Appendix C2

Safety and Security

Background

The *Moving Ahead for Progress in the 21st Century Act (MAP-21* includes two planning factors related to safety & security that must be addressed:

- Increase the safety of the transportation system for motorized and non-motorized users.
- Increase the security of the transportation system for motorized and non-motorized users.

The two planning factors are required in the planning process of Metropolitan Planning Organizations (MPOs) through the development of their long-range transportation plans. MAP-21 calls for the long-range plan (Metropolitan Transportation Plan, or MTP in the SACOG region) to have a safety element comprised of the State Strategic Highway Safety Plan (SSHSP) and appropriate elements of security planning to be included as well. The security planning areas include emergency relief, disaster preparedness plans, strategies and policies that support homeland security when appropriate.

MAP-21 provides a flexible frame for the MTP to build its safety and security programs. This flexibility allows the MPO to address specific regional needs through prioritization of appropriate efforts. SACOG is focusing its efforts on education and disaster preparedness for the road system and transit providers and using the SSHSP for guidance on roadway improvements.

Transportation System Redundancy and Evacuation Planning

FHWA's [*Using Highways for No-Notice Evacuations* ,"Routes to Effective Evacuation Planning Primer Series," U.S. DOT, FHWA, December 2007] guidance identifies transportation system redundancy for both roads and transit as an important element of planning our investments to improve safety and security in the event of a natural or human associated disaster. The report suggests evacuation planning efforts should identify critical corridors to move people and goods out an area impacted by disaster. In the Sacramento region, improved transportation infrastructure is important to facilitate evacuation planning and provide redundant evacuation routes.

Examples of transportation infrastructure that are at risk in the Sacramento Region and the entities responsible for assessment planning to manage that risk are included in the following table:

Transportation Infrastructure	Responsible Planning Entities
Rail Lines	Union Pacific, Sierra Northern, Amtrak, Sacramento Regional Transit District, California Northern, Sacramento River Train
Pipelines	Local Utilities, National Hazardous Liquids
Electrical and Telecommunications Grids	AT&T, SMUD, PG&E
Cellular Technology Communication Systems	AT&T and Verizon
Local Roadways	Local Cities, Counties and Caltrans
Limited Access Freeways	Caltrans
Bridges	Local Cities, Counties and Caltrans
Aviation Facilities	Counties, Federal Aviation Administration, U.S. Air Force, U.S. Coast Guard, and Private Operators
Navigable Waterways	U.S. Army Corps of Engineers, Port of Sacramento
Levee Roadways	U.S. Army Corps of Engineers, Counties, Local Cities, and Caltrans
Bicycle and Pedestrian Trails along Levees	U.S. Army Corps of Engineers, Counties, and Local Cities
Waterborne Transportation Resources	Private Operators, U.S. Army Corps of Engineers, U.S. Coast Guard, and Port of Sacramento

An all-hazard risk assessment for the Sacramento Region's transportation assets can guide the transportation agencies towards their future resource investments. Part of the all-hazard assessment is identifying performance of transportation assets during modeled evacuations. Many system failures are likely to be identified during the assessment. This assessment is planned under future development of SACOG's safety and security coordination efforts.

Among the active efforts in the region, Sacramento County and the City of Sacramento develop advanced evacuation plans for the population and employment centers of our region. In terms of regional transportation needs, FHWA calls for anticipating risks to a region's transportation system through placing hazards risks at transportation infrastructure locations. This all-hazard approach to analysis of the transportation infrastructure can outline the vulnerable locations to human and non-human induced events.

FLOODING & EVACUATIONS

The 2005 Hurricane Katrina flood disaster brought to light Sacramento's vulnerable levees and ranked our region as a national concern for serious flooding. Thirty-five percent of our region's population, over 720,000 people, lived within the state's estimated 200-year floodplain in 2005. The ensuing years have resulted in increased safety and security efforts at the state level and Sacramento Regional Flood Control Agency (SAFCA), along with local governments developing evacuation plans. Funding has also been increased, such as local property assessments, to improve the region's levees in many of our at-risk areas. Even with these important efforts towards improved flood safety, the region remains the most at-risk large metropolitan area in the U.S. for a major flood event.

