

# BAY BRIDGE CLOSURE FOR EMERGENCY EYEBAR REPAIRS TRANSPORTATION RESPONSE EFFORTS

Tuesday, October 27, 2009 to Monday, November 2, 2009

Report to the Metropolitan Transportation Commission Operations Committee  
December 11, 2009

## INCIDENT SUMMARY

On Tuesday, October 27, 2009, at 5:32 p.m., portions of structural elements on the Bay Bridge used in the repair of a cracked eyebar fell and damaged three vehicles traveling westbound on the East Span upper deck. By 9:00 p.m., all approaches to the bridge in Oakland and San Francisco were closed. The repair was completed, inspected and tested, on November 2, 2009, and the bridge was reopened to traffic at 9:00 a.m. on Monday, November 2, 2009.

Although this closure was unanticipated, it occurred less than two months after the extensively planned Labor Day weekend activities on the Bay Bridge. As a result, most of the traffic mitigation measures developed for Labor Day weekend were re-instituted immediately. However, the transportation impacts of this closure differed from Labor Day weekend in three important areas, which combined to make the response considerably more challenging:

- **The closure was not planned.**
- **The closure duration was unknown.**
- **The closure occurred on weekdays.**



## CONGESTION and TRAVEL IMPACTS

The primary vehicular detour routes were via (1) the San Mateo-Hayward Bridge to the south, and (2) the Richmond-San Rafael and Golden Gate Bridges to the north. Traffic congestion on the detours was substantial on weekdays. Less severe congestion occurred over the weekend. However, the major delays were largely confined to the detours, and region-wide impacts were minimal.

Bottlenecks at a few key locations were the primary contributors to the major congestion that occurred. The southerly detour via the San Mateo Bridge probably received the largest amount of detoured traffic. The eastbound drive across the bridge, normally congested on a typical P.M. commute, saw delays increase by more than 83 minutes, with congestion occurring from about noon to 8:00 P.M. The primary constraint was the EB-NB connector at the 92/880 interchange. Severe congestion also occurred in the opposite direction during the morning commute, with westbound delays on the San Mateo Bridge increasing by as much as 80 minutes. The primary westbound constraint was the WB-NB connector at the 92/101 interchange. Once past these bottlenecks, travel on the remainder of the detour was largely at free flow speeds. Use of the Dumbarton Bridge further to the south increased by as much as 28 minutes.

The northerly detour via the San Rafael and Golden Gate Bridges also experienced severe congestion. The controlling bottleneck was the local connection between US-101 and I-580, primarily via Sir Francis Drake Boulevard. Backups from the single lane off-ramp from westbound I-580 to Sir Francis Drake Blvd extended across the entire length of the San Rafael Bridge, and as far back as Marina Way in Richmond, a distance of 7.5 miles. In the opposite direction, major congestion occurred on northbound US-101 in Marin County leading to the Sir Francis Drake Blvd off-ramp, with travel times increasing by up to an hour compared to normal evening commute conditions.

On SR-37 in Solano and Sonoma Counties, westbound A.M. commute period traffic experienced as much as 45 minutes of delay between the 80/37 and 37/121 interchanges. During the evening commute, eastbound traffic experienced as much as 30 minutes of delay between 121/37 and 37/29.

Although not normally congested, southbound US-101 approaching the Golden Gate Bridge experienced extreme delays during the evening commute. This was largely the effect of the limited total number of lanes available on the bridge to serve both directions of travel. By necessity, four lanes were provided in the northbound direction during the evening since that is the peak commute direction. With only two lanes on the bridge remaining for southbound travel, evening delays entering San Francisco from the north were as much as 90 minutes.

