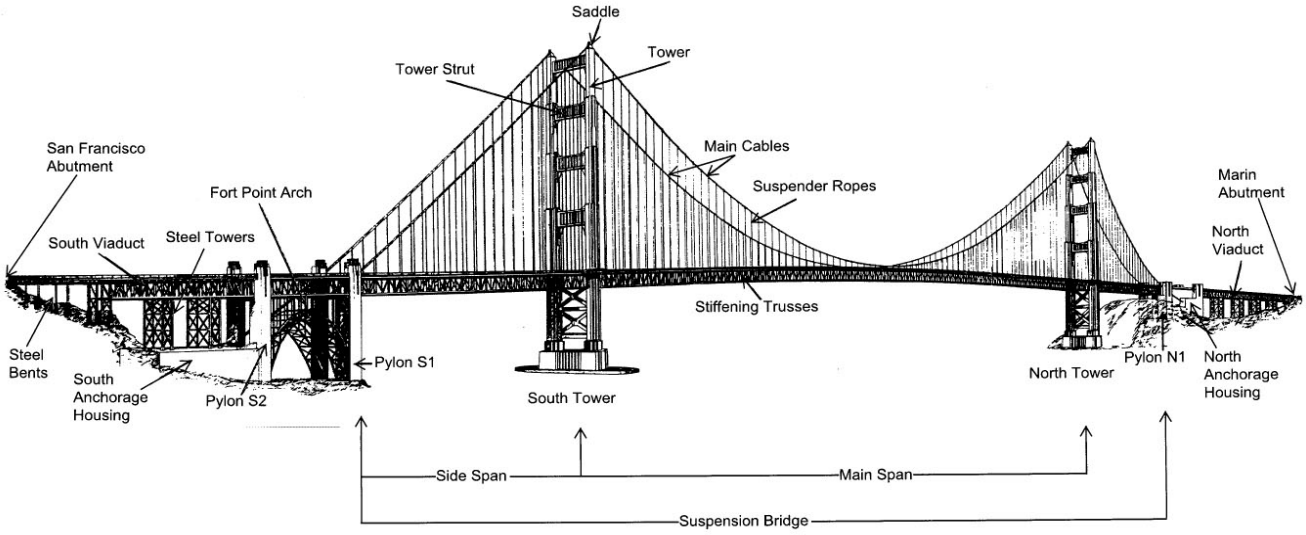
CHAPTER 1 - PROPOSED PROJECT

1.1 INTRODUCTION

The Golden Gate Bridge is owned and operated by the Golden Gate Bridge, Highway and Transportation District. The project proposes to construct a physical suicide deterrent system along both sides of the Bridge. As shown in Figure 1-1, the project limits are from the Marin abutment (north viaduct) to the San Francisco abutment (south viaduct). The total length of the project would be 1.7 miles.

The illustration below identifies the various structural elements of the Bridge.



Main Elements of the Golden Gate Bridge

(Source: MacDonald Architects, "HASR: Seismic Retrofit Project, Golden Gate Bridge," [1995]).

The Bridge has a symmetrical design. Vertical bridge elements on the horizontal plane are generally based on increments of 12 ½ feet. For example, the outside handrail posts and the public safety rail posts are

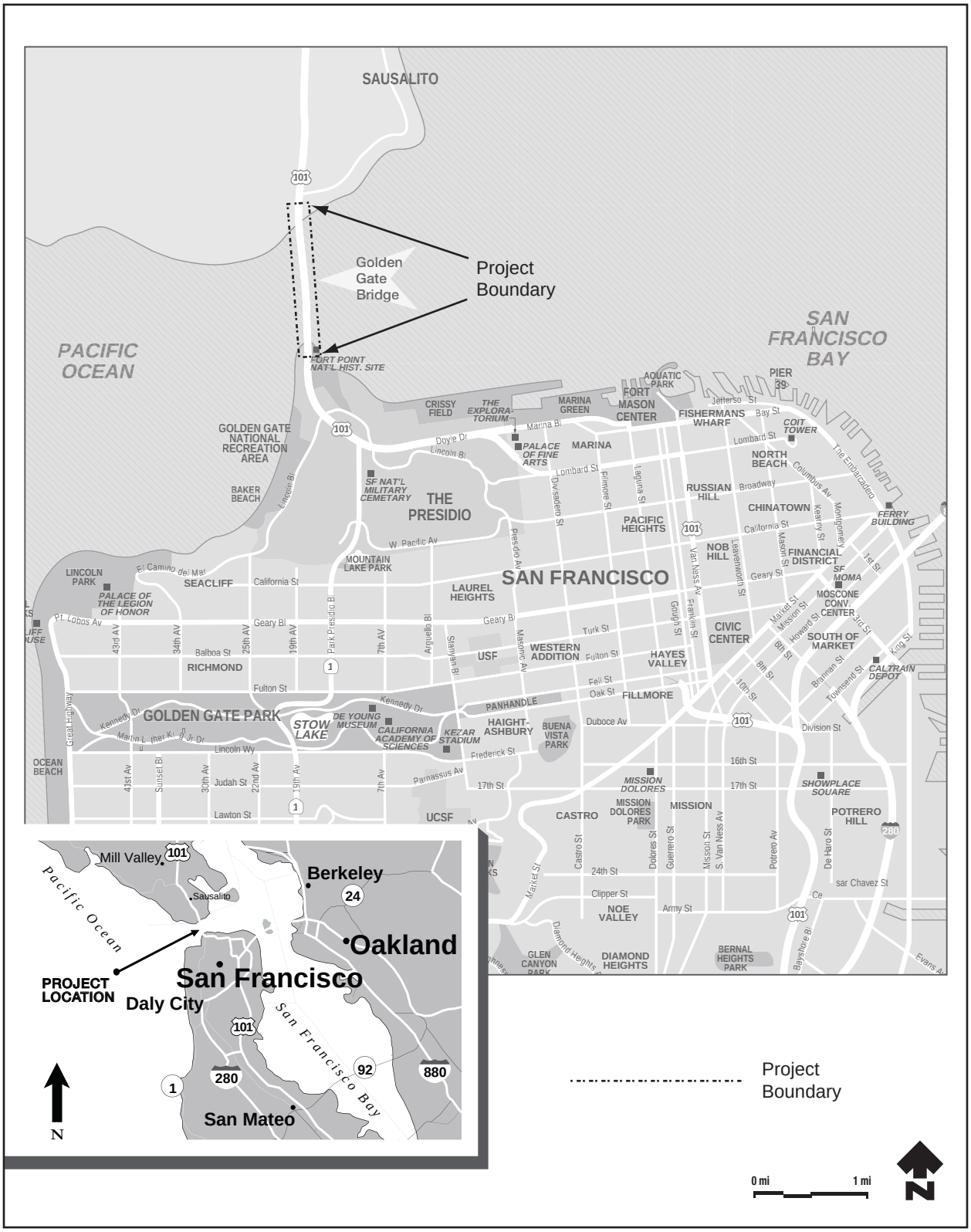


FIGURE 1-1
PROJECT LOCATION

aligned at a spacing of 12 ½ feet. Additionally, light posts are 150 feet apart (12 x 12 1/2 feet), and the suspender ropes are 50 feet apart (4 x 12 ½ feet). Belvederes (24 widened areas located on both the east and west sidewalks) are 12½ feet long and centered between two suspender ropes. Maintenance gates on the public safety railing are spaced at 150 feet (12 x 12 1/2 feet) and are aligned with the light posts.

Vertical members of the stiffening truss are spaced at 25 feet and are aligned with the suspender ropes. Figure 1-2 shows a plan view of a section of the Bridge illustrating the relationship of these bridge elements.

1.1.1 PROJECT HISTORY

Over the years, the Golden Gate Bridge, Highway and Transportation District's (District) Board of Directors (Board) has considered numerous approaches to reduce the number of persons jumping from the Bridge. The District has investigated a variety of possible measures, both physical and non-physical in nature, and ultimately implemented several non-physical suicide deterrent systems, which are currently in operation on the Bridge.

On October 30, 1970, by Board Resolution #7140, the Board hired a consultant firm to proceed with *Suicide Prevention Study, Phase 1*, which was limited to the conceptual development of physical suicide deterrent alternatives. The Phase 1 report dated January 1971 identified 18 alternatives that were evaluated against criteria established by the Board and outlined below. Alternative 16 was selected for further analysis. On October 10, 1975, the Board, by Resolution #8701, accepted the *Report of Suicide Deterrent Test Model,* which included the first step (additional design work) of three additional steps required for further evaluation of Alternative 16. In November 1978, the Board decided not to proceed further.

During the studies in the 1970s, the Board adopted criteria for use in evaluating physical suicide deterrent systems that included:

- Cannot cause safety or nuisance hazards to pedestrian or Bridge personnel
- Must be totally effective as a barrier
- Cannot bar pedestrian traffic
- Weight cannot be beyond established allowable limits
- Cannot cause excessive maintenance problems
- Aerodynamics cannot be beyond established allowable limits

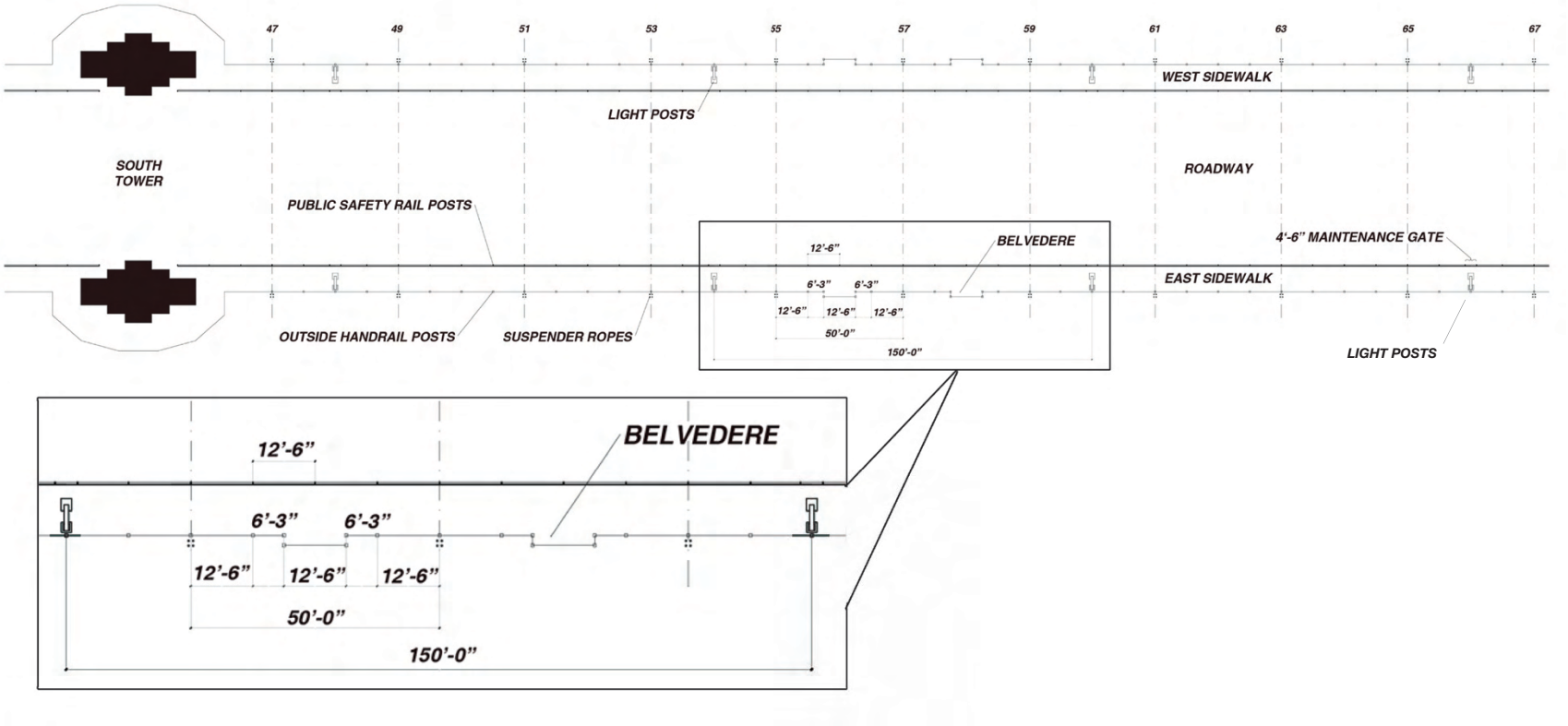


FIGURE 1-2
PLAN VIEW OF BRIDGE

Source: macdonald architects, 2008

In light of the environmental laws passed in 1969 and 1970, these criteria were expanded to require a consideration of the following criteria:

- Historical and architectural considerations
- Visual and aesthetic impacts
- Cost effectiveness

On April 11, 1997, the Board, by Resolution #97-106, authorized a fencing company to design and develop a prototype for a physical suicide deterrent system.

After thorough review of the prototype the Board rejected the proprietary fence system because it did not meet the criteria for total effectiveness, visual impact, and cost.

The current project, including the engineering design work and environmental evaluation associated with development of a physical suicide deterrent system, was initially authorized by Resolution #2005-15, adopted by the District's Board at its March 11, 2005 meeting.

1.2 PURPOSE AND NEED

1.2.1 PURPOSE OF THE PROPOSED PROJECT

The purpose of the Golden Gate Bridge Physical Suicide Deterrent Project is to consider a physical suicide deterrent system that reduces the number of injuries and deaths associated with individuals jumping off the Bridge. The proposed physical suicide deterrent system must meet the revised criteria as set forth by the District, by Resolution 2005-033, adopted on April 22, 2005, as identified below.

1. Must impede the ability of an individual to jump off the Bridge
2. Must not cause safety or nuisance hazards to sidewalk users including pedestrians, bicyclists, District staff, and District contractors or security partners
3. Must be able to be maintained as a routine part of the District's ongoing Bridge maintenance program and without undue risk of injury to District employees
4. Must not diminish ability to provide adequate security of the Bridge

5. Must continue to allow access to the underside of the Bridge for emergency response and maintenance activities

6. Must not have a negative impact on the wind stability of the Bridge

7. Must satisfy requirements of state and federal historic preservation laws

8. Must have minimal visual and aesthetic impacts on the Bridge

9. Must be cost effective to construct and maintain

10. Must not in and of itself create undue risk of injury to anyone who comes in contact with the suicide deterrent system

11. Must not prevent construction of a moveable median barrier on the Bridge

1.2.2 NEED FOR THE PROPOSED PROJECT

The specific need for the proposed physical suicide deterrent system on the Bridge stems from the following:

- The Bridge's sidewalks are open to the public, and the existing outside railing along the sidewalks is four (4) feet high. Individuals of varying heights, weights, ages, and sexes, who were not using the Bridge sidewalks for their intended purpose, have climbed over the existing railing and jumped to their death. There is no other physical barrier preventing an individual from jumping, once the railing has been scaled.
- In 2005, there were 622 known suicides in the nine Bay Area counties, of which 23 were estimated to occur at the Bridge. Further, in that same year, 58 persons contemplating suicide were successfully stopped. In 2006, 31 suicides are known to have occurred at the Bridge, while 57 individuals were stopped. Similarly, in 2007, 39 suicides occurred and 90 were stopped. The individuals taken off of the Bridge are transported to a local hospital for a psychiatric evaluation pursuant to Section 5150 of the California Welfare and Institutions Code.
- As described in Section 1.5.2, a variety of non-physical measures to deter suicides on the Bridge have been in place for many years. However, there are still approximately two dozen deaths that occur each year as a result of individuals jumping off the Bridge. The non-physical measures have stopped approximately two-thirds of those individuals with the intent to commit suicide at the Bridge; despite these measures one-third are not prevented.

- Although official figures have not been maintained through the years, since 1937 it is estimated that approximately 1,300 individuals have committed suicide by jumping off of the Bridge.

1.3 PROJECT DESCRIPTION

This section describes the proposed action and the design alternatives that were developed by a multi-disciplinary team to achieve the project purpose and need while avoiding or minimizing environmental impacts. The alternatives are Alternative 1A – Add Vertical System to Outside Handrail, Alternative 1B – Add Horizontal System to Outside Handrail, Alternative 2A – Replace Outside Handrail with Vertical System, Alternative 2B – Replace Outside Handrail with Horizontal System, Alternative 3- Add Net System that Extends Horizontally from Bridge (Add Net System), and the No-Build Alternative.

The project is located in the City and County of San Francisco and Marin County on the Bridge from the Marin abutment (north viaduct) to the San Francisco abutment (south viaduct). The Bridge connects Highway 101 in San Francisco with Highway 101 in Marin. The project covers a distance of 1.7 miles. Within the limits of the proposed project, the roadway is a six-lane undivided highway with four 10-foot and two 11-foot wide lanes, and a 10-foot sidewalk on both sides.

The purpose of the proposed project is to consider a physical suicide deterrent system on the Bridge that reduces the number of injuries and deaths associated with individuals jumping off the Bridge. The specific need for the project stems from the fact that the 4-foot height of the outside handrail does not sufficiently deter individuals, who are not using the sidewalk for its intended purposes, from climbing over the outside handrail. There is no other physical barrier beyond the outside handrail preventing an individual from jumping, once the outside handrail is scaled.

1.4 PROJECT COSTS AND FUNDING

The preliminary design and environmental studies are being funded with monies from outside agencies and individuals. At the present time the District has not programmed construction funds for any build alternatives in its Capital Plan. After the conclusion of the public comment period for the Draft EIR/EA, the Board may select a Locally Preferred Alternative at which time a funding plan will be developed for the selected alternative. Based on the current concept level design and preliminary estimates, the net alternative costs are approximately $25 million, while the other build alternatives cost approximately $40 to $50 million.

