718		$0
Existing SMART Corridor Vehicle Detection Stations (used by project)	0	$14,080	$358	$0	10	same as New MVDS	$0			$0
New Vehicle Detection Stations	0	$14,080	$358	$0	10	Alameda CTC Cost Data	$0			$0
Existing SMART Corridor TSP intersections	0	$5,060	$403	$0	10	Alameda CTC Cost Data	$0			$0
New TSP intersections (including ramp metering locations)	1	$5,060	$403	$403	10	Alameda CTC Cost Data	$403	$403		$0
New EVP-only intersections	1	$5,060	$403	$403	10	Same as EVP/TSP intersection	$403	$403		$0
New Trailblazer Signs	0	$24,675	$1,000	$0	10	Per Skyline; includes GPRS cost	$0			$0
New Traffic Signal	0	$200,000	$3,000	$0	10	Based on City of Concord	$0			$0
Traffic Signal Controller Upgrades (existing signal)	2	$2,500	$250	$500	10	10% of Capital cost	No increase in maint cost.			
Wireless GPRS modem (traffic signal controllers)	1	$2,820	$282	$282	3	10% of Capital cost	$282	$282		$0
Controller communications: Ethernet switch	0	$4,060	$406	$0	10	10% of Capital cost	$0			$0
Controller communications: Ethernet module	1	$1,475	$148	$148	10	10% of Capital cost	$148	$148		$0
New Intersection Vehicle Detection: Video Image Detection camera	0	$11,785	$336	$0	10	Estimated same as CCTV camera	$0			$0
New Intersection Vehilce Detection: Magnetometer	0	$8,438	$844	$0	10	10% of Capital cost	$0			$0
Speed Feedback Signs	0	$12,875	$500	$0	15	Compared to trailblazer	$0			$0
New Arterial Changeable Message Sign (CMS): single sided	0	$160,333	$1,500	$0	10	Compared to trailblazer	$0			$0
New Arterial Changeable Message Sign (CMS): double-sided	0	$246,782	$2,000	$0	10	Compared to trailblazer	$0			$0
Exisiting TSP emitters	0	$1,000	$500	$0	10	AC Transit Data	$0			$0
New multi-mode (GPS-InfraRed) TSP Emitters	0	$4,750	$0	$0	10	Assumed to be same as existing	$0			$0
Traffic Signal Software Maintenance/Upgrades *	0.00%	$500,000	$27,500	$0	5	Actual bids	$0			$0
Estimated Annual Maintenance Cost (Subtotal)				**$3,125**		**Total Increase due to ICM Devices**	**$2,625**	**$2,625**	**$0**	**$0**

TOTAL ESTIMATED CONSTRUCTION COST	**$**	**72,595.00**

* Local ROW cost only- no increase in maintenance cost if traffic signal system is existing

Operating Costs

Device	Quantity	Capital Cost	Unit Operation Cost	Total Cost/Year	Notes	Devices that Increase Inventory	Paid by Caltrans	Paid by CCTA	Net Contribution by City
San Pablo Corridor Collocation	1.46%		$122,512	$1,788	Estimated Cost	$1,788	$1,788		$0
Wireless GPRS modem	1		$768	$768	$64 per month	$768	$768		$0
Point-Point T1 line for each camera	2		$2,100	$4,200	$175 per month	$4,200	$4,200		$0
Field Devices Electricity (new traffic signal, new CCTV cameras)	2		$660	$1,320	Alameda CTC Cost Data	$1,320	$1,320		$0
IT/Staffing Assistance* - Maintenance Staff	1.46%			$0	Internal based on each Agencies' O&M policy	$0			$0
IT/Staffing Assistance* - Operation Staff	1.46%			$0	Internal based on each Agencies' O&M policy	$0			$0
Estimated Annual Operating Cost (Subtotal)				**$8,076**	**Total Increase due to ICM Devices**	**$8,076**	**$8,076**	**$0**	**$0**

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Total Estimated Annual Operation and Maintenance Cost	**$11,201**	**Total Increase due to ICM Devices**	**$10,701**	**$10,701**	**$0**	**$0**

Maintenance Costs -- HERCULES (LOCAL ROW)