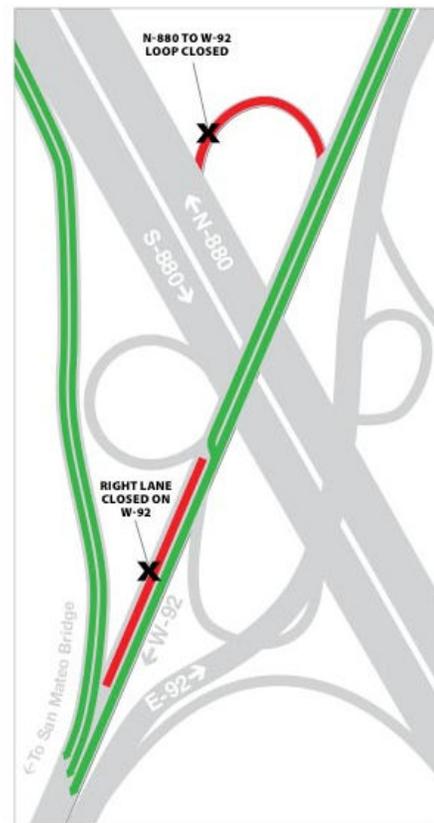
Delays on the morning of Monday November 2<sup>nd</sup> were even greater than on the previous weekdays. A probable Monday reopening of the Bay Bridge had been widely publicized the night before, and many commuters who had stopped driving the week before may have returned to their cars in anticipation. For example, the westbound drive across the San Mateo Bridge saw travel times 80 minutes greater than the norm at about 8:30 a.m. on Monday.

## FREEWAY ENHANCEMENTS

The Caltrans District 4 Emergency Operations Center (EOC) was activated at 6:45 p.m. on Tuesday October 27, and was staffed around the clock to provide hourly situation reports and travel time reports on the main detour routes. No other regional, local or transit EOCs were activated as a result of this bridge closure. A command center was established at Pier 7 on Burma Road near the eastern end of the Bay Bridge, where repair operations were coordinated.

Operational modifications were made to the 92/880 interchange in the evening immediately after the closure. The connector from southbound I-880 to westbound SR-92 was restriped to two lanes. The connector from northbound I-880 to westbound SR-92 was closed to facilitate traffic from eastbound SR-92 to northbound I-880 (these movements would otherwise share the same collector road). For the northerly detour via the Richmond-San Rafael, congestion at the off-ramps to Sir Francis Drake Boulevard were partially ameliorated by the use of portable CMSs advising motorists to use other downstream off-ramps which were less congested.

Previously approved lane closures on the detour routes were cancelled for the duration of the Bay Bridge closure. CHP officers assigned to these closures were redeployed to assist with the Bay Bridge related closures.



## Freeway Service Patrol

FSP service on all approaches to all bridges were augmented to cover the mid-day period between 10 am and 3 pm. From Wednesday thru Friday, the PM shift was extended one extra hour on the bridge approaches, and enhanced AM service was provided on Hwy 4 and Hwy 880 near San Mateo Bridge approach. Over the weekend, one additional FSP truck was added on five beats providing service between 10 am and 8 pm. On Sunday, FSP service was added on Hwy 101 between SF and SFO Airport. The estimated cost of expanded FSP service was approximately \$12,000.

### Freeway Mitigation Measures Proposed But Not Implemented

- Expansion of HOV lane hours of operation. This measure was not implemented because of (a) the uncertainty of the duration of the closure, (b) the time associated with implementing the regulatory signing changes, (c) problems the CHP would experience enforcing the new HOV hours, (d) the potential for exacerbating the already severe congestion on detour routes by under-utilizing all of the freeway lanes, and (e) confusion to motorists.
- Allowing all vehicles to use HOV lanes. This proposal was not implemented to preserve the time savings advantage for travelers who used transit or rideshared at a time when freeway delays were considerably more severe than the norm.
- Allowing transit buses to use lower deck of Bay Bridge. This proposal was not implemented due to operational conflicts that would occur between two-way use of the lower deck and access to the Treasure Island ramps used by local traffic from San Francisco.

## TRANSIT RESPONSE

Use of transit jumped during the closure, but the ability of transit agencies to provide much additional service was constrained by recent budget cuts and by the amount of rolling stock available during peak commute periods. This situation differed from the Labor Day closure of the Bay Bridge, which took place over a holiday weekend when demands on transit services are much less.

