



Council Meeting: May 6, 2008

SUBJECT: Receive Staff Report on Recent Emergency Bridge Repairs, Revise the Budget and Schedule for Wolfe Road CalTrain Overcrossing, Project 825620, and Approve Budget Modification No. 53

REPORT IN BRIEF

The Department of Public Works (DPW), requests the City Council revise the schedule and budget for the Wolfe Road CalTrain Overcrossing, Project 826620 to move it forward to the current fiscal year. The project was scheduled for design in FY 2010/11 with construction in FY 2011/12. Recent accelerated deterioration of the bridge bearing pads, and subsequent damage requires that the design and construction of bridge repairs occur sooner than FY 2010/11.

BACKGROUND

The Wolfe Road Bridge over CalTrain is one of several bridges owned by the City, and inspected biennially by Caltrans. The bridge was built in 1981, when there were only two sets of railroad tracks beneath. After the bridge was built, CalTrain added two sets of tracks, closer to the bridge supporting columns.

The July 12, 2004 Caltrans bridge report recommended deck repair, replacement of bridge bearing pads, and patching spalls in the superstructure. In response to the bridge report, staff prepared, and the City Council approved Capital Improvement Project 825620 *Wolfe Road CalTrain Overcrossing* for bridge rehabilitation as recommended in the report. The capital improvement project scheduled \$78,030 in FY 2010/11 and \$557,134 for FY 2011/12, from the Gas Tax Fund. This estimate was based on the information available at the time.

As one of several safety precautions, CalTrain inspects their railroad tracks about every 72 hours to make sure the tracks are free and clear. On Wednesday, April 23, 2008, CalTrain personnel notified the City that chunks of concrete had fallen from the bridge onto the railroad tracks below. CalTrain emphasized their safety concern, demanding immediate action.

The City immediately mobilized resources to inspect the bridge and take appropriate action. City staff reviewed the site and obtained photographs. Caltrans Bridge Inspector, Daniel Zuhlke was contacted in the field and reviewed the photos via the internet, in collaboration with other Caltrans

employees in their office with access to the bridge plans. Caltrans had recently completed the 2008 inspection of this bridge, with the report pending. Caltrans did not find potential for imminent risk of bridge failure, but agreed to visit the site the next day at the City's request.

City staff hired bridge structural consultant HNTB Corporation, on an emergency \$20,000 contract, to inspect, evaluate and advise the City on the bridge. The City Purchasing Division also released a check to CalTrain for \$10,760 to cover required: permit fees, CalTrain flagger costs, and railroad insurance.

The Caltrans Bridge Engineer, the HNTB Bridge Engineer, and the CalTrain Chief Engineer and CalTrain flaggers entered the CalTrain right-of-way and inspected the bridge together on Thursday, April 24, 2008. They found that the bridge bearing pads had deteriorated, allowing the central portion of the bridge to settle approximately one and one-half inches vertically. This settlement and possible stress from post-tensioning allowed portions of the decorative outer concrete skin of the structure to bear upon one another causing some concrete at the edge of two hinge joints to break away and fall off the bridge. One of these hinges is directly over a set of recently added railroad tracks. CalTrain ordered their trains to go slow in the area to reduce the risk of a falling piece causing damage.

Since they found no indication of overall bridge failure, the concern was focused on removing material subject to breaking off, to protect trains, rails, and personnel below. On the evening of Friday, April 25, at 11:30 p.m. the HNTB Bridge Engineer, CalTrain Chief Engineer, CalTrain right-of-way flaggers and City personnel assembled to check the bridge hinges, remove loose material, and more closely inspect the bridge. Near midnight (April 26) after receiving the all-clear from CalTrain to enter the right-of-way, the team removed loose material, and performed a closer inspection. HNTB has prepared a report with findings and recommendations (Attachment A).

EXISTING POLICY

The following documents contain policy direction on this issue:

Land Use and Transportation Element C3.4. Maintain roadways and traffic control devices in good operating condition.

Fiscal Sub-Element 7.1C.1.d. High priority should be given to replacing capital improvements prior to the time that they have deteriorated to the point where they are hazardous, incur high maintenance costs, negatively affect property values, or no longer serve their intended purposes.