The confluence of two rivers with significant flood risk – the American and Sacramento - is of particular concern because these rivers surround two perimeters of Sacramento's central business district (CBD), West Sacramento and Natomas. In the context of federal guidance on transportation safety & security planning needs, SACOG conducted a comparative analysis of river crossings in peer river city CBDs.

The study examined the number of CBD river crossings as a measure of transportation system redundancies that could serve as potential evacuation routes. Eight river cities were selected as peers to Sacramento on the basis of their CBD size and metropolitan area population. The number of freeway and street bridges were counted for each peer city CBD and then compared to the linear miles of river frontage in the study area. These results suggest that Sacramento has fewer river crossings than any of the peer river cities. The reported measure of this deficit is the "riverfront miles per bridge" in the table.

Peer River Cities	Riverfront Miles per Bridge (Freeway & Street)	Freeway Bridges	Street Bridges	Linear Miles of River*	Square Miles*	Transit % of Commute Trips*
Denver	0.30	2	9	3.3	7.2	21%
Portland, OR	0.39	2	6	3.1	7.3	30%
Minneapolis	0.44	2	7	4.0	7.2	30%
Pittsburgh**	0.50	3	9	6.0	7.6	33%
Kansas City**	0.55	4	4	4.4	6.2	6%
Columbus, OH	0.71	5	3	5.7	6.9	8%
Austin	0.79	2	3	3.9	7.3	4%
Cincinnati	0.91	2	5	4.5	7.2	17%
Sacramento**	**0.94**	**3**	**3**	**5.7**	**7.4**	**12%**

* Central Business Districts (CBD) are the study areas
** Kansas City, Pittsburgh & Sacramento are the only peer cities at the confluence of two rivers with perimeters of their CBDs surrounded

The river crossings analysis also suggests a possible correlation between peer river cities and transit commute mode share - the cities with fewer river crossings typically had smaller transit mode shares – the safety implication being that evacuation via transit during a flood event may be a larger logistical challenge for Sacramento's CBD. Our region's evacuation plans will need to address this challenge in order to plan for transit options with redundant evacuation routes that can move large numbers of people out of a disaster area quickly. Transit's role in evacuation efforts and the need for redundancy evacuation routes were raised during a SACOG transit workshop held to simulate a flood disaster with our region's transit operators. This simulation was the first planning effort in the region to look at how transit resources could be reallocated during an emergency and deal with collateral problems including power supply disruptions that would stop light rail operations and create increased demand for bus and shuttle systems. SACOG is now working with the region's transit operators on more coordinated emergency planning through a Caltrans planning grant.

OTHER EMERGENCY EVACUATION CONCERNS

Although federal, state and local attention has been focused on risks related to flooding, there are additional risks and issues that are important for the SACOG region to address in providing improved evacuation planning:

- Human-associated risks in the SACOG Region are more difficult to prevent. Coordination efforts through the Transit Coordinating Committee have helped prepare the transit agencies to respond to risks from criminal and terrorism threats. Similar planning exercises caused by human-associated activities are planned if future grants are received by this program.

- Many difficulties during emergencies are encountered when real-time information is not accurate for use by first responders, emergency planners and incident commanders. SACOG has completed work with partner agencies to implement an Intelligent Transportation System (ITS) project called the STARNET System to improve information and coordination.

- Wildfires also pose a major danger in the Sierra Nevada Foothills of our region during the summer and fall months. The danger could be significantly increased under many of the impacts envisioned under global climate change. Similar to the flooding threat, there is a level of predictability that can be used to prepare the transportation network.

Road Safety

Safety issues in the Sacramento region involve all modes of travel, however, data reporting is limited and planning efforts have only recently been increasing. Caltrans, local member agencies and SACOG are active partners in planning and implementation of multimodal safety improvement strategies across the region.