### Regional Coordination Conference Calls

MTC set up daily Regional Transit Coordination conference calls beginning on the morning of Wednesday October 28<sup>th</sup>. Participating in the calls were staff from MTC, 511, Caltrans, BART, AC Transit, San Francisco Municipal Transportation Agency (SFMTA), Alameda Ferry, Golden Gate Ferry and Transit, Golden Gate Bridge Highway and Transportation District (GGBHTD), Amtrak, Western Contra Costa Transit Authority (WestCat), Greyhound, Livermore Amador Valley Transit Authority (LAVTA), San Mateo County Transit District (SamTrans), Caltrain, Vallejo Ferry and Transit, and County Connection. These calls were instrumental in exchanging information between agencies, coordinating services, and keeping information on service changes up to date. Updated "Transit Agency Contingency Plan" reports were issued after each conference call.



The **BART** system shouldered the heaviest mode shift load during the closure, running longer trains throughout the day. More than 437,000 people rode their trains on Wednesday Oct 28th - more than on any single day in the system's 37-year history. However, the very next day, BART surpassed that to set its new historical record: 442,000 riders on Thursday, October 29. On Thursday, ridership across the system was 24% higher than normal, and there were 260,600 total transbay riders (57% higher than normal). Parking lots at BART stations were at capacity by early morning each day, which limited the ability of many drivers to switch modes. MTC arranged for two additional park & ride lots and shuttle service near the West Oakland and Castro Valley BART stations. BART trains typically run until midnight each night, but the system operated overnight service on the nights of Friday-Saturday and Saturday-Sunday during the bridge closure. The late Saturday service was particularly important since that was Halloween.

**AC Transit** re-routed transbay buses to serve four East Bay BART stations (MacArthur, West Oakland, Coliseum, and North Berkeley). Assistance was provided by Caltrans to reserve curbside parking for AC Transit buses at these stations. AC Transit Overnight service was re-routed over the San Mateo Bridge.

The **Alameda-Oakland Ferry** ridership increased by 140% over the seven-day bridge closure, carrying 7,700 more passengers than in a comparable period in the previous year. The **Vallejo Ferry** ridership increased by 70%, carrying 6,300 more passengers over the bridge closure period.

### **Reimbursement For Modified Transit Service**

Only BART and the Alameda Ferry provided additional service. Golden Gate Ferry made an additional high-capacity vessel available on stand-by, but it was not needed. AC Transit provided overnight Owl service into San Francisco (suspended when BART provided overnight service) and SFMTA provided security for the overnight BART service operating in San Francisco.

MTC is currently working with these transit operators to determine net costs eligible for potential reimbursement. These costs are currently estimated at \$350,000.

### **MOTORIST & PUBLIC INFORMATION**

Within the first hour of the closure, 91 freeway changeable message signs were activated, alerting motorists of the closure and recommending the use of alternate bridges. These freeway CMSs were later supplemented with 65 portable CMSs. Caltrans Highway Advisory Radio broadcasts were activated at 6 sites. Mutual aid was provided by adjacent Caltrans districts via CMS activations in Districts 3 (Sacramento), 5 (San Luis Obispo) and 10 (Stockton). Updates were also posted on the California Highway Information Network (CHIN). CHP issued multiple updated media advisories and SIGNALERTS.