DISCUSSION

Although the immediate concern was alleviated swiftly, the consultant and staff recommend moving the design and construction of the Wolfe Road CalTrain Overcrossing project up. HNTB states in the attached report that “There is currently no imminent danger of bridge collapse, but due to worsening condition of the hinges, and to reduce the hazard of falling concrete onto Caltrain tracks, HNTB recommends ... (the bridge repair) ... be completed within the next 6 months, before the next winter”. HNTB is revising the scope of work and cost estimate to reflect the latest information. The cost of repair is greater than initially anticipated due to several reasons, which include additional information allowing a more complete understanding of costs, recognition that the bearing pads from all four bridge hinges must be replaced, and the difficulty in raising the bridge over the CalTrain right-of-way, particularly when the hinge is directly over newer tracks.

Until the bridge can be fully refurbished, the consultant also recommends inspection, including sounding for other loose material, and removal of loose material on a monthly basis.

FISCAL IMPACT

The preliminary estimate for this project is \$2 million. This includes design and preparation of bid documents, bidding, construction, project management, permit fees, special inspection, and contingency.

Staff will pursue use of Federal Highway and Bridge Rehabilitation and Reconstruction (RBRR) funds, or other possible grant funds. However, seeking outside funding within the quick schedule necessary for these repairs may not be fruitful. Therefore, staff recommends allocating State Proposition 1B Infrastructure Bond Funds for this project.

In November 2006, California voters approved Proposition 1B to authorize \$42.7 billion in statewide bonds to fund infrastructure projects. These State Infrastructure Bonds included \$2 billion statewide in funds for maintenance and improvement of local streets and roads. Sunnyvale’s allocation is estimated to be \$4.2 million. Eligible projects include repairs to pavement, bridges, non-driving facilities, traffic signals, and other facilities that reduce traffic congestion, reduce deterioration of facilities, or improve traffic flow and safety. One half of the total allocation to cities was made available in FY 2007/08; Sunnyvale is eligible to receive \$2.1 million after filing a project plan with the State’s Department of Finance. The funds were not programmed in last year’s Capital Improvement Program because the guidelines and requirements of the Bonds were not available at that time. Staff is recommending that these funds

be utilized to allow the Wolfe Road CalTrain Overcrossing project to proceed immediately. Appropriating the State Infrastructure Bond funds for the project will make \$635,164 in Gas Tax funds available for future projects in FY 2010/11 and FY 2011/12.

Projects as submitted for the State Infrastructure Bond funds are flexible, and substitutions are allowed. Should Bridge Rehabilitation funds become available, staff could amend the request to utilize the funds for other eligible projects.

The following table presents Budget Modification No. 53, which appropriates State Infrastructure Bond funds to the Wolfe Road CalTrain Overcrossing project:

**BUDGET MODIFICATION NO. 53
FISCAL YEAR 2007/2008**

	<u>Current</u>	<u>Increase (Decrease)</u>	<u>Revised</u>
Capital Projects Fund/General Sub-fund			
<u>Revenues:</u>			
State Proposition 1B Infrastructure Bond Funds	\$0	\$2,100,000	\$2,100,000
<u>Expenditures:</u>			
Project 825620 — Wolfe Road CalTrain Overcrossing	\$0	\$2,100,000	\$2,100,000

Upon approval of this Budget Modification, staff will adjust the funding for the project to remove the FY 2010/11 and FY 2011/12 allocations of Gas Tax in the recommended FY 2008/2009 Budget.

PUBLIC CONTACT

Public contact was made by posting the Council agenda on the City's official-notice bulletin board outside City Hall, in the Council Chambers lobby, in the Office of the City Clerk, at the Library, Senior Center, Community Center, and Department of Public Safety; posting the agenda and report on the City's Web site; and making the report available at the Library and the Office of the City Clerk.

ALTERNATIVES

1. Approve revising the schedule and budget for Wolfe Road CalTrain Overcrossing, project #825620, to begin in the current fiscal year and approve Budget Modification No. 53 to appropriate \$2.1 million in State Infrastructure bond proceeds to the project.
2. Direct staff to prepare a stop-gap measure project to minimize project costs until the existing project funding is available beginning in fiscal year 2010/11.
3. Cancel a current Capital Project and redirect funds and resources from it to the Wolfe Road CalTrain Overcrossing.

RECOMMENDATION

Staff recommends Alternative No. 1: Approve revising the schedule and budget for Wolfe Road CalTrain Overcrossing, project #825620, to begin in the current fiscal year, and approve Budget Modification No. 53 to appropriate \$2.1 million in State Infrastructure bond proceeds to the project. This alternative addresses the issue in the quickest most cost-effective manner.