1.5 PROJECT ALTERNATIVES

1.5.1 BUILD ALTERNATIVES

The following build alternatives would impede the ability of individuals to jump from the Bridge, as well as generally satisfy additional criteria established by the District. During the screening process, these alternatives were evaluated for their ability to meet the project's purpose and need, which included the District's criteria. These alternatives include:

- Alternative 1A – Add Vertical System to Outside Handrail
- Alternative 1B – Add Horizontal System to Outside Handrail
- Alternative 2A – Replace Outside Handrail with Vertical System
- Alternative 2B – Replace Outside Handrail with Horizontal System
- Alternative 3 – Add Net System that Extends Horizontally from Bridge (Add Net System)

As described below, Alternatives 1A, 2A and 3 were evaluated utilizing a fairing, while Alternatives 1B and 2B were evaluated utilizing a winglet.

Common Design Features of the Build Alternatives

The build alternatives were developed after the first phase of the project, wind tunnel testing, was completed. Wind tunnel testing was performed on various designs to determine which design features would not render the Bridge unstable during high winds. The wind tunnel testing determined that physical suicide barriers affected the aerodynamic stability of the Bridge. Testing also determined that wind devices could be installed to mitigate the adverse effects associated with the additions of such barriers.

All of the build alternatives developed and included in this document require the addition of one of two different types of wind devices. The first type of wind device is called a fairing and consists of a curved element placed at two locations below the sidewalk on the top chord of the west stiffening truss. The second type of wind device is called a winglet and consists of a curved element placed above the sidewalk at the top of the proposed barrier system. During the screening process, the build alternatives were evaluated for their ability to meet the project's purpose and need, which included the District's criteria. All of the build alternatives generally satisfy the District's criteria (see Section 1.5, Comparison of Alternatives). Additionally, each build alternative has been developed to maintain the symmetry of the Bridge. The outside handrail

posts, light posts, suspender ropes, and belvederes would all remain at the current locations. There would be no changes to the stiffening trusses.

The five build alternatives would all be constructed of steel that would be painted International Orange to match the material and color of the Bridge. Wind devices, such as fairings and winglets, would be incorporated on all build alternatives. During the construction phase, all build alternatives would use the same construction staging areas.

Unique Features of Build Alternatives

Alternative 1A – Add Vertical System to Outside Handrail

Alternative 1A would construct a new barrier on top of the outside handrail (and concrete rail at the north anchorage housing and north pylon). The barrier would extend 8 feet vertically from the top of the 4-foot high outside handrail for a total height of 12 feet. The barrier's vertical members would be comprised of ½-inch diameter vertical rods spaced at 6 ½ inches on center, leaving a 6-inch clear space between rods. Transparent panels to preserve views would be installed at the belvederes and towers on both sides of the Bridge. Transparency would be preserved through ongoing maintenance of the panels. The existing rail posts would be replaced with new 12-foot-high outside rail posts at the same locations and of the same cross-section, size, material, and color of the original posts. The top horizontal header would consist of a chevron-shaped member matching the top element of the outside handrail. The vertical rods would be attached to the horizontal header and outside handrail.

This alternative assumes that the modification to the outside handrail on the west side of the Bridge between the two main towers and the installation of the wind fairings have been completed as part of the previously approved Seismic Retrofit Project. Figures 1-3 and 1-4 illustrate Alternative 1A from several directions and Figures 1-5 through 1-7 represent architectural sketches of the proposed alternative. Special provisions for viewing areas are made at the mid-span of the Bridge. Figures 1-26 through 1-28 illustrate the plans for the physical suicide barrier at those locations.

Because maintenance workers would no longer be able to climb over the outside handrail to reach the below-deck maintenance traveler, gates would be located at a spacing of 150 feet on center to generally match the locations of the existing light posts and gates on the public safety railing. The gates would be 8 feet wide and 8 feet high (two 4-foot-wide by 8-foot-high panels), and match the appearance of the vertical system. The frame for each gate door would be constructed of 2-inch by 2-inch steel members.

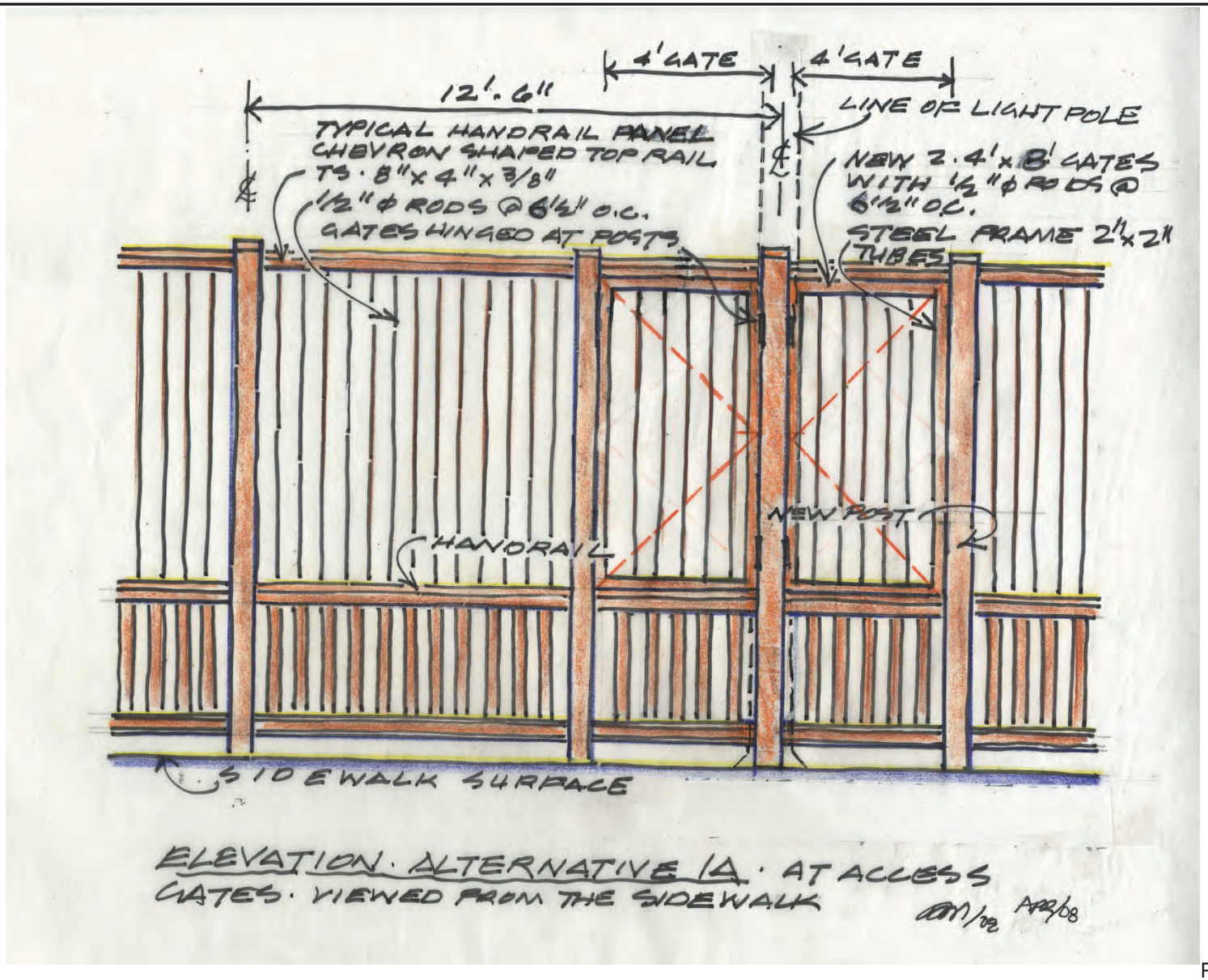


FIGURE 1-5
ALTERNATIVE 1A: ELEVATION AT ACCESS GATES

Source: macdonald architects, 2008

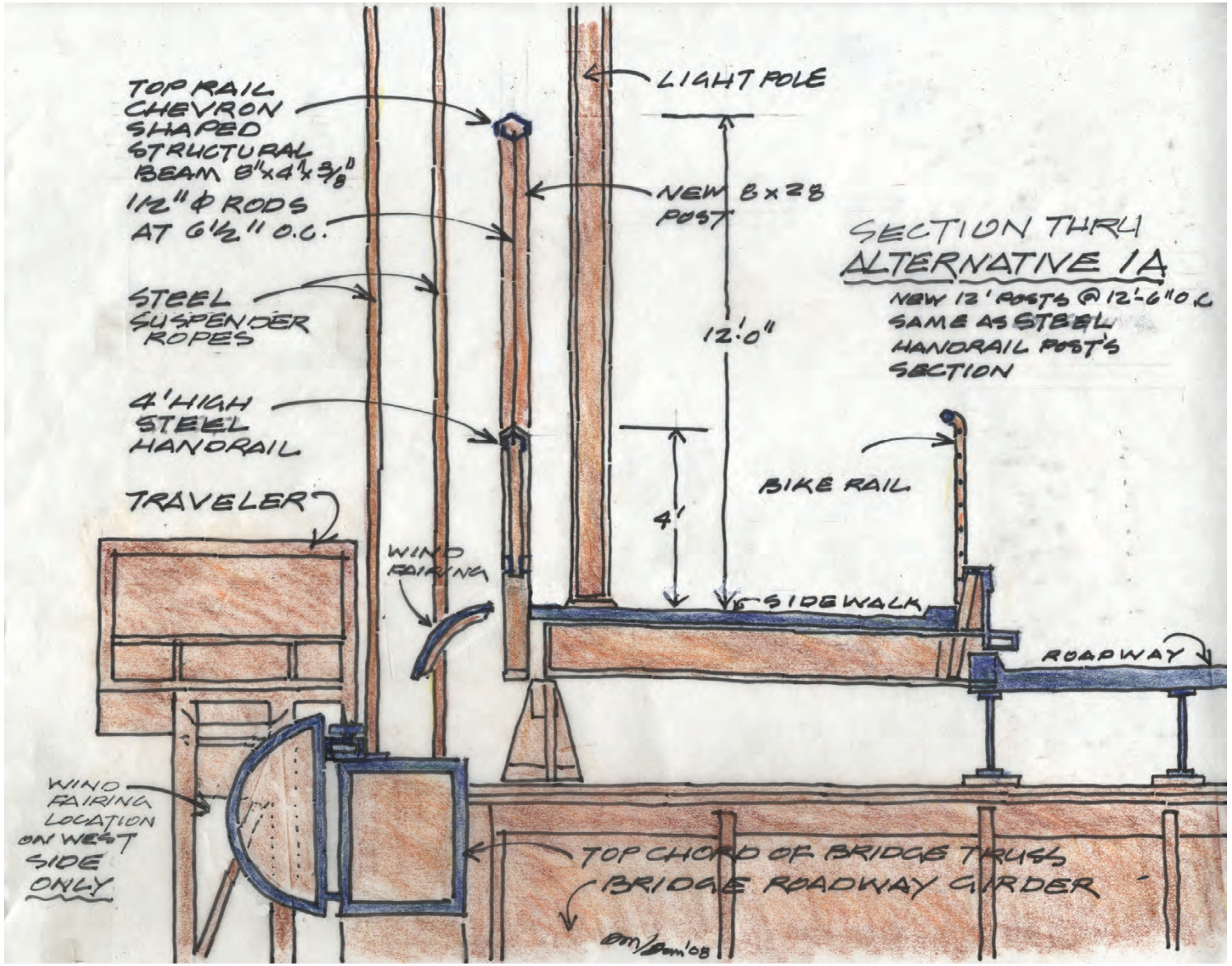


FIGURE 1-6
ALTERNATIVE 1A: CROSS SECTION

Source: macdonald architects, 2008

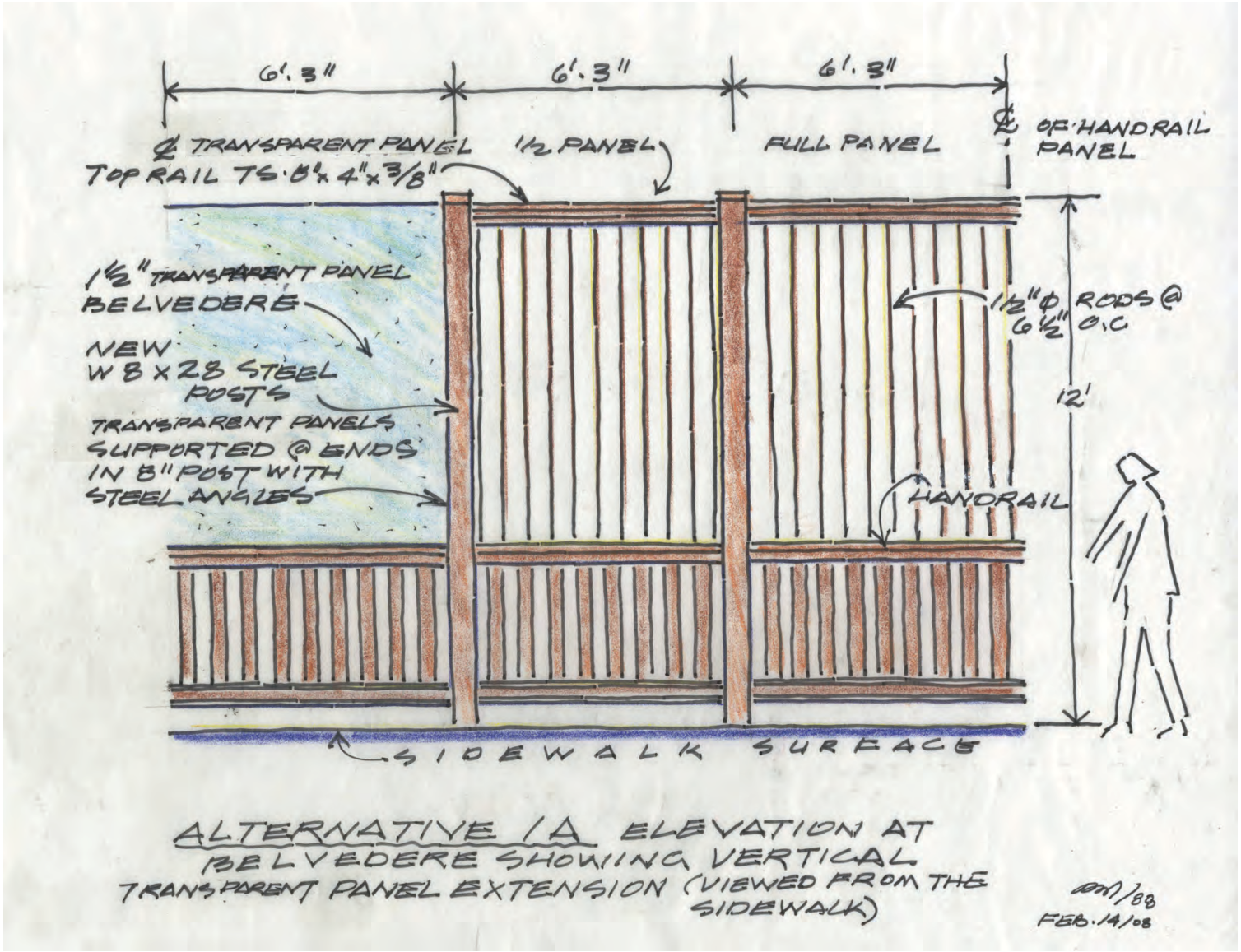


FIGURE 1-7
ALTERNATIVE 1A: ELEVATION AT BELVEDERE

Source: macdonald architects, 2008

The gates would be located on top of the outside handrail. The outside handrail would be reconstructed.

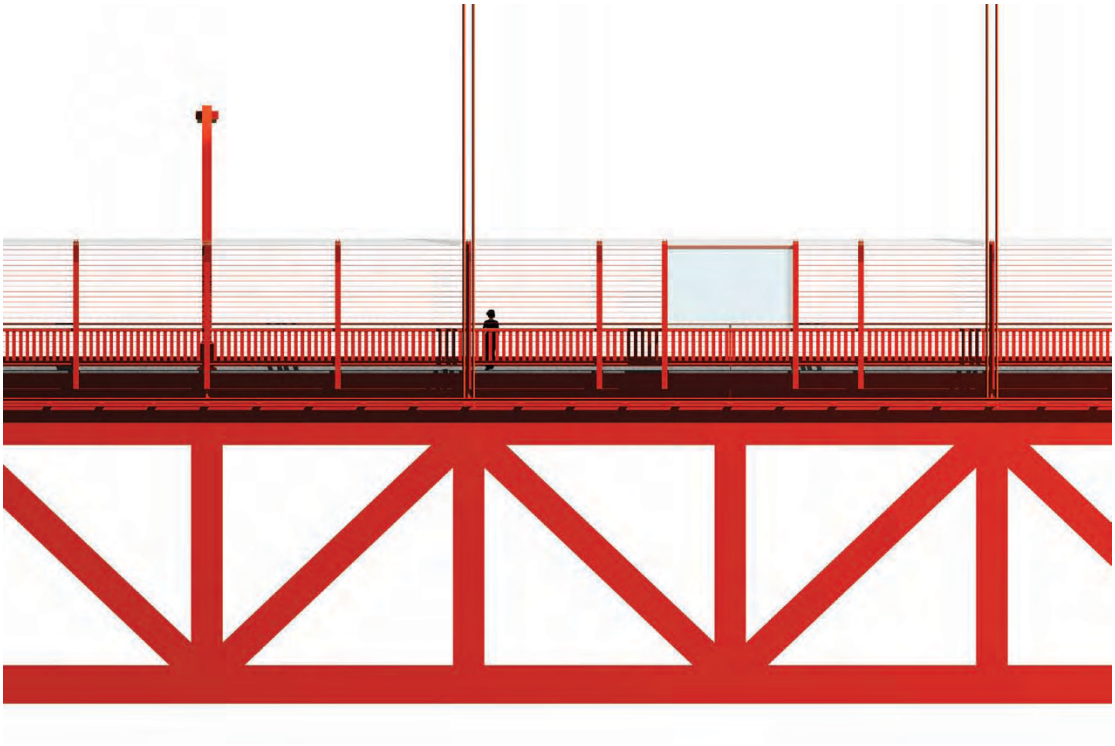
Alternative 1B – Add Horizontal System to Outside Handrail

Alternative 1B would construct a new barrier on top of the outside handrail (and concrete rail at north anchorage housing and north pylon) consisting of ⅜-inch diameter horizontal steel cables at 6 inches on center leaving 5 ⅝ inches clear space between cables.