Highway safety is a challenge in both rural and urban areas of the Sacramento region. In rural areas, shoulders are limited along many highways and guardrails are lacking along many high-accident locations. Key safety challenges along urban highways include narrow shoulders; roadside obstacles; short, tight ramps; and poor lighting and signage along older sections of urban freeways and highways.

Improving interchange and intersection safety for roadway users is a significant area of safety need. Caltrans maintains a list of uncontrolled highway and rail intersections, but very little federal or state money has been available to fund these types of improvements. The table below provides an inventory as of 2015 for street access control devices at rail intersections in our region.

	Flashers		Gates		Passive		Other						
	At Grade		At Grade		At Grade		Above Grade		At Grade		Below Grade		
County	HR*	LR**	HR	LR	HR	LR	HR	LR	HR	LR	HR	LR	Grand Total
El Dorado	8		1						7				**16**
Placer	3		49		13		27		2		21		**115**
Sacramento	28	3	127	66	51	47	27	6	33	24	20	8	**440**
Sutter	2		16		6		1		5		2		**32**
Yolo	14		62		13		16		2		9		**116**
Yuba	1		17		9		4		2		15		**48**
Region	**56**	**3**	**272**	**66**	**92**	**47**	**75**	**6**	**51**	**24**	**67**	**8**	**767**

Source: California Public Utilities Commission, Rail Crossings Engineering Section, 2014.
*HR signifies Heavy Rail Crossings
**LR signifies Light Rail Crossings

Of the 767 crossings in our region, 139 are protected in a passive approach. For example, a rural crossing with railroad warning signs and no active link to approaching trains. This type of crossing places a greater responsibility on the vehicle operator, pedestrian or bicyclist to yield to an approaching train. Many of the passive crossings are also located along Sacramento Regional Transit's Light Rail lines. Three hundred and ninety seven crossings are protected by warning flashers or a combination of flashers and gates activated by approaching trains.

Several programs exist to improve railroad grade crossing protection. The California Public Utilities Commission (CPUC) administers Section 190 Grade Separation funds throughout the state which provides about $15 million annually to grade separate crossings between roadways and railroad tracks. The CPUC also administers about $16 million per year in federal Section 130 funds to eliminate hazards at existing at-grade public highway-rail crossings.

Other human risks involve the 16 items of the SHSIP that include pedestrians and bicyclists and transit system safety plans. The sixteen items are outlined below:

1. Reduce Impaired Driving Related Fatalities
2. Reduce the Occurrence and Consequence of Leaving the Roadway and Head-on Collisions
3. Ensure Drivers are Licensed and Competent
4. Increase Use of Safety Belts and Child Safety Seats
5. Improve Driver Decisions about Rights of Way and Turning

6. Reduce Young Driver Fatalities
7. Improve Intersection and Interchange Safety for Roadway Users
8. Make Walking and Street Crossing Safer
9. Improve Safety for Older Roadway Users
10. Reduce Speeding and Aggressive Driving
11. Improve Commercial Vehicle Safety
12. Improve Motorcycle Safety
13. Improve Bicycling Safety
14. Enhance Work Zone Safety
15. Improve Post Crash Survivability
16. Improve Safety Data Collection, Access, and Analysis

SACOG Active or Planned Efforts Related to Safety & Security

Four policy statements support the active or planned efforts by SACOG that will guide safety and security planning efforts for the future:

- SACOG supports efforts with its transportation providers to provide for a safe and secure transportation system for all users. (Pedestrian, Bicycle, Private Auto and Public Transportation)
- SACOG will continue to champion agency coordination, training, and information-sharing efforts to promote security preparedness throughout the region.
- SACOG will continue to seek funding sources to strengthen the safety and security of the region's transportation system.
- SACOG will continue to consider increased transportation system safety and security when evaluating funding requests for transportation projects in the region.