Device	Number of Devices	Unit Capital Cost	Unit Maintenance Cost/Year	Total Cost/Year	Life (Years)	Maintenance Cost Notes	Devices that Increase Inventory	Paid by Caltrans	Paid by CCTA	Net Contribution by City
Existing SMART Corridor cameras (used by project)	1	$9,300	$336	$336	10	Same as new CCTV Camera	$336		$336	$0
New closed-circuit television (CCTV) cameras	0	$23,000	$336	$0	10	Alameda CTC Cost Data	$0		$0	$0
New video encoders	0	$3,590	$359	$0	10	10% of Capital cost	$0			$0
Existing SMART Corridor Vehicle Detection Stations (used by project)	1	$14,080	$358	$358	10	same as New MVDS	$358		$358	$0
New Vehicle Detection Stations	1	$14,080	$358	$358	10	Alameda CTC Cost Data	$358		$358	$0
Existing SMART Corridor TSP intersections	0	$5,060	$403	$0	10	Alameda CTC Cost Data	$0		$0	$0
New TSP intersections	5	$5,060	$403	$2,013	10	Alameda CTC Cost Data	$2,013		$2,013	$0
New EVP-only intersections	0	$5,060	$403	$0	10	Same as EVP/TSP intersection	$0			$0
New Trailblazer Signs	3	$24,675	$1,000	$3,000	10	Per Skyline; includes GPRS cost	$3,000		$3,000	$0
New Traffic Signal	0	$200,000	$3,000	$0	10	Based on City of Concord	$0			$0
Traffic Signal Controller Upgrades (existing signal)	3	$2,500	$250	$750	10	10% of Capital cost	No increase in maint cost.			
Wireless GPRS modem (traffic signal controllers)	0	$2,820	$282	$0	3	10% of Capital cost	$0			$0
Controller communications: Ethernet switch	0	$4,060	$406	$0	10	10% of Capital cost	$0			$0
Controller communications: Ethernet module	0	$1,475	$148	$0	10	10% of Capital cost	$0			$0
New Intersection Vehicle Detection: Video Image Detection camera	0	$11,785	$336	$0	10	Estimated same as CCTV camera	$0			$0
New Intersection Vehilce Detection: Magnetometer	0	$8,438	$844	$0	10	10% of Capital cost	$0			$0
Speed Feedback Signs	0	$12,875	$500	$0	15	Compared to trailblazer	$0			$0
New Arterial Changeable Message Sign (CMS): single sided	0	$160,333	$1,500	$0	10	Compared to trailblazer	$0			$0
New Arterial Changeable Message Sign (CMS): double-sided	0	$246,782	$2,000	$0	10	Compared to trailblazer	$0			$0
Exisiting TSP emitters	0	$1,000	$500	$0	10	AC Transit Data	$0			$0
New multi-mode (GPS-InfraRed) TSP Emitters	0	$4,750	$0	$0	10	Assumed to be same as existing	$0			$0
Traffic Signal Software Maintenance/Upgrades *	10.00%	$500,000	$27,500	$2,750	5	Actual bids	$2,750		$2,750	$0
Estimated Annual Maintenance Cost (Subtotal)				**$9,229**		**Total Increase due to ICM Devices**	**$8,815**	**$0**	**$8,815**	**$0**

TOTAL ESTIMATED CONSTRUCTION COST	**$ 120,905.00**

* Local ROW cost only- no increase in maintenance cost if traffic signal system is existing
New signal system workstation for Hercules (connected to County signal system) being provided by project.

Operating Costs

Device	Quantity	Capital Cost	Unit Operation Cost	Total Cost/Year	Notes	Devices that Increase Inventory	Paid by Caltrans	Paid by CCTA	Net Contribution by City
San Pablo Corridor Collocation	1.64%		$122,512	$2,012	Estimated Cost	$2,012		$2,012	$0
Wireless GPRS modem	0		$768	$0	$64 per month	$0			$0
Point-Point T1 line for each camera	0		$2,100	$0	$175 per month	$0			$0
Field Devices Electricity (new traffic signal, new CCTV cameras)	0		$660	$0	Alameda CTC Cost Data	$0			$0
IT/Staffing Assistance* - Maintenance Staff	1.64%			$0	Internal based on each Agencies' O&M policy	$0			$0
IT/Staffing Assistance* - Operation Staff	1.64%			$0	Internal based on each Agencies' O&M policy	$0			$0
Estimated Annual Operating Cost (Subtotal)				**$2,012**	**Total Increase due to ICM Devices**	**$2,012**	**$0**	**$2,012**	**$0**

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Total Estimated Annual Operation and Maintenance Cost	**$11,241**	**Total Increase due to ICM Devices**	**$10,827**	**$0**	**$10,827**	**$0**

Operations and Maintenance Costs -- WestCAT

Device	Number of Devices	Unit Capital Cost	Unit Operations & Maintenance Cost/Year	Total Cost/Year	Life (Years)	Operations and Maintenance Cost Notes	Devices that Increase Inventory	Paid by Caltrans	Paid by CCTA	Net Contribution by WestCAT
Exisiting TSP emitters (none for WestCAT)	0	$1,000	$500	$0	10	AC Transit Data	$0			$0
New multi-mode (GPS-InfraRed) TSP Emitters *	40	$4,750	$500	$20,000	10	Assumed to be same as existing	$20,000			$20,000
Total Estimated Annual Operation and Maintenance Cost				**$20,000**		**Total Increase due to ICM Devices**	**$20,000**	**$0**	**$0**	**$20,000**

TOTAL ESTIMATED CONSTRUCTION COST	**$**	**190,000.00**

* Capital Cost includes estimated installation cost of $750 per bus (to be performed by transit agency)

Operations and Maintenance Costs -- AC Transit

Device	Number of Devices	Unit Capital Cost	Unit Operations & Maintenance Cost/Year	Total Cost/Year	Life (Years)	Operations and Maintenance Cost Notes	Devices that Increase Inventory	Paid by Caltrans	Paid by Alameda CTC	Net Contribution by AC Transit
Exisiting TSP Emitters (AC Transit 72R)	40	$1,000	$500	$20,000	10	AC Transit Data	$0			$0
New multi-mode (GPS-InfraRed) TSP Emitters *	40	$4,750	$500	$20,000	10	Assumed to be same ex AC Transit	$20,000			$20,000
Total Estimated Annual Operation and Maintenance Cost				**$40,000**		**Total Increase due to ICM Devices**	**$20,000**	**$0**	**$0**	**$20,000**

TOTAL ESTIMATED CONSTRUCTION COST	**$ 190,000.00**

* Capital Cost includes estimated installation cost of $750 per bus (to be performed by transit agency). Includes future project to install emmitters on other buses. (expansion beyond 72R)