Alternative No. 2., preparing a stop-gap measure project to minimize project costs until the existing project funding is available beginning in fiscal year 2010/11, will likely cost more money in the long run. It may place the City at higher risk due to the possibility of potential damage to CalTrain. Since the bearing pads appear to have failed, the unabated friction from expansion and contraction, and loss of damping of traffic loads will lead to further structural damage, and additional costs. Therefore, this alternative is not recommended.

Alternative No. 3., canceling a current Capital Project and redirecting funds and resources from it to the Wolfe Road CalTrain Overcrossing would result in deferring another needed high priority project with related consequences. Many current capital improvement projects, such as Mathilda Bridge, or Murphy Street Rehabilitation have grant funding that cannot be reallocated. Removing City required matching funds would jeopardize the grant funding. Therefore, this alternative is not recommended.

Reviewed by:



Marvin A. Rose, Director of Public Works

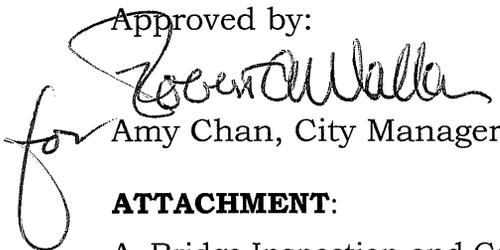
Prepared by: Mark Rogge, Assistant Director of Public Works

Reviewed by:



Mary J. Bradley, Director of Finance

Approved by:



for Amy Chan, City Manager

ATTACHMENT:

A. Bridge Inspection and Concrete Removal Report from HNTB

The HNTB Companies
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April 28, 2008



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City of Sunnyvale
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Sunnyvale, CA 94088-3707

RE: Bridge Inspection and Concrete Removal of Wolfe Road Overhead

Location: Wolfe Road over Caltrain tracks at MP 39.7

References: Caltrans Bridge Inspection Report, dated 04/14/04, Bridge No. 37C0776

As a result of Caltrain routine track inspections, large pieces of concrete (approximately 12"x15" size, shown in Photo 1) fallen from Wolfe Road Overhead were discovered adjacent to Caltrain rails, and Caltrain notified the City of Sunnyvale (City) on 4/23/08. By request of the City, HNTB met with the City, Caltrans and Caltrain at the bridge location on 4/24/2008 to perform an evaluation of the site condition – spalling concrete on the bridge. According to Caltrain, spalling concrete currently poses a major safety hazard to Caltrain rail traffic below.

Background

In response to the 4/14/04 Caltrans Bridge Inspection Report for Wolfe Road OH Bridge, the City scheduled a Capital Improvement Project to repair minor spalling, deck rehabilitation, and the failing bearing pads.

See Photo 2 for an Aerial view of Wolfe Road Overhead, hinge and abutment locations.



Photo 1 – Large Pieces of Concrete Discovered by Caltrain and reported on 4/23/08