Security initiatives will continue to help protect the region from natural and human events that pose a risk to public safety. The California Department of Transportation established working groups for each of the sixteen goals listed above. SACOG continues to work with our agency partners to address the goals through coordinated efforts, including information-sharing, testing of the region's transportation assets, and coordination leading to the funding of transportation projects that improve the region's transportation safety, security, multi-agency coordination, preparedness, and continuity.

Over the past four years SACOG has passed through nearly seven million dollars in Proposition 1B funds to local transit operators to improve safety and security on the regional transit system. These

funds are recommended by SACOG to CalEMA who then awards the funds and administers the program. Some of the projects funded so far are, Paratransit Inc. Mobile Dispatch Vehicle to coordinate transit operations at a staging site, SRTD light rail information signs, automatic vehicle location upgrades, RT Fiber Optic cabling to link Light rail network station cameras, on board security cameras for Yolo bus, Yuba Sutter Transit, Folsom Stage Lines, E-tran, and bus yard security improvements to E-trans bus yard in Elk Grove.

CALL BOXES AND SAFE

SACOG manages the Sacramento region's highway call box program, a cooperative effort that has installed more than 1,200 call boxes on about 750 miles of highway in a six-county area. The boxes provide motorists in need with a link to the California Highway Patrol (CHP). Location information is displayed on a computer at a private call answering service, CVR-SAFE, when a motorist uses the call box phone/TTY to request help from the CHP.

Call boxes on Class I Bike trails function in much the same way. Signage information reflects County, Bike trail, and box number. These call boxes are directly connected to local law enforcement offices not CVRS's private call answering service. When a biker/pedestrian uses a bike trail call box they speak directly to police or sheriff.

The program is a joint venture of Sacramento, San Joaquin, Sutter, Yolo, Yuba, and El Dorado Counties, which together operate the Capitol Valley Regional Service Authority for Freeways and Expressways (CVR-SAFE). It is financed by an annual $1 charge on all registered vehicles in the participating counties. SACOG provides staffing and management for SAFE.

Capitol Valley Regional SAFE upgraded its call boxes to digital technology (from analog) and upgraded the call boxes to include TTY capability. CVR-SAFE has begun implementing the Mobile Call Box Program in cooperation with the 511 Road information system. The Mobile Call Box Program allows motorists in distress to access call box services by using their cell phones by calling 511, instead of the fixed call boxes along the roadways. Stranded motorists could stay in their car while requesting motorist aid (non 911 calls). CVR-SAFE continues to explore various other Motorist Aid ideas. The SAFE is a contributor to the upgraded 511 Road information system which was made available through the STARNET application.

STARNET

The Sacramento Transportation Area Network (STARNET) is an information exchange network and operations coordination framework that can be used by the operators of transportation facilities and emergency responders in the Sacramento region of California. STARNET enables the real-time sharing of data and live video, and refinement of joint procedures pertaining to the operation of roadways and public transit, and public safety activities. It provides more information for travelers via the region's 511 web site, regional smart phone application and interactive telephone service (dial 511).

The goals of STARNET included the following:

- Make travel easier and safer

- Gather and disseminate more and better real-time travel information
- Better travel decisions – time, mode, route
- Provide transportation system managers and emergency responders with more and better real-time information
- Including information from other agencies
- Better operational decisions and actions
- Allow shared use of field devices when appropriate
- Better use of resources and better operation

STARNET is built upon Intelligent Transportation System (ITS) investments by capitalizing on field infrastructure (cameras, changeable message signs, traffic signals, vehicle location systems, etc) and central systems (freeway management systems, traffic signal systems, transit management systems, computer aided dispatch systems, etc) operated by each agency. As part of the STARNET implementation, interfaces were be developed to these existing systems to enable them to share data and video with each other, provide data and video to the public via the 511 regional travel information systems, and provide operations and emergency response personnel with a map-based regional transportation management display.