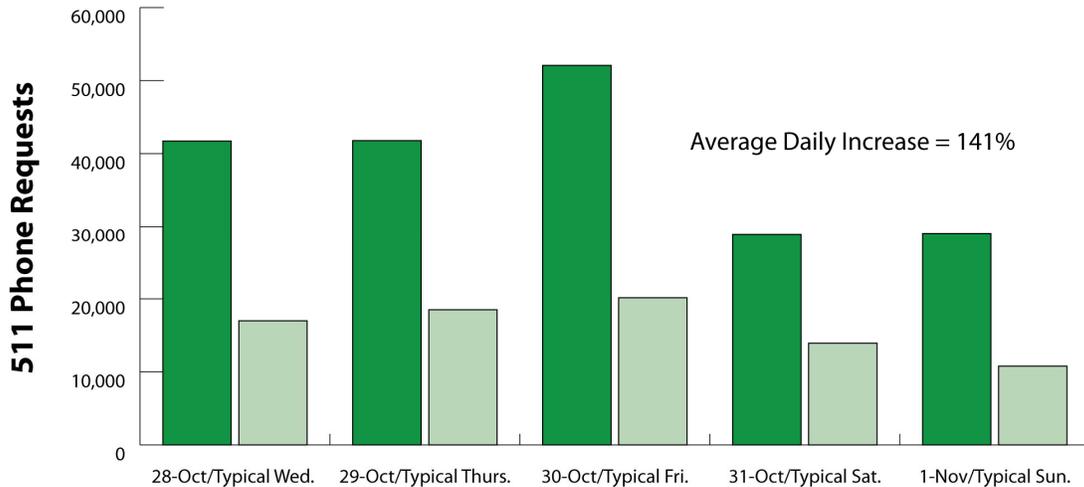


The 511.org website was updated with a special bridge closure web page shortly after the closure. This website was continuously updated with closure status, as well as links to the 511 Transit Trip Planner, a list of transit options and service enhancements, and maps of detour routes. Two portable 511 ETC readers were placed at the 92/880 interchange to provide more accurate travel time data.

The Bay Bridge Information site ([www.baybridgeinfo.org](http://www.baybridgeinfo.org)) linked prominently to 511 and encouraged people to visit 511.org or call 511 for information. SFGate also linked to 511.org prominently on their home page throughout the closure, and 511 was widely mentioned by online news providers as a good source for transportation information and Bay Bridge updates.

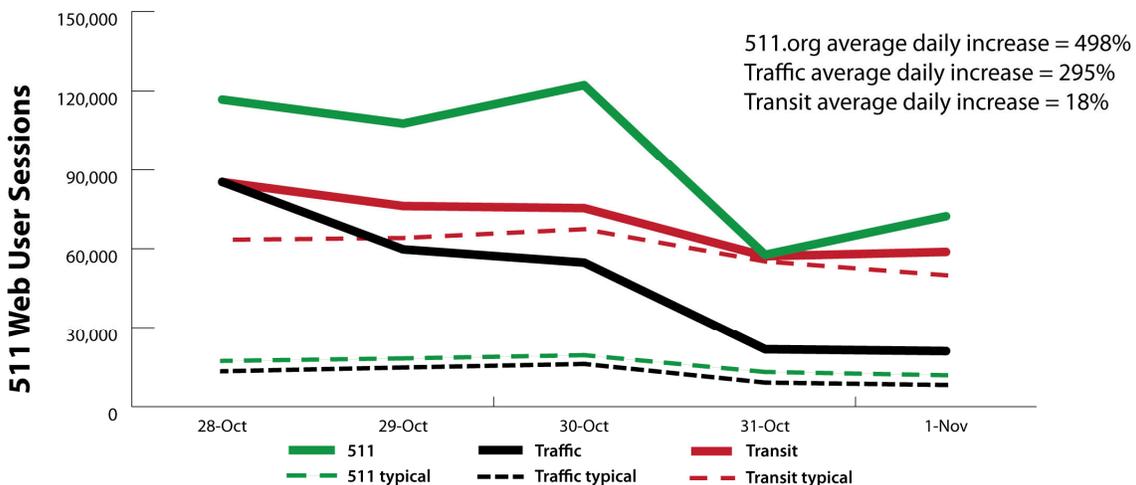
## 511 Phone

511 Phone handled approximately 140% more calls than typical for each of the five days of the Bay Bridge closure (Tues 10/28 - Sun 11/1.) For example, on Thursday, 10/29, the system received 52,091 calls (compared to about 18,500 calls on a typical Thursday.) Calls to 511 phone on 10/28 (the first day of the bridge closure) were about 47% higher than the number of calls to 511 on the first day of the Labor Day Bay Bridge closure.