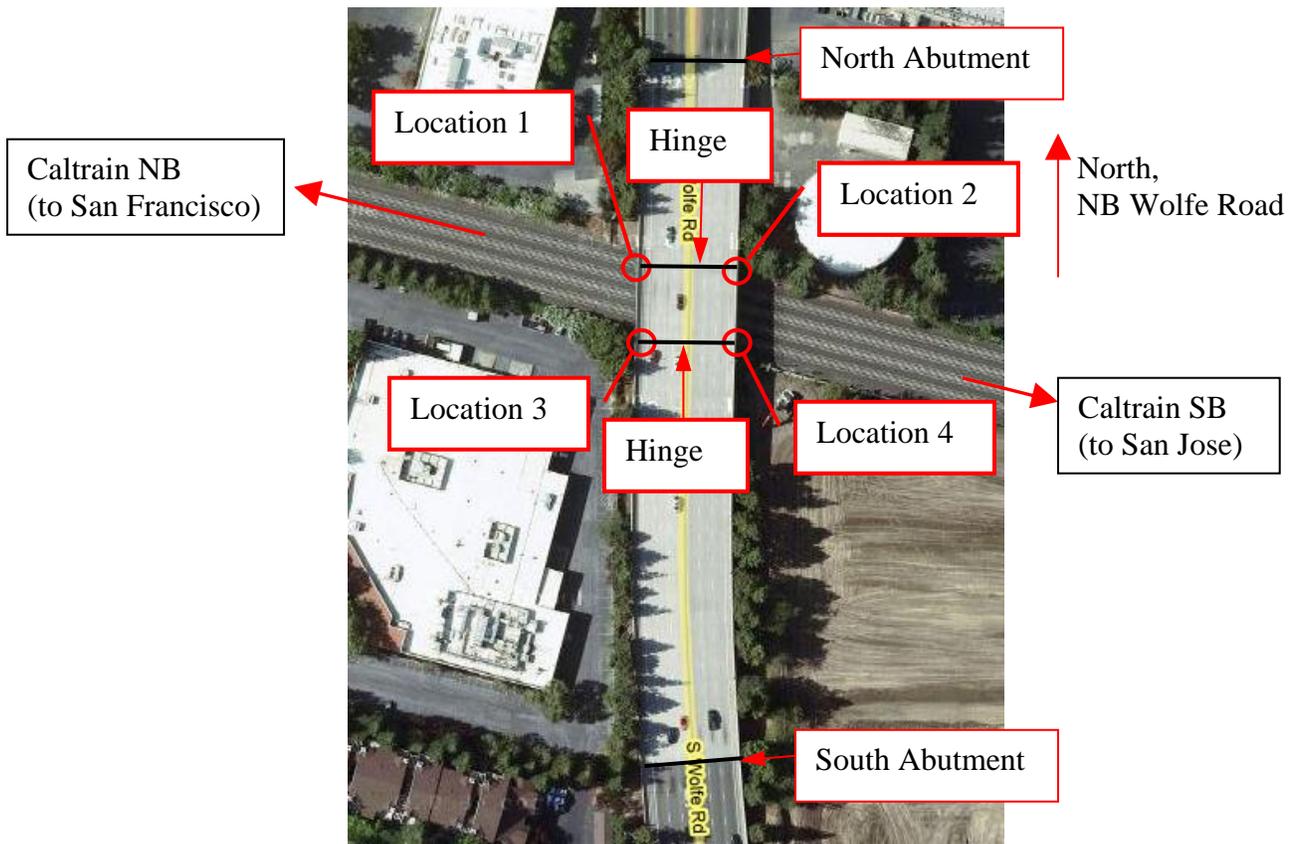


Photo 2 – Aerial View of Wolfe Road Overhead, Hinge and Abutment Locations.

Site Observations on 4/24/08

HNTB performed a visual inspection of the two abutments and two hinges of the railroad span on 4/24/08. Assessment of the hinge locations indicate there have been large chunks of concrete (up to 12"x15" in size), and reinforcement which have broken off from the superstructure and fallen on the Caltrain right-of-way. The spalling occurs at both north and south hinge locations on the west side of the bridge. The area of major concern is the northern hinge where spalled concrete falls directly onto a Caltrain track. There is an approximate 3' x 1.5' area of delaminated concrete in the soffit, adjacent to the spall at the north hinge above the Northbound Caltrain track (see Photos 3 and 4).



Photo 3 – Loose Pieces of Concrete Fallen from Bridge near Location 1



Photo 4 - Delaminated Concrete in Bridge Soffit at Location 1

Inspections at the deck surface indicate the elevation difference between railroad span and the adjacent spans at the hinges is approximately 1½" due to deteriorated bearing pads (see Photos 5 and 6).