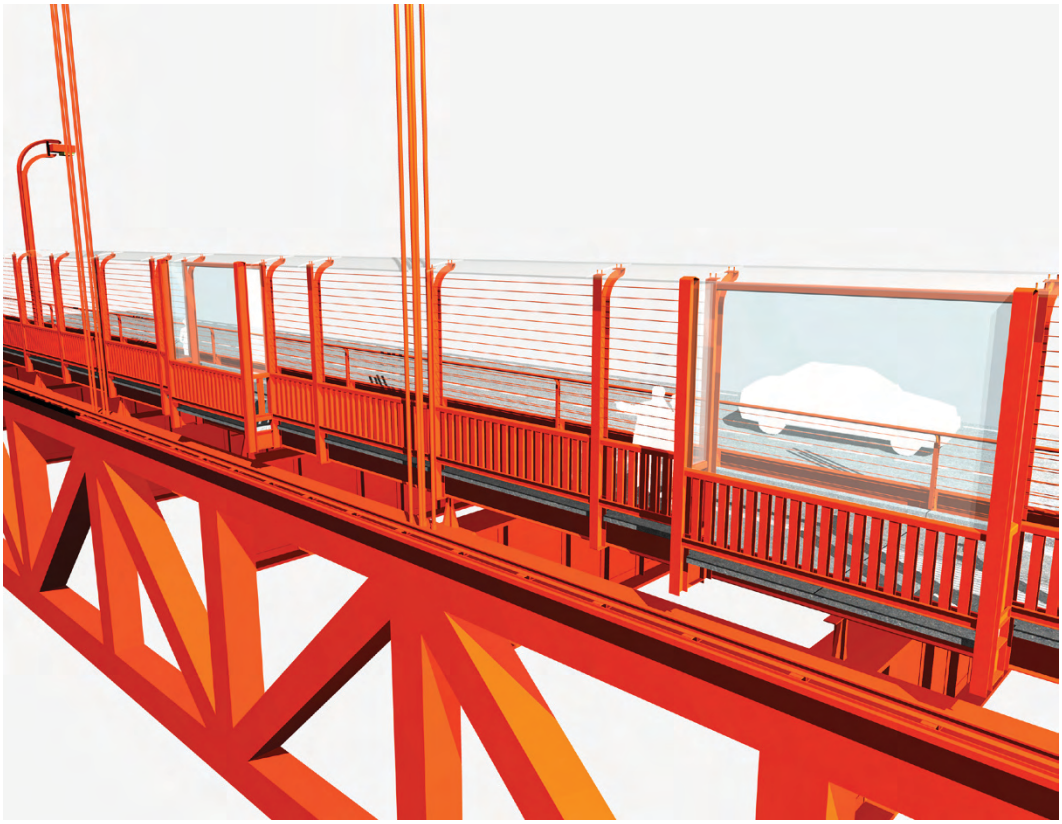
The cable diameter matches the cables on the public safety railing. The new barrier would extend 8 feet above the top of the 4-foot-high outside handrail for a total height of 12 feet. The existing rail posts would be replaced with new 12-foot-high outside rail posts at the same locations and of the same cross-section, size, material, and color of the original posts. Transparent panels to preserve views would be installed at the belvederes and towers on both sides of the Bridge. Transparency would be preserved through ongoing maintenance of the panels.

A transparent winglet would be placed on top of the outside rail posts to ensure aerodynamic stability and impede individuals who have climbed up the horizontal cables from clearing the barrier. The winglet would be a transparent 42-inch wide panel with a slight concave curvature extending approximately 2 feet over the sidewalk. The winglet would run the length of the suicide deterrent barrier, except at the north and south towers. The winglet would be notched at the suspender ropes and light posts. Figures 1-8 and 1-9 illustrate Alternative 1B from various locations and Figures 1-10 through 1-12 represent architectural sketches of the proposed alternative. Special provisions for viewing areas are made at the mid-span of the Bridge. Figures 1-26 through 1-28 illustrate the plans for the physical suicide barrier at those locations.

Because maintenance workers would no longer be able to climb over the outside handrail to reach the below-deck maintenance traveler, gates would be located at a spacing of 150 feet on center to generally match the locations of the existing light posts and gates on the public safety railing. The gates would be 8 feet wide and 8 feet high (two 4-foot-wide by 8-foot-high panels), and match the appearance of the horizontal system. The frame for each gate door would be constructed of 2-inch by 2-inch steel members. The gates would be located on top of the outside handrail. The outside handrail would remain in place.