INCIDENT MANAGEMENT

Incidents on highways and freeways are both a safety issue and a significant cause of congestion. Contrary to common belief, up to 50 percent of traffic congestion on freeways is not caused by lack of capacity, but is due to incidents including weather, collisions, spilled loads, and stalled vehicles. Through improving the response time in dealing with these traffic problems – and ideally avoiding them altogether –investments in the MTP/SCS can make significant progress in increasing safety and reducing roadway congestion.

SAFE ROUTES TO TRANSIT

Bicycling and light rail are complementary modes that together can provide transportation for a significant number of commuters, students, shoppers and other travelers. Since transit providers in the United States have generally focused on passengers arriving at stations by motor vehicle, the full potential of attracting customers who arrive by bike has not yet been realized. Improving and promoting bike access to light rail stations would dramatically increase the pool of transit customers and provide a variety of important community benefits.

Through the MTP/SCS focus on more compact land uses, growth in TPAs, complete streets improvements and funding for bicycle and pedestrian facilities, SACOG continues to seek to improve the safety and convenience of walking and bicycling to transit stations and stops throughout the region.

SAFE ROUTES TO SCHOOL (SRTS)

SACOG plans to do the following to promote the ability of more school children to walk and bicycle to school, and reduce school vehicle traffic:

- Obtain federal funds from the Federal Highway Administration through Caltrans to implement at least one SRTS pilot program within the MTP Plan Area.
- Conduct workshops with cities, counties, school districts and transit operators within the region to identify other potential opportunities for collaboration that would reduce greenhouse gas impacts. At a minimum, the issues discussed will include the findings from the SRTS activities described above, opportunities to increase the number of students with bus or other transit options to get to and from school, and integrating school siting practices with goals of promoting walkable neighborhoods with a wide range of easily accessible services.

SACOG will also encourage its member agencies to apply for federal and state funds for eligible planning and infrastructure projects in order to improve bicycle and pedestrian safety for school children.

Regional Data Monitoring

SACOG started coordination with our member's information technology departments in 2000. Since the Office of Homeland Security was created in 2001, SACOG has participated in several geo-spatial information development efforts through our Regional GIS Coordination Committee. A grant from Sacramento County's Office of Emergency Services funded a nationally-recognized address maintenance system to keep our public safety dispatch system up to date. In 2006, our regional Office of Homeland Security funded over 1,000 square miles of high-resolution ortho and oblique imagery. Coordination efforts continue to identify valuable information development projects and match them with funding sources to improve our response capabilities

MAPPING AND GEOGRAPHIC INFORMATION

SACOG's Mapping and Geographic Information Systems (GIS) coordinates the base street and address map used by local, regional, state and federal government agencies in our region. SACOG regularly provides data to both the Unites States Geological Survey's (USGS) National Map program and the National Geospatial Intelligence Agency (NGA) data collection efforts. The data provided to the organizations are collected from SACOG Member agencies through our Regional GIS Cooperatives project and consolidated and standardized into a single regional set of information.

REGIONAL GIS COOPERATIVES

SACOG started the GIS Cooperatives project in 2000 to facilitate the development of common property and transportation base maps in each of our six counties. The Sacramento County GIS Cooperative was previously awarded Homeland Security grants from the Sacramento County Office of Emergency Operations to develop an online tool to maintain the GIS Street file. The tool, known as the Street Address Portal, now allows for local government data maintainers and public safety data reviewers to collaborate on monthly updates of the street address file for all public safety dispatch agencies in Sacramento County. Future plans for the GIS Cooperatives Project include replicating the successes of the Street Address Portal project with our other cooperative groups. SACOG also continues to promote data sharing and cooperative data maintenance projects to improve and enhance our local GIS programs.

REGIONAL IMAGERY COLLECTION

In 2014, members of the Regional GIS Collaborative project asked SACOG to coordinate an update to the region's 2006 and 2009 Regional Imagery Collections of six-inch ortho-photography and oblique imagery for the urbanized portions of our region. Nine local governments partnered with the Sacramento Metropolitan Utility District, Sacramento Regional Fire EMS, Sacramento Area Sewer District and the University of California joined this project to collect current imagery for over 1,100 square miles of our region.