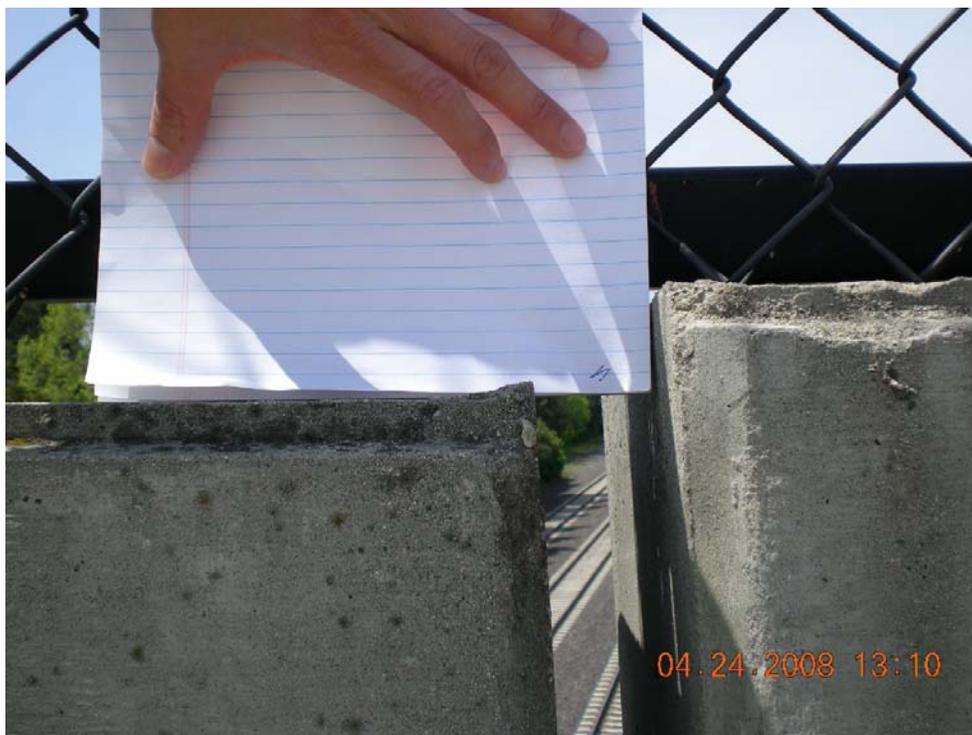


Photo 5 - View of 1½" differential at Barrier at North Hinge (west side)



Photo 6 - View of North Hinge Expansion Joint – Looking East.
Span on right hand side (railroad span) about 1½” lower

Concrete Removal Work on 4/25/08

At the request of the City, HNTB was directed to serve as Engineer on site to direct concrete removal of unsound concrete which could potentially fall off the bridge and onto the tracks. The work was performed with the following individuals on site:

- Caltrain: Steve Hill, PE, Chief Engineer, Maintenance & Construction, 2 Caltrain flagmen
- City of Sunnyvale: Joe Gonsalves, James LeMasters, Justin Chapel
- HNTB: Kuan Go, PE

Sounding test of the concrete around the hinge was first performed, followed by removal of the unsound concrete pieces. Concrete removal was performed by hand tools. Overall, two large pieces of unsound concrete were removed from the hinge area: One 6"x4"x3" piece at the hinge seat level and the second piece measures approximately 24"x4"x2" at the bridge soffit (See photos 5 and 6).