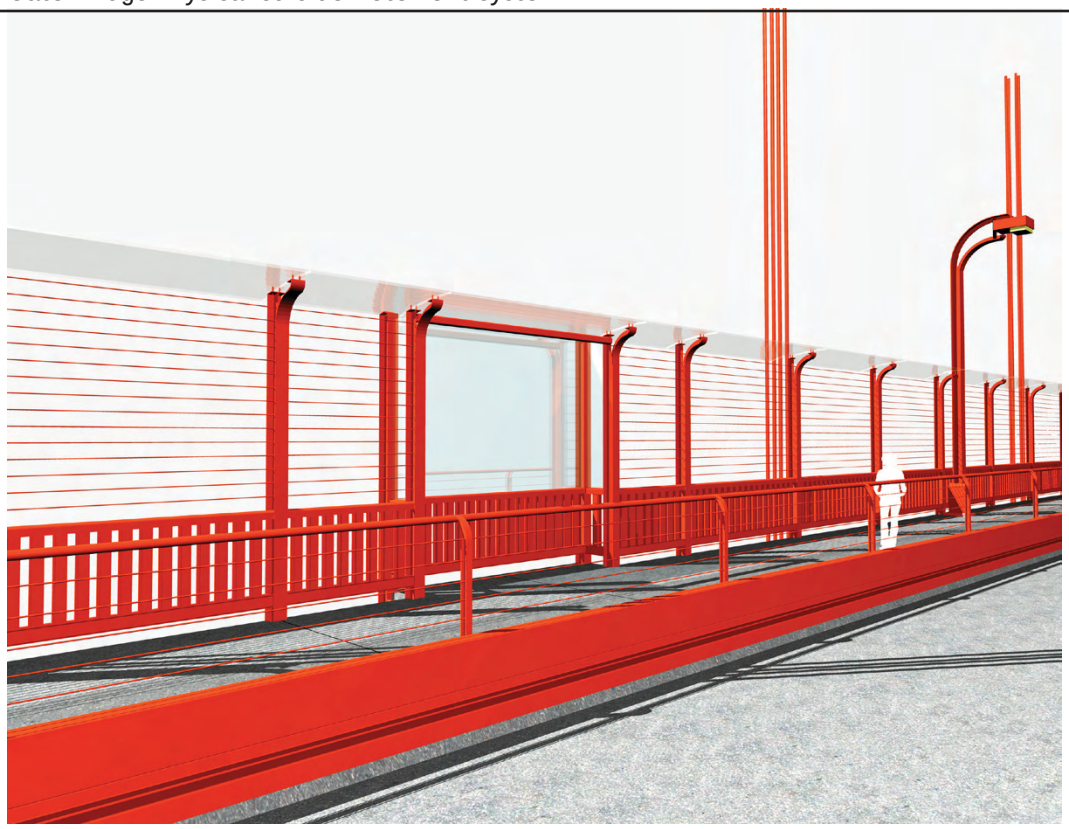
ALTERNATIVE 1B: ELEVATION EAST SIDE



ALTERNATIVE 1B: EXTERIOR VIEW EAST SIDE

FIGURE 1-8
ALTERNATIVE 1B: ILLUSTRATIONS

Source: macdonald architects, 2008



ALTERNATIVE 1B: VIEW FROM ROAD

ALTERNATIVE 1B: EXTERIOR VIEW WEST SIDE

FIGURE 1-9
ALTERNATIVE 1B: ILLUSTRATIONS

Source: macdonald architects, 2008

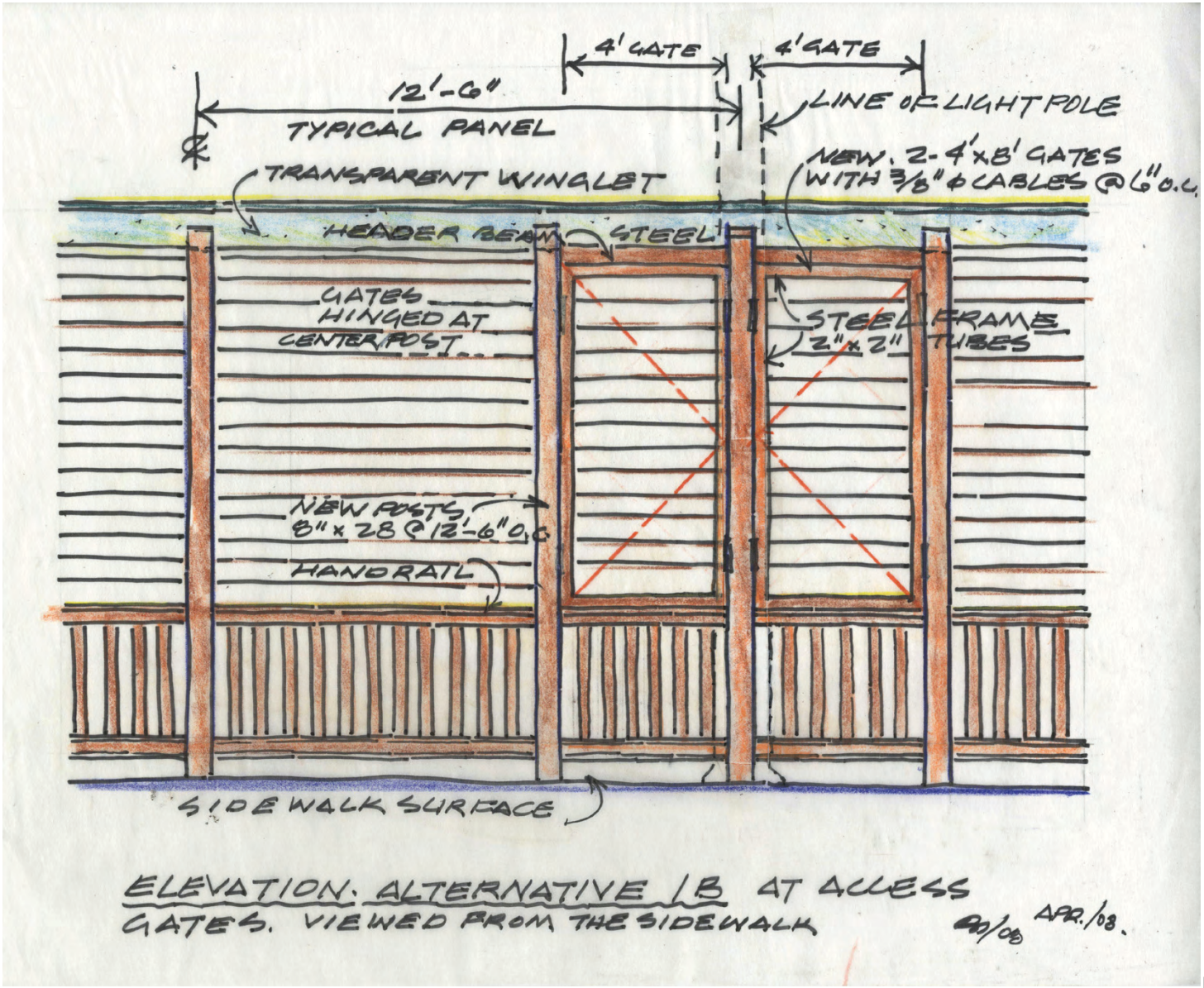


FIGURE 1-10
ALTERNATIVE 1B: ELEVATION AT ACCESS GATES

Source: macdonald architects, 2008

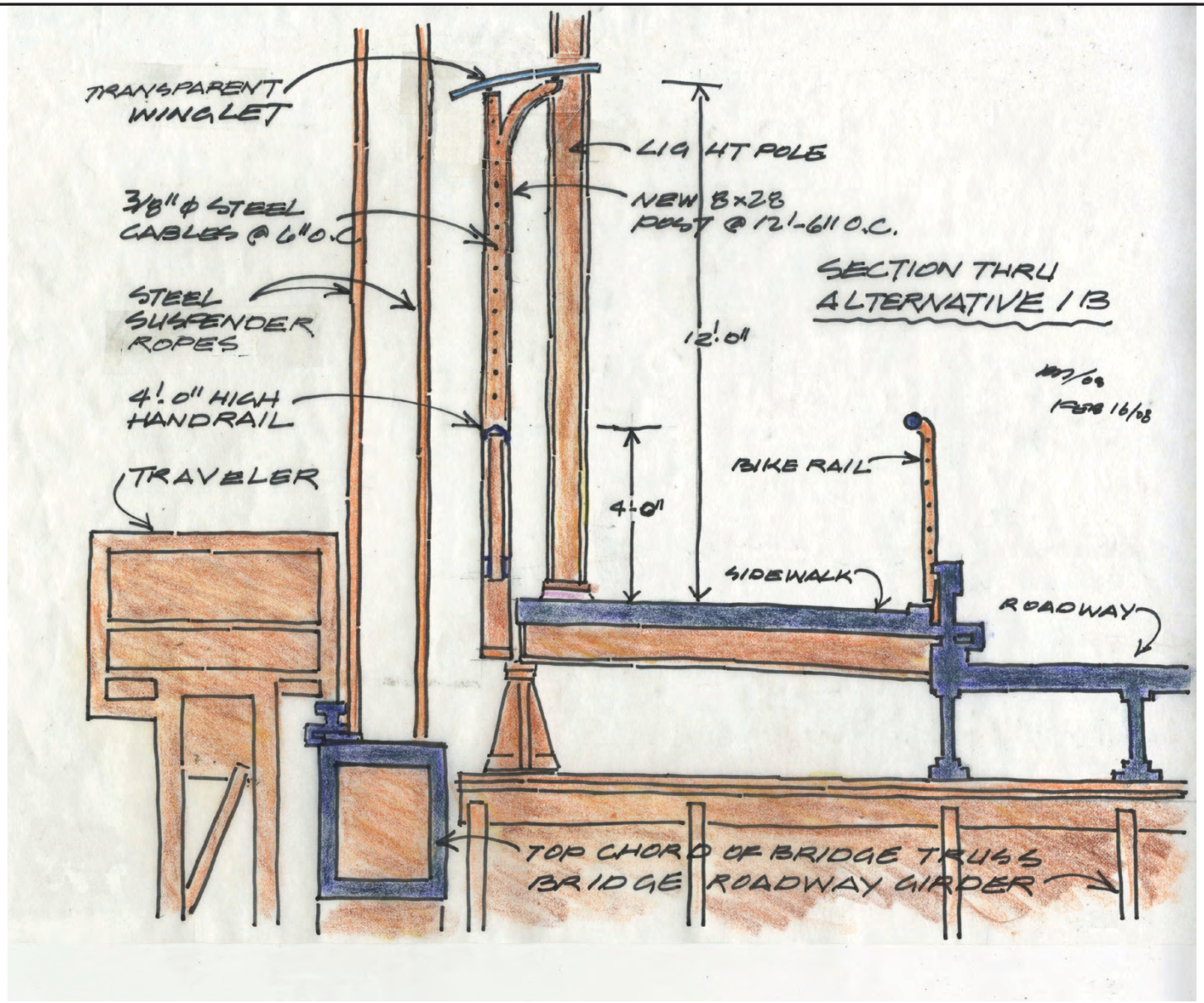


FIGURE 1-11
ALTERNATIVE 1B: CROSS SECTION

Source: macdonald architects, 2008

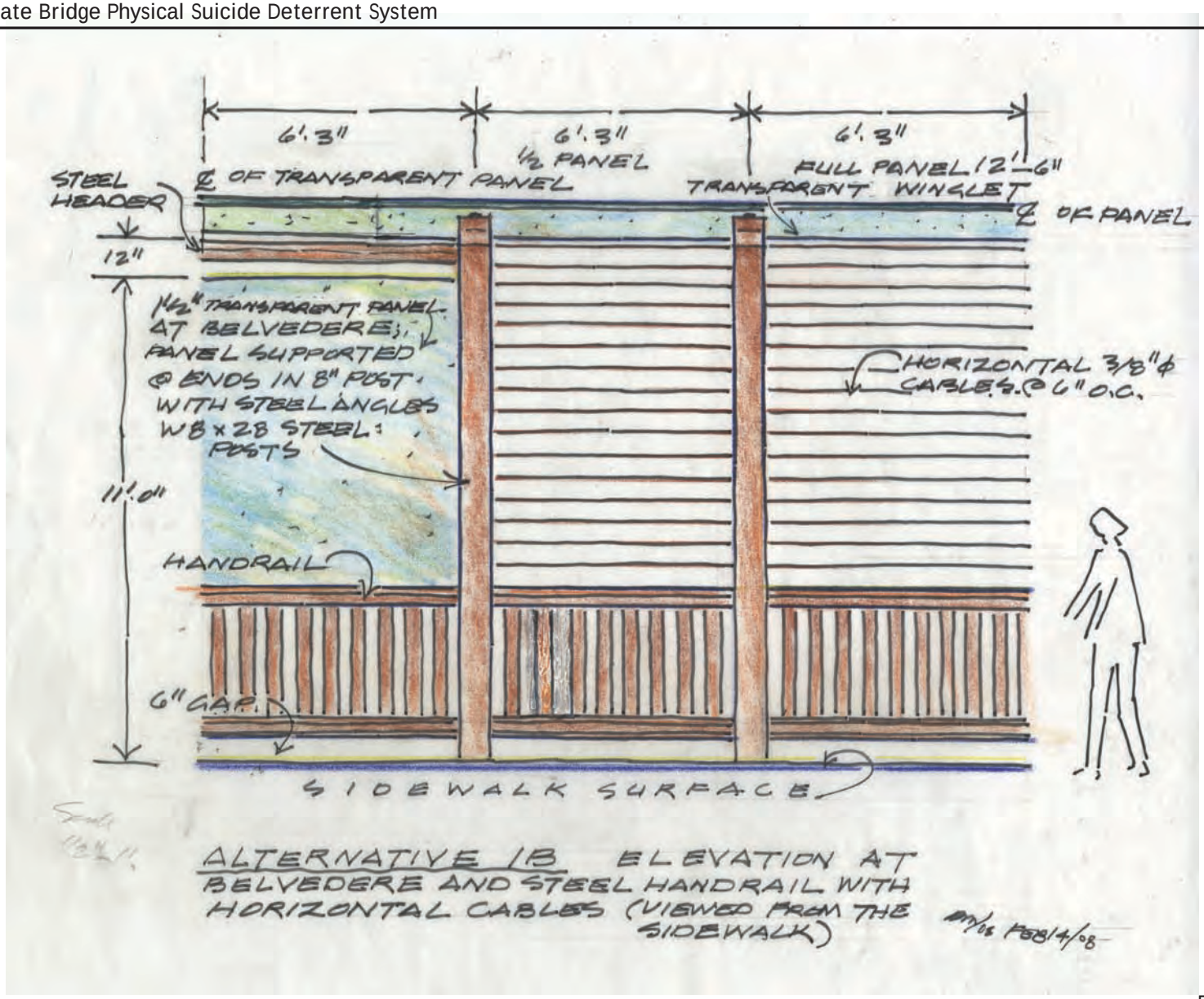


FIGURE 1-12
ALTERNATIVE 1B: ELEVATION AT BELVEDERE

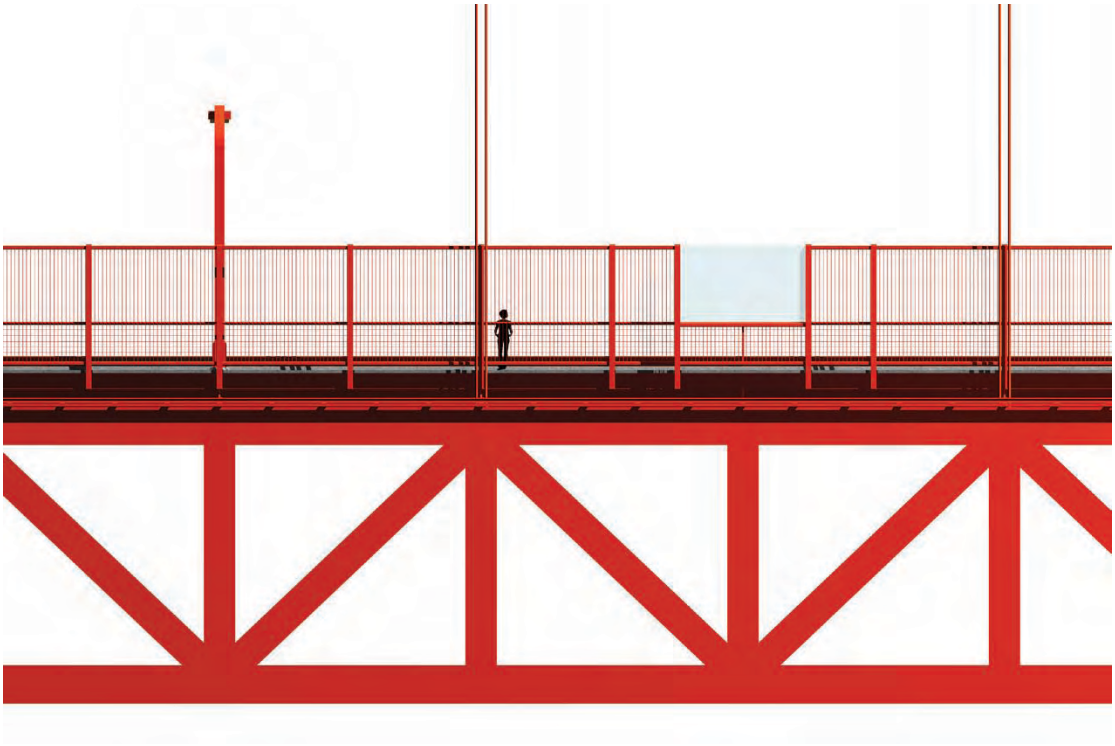
Source: macdonald architects, 2008

Alternative 2A – Replace Outside Handrail with Vertical System

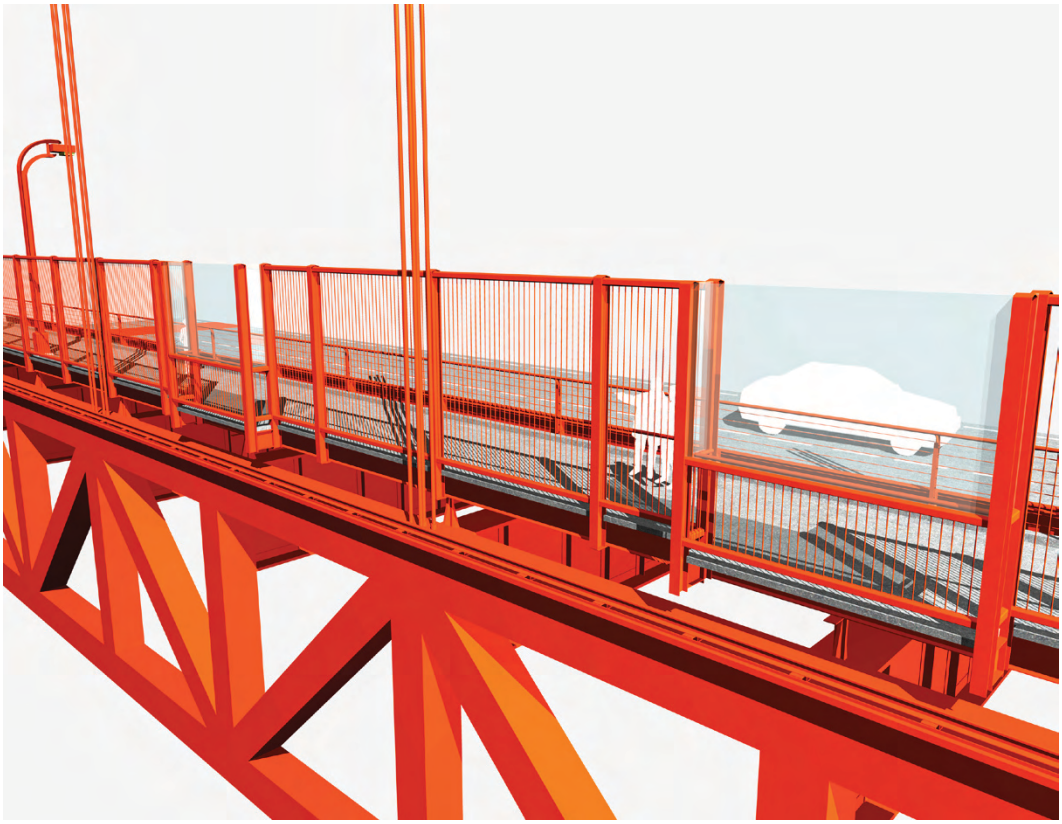
Alternative 2A would construct a new vertical 12-foot-high barrier consisting of ½-inch diameter vertical steel rods spaced at 4 ½ inches on center, leaving a 4-inch clear space between rods. A rub rail would be installed at the same height as the public safety railing (4 feet 6 inches). The existing rail posts would be replaced with new 12-foot-high outside rail posts at the same locations and of the same cross-section, size, material, and color of the original posts. The top horizontal header would consist of a chevron-shaped member matching the top element of the outside handrail to be removed. The vertical rods would be attached to the header and bottom barrier element. Transparent panels to preserve views would be installed at the belvederes and towers on both sides of the Bridge. Transparency would be preserved through ongoing maintenance of the panels.

This alternative assumes that the modification to the outside handrail on the west side of the Bridge between the two main towers and the installation of the wind fairings have been completed as part of the previously approved Seismic Retrofit Project. Figures 1-13 and 1-14 illustrate east and west side views of Alternative 2A and Figures 1-15 through 1-17 represent architectural sketches of the propose alternative. Special provisions for viewing areas are made at the mid-span of the Bridge. Figures 1-26 through 1-28 illustrate the plans for the physical suicide barrier at those locations.

Because maintenance workers would no longer be able to climb over the outside handrail to reach the below-deck maintenance traveler, gates would be located at a spacing of 150 feet on center to generally match the locations of the existing light posts and gates on the public safety railing. The gates would be 8 feet wide (two 4-foot-wide panels) and 12 feet high, and match the appearance of the vertical system. The frame for each gate door would be constructed of 2-inch by 2-inch steel members. A rub rail would be located at a height of 4 feet 6 inches, matching the height of the public safety railing.