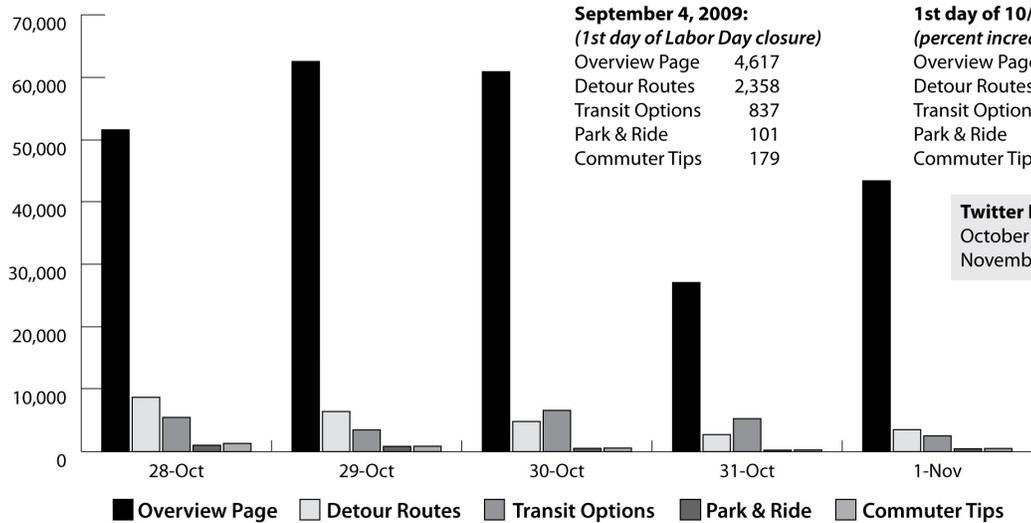
## 511 Web

The 511.org page supported more than 116,000 user sessions on the first day of the bridge closure (Wed. 10/28). This is a 540% increase over a typical day's usage (~17,000 user sessions.) Both the 511 traffic and 511 transit pages were heavily used during the bridge closure. On the first day of closure (Wed. 10/28) each supported approximately 85,000 user sessions. The 511 transit page is the most popular 511 page on a typical day. During the closure use of the 511 transit page increased 18%. Use of the 511 traffic page, which has lower use on a typical day, increased by 295%.



Of the special Bay Bridge closure web pages, the overview page was most heavily used. 76% of the total special page user sessions were on the Overview Page. 13% of total user sessions were on the Detour Routes page, 8% were on the Transit Options page and 2% were on the Commuter Tips page. Use of the Overview Page on the first day of this unanticipated closure (Wed. 10/28) was more than 1000% higher than use of the overview page on the first day of the Labor Day closure (Fri. 9/4.)

# 511 Bridge Closure Special Pages



**September 4, 2009:**  
*(1st day of Labor Day closure)*  
 Overview Page 4,617  
 Detour Routes 2,358  
 Transit Options 837  
 Park & Ride 101  
 Commuter Tips 179

**1st day of 10/09 closure:**  
*(percent increase)*  
 Overview Page 1,018%  
 Detour Routes 265%  
 Transit Options 546%  
 Park & Ride 889%  
 Commuter Tips 616%

**Twitter Registrants:**  
 October 27 250  
 November 2 644

MTC Graphics /pb - 11/12/09

## 511 Twitter

During the closure, staff posted real-time updates to the 511 Twitter feed, mirroring messages on 511 phone and web. The 511 Twitter feed was promoted through a link on the 511 special page. The number of people following @511SFBay on Twitter increased from about 250 on Tuesday (10/27) to 644 on Monday (11/2). Our Twitter messages were forwarded (re-tweeted) to others by 48 people, and approximately 262 people mentioned 511.org in their Twitter messages.

**511 SF Bay Area** | 511.ORG | TRANSIT | TRAFFIC | RIDESHARE | BICYCLING | MY 511 | Login | Register

511 Home | Get Around | Go Green | Call 511 | About 511 | Apps & Extras

### Bay Bridge REMAINS CLOSED in Both Directions

**TRAFFIC DISRUPTION**

**OVERVIEW** | DETOUR ROUTES | TRANSIT OPTIONS | PARK & RIDE | COMMUTER TIPS

#### Closure Details

**Current Status** (as of 5:20 a.m., 11/2/09)  
 The Bay Bridge remains closed in both directions until further notice. The bridge remains closed AT LEAST through the Monday morning commute. Motorists are urged to plan ahead and use alternate routes. Caltrans crews are working to reopen the Bay Bridge as quickly as possible. Check back for transit updates and for an updated bridge reopening schedule as more information becomes available.

Residents of Treasure Island are allowed access to their homes via the San Francisco side of the bridge; CHP is requiring proof of residency.