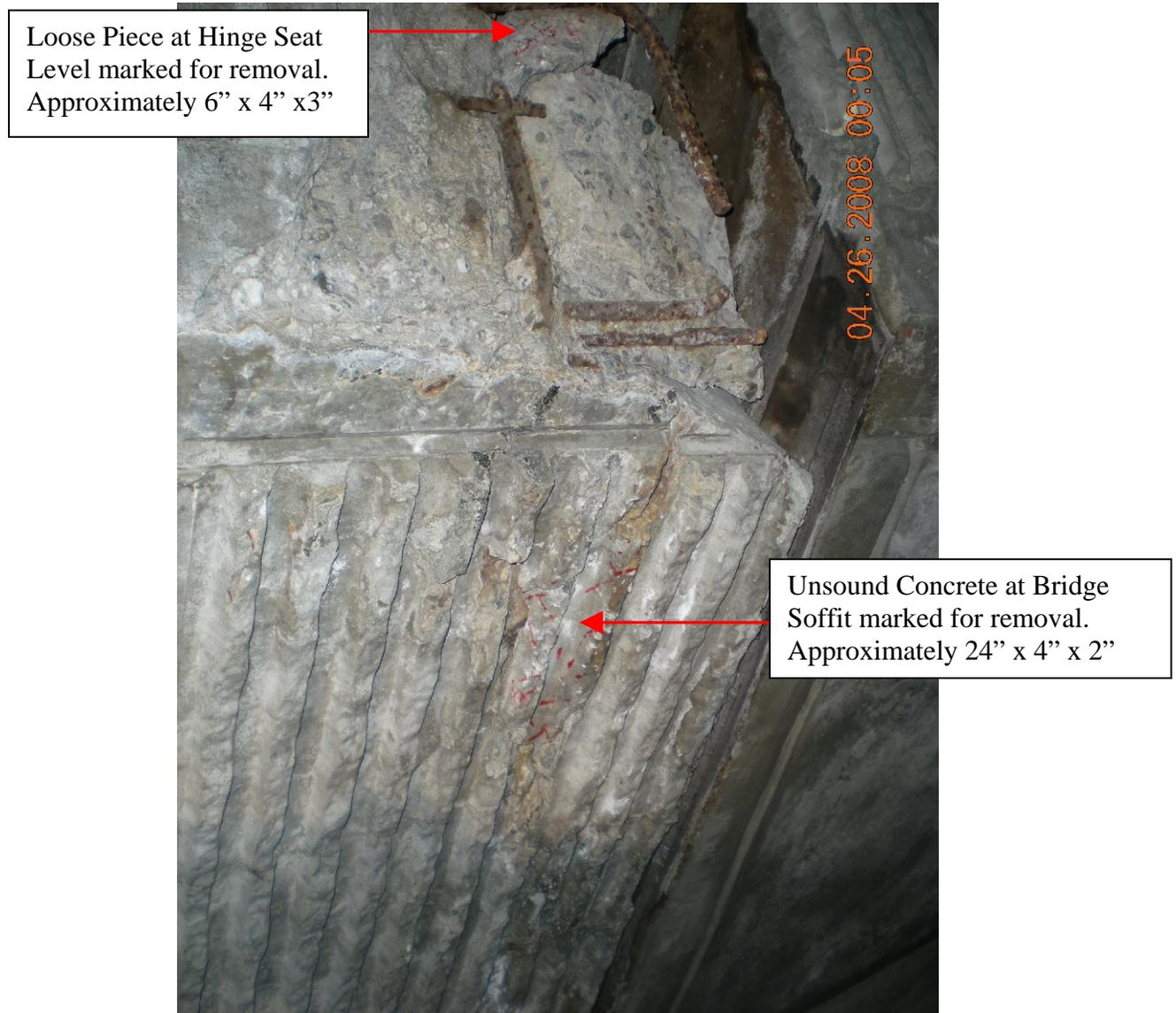


Photo 5 – “Before” Photo of Two Concrete Pieces Identified for Removal at Location 1