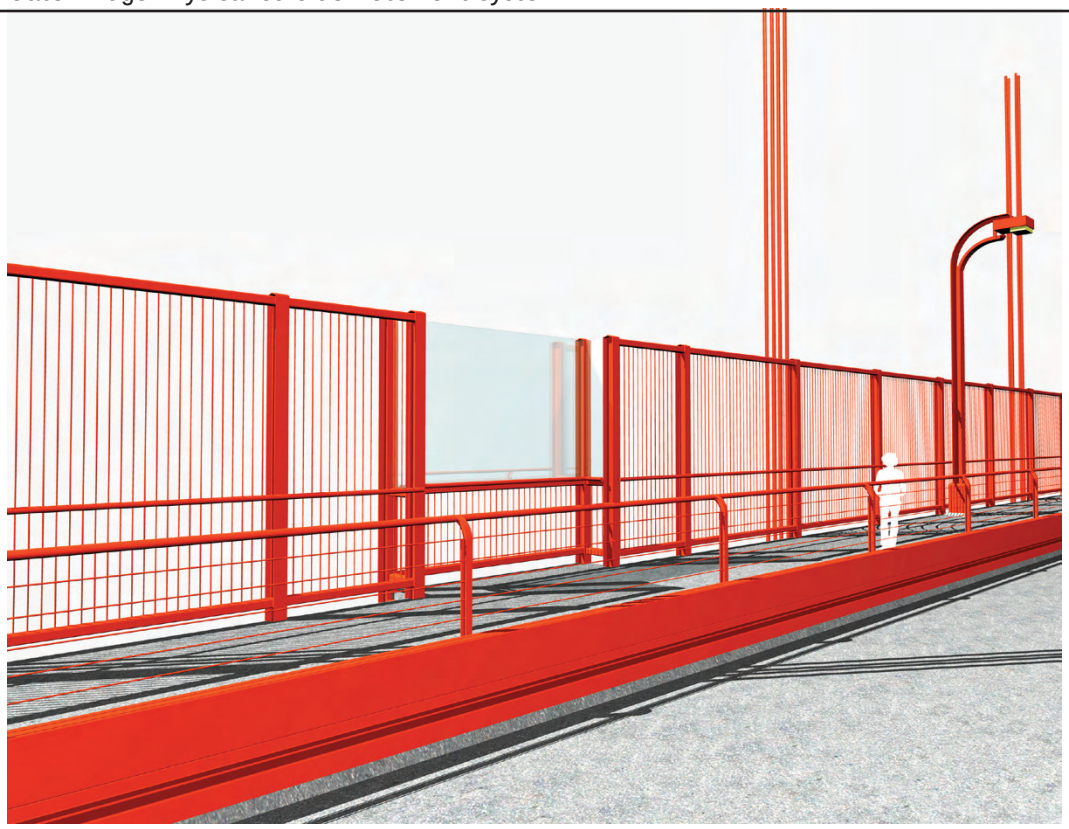
ALTERNATIVE 2A: ELEVATION EAST SIDE



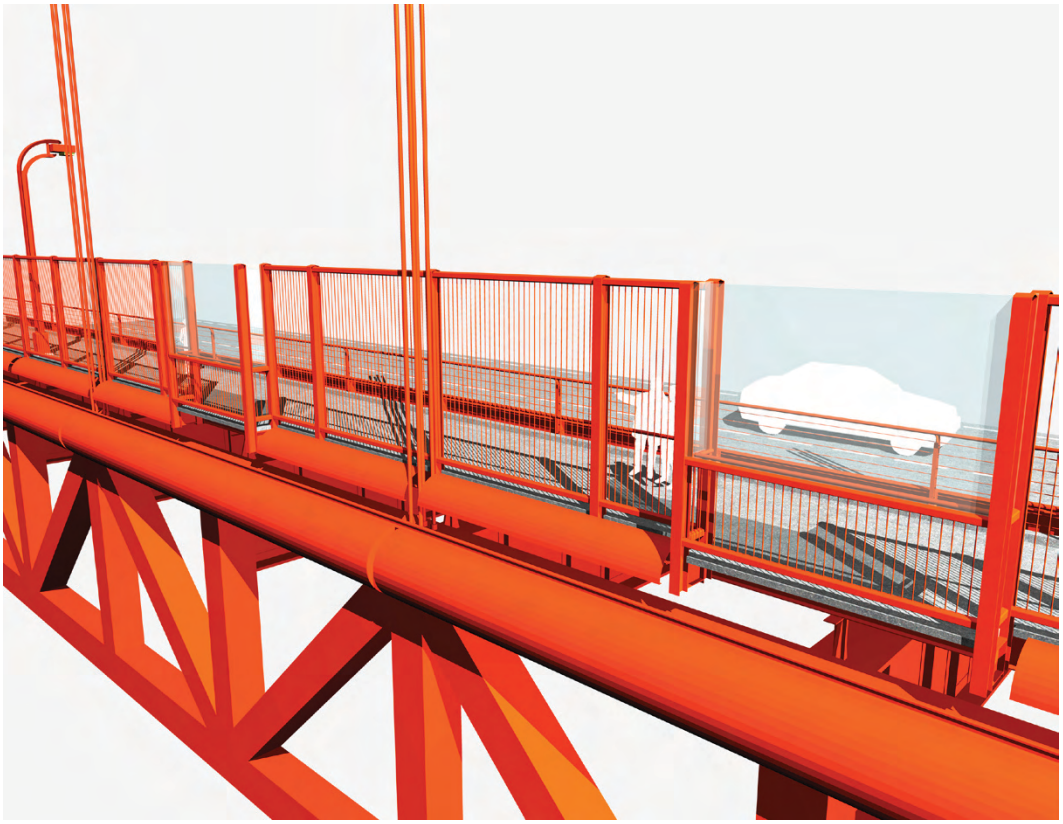
ALTERNATIVE 2A: EXTERIOR VIEW EAST SIDE

FIGURE 1-13
ALTERNATIVE 2A: ILLUSTRATIONS

Source: macdonald architects, 2008



ALTERNATIVE 2A: VIEW FROM ROAD



ALTERNATIVE 2A: EXTERIOR VIEW WEST SIDE

FIGURE 1-14
ALTERNATIVE 2A: ILLUSTRATIONS

Source: macdonald architects, 2008

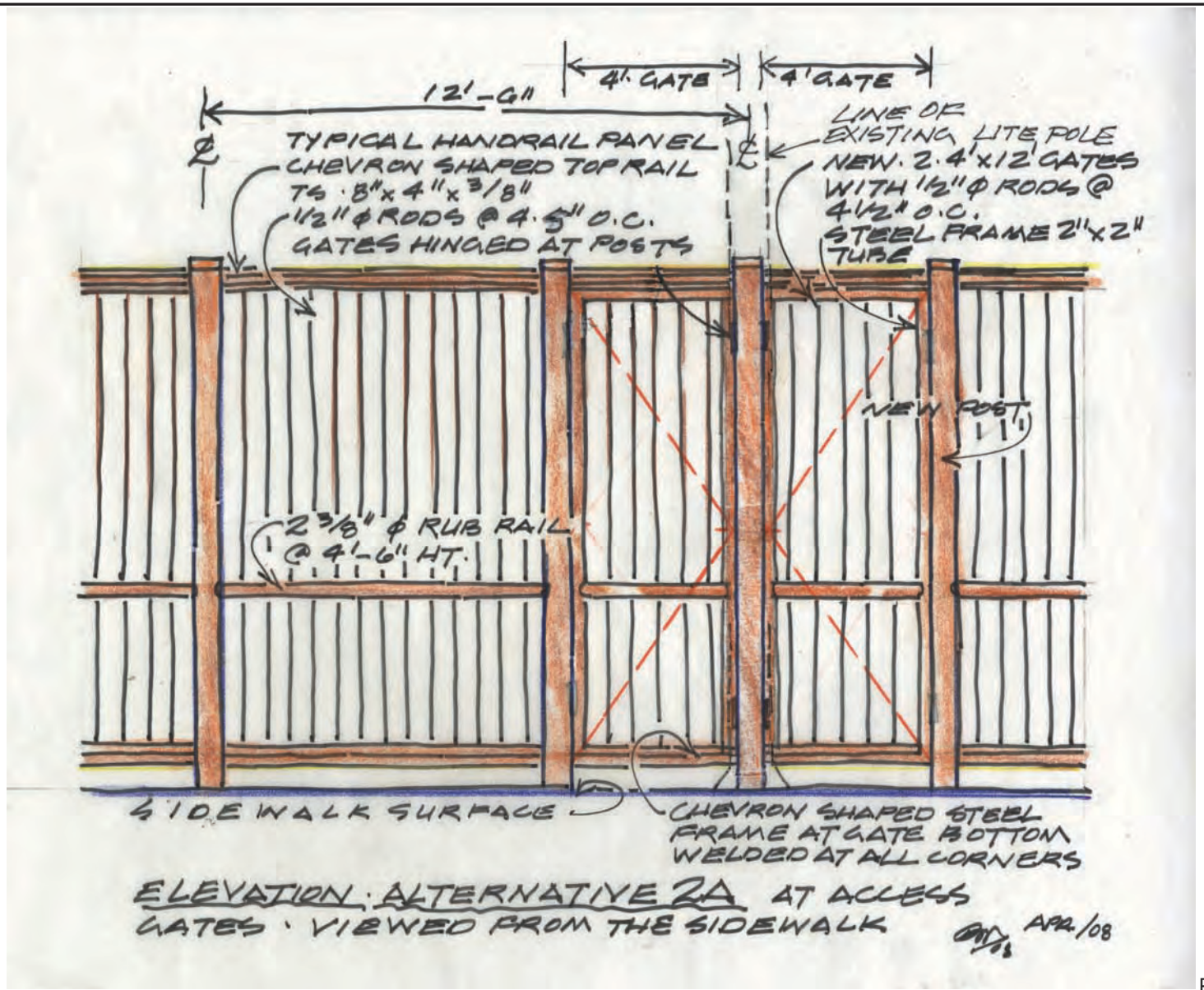


FIGURE 1-15

ALTERNATIVE 2A: ELEVATION AT ACCESS GATES

Source: macdonald architects, 2008

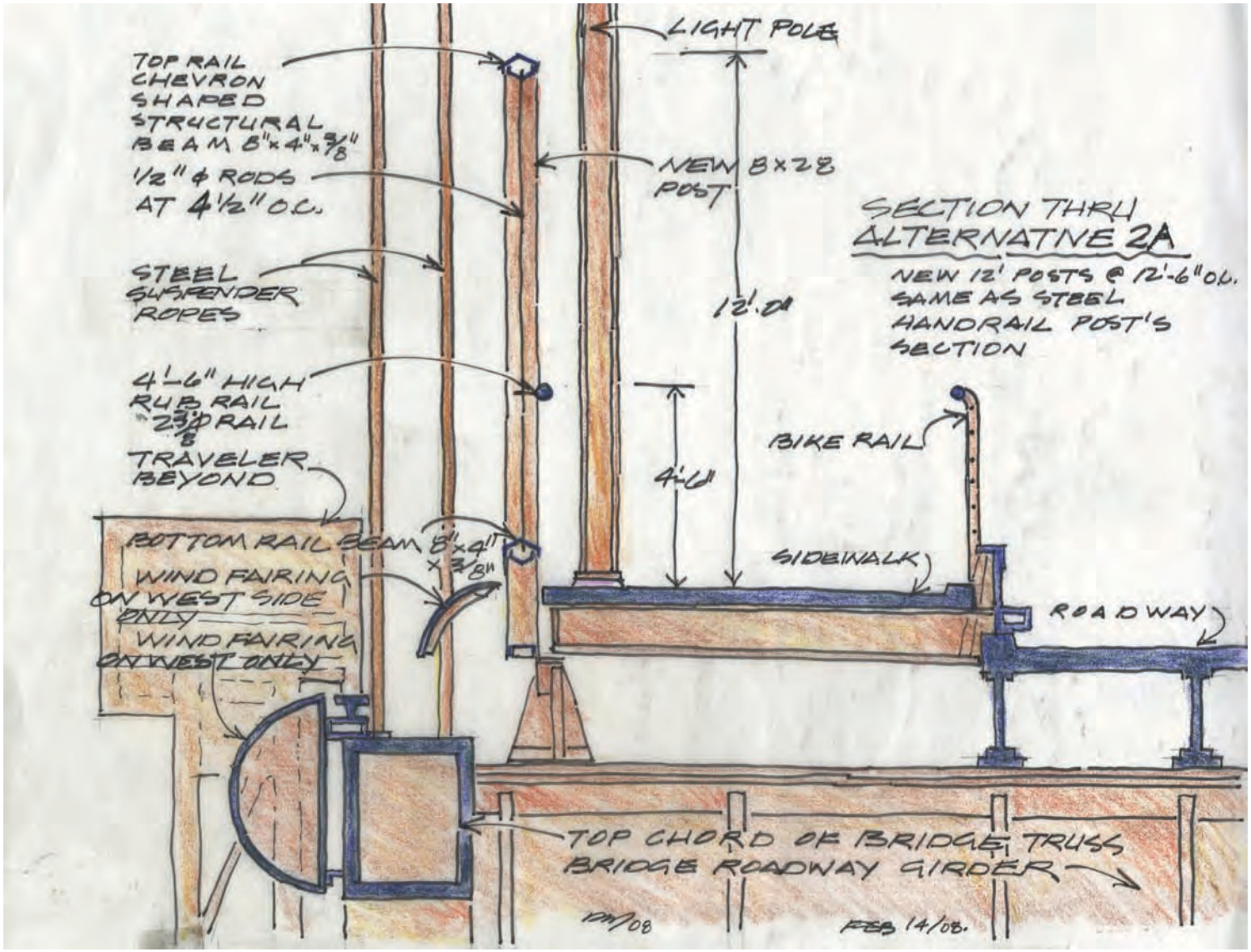


FIGURE 1-16
ALTERNATIVE 2A: SECTION

Source: macdonald architects, 2008

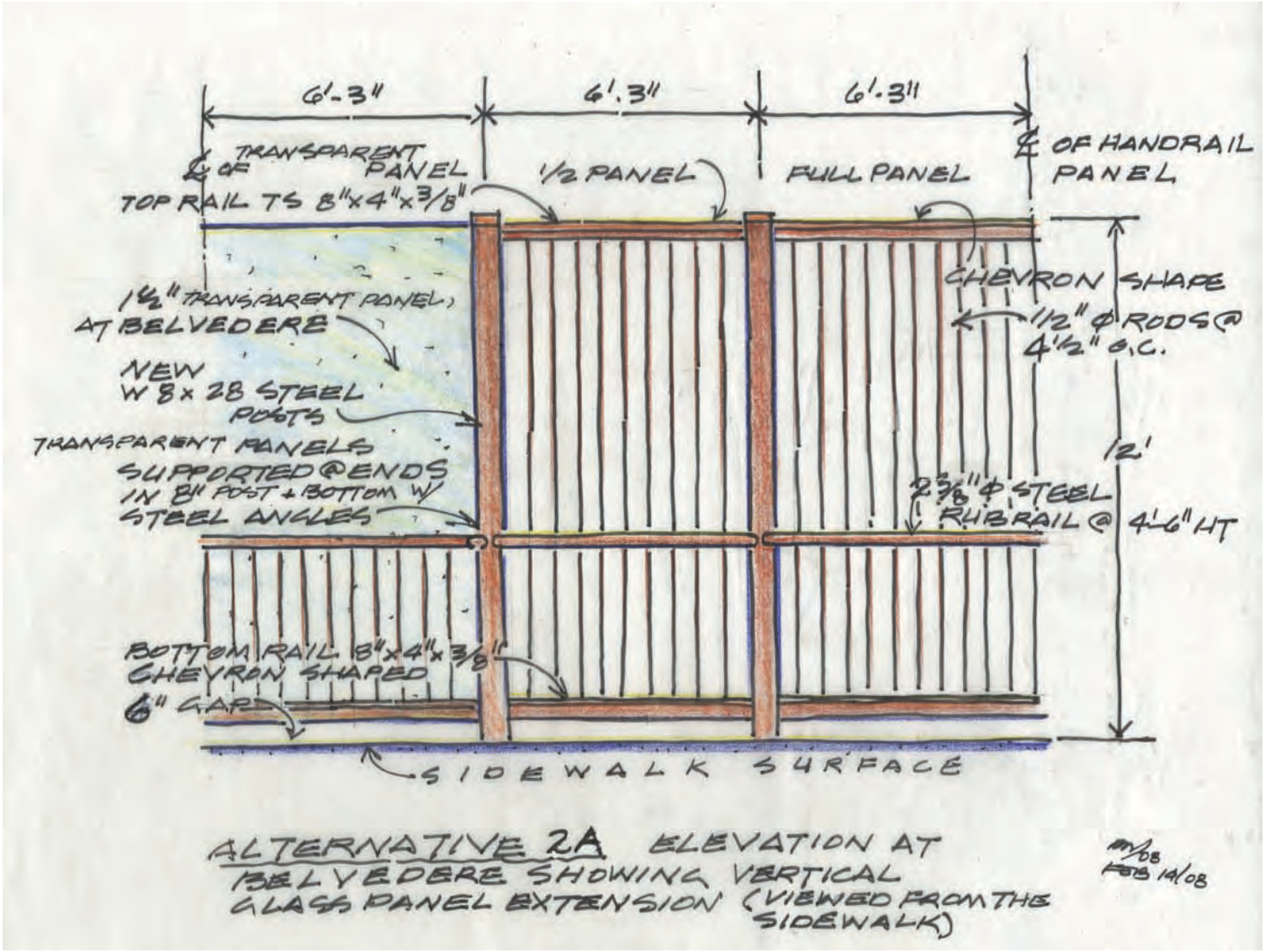


FIGURE 1-17
ALTERNATIVE 2A: ELEVATION AT BELVEDERE

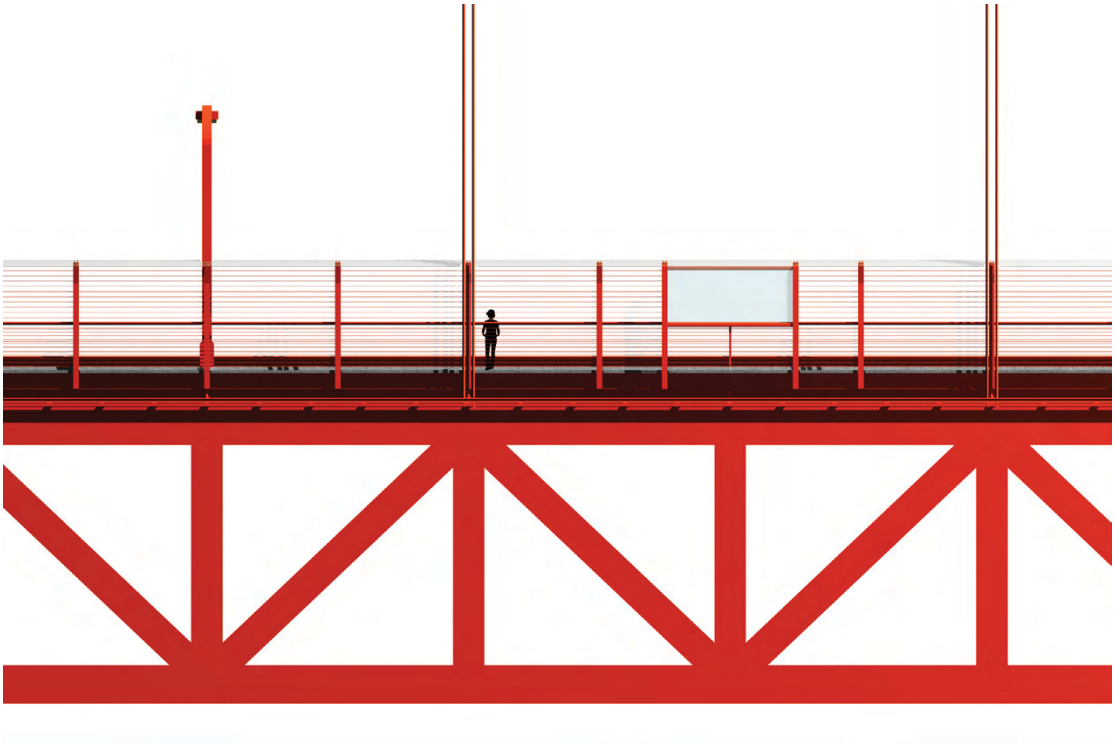
Source: macdonald architects, 2008

Alternative 2B – Replace Outside Handrail with Horizontal System

Alternative 2B would construct a new 10-foot-high barrier consisting of ⅜-inch diameter steel horizontal cables. The cables in the lower 3 ½-foot section would be spaced at 4.4 inches on center, while the cables in the upper 6 ½-foot section would be spaced 6 inches on center. A rub rail would be installed at the same height as the public safety railing (4 feet 6 inches). The existing rail posts would be replaced with new 10-foot-high outside rail posts at the same locations and of the same cross-section, size, material, and color of the original posts. Transparent panels to preserve views would be installed along the upper 6 ½-foot portion at the belvederes and towers on both sides of the Bridge. Transparency would be preserved through ongoing maintenance of the panels.

A transparent winglet would be placed on top of the outside rail posts to ensure aerodynamic stability and impede individuals who have climbed up the horizontal cables from clearing the barrier. The winglet would be placed on top of the rail posts. The winglet would be a clear 42-inch-wide transparent panel with a slight concave curvature extending approximately 2 feet over the sidewalk. The transparent winglet would run the length of the suicide deterrent barrier, except at the north and south towers. The transparent winglet would be notched at the suspender ropes and light posts. Figures 1-18 and 1-19 illustrate east and west side views of Alternative 2B and Figures 1-20 through 1-22 represent architectural sketches of the proposed alternative. Special provisions for viewing areas are made at the mid-span of the Bridge. Figures 1-26 through 1-28 illustrate the plans for the physical suicide barrier at those locations.

Because maintenance workers would no longer be able to climb over the outside handrail to reach the below-deck maintenance traveler, gates would be located at a spacing of 150 feet on center to generally match the locations of the existing light posts and gates on the public safety railing. The gates would be 8 feet wide (two 4-foot-wide panels) and 10 feet high, and match the appearance of the horizontal system. The frame for each gate door would be constructed of 2-inch by 2-inch steel members. A rub rail would be located at a height of 4 feet 6 inches, matching the height of the public safety railing.