The 92/880 interchange was re-stripped to allow two lanes of traffic from southbound 880 to westbound 92 to handle the extra traffic load. One lane of westbound 92 is closed over 880 to accommodate the additional traffic coming from southbound 880. Additionally, the northbound 880 connector to westbound 92 is closed. Motorists may use Tennyson Road to Hesperian Boulevard or Tennyson Road to Industrial Boulevard to access westbound 92.

#### How You Can Plan Ahead

**Take Transit or Telecommute**  
 If at all possible, avoid driving between San Francisco and the East Bay while the Bay Bridge remains closed. Caltrans recommends that you allow extra time for travel, use [public transit](#), telecommute, or [carpool](#). For those who must drive, use [recommended detour routes](#).

On Monday, November 2, 511 is providing **FREE shuttle service to Castro Valley and West Oakland BART stations** approximately every 15 minutes from 6-10 a.m. and 4-7 p.m. from the following two park & ride lots:

- 20630 John Drive, Castro Valley - serves Castro Valley BART
- 7th/Linden Park & Ride lot, Oakland - serves West Oakland BART

#### WHAT YOU NEED TO KNOW

- Bridge remains closed AT LEAST through the Monday morning commute. Check back for updates.
- Expect regional traffic delays.
- 511 can help you find alternate [transit options](#).

#### FEATURED LINKS

- [Caltrans Closure Info](#)
- [Transit Trip Planner](#)
- [Follow 511 on Twitter](#)

## PROBLEMS ENCOUNTERED and LESSONS LEARNED

### Traffic Handling

- (1) **Monitoring:** Severe traffic congestion occurred on the detour routes. Other than the easily-implementable improvements at the 92/880 interchange, no other major physical changes were deemed feasible or appropriate given the uncertain duration of the bridge closure. However, more comprehensive traffic monitoring capabilities are needed to ensure that mitigation measures are deployed rapidly and are effective. Several upgrades to the District 4 Traffic Operations System, funded by MTC, are currently underway which will help accomplish this.
- (2) **Detour Pre-Planning:** Incidents that disrupt key transportation links have logical detour routes and mitigation measures associated with them. These routes and measures should be fully documented and disseminated in advance, and plans should be coordinated in advance with all agencies who will be involved in the response. Equipment needed for the most likely mitigation measures could also be staged in preparation. This planning effort can be coordinated under the Caltrans/CHP/MTC Incident Management Task Force (IMTF).

### Regional Transit Coordination

- (3) **Coordination Conference Calls:** Regional Transit Conference Calls worked well to keep all agencies up to date on closure status and changes in service. An official contact protocol needs to be established to ensure that transit providers are contacted quickly after an incident that either affects them or requires their support, and every effort should be taken to provide them with sufficient advance notice and accurate information. Also, it would be helpful to encourage continuity of staff participants in the calls to avoid repeating "old" information/status reports.
- (4) **Transit Coordination Group Contact List:** The Regional Transportation Coordination Group contact list was based on the Labor Day closure contact list developed by Caltrans. During the emergency repair closure, this list expanded to include additional agencies and additional staff. The list is being updated to be all-inclusive for future regional coordination communications.
- (5) **Regional Transportation Contingency Plan:** The format for this Plan was very useful and will be considered to replace the Regional Summary Report format currently produced in the MTC EOC. Suggestions were made to add a contact name/phone number for each agency so that follow-up questions can be directed appropriately.
- (6) **Transit Agency Resource Needs:** Caltrans assisted AC Transit with securing barricades to be used to reserve parking space at four BART stations. Similarly, MTC 511 Rideshare staff coordinated additional parking capacity and shuttle service for the West Oakland and Castro Valley BART Stations. There is a need to identify transit agency resource needs and overflow parking options in advance of the next closure and/or incident to ensure an expeditious response.

### Public Notification

- (7) A consistent, timely and accurate message needs to be conveyed to the public. Because of the dynamic nature of this repair operation, it was not possible to give timely and accurate information to the public on the bridge reopening time. Although it is difficult to speculate how that dynamic nature of this incident could have been changed, the inability to provide commuters with more definitive information on the duration of the closure probably had an effect on motorists willingness to explore other travel modes.