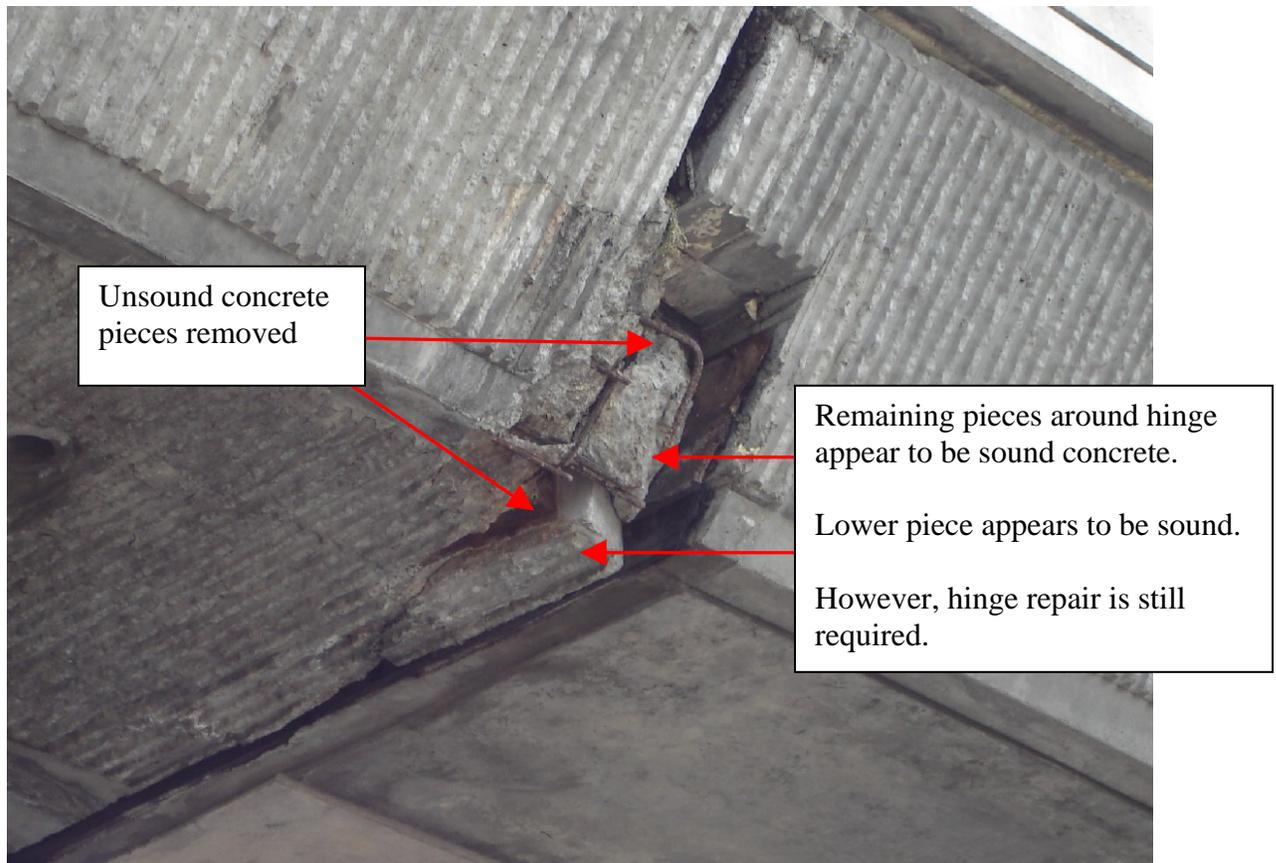


Photo 6 – “After” Photo of Two Unsound Concrete Pieces Removed at Location 1

Conclusion

Based on HNTB’s review of the Bridge As-Built, Caltrans Bridge Inspection Report, visual inspections and concrete removal work, it is our opinion that the concrete cracking and spalling at the hinge could be due to several reasons. Some of the reasons are highlighted below:

- Concrete cracking at the hinge due to post-tensioning. This area of the hinge consists of two post-tensioned anchorages spaced about 3 feet apart laterally. The post-tensioned anchorages at this corner have a high concentration of stresses which may have caused minor cracking of concrete around the anchorage regions.
- Failed elastomeric bearing pads – Due to the failed elastomeric bearing pads, there is a loss of a damping mechanism for traffic impact loads, while the 1½” drop at the hinge significantly increases the impact loads. Therefore the hinge exhibits higher traffic impact loads than what it was designed for. This increased impact loads on the hinge may have caused the minor cracks to enlarge.
- Additional vibration from increased train traffic on the newer Northbound tracks, which were installed after the bridge was constructed.
- Water seepage into the cracks may have caused reinforcing and anchorage steel to corrode and expand, resulting in concrete spalling.

Based on our inspections and concrete removal work, it is our opinion that the remaining pieces around the hinge at Location 1 appear to be sound (see Photo 7). However, further repairs will be required as per the recommendations below.

At Location 2, the pieces at the east side of the north hinge may still fall within the immediate future. Since they are approximately 15' away from the edge of Caltrain tracks, they pose less of a safety concern (see Photo 8).