ALTERNATIVE 2B: ELEVATION EAST SIDE

ALTERNATIVE 2B: EXTERIOR VIEW EAST SIDE

FIGURE 1-18
ALTERNATIVE 2B: ILLUSTRATIONS

Source: macdonald architects, 2008

ALTERNATIVE 2B: VIEW FROM ROAD

ALTERNATIVE 2B: EXTERIOR VIEW EAST SIDE

FIGURE 1-19
ALTERNATIVE 2B: ILLUSTRATIONS

Source: macdonald architects, 2008

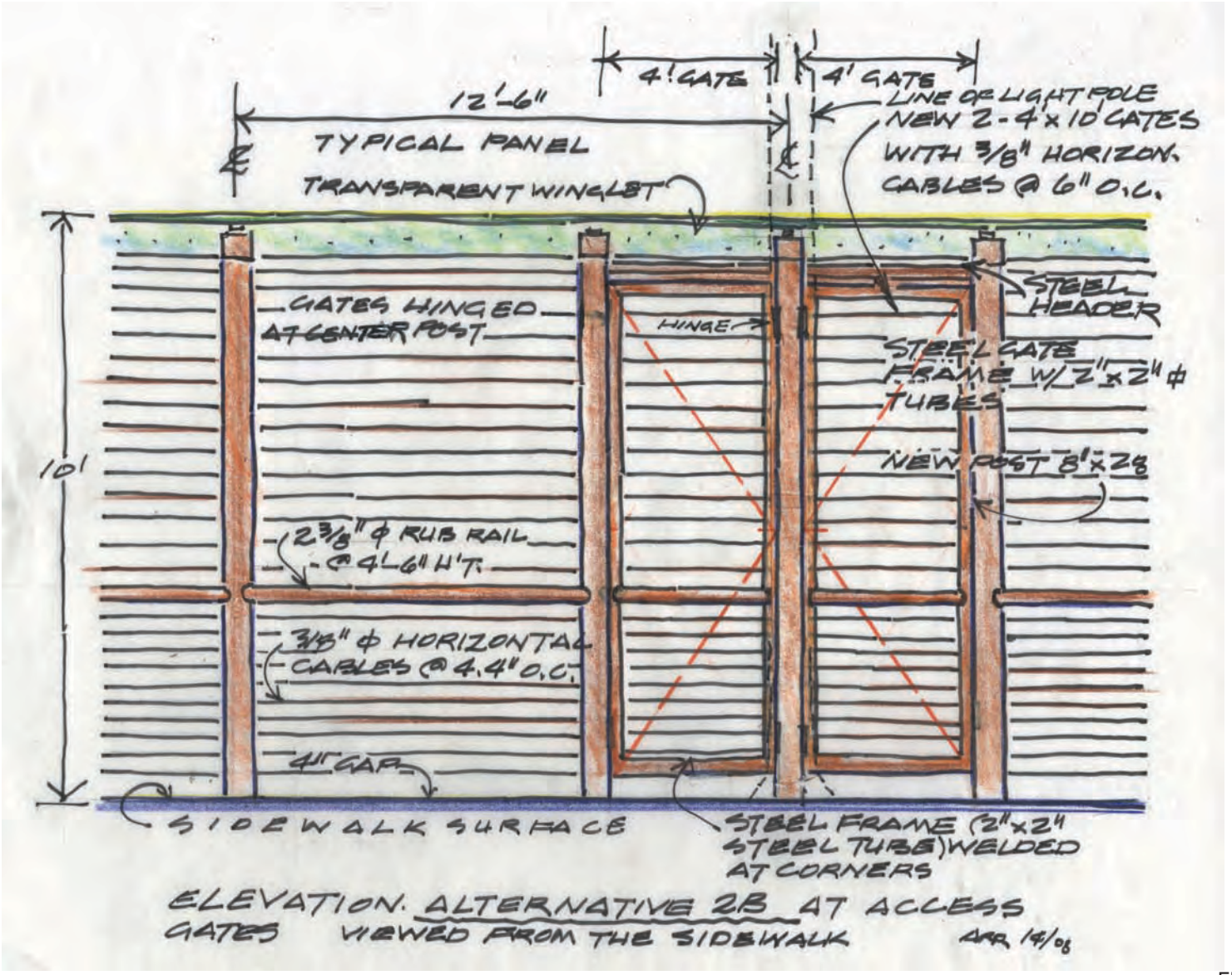


FIGURE 1-20
ALTERNATIVE 2B: ELEVATION AT ACCESS GATES

Source: macdonald architects, 2008

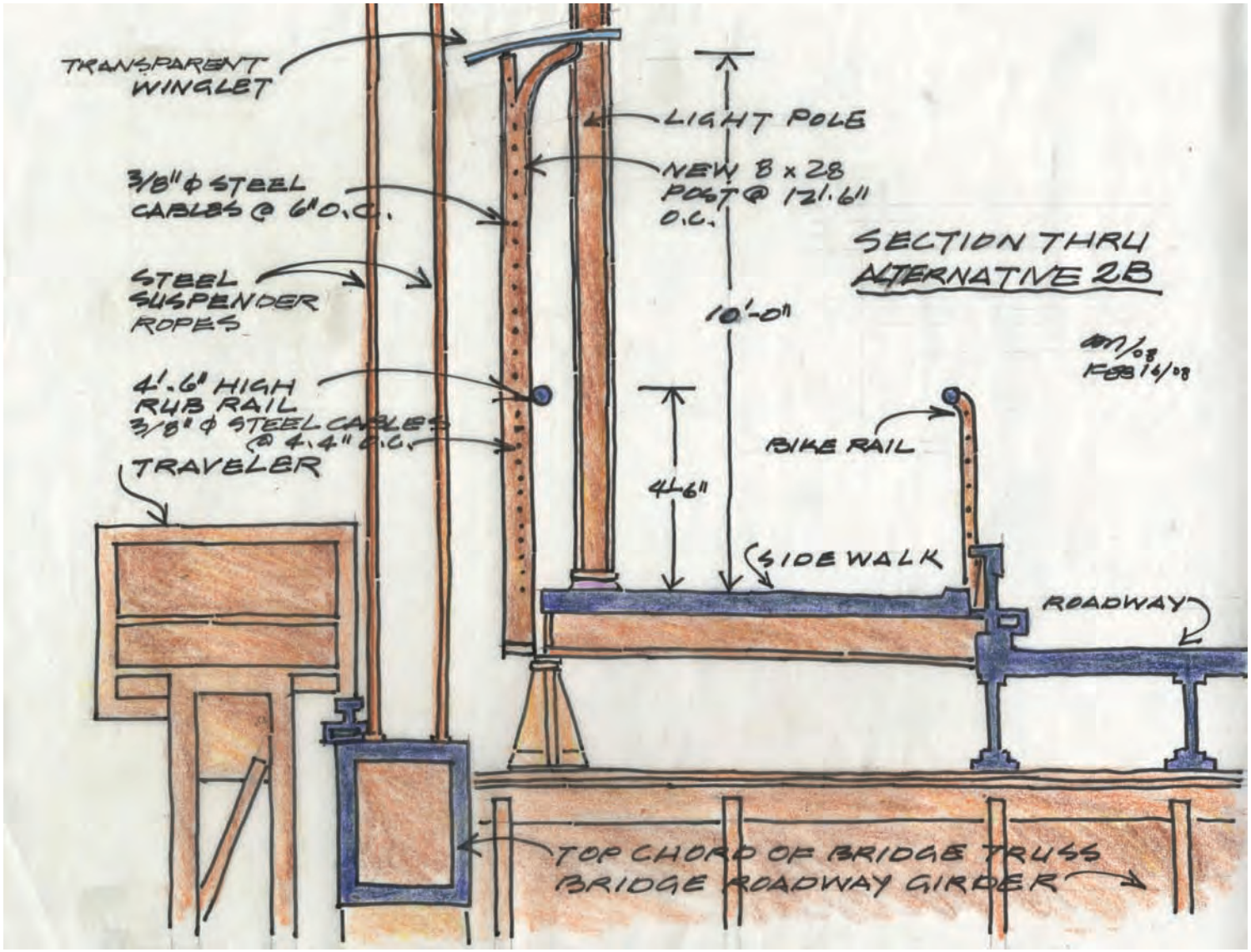


FIGURE 1-21
ALTERNATIVE 2B: CROSS SECTION

Source: macdonald architects, 2008

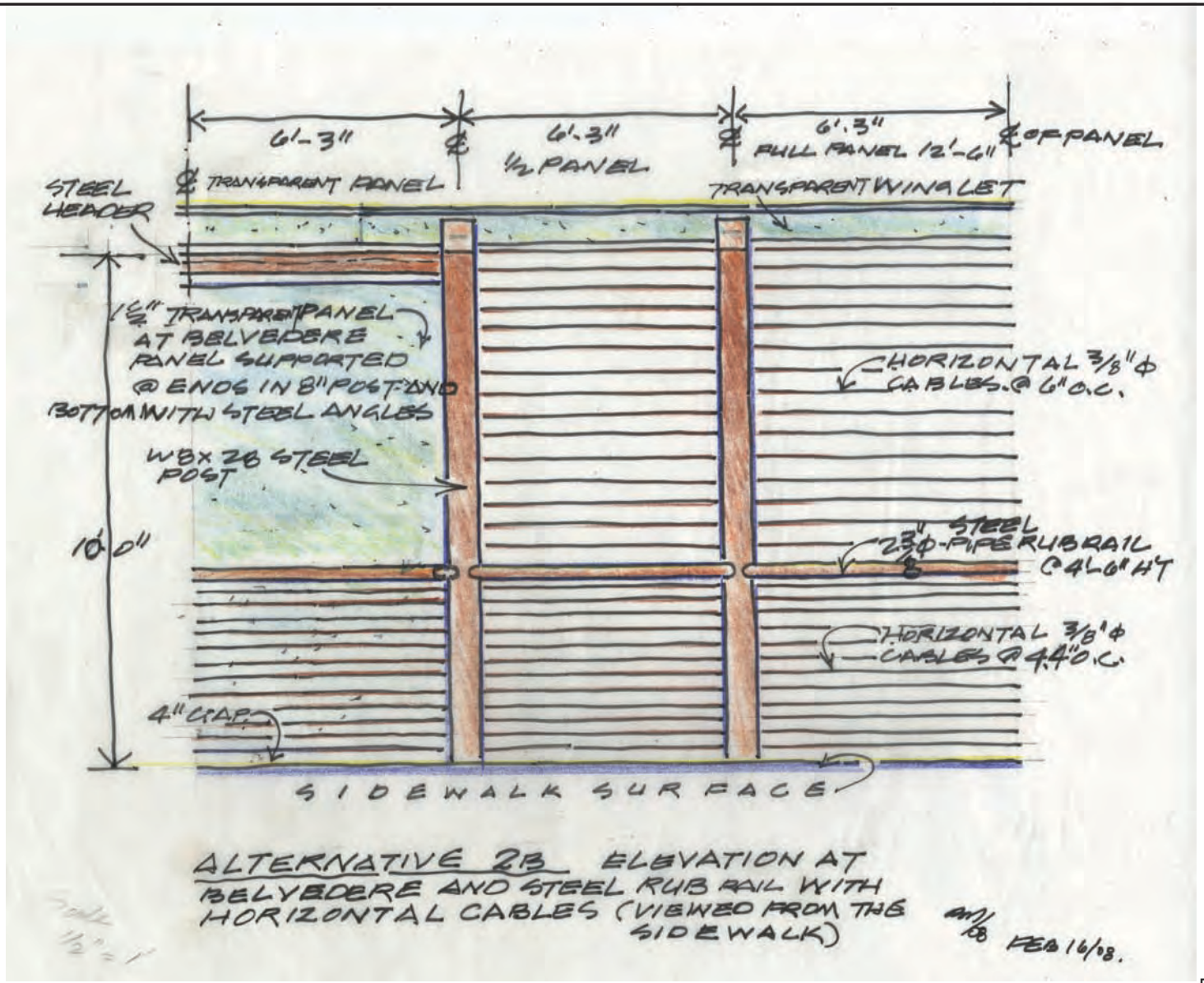


FIGURE 1-22
ALTERNATIVE 2B: ELEVATION AT BELVEDERE

Source: macdonald architects, 2008

Alternative 3 – Add Net System

Alternative 3 would construct a horizontal net approximately 20 feet below the sidewalk and approximately 5 feet above the bottom chord of the exterior main truss. Use of such net installations for suicide prevention on other facilities has resulted in greatly reduced fatalities and suicide attempts. Should individuals jump, they would be expected to survive the fall and could be rescued. The net would extend horizontally approximately 20 feet from the Bridge and be covered with stainless steel cable netting incorporating a grid between 4 and 10 inches. The horizontal support system would connect directly to the exterior truss and be supported by cables back to the top chord of the truss. The support system for the netting would include cables that would pre-stress the netting to help keep it taut and not allow the wind to whip the netting. Figures 1-23 and 1-24 illustrate east and west side views of Alternative 3 and Figure 1-25 represents an architectural sketch of the proposed alternative. Special provisions for viewing areas are made at the mid-span of the Bridge. Figures 1-26 through 1-28 illustrate the plans for the physical suicide barrier at those locations.

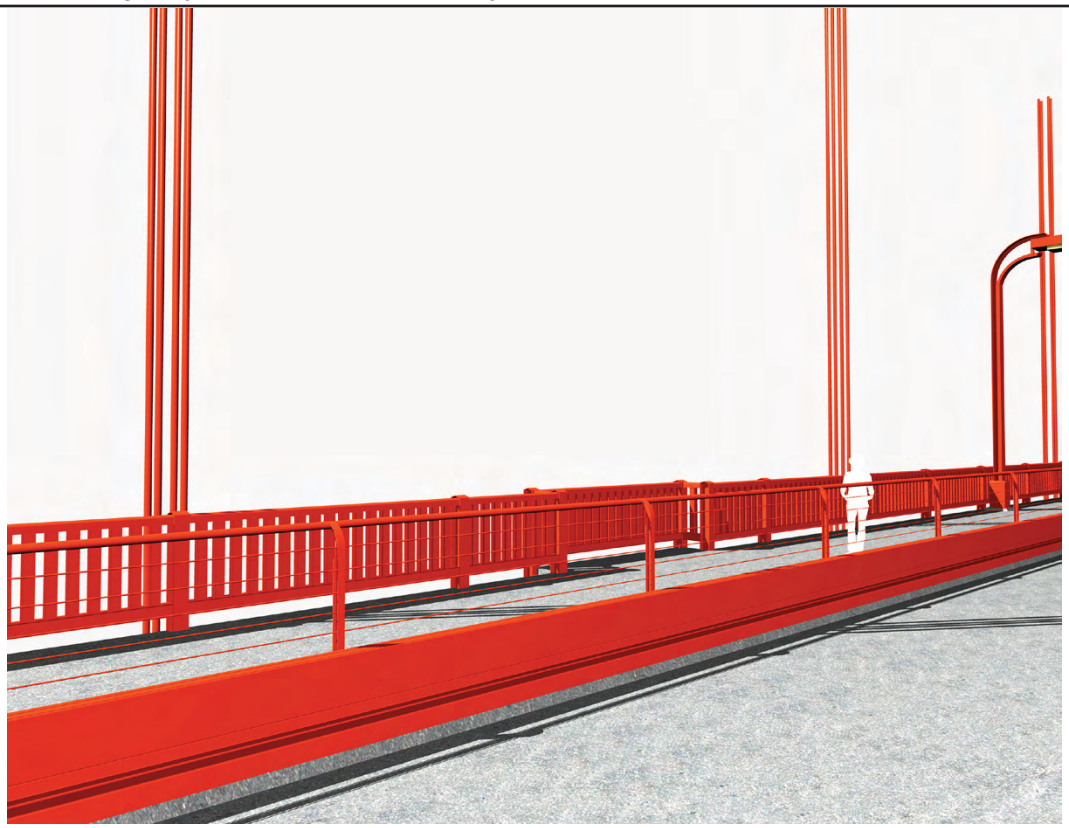
The horizontal net would consist of independent 25-foot sections that can be rotated vertically against the truss to allow the maintenance travelers to be moved. The net and the steel horizontal support system would be painted to match the International Orange Bridge color. With this alternative there would be no modifications to the above deck Bridge features. This alternative assumes that the modification to the outside handrail on the west side of the Bridge between the two main towers and the installation of the wind fairings have been completed as part of the previously approved Seismic Retrofit Project.