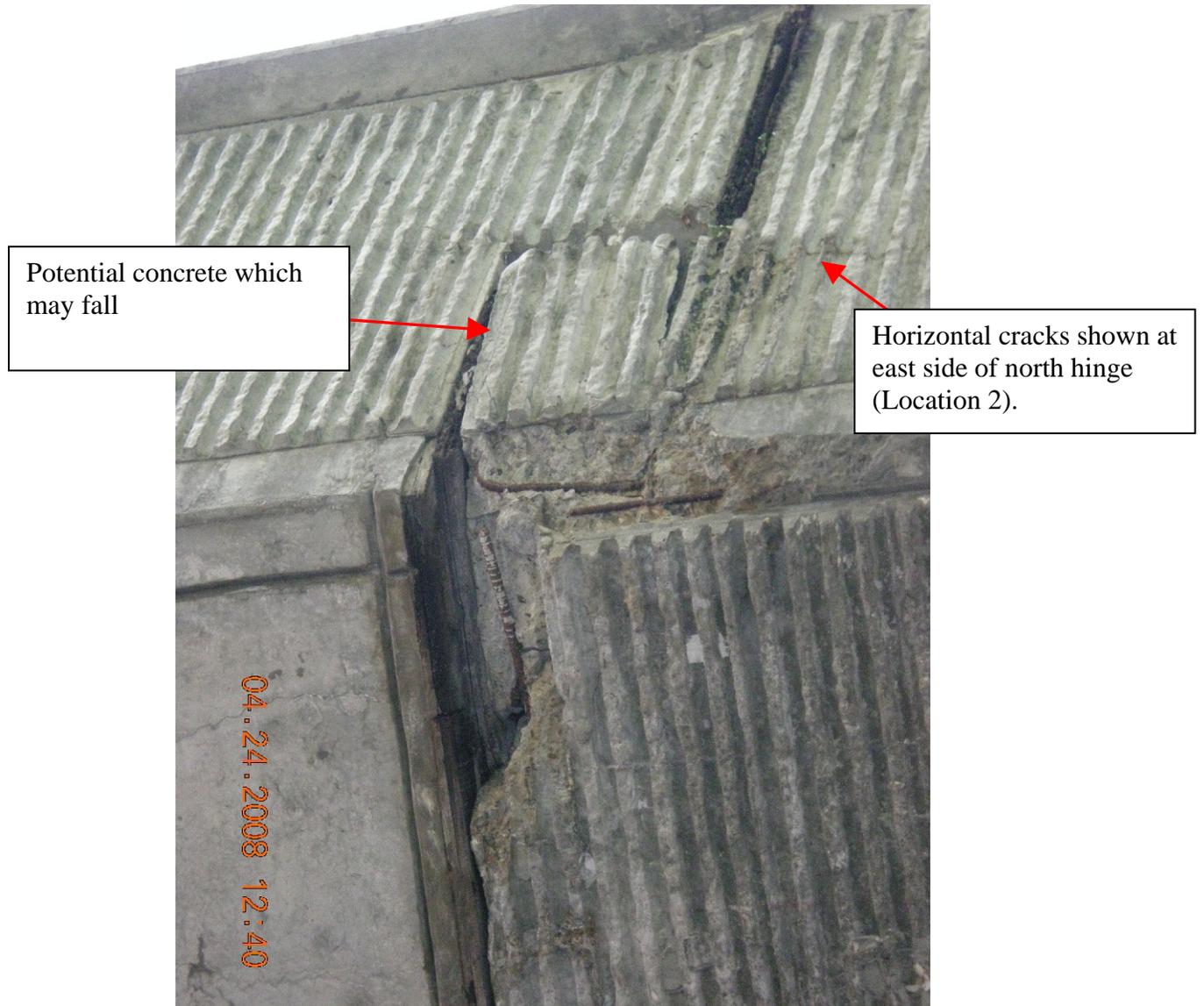


Photo 7 – Location 2 Hinge showing horizontal crack and potential concrete which may fall

At the south hinges (Locations 3 and 4), the hinges appear to be in fair condition, with minor horizontal crack. However, these hinges will likely deteriorate to conditions similar to the hinges at Locations 1 and 2 if repairs are not carried out.



Photo 8 – Typical Condition of South Hinge (Locations 3 and 4) showing minor horizontal crack

Recommendations

There is currently no imminent danger of bridge collapse, but due to worsening condition of the hinges, and to reduce the hazard of falling concrete onto Caltrain tracks, HNTB recommends the following to be completed within the next 6 months, before the next winter:

- Repair spalled concrete at hinge joints
- Replace failed elastomeric bearing pads
- Treat deck with methacrylate resin

Before the start of the recommended construction above, HNTB also recommends the City and Caltrain perform the following work to reduce the likelihood of additional concrete falling onto the tracks:

- Caltrain track inspectors should monitor Wolfe Road OH at MP 39.7 for loose concrete pieces during their routine track inspections every 72 hours.
- Perform concrete sounding test of north hinge above northbound (NB) Caltrain track and remove loose concrete pieces every month during the dry season. This work shall be carried out under the direction of a Professional Engineer.
- If further concrete deteriorations are found over the inspections, more frequent monitoring and inspections may be warranted and repair work should be accelerated. The City should also consider limiting large trucks for using the Wolfe Road OH bridge if this situation arises.

Repairing the spalled concrete at the hinges and replacement of failed bearing pads will require further design and analysis work. In addition, temporary roadway closure and close coordination with Caltrain will be required to ensure the work can be completed within the roadway and track closure periods.

We appreciate the opportunity to service the City of Sunnyvale on this important assignment. If you have any questions or need any additional information please do not hesitate to contact me.

Very Truly Yours,
HNTB Corporation



Kuan Go, PE
Project Manager

cc: J. Litzinger, E. Okada, S. Lai - HNTB