ALTERNATIVE 3: ELEVATION EAST SIDE

ALTERNATIVE 3: EXTERIOR VIEW EAST SIDE

FIGURE 1-23
ALTERNATIVE 3: ILLUSTRATIONS

Source: macdonald architects, 2008



ALTERNATIVE 3: VIEW FROM ROAD

ALTERNATIVE 3: EXTERIOR VIEW WEST SIDE

FIGURE 1-24
ALTERNATIVE 3: ILLUSTRATIONS

Source: macdonald architects, 2008

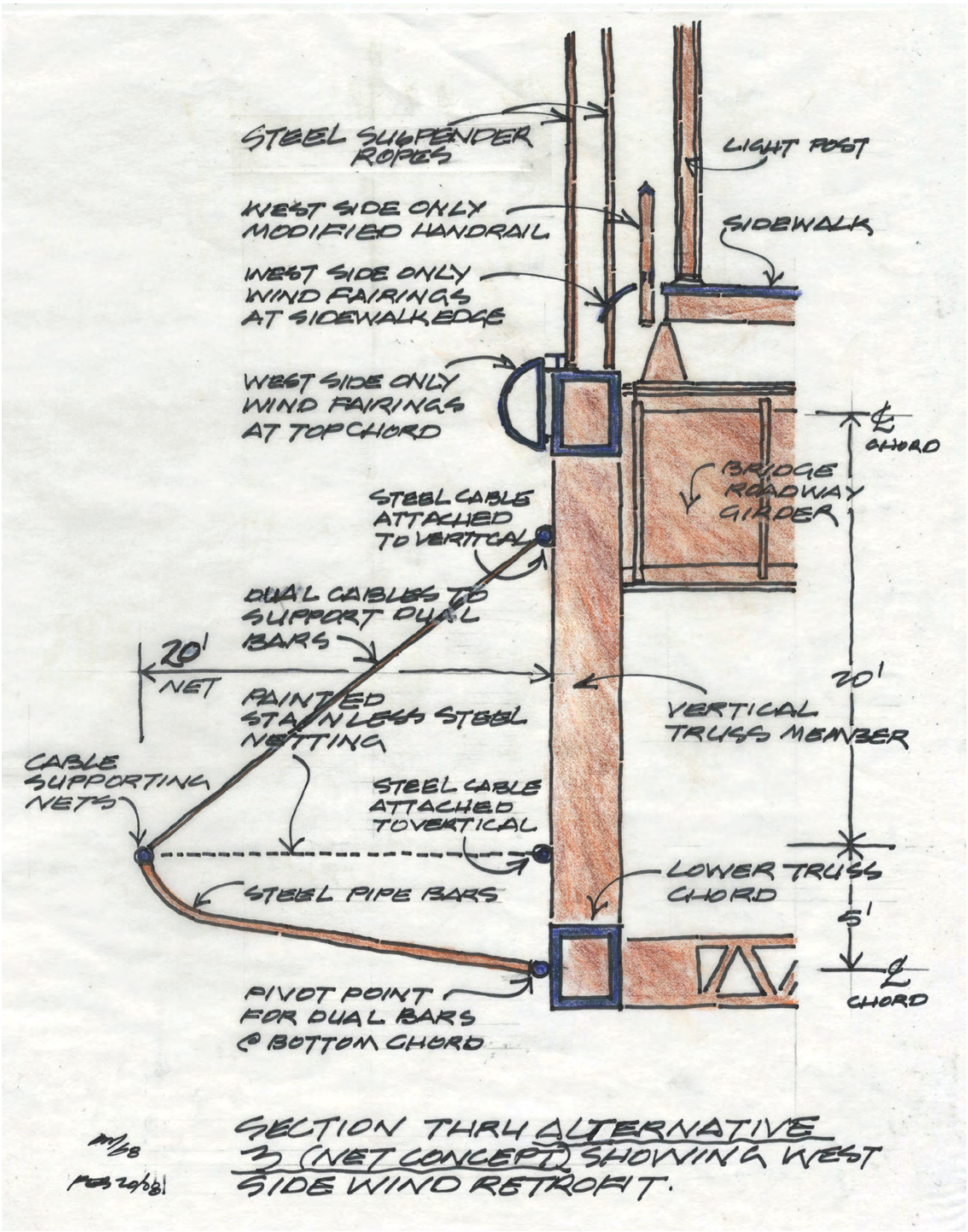


FIGURE 1-25
ALTERNATIVE 3: CROSS SECTION

Source: macdonald architects, 2008

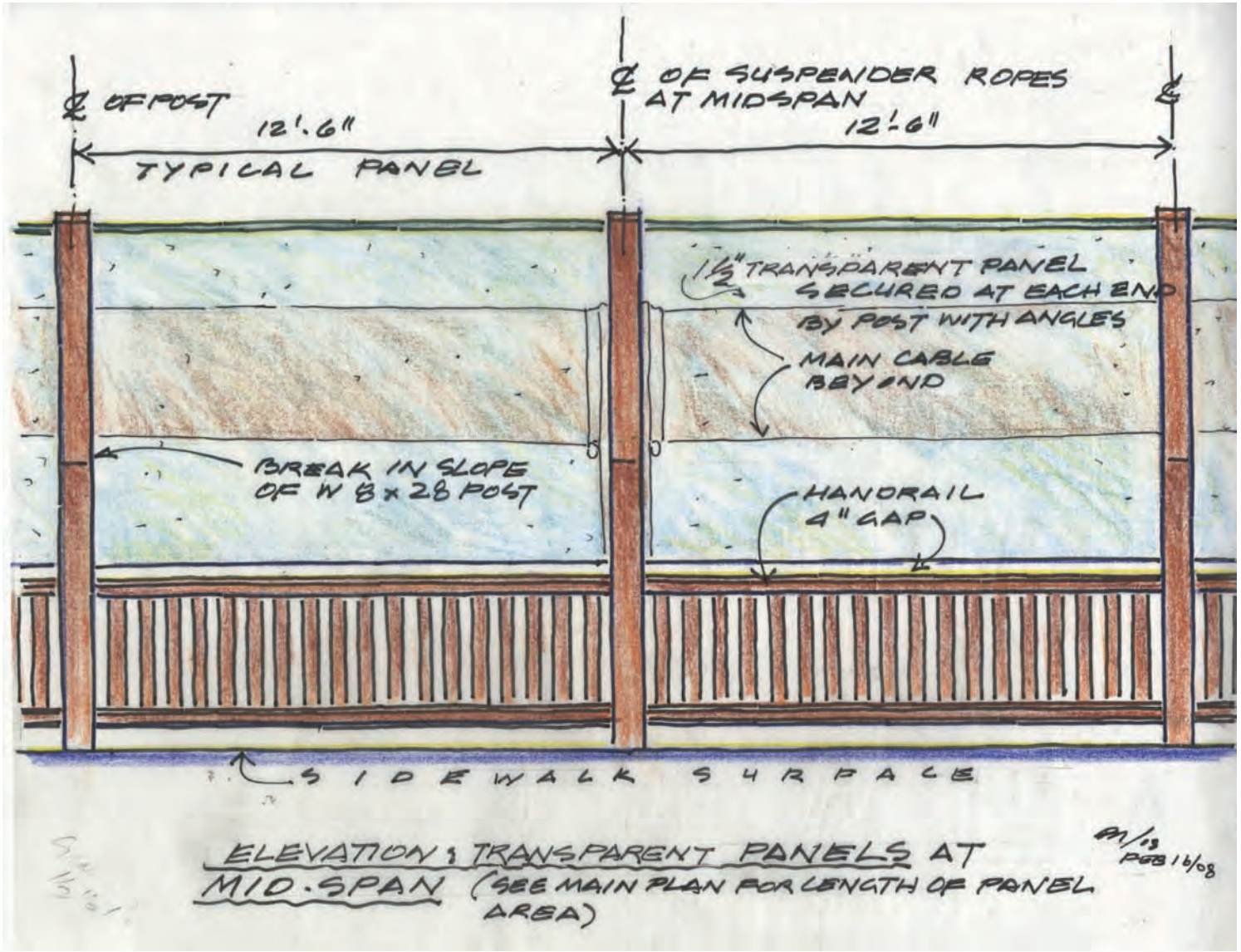


FIGURE 1-26
ELEVATION OF TRANSPARENT PANELS AT MID-SPAN

Source: macdonald architects, 2008

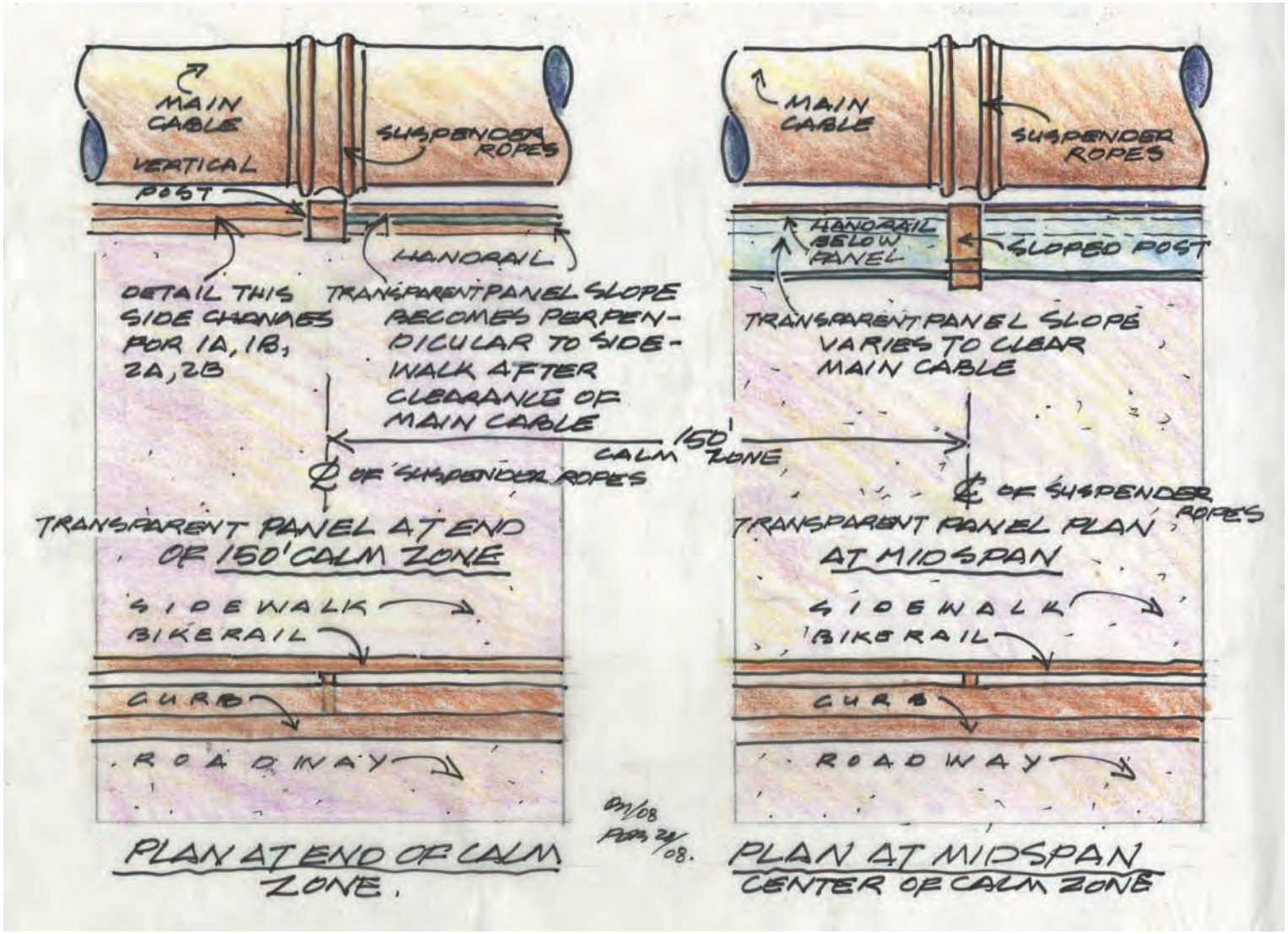


FIGURE 1-27
PLAN AT MID-SPAN

Source: macdonald architects, 2008

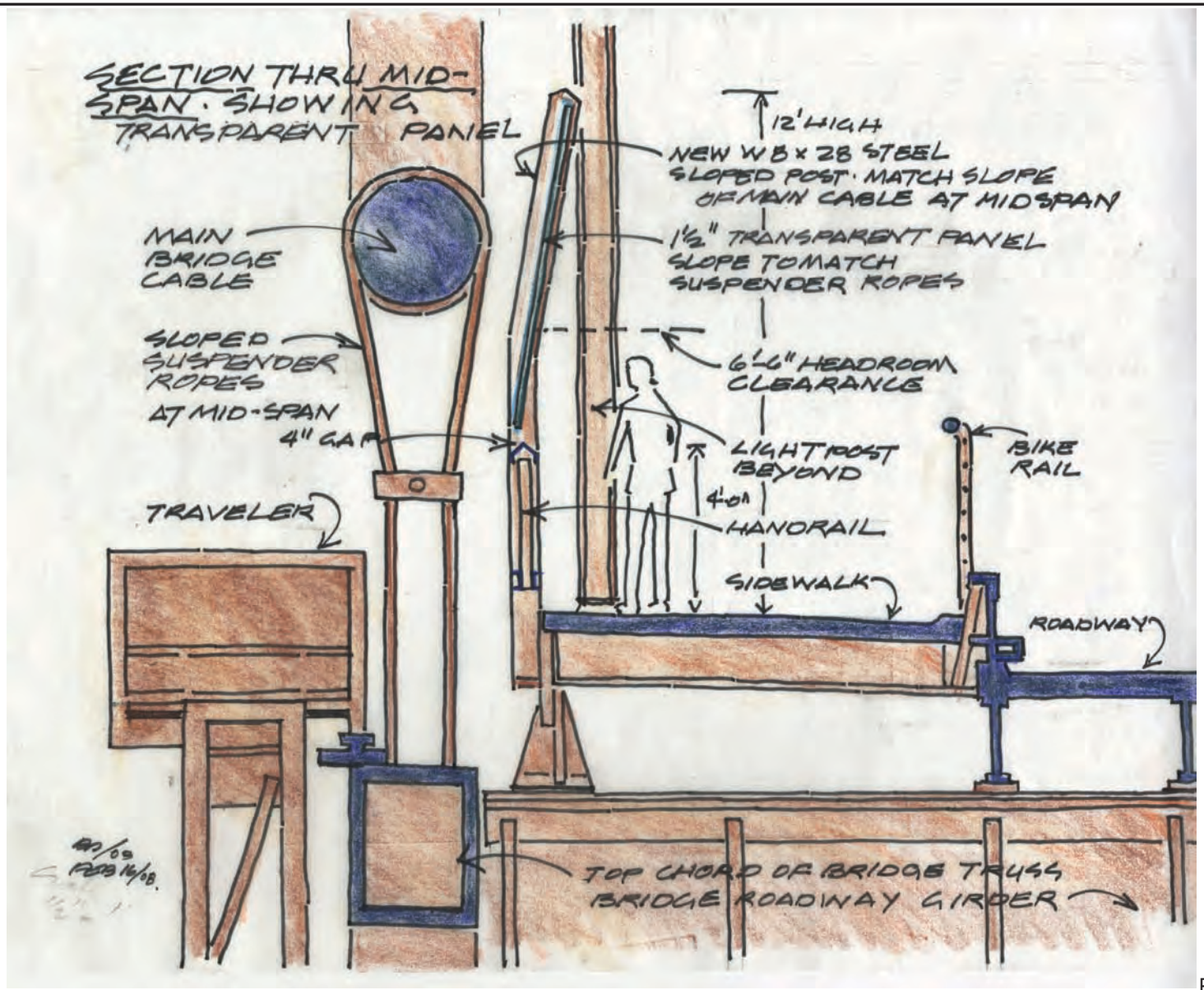


FIGURE 1-28
MIS-SPAN CROSS SECTION

Source: macdonald architects, 2008

1.5.2 NO-BUILD ALTERNATIVE

The No-Build Alternative represents an alternative and a baseline for future year conditions if no other actions are taken in the study area beyond what is already in place. Under this alternative, the Bridge's sidewalks would remain open to the public, with the existing outside railing remaining four (4) feet high. The No-Build Alternative would continue the existing non-physical suicide deterrent programs at the Bridge, as well as implement Bridge modifications approved as part of the seismic upgrade project.

Individuals of varying heights, weights, ages, and sexes, not using the Bridge sidewalks for their intended purpose, could climb over the existing railing and jump to their death. There would be no other physical barrier preventing an individual from jumping, if the railing were to be scaled. Suicide rates under this alternative would likely follow historical trends as indicated below.

- In 2005, there were 622 known suicides in the nine Bay Area counties, of which 23 were estimated to occur at the Bridge. Further, in that same year, 58 persons contemplating suicide were successfully stopped. In 2006, 31 suicides are known to have occurred at the Bridge, while 57 individuals were stopped. Similarly, in 2007, 39 suicides occurred and 90 were stopped. The individuals taken off of the Bridge are transported to a local hospital for a psychiatric evaluation pursuant to Section 5150 of the California Welfare and Institutions Code.
- A variety of non-physical measures to deter suicides on the Bridge have been in place for many years. However, there are still approximately two dozen deaths that occur each year as a result of individuals jumping off the Bridge. The non-physical measures have stopped approximately two-thirds of those individuals with the intent to commit suicide at the Bridge; despite these measures one-third are not prevented.
- Although official figures have not been maintained through the years, since 1937 it is estimated that approximately 1,300 individuals have committed suicide by jumping off of the Bridge.

Existing Suicide Deterrent Programs

Emergency Counseling Telephones

On November 5, 1993, by Board Resolution #93-264, the District upgraded the emergency motorist "call-box" telephone system on the Bridge sidewalks to also accommodate suicide prevention and crisis intervention calls. Additional phones were installed to expand the coverage area with a total of 11 phones located on both sidewalks. The system was modified to

allow the Bridge security staff to instantly connect callers, at their request, to trained suicide prevention counselors at San Francisco Suicide Prevention's crisis line.

To comply with international convention regarding emergency telephones, the signs above the telephone call boxes were modified in color from black on yellow to white on blue. The wording was changed from "Emergency Telephone" to "Emergency Telephone and Crisis Counseling" and the international "telephone" icon was added. Further, in 2006, additional signs with blue with white lettering, were added directly above the telephone call boxes that read: "Crisis Counseling, There is Hope, Make the Call. The Consequences of Jumping from this Bridge are Fatal and Tragic."

The phones are used both by potentially suicidal persons seeking assistance and by members of the public who wish to alert District authorities to persons that may be contemplating suicide. In recent years, the proliferation of cellular telephones has also increased the incidence of reporting by the general public of potential persons contemplating suicide.

Public Safety Patrols

On February 23, 1996, under Board Resolution 93-34, a Public Safety Patrol was initiated on the Bridge sidewalks with suicide prevention as one of its primary objectives. The patrols started on April 1, 1996. Under this program, the District's existing Bridge Patrol Program was reoriented with an emphasis on patrolling the Bridge east sidewalk. The initial patrols were performed on foot and by scooter. In August 1999, the Board authorized the formation of a bicycle unit within the Bridge Patrol ranks. Today the majority of sidewalk patrolling is done on bicycles. In December 2001, as a result of heightened security concerns, the Board authorized the hiring of additional Bridge patrol officers to expand the Bridge's security force. These new officers are trained in suicide prevention and intervention. In early 2003, the California Highway Patrol (CHP) deployed its own bicycle patrol officers on the Bridge, increasing law enforcement coverage even further. CHP officers are also trained in suicide intervention.

Employee Training

All Bridge security personnel, as well as several Bridge ironworkers who have volunteered to assist in suicide intervention and rescue activities, have received special training. In 2004, the District, CHP, and the U.S. Park Police jointly sponsored an intensive full-day training session on crisis intervention and suicide prevention. This course was attended by more than 120 law enforcement officers, District security, and ironworker personnel. The course was conducted by a nationally renowned expert in

the field of crisis intervention and by personnel from San Francisco Suicide Prevention, Inc.

Surveillance Cameras

In the 1960s, closed-circuit cameras were installed at the Bridge towers to remotely monitor traffic conditions. As a result of security system upgrades in the mid 1990s and again following September 11, 2001, additional cameras were installed at other locations on and around the Bridge. This network of cameras aids in directing intervention personnel.

Seismic Retrofit Project

Immediately following the 1989 Loma Prieta earthquake, a vulnerability study for the Bridge was conducted that concluded if a high magnitude earthquake centered near the Bridge occurred, there would be a substantial risk of impending collapse of the San Francisco and Marin Approach Viaducts and the Fort Point Arch, and extensive damage to the remaining Bridge structures. After determining that retrofitting the Bridge would be more cost-effective than replacement, a construction phasing plan was developed in 1996 to retrofit the Bridge. The seismic retrofit modifications were designed to maintain the historic and architectural appearance of the Bridge. The following phasing plan reflected the degrees of structural vulnerabilities:

- Phase I retrofit the Marin (north) Approach Viaduct
- Phase II retrofit the San Francisco (south) Approach Viaduct, San Francisco (south) Anchorage Housing, Fort Point Arch, and Pylons S1 and S2
- Phase III retrofit the Main Suspension Bridge and Marin (north) Anchorage Housing and North Pylon

Phase I of the Seismic Retrofit Project was completed in 2002. Phase II of the Seismic Retrofit Project was completed in 2008. The third and final phase has been divided into two construction projects: Phase IIIA and Phase IIIB. Phase IIIA, which was awarded on March 28, 2008, will retrofit the north anchorage housing and north pylon. It is scheduled to be completed in three years. Phase IIIB, the seismic retrofit of the main span and towers, is planned to start in 2010. Phase IIIB includes a wind retrofit of the suspended span, including the replication of the west outside handrail between the towers and the installation of wind fairings along the same length.

Wind Retrofit of West Outside Handrail

In accordance with the findings of the wind study report conducted for the Seismic Retrofit Project, the vertical members under the outside handrail on the west side of the Bridge between the two main towers will be modified to reduce the effects of the wind on the handrail. The retrofit modification will replace the existing vertical members and bottom rail with narrower members. The new vertical members will be spaced at 5 inches on center, which will help to increase the porosity of the handrail by allowing the wind to pass through the pickets more freely, thus reducing the wind loads inducted upon these elements. The top rail and main support posts will remain unchanged.

Wind fairings will be installed at the west outer edge of the sidewalk and the top chord of the main stiffening truss. A quarter round fairing, with a radius of 19 inches, will be placed at the sidewalk's edge and a half round fairing, with a radius of 25 inches will be placed along the top chord of the stiffening truss. The fairings will be painted to match the existing Bridge color. The fairings radius and diameter will be equivalent to the width of the edge of sidewalk and top chord of the stiffening truss of which they cover. This will retain the same scale and the same relationship of solids and voids of the main suspension truss' elevation. This modification was previously approved as part of the Seismic Retrofit Project.

1.6 COMPARISON OF ALTERNATIVES

The current project, including the engineering design work and environmental evaluation associated with development of a physical suicide deterrent system, was initially authorized by Resolution #2005-15, adopted by the District's Board at its March 11, 2005 meeting. At this time the criteria were revised, as shown in Section 1.2 of this chapter, to encompass the considerations listed in that section while also recognizing the historic significance of the Bridge.

All of the build alternatives generally satisfy the revised criteria established by the District. During the screening process, many groups of alternatives, as discussed in Section 1.6 of this chapter, were considered and evaluated for their ability to meet the project's purpose and need, which included the District's criteria. The build alternatives evaluated in this environmental document were selected because they all impede the ability of an individual to jump from the Bridge and generally satisfy the District's criteria. Table 1-1 on the following page compares the alternatives in relation to their ability to satisfy the District criteria.

1.6.1 FINAL DECISION-MAKING PROCESS

After the public circulation period, all comments will be considered, and the District will select a preferred alternative and make the final determination of the project's effect on the environment. In accordance with CEQA, the District will certify that the project complies with CEQA, prepare findings for all significant impacts identified, prepare a Statement of Overriding Considerations for impacts that will not be mitigated below a level of significance, and certify that the findings and Statement of Overriding Considerations have been considered prior to project approval. The District will then file a Notice of Determination with the State Clearinghouse that will identify whether the project will have significant impacts, mitigation measures were included as conditions of project approval, findings were made, and a Statement of Overriding Considerations was adopted. Similarly, if the Department, as assigned by FHWA, determines the NEPA action does not significantly impact the environment, the Department will issue a Finding of No Significant Impact (FONSI) in accordance with NEPA. If the Department determines the NEPA action significantly impacts the environment, an Environmental Impact Statement (EIS) will be prepared.

1.7 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM FURTHER DISCUSSION

1.7.1 ALTERNATIVE EVALUATION PROCESS

The concept of installing a physical suicide deterrent system on the Bridge has been explored since 1971. A variety of concepts have been studied, with all concepts ultimately rejected based primarily on aesthetic and effectiveness concerns. Subsequently, the District enhanced its monitoring, patrol, and intervention capabilities, which was effective for certain situations and instances. Nonetheless, approximately two dozen individuals jump from the Bridge each year.

On March 11, 2005, the District's Board approved proceeding with environmental studies and preliminary design work, contingent upon outside funding for those efforts, for development of a physical suicide deterrent system on the Bridge. The resolution authorizing this action stipulated that suicide deterrent system concepts conform to the 11 specific criteria (see Section 1.2 for criteria).

Table 1-1 Comparison of Alternatives

Project Alternative	DISTRICT CRITERIA									
	Must impede the ability of an individual to jump off the GGB	**Must not cause safety or nuisance hazards to sidewalk users, including pedestrians, bicyclists, District staff, and District contractors/security partners**	**Must be able to be maintained as a routine part of the District's ongoing Bridge maintenance program without undue risk of injury to District employees.**	**Must not diminish ability to provide adequate security of the Golden Gate Bridge.**	**Must continue to allow access to the underside of the Bridge for emergency response and maintenance activities.**	**Must satisfy requirements of State and Federal historic preservation laws.**	**Must have minimal visual and aesthetic impact on the Golden Gate Bridge.**	**Must be cost effective to construct and maintain.**	**Must not, in and of itself, create undue risk of injury to anyone who comes in contact with the Suicide Deterrent System.**	**Must not prevent construction of a moveable median barrier on the GGB.**
1A - Add Vertical System to Outside Handrail	Configuration of thin rods vertically aligned provides for a system that is difficult to grasp and climb. Overall height sufficient to prevent a climber from reaching top of barrier from sidewalk level.	System serves as a passive barrier deterrent, and does not pose a safety or nuisance hazard to sidewalk users, District staff and District contractors/security partners.	Primary fence materials (posts, rods, etc) will utilize materials and components similar or identical to those used on the recently installed bike/ped railing.	System will not impede security patrols and will have no negative impact on sidewalk and above-deck security. System will help to protect main cable components (suspenders, main cable) and underbridge areas by making access to these components/areas more difficult.	Current underbridge emergency response access will be maintained through the provision of access gates. Maintenance workers will have to walk along the upper chord of the truss, on the outside of the railing to access the maintenance traveler from the gates.	Project implementation will be in accordance with State and Federal historic preservation laws.	Use of thin vertical rods allows views through the barrier from the roadway/sidewalk perspectives, although stacking of rods will obstruct angled views from roadway/sidewalk perspectives. Barrier could be visible in views towards the Bridge, depending on the distance and duration of the view.	System utilizes conventional, readily available materials that can be installed using standard construction equipment and tools. Maintenance traveler modification costs can be avoided. System will increase the painted steel surfaces of the Bridge, which will increase maintenance costs.	System is not expected to cause injury to those in contact, since it is passive and relies upon fixed, stationary elements for its anti-climb effectiveness.	Based on wind tests, system can be installed in conjunction with a moveable barrier system.
1B - Add Horizontal System to Outside Handrail	Horizontal cable alignment provides a foot-hold for climbing, but winglet will impede climbing over barrier. Overall height sufficient to prevent a climber from reaching top of barrier from sidewalk level.	System serves as a passive barrier deterrent, and does not pose a safety or nuisance hazard to sidewalk users, District staff and District contractors/security partners	Primary fence materials (posts, rods, etc) will utilize materials and components similar or identical to those used on the recently installed bike/ped railing. Transparent winglet will require periodic maintenance in order to maintain aesthetics and transparency.	System will not impede security patrols and will have no negative impact on sidewalk and above-deck security. System will help to protect main cable components (suspenders, main cable) and underbridge areas by making access to these components/areas more difficult.	Current underbridge emergency response access will be maintained through the provision of access gates. Maintenance workers will have to walk along the upper chord of the truss, on the outside of the railing to access the maintenance traveler from the gates.	Project implementation will be in accordance with State and Federal historic preservation laws.	Use of horizontal system would allow head-on and angled views from sidewalk/roadway perspectives. Barrier could be visible in views towards the Bridge, depending on the distance and duration of the view. Use of above-deck winglet could be in conflict with Bridge aesthetics.	System utilizes conventional, readily available materials that can be installed using standard construction equipment and tools. Maintenance traveler modification costs can be avoided. Maintenance costs associated with winglet will be greater than 1A. System will increase the painted steel surfaces of the Bridge, which will increase maintenance costs.	System is not expected to cause injury to those in contact, since it is passive and relies upon fixed, stationary elements for its anti-climb effectiveness.	Based on wind tests, system can be installed in conjunction with a moveable barrier system.
2A- Replace Outside Handrail with Vertical System	Configuration of thin rods vertically aligned provides for a system that is difficult to grasp and climb. Overall height sufficient to prevent a climber from reaching top of barrier from sidewalk level.	System serves as a passive barrier deterrent, and does not pose a safety or nuisance hazard to sidewalk users, District staff and District contractors/security partners.	Primary fence materials (posts, rods, etc) will utilize materials and components similar or identical to those used on the recently installed bike/ped railing.	System will not impede security patrols and will have no negative impact on sidewalk and above-deck security. System will help to protect main cable components (suspenders, main cable) and underbridge areas by making access to these components/areas more difficult.	Current underbridge emergency response access will be maintained through the provision of access gates. Maintenance workers will have to walk along the upper chord of the truss, on the outside of the railing to access the maintenance traveler from the gates.	Project implementation will be in accordance with State and Federal historic preservation laws.	Use of thin vertical rods allows views through the barrier from the roadway/sidewalk perspectives, although stacking of rods will obstruct angled views from roadway/sidewalk perspectives. Barrier could be visible in views towards the Bridge, depending on the distance and duration of the view.	System utilizes conventional, readily available materials that can be installed using standard construction equipment and tools. System will increase the painted steel surfaces of the Bridge, which will increase maintenance costs.	System is not expected to cause injury to those in contact, since it is passive and relies on fixed, stationary elements for its anti-climb effectiveness.	Based on wind tests, system can be installed in conjunction with a moveable median barrier system.

Project Alternative	DISTRICT CRITERIA									
	Must impede the ability of an individual to jump off the GGB	**Must not cause safety or nuisance hazards to sidewalk users, including pedestrians, bicyclists, District staff, and District contractors/security partners**	**Must be able to be maintained as a routine part of the District's ongoing Bridge maintenance program without undue risk of injury to District employees.**	**Must not diminish ability to provide adequate security of the Golden Gate Bridge.**	**Must continue to allow access to the underside of the Bridge for emergency response and maintenance activities.**	**Must satisfy requirements of State and Federal historic preservation laws.**	**Must have minimal visual and aesthetic impact on the Golden Gate Bridge.**	**Must be cost effective to construct and maintain.**	**Must not, in and of itself, create undue risk of injury to anyone who comes in contact with the Suicide Deterrent System.**	**Must not prevent construction of a moveable median barrier on the GGB.**
2B - Replace Outside Handrail with Horizontal System	Horizontal cable alignment provides a foot-hold for climbing, but winglet will impede climbing over the barrier.	System serves as a passive barrier deterrent, and does not pose a safety or nuisance hazard to sidewalk users, District staff and District contractors/security partners.	Primary fence materials (posts, rods, etc) will utilize materials and components similar or identical to those used on the recently installed bike/ped railing. Transparent winglet will require periodic maintenance in order to maintain aesthetics and transparency.	System will not impede security patrols and will have no negative impact on sidewalk and above-deck security. System will help to protect main cable components (suspenders, main cable) and underbridge areas by making access to these components/areas more difficult.	Current underbridge emergency response access will be maintained through the provision of access gates. Maintenance workers will have to walk along the upper chord of the truss, on the outside of the railing to access the maintenance traveler from the gates.	Project implementation will be in accordance with State and Federal historic preservation laws.	Use of horizontal system would allow head-on and angled views from sidewalk/roadway perspectives. Barrier could be visible in views towards the Bridge, depending on the distance and duration of the view. Use of above-deck winglet could be in conflict with Bridge aesthetics.	System utilizes conventional, readily available materials that can be installed using standard construction equipment and tools. Maintenance costs associated with winglet will be greater than 2A. System will increase the painted steel surfaces on the Bridge, which will increase maintenance costs.	System is not expected to cause injury to those in contact, since it is passive and relies upon fixed, stationary elements for its anti-climb effectiveness.	Based on wind tests, system can be installed in conjunction with a moveable barrier system.
3- Add Net System that Extends Horizontally from Bridge	Horizontal net designed to collapse and capture potential jumpers.	Design requires District staff to rescue captured individuals.	Net material will collect debris and garbage, requiring periodic cleaning.	System will not impede security patrols and will have no negative impact on sidewalk and above-deck security.	Net is hinged at the bottom and rotates up to allow current maintenance traveler operations.	Project implementation will be in accordance with State and Federal historic preservation laws.	Net system would not be visible from motorists traveling along the Bridge and would have limited visibility to pedestrians. Net system could be visible in views towards the Bridge, depending upon the distance and duration of the view.	Netting support system and netting itself will utilize conventional materials that can be installed using standard construction equipment and tools. System will increase the painted steel surfaces on the Bridge, which will increase maintenance costs.	System will require Bridge workers to rescue individuals who land in the net.	Based on wind tests, system can be installed in conjunction with a moveable barrier system.
No-Build Alternative	The retention of the existing 4 foot high outside handrail would not impede the ability of an individual to jump off the Bridge.	The outside handrail does not pose a safety or nuisance hazard to sidewalk users, District staff and District contractors/security partners.	Under this alternative there would be no change to current maintenance activities.	Under this alternative there would be no change to existing security operations.	Under this alternative continued access to the underside of the Bridge would be available.	There would be no change to the outside handrail and therefore no impact to the historic character of the Bridge.	Under this alternative there would be no change to the existing visual environment.	No new construction would occur and therefore there would be no construction costs associated with this alternative.	The outside handrail does not cause injury to those in contact, since it is passive and relies upon fixed stationary elements.	Based on wind tests, retention of the 4 foot high outside handrail would not interfere with installation of a moveable barrier system.

Conduct Industry Review

A comprehensive review of industry research, design, and experience related to suicide deterrent systems was conducted that included concepts from past studies performed on behalf of the District, existing installations and suggestions received from the public. A total of 83 concepts were recorded that were then organized into the following 13 groups, with each group representing a primary physical feature of the proposed system.

Group 1 – Fencing with vertical rod, bar or cable components (19 concepts)

Group 2 – Fencing with horizontal rod, bar or cable components (five concepts)

Group 3 – Horizontal net systems (12 concepts)

Group 4 – Glass systems (six concepts)

Group 5 – Enclosed walkway systems (nine concepts)

Group 6 – Chain link fence systems (seven concepts)

Group 7 – Electric systems (seven concepts)

Group 8 – Short systems (five concepts)

Group 9 – Barbed wire systems (four concepts)

Group 10 – Vertical net, metal mesh or wire grid systems (five concepts)

Group 11 – Offset barrier area systems (two concepts)

Group 12 – Laser systems (one concept)

Group 13 – Top chord attachment systems (one concept)

Evaluate Groups/Initial Wind Tunnel Testing

In order to process these groups of ideas down to those that would be considered technically feasible, they were first evaluated against the following list of performance criteria developed from the District-adopted criteria that established clear thresholds for compliance. These performance criteria were intended to screen ideas that contained an obvious flaw or "fatal" flaw.

Criterion 1. System must impede the ability of an individual to jump off the Bridge

Criterion 2. System must not cause safety or nuisance hazard to sidewalk users

Criterion 8. System must have minimal visual and aesthetic impact on the Bridge

Criterion 10. System must not in itself create undue risk of injury to anyone who comes in contact with the system

The District criteria used to screen or eliminate groups of concepts were chosen based on the ability to establish clear thresholds for compliance with each criterion. For example, Short Fence Systems below 6 feet in height were considered ineffective as a deterrent to climbing based on the ease with which an individual could jump over such a height. Similarly, systems that utilized barbed wire or electric shock transmission would create a hazard to sidewalk users and lead to injury to someone coming in contact with the system (District Criteria 2 and 10). Only those systems considered to have an obvious negative visual or aesthetic impact (chain link, barbed wire, or enclosure) were eliminated based on aesthetics.

When evaluated against the performance criteria, nine groups were removed from further consideration: enclosed walkway (2, 8), chain link fence (8), electric fences (8, 10), barbed wire (2, 8, 10), short systems (1), offset barrier area (2, 8, 10), horizontal bars (1), laser (10), and top chord attachment (5).

During this phase of the project conceptual designs were evaluated for their performance during high winds to determine which concepts would and would not affect the aerodynamic stability of the Bridge. Meteorological and topographical analyses of wind hazards specifically associated with the Bridge site found that the Bridge could be subjected to winds of up to 100 miles per hour. Very small changes in the shape of the Bridge cross-sections (including the spacing and design of rail and fence elements) can have a significant impact on the Bridge's aerodynamic stability during high winds. Conceptual designs that significantly affected the aerodynamic stability of the Bridge under high winds were eliminated from further consideration, in accordance with the Board's established criterion that mandated maintenance of the aerodynamic stability of the Bridge.

Initial wind tunnel testing was performed to establish basic wind criteria and the aerodynamic stability of the Golden Gate Bridge. This testing was developed around three generic physical suicide deterrent system types using parametric features impacting Bridge aerodynamic performance (spacing, height, member size and shape, solid ratio, and top treatment). The three generic physical suicide deterrent systems tested were vertical extensions added on to the existing outside handrail, replacing the existing

outside handrail, and utilizing nets that cantilever out horizontally. The preliminary wind tunnel testing determined that all three generic suicide deterrent system types were feasible (i.e. met the established aerodynamic performance criteria) and also that the existence of the movable barrier had little or no impact on the aerodynamic stability of the Bridge. Therefore, District Criteria 11, which indicates that the system must not prevent construction of a moveable median barrier on the Bridge, is satisfied by all potential suicide deterrent systems.

Develop Concept Types

The four groups of concepts remaining after the initial evaluation of the 13 groups were carried forward to be developed into technically feasible alternatives. These groups included 1) vertical rods, bars, or cables; 2) horizontal rods, bars or cables; 3) horizontal net; and 4) glass systems. Design criteria were developed and architectural considerations identified that would guide the evaluation and development of technically feasible alternatives.

Design criteria were established at a parametric level sufficient to define the overall limits and basic forms of physical suicide deterrent system concepts. The design criteria include a barrier solid ratio to ensure the aerodynamic stability of the Bridge, a barrier height range depending on whether the existing outside handrail was retained (12-foot height) or removed (10-foot height), barrier top treatment to impede climbing, and spacing of barrier members (4 inches to 6 inches) in accordance with codes (buildings 4 inches and bridges 6 inches) for pedestrian outside handrails.

Architectural considerations included developing a physical suicide deterrent system compatible with the existing structural and ornamental forms, as well as with the exterior and safety railings. Because the predominant forms of the Bridge are oriented either horizontally or vertically, the primary elements of the physical suicide barrier system were positioned in horizontal or vertical arrays. The other significant aesthetic concern was related to minimization of the various view perspectives of the Bridge. These perspectives include driver, pedestrian, and panoramic. It was determined that any new feature or element must be in visual harmony with the existing Bridge and must minimize impacts to Bridge user view perspectives.

As a result of screening concepts against the identified performance criteria, and by applying the design criteria and architectural considerations discussed above, a total of nine generic concept types were identified. These concepts included three physical suicide barriers using horizontal members, four physical suicide barriers using vertical members, one vertical physical suicide barrier using glass pickets, and one net

alternative. Illustrative examples of these concepts were developed and circulated with the Notice of Preparation Issued in June 2007. These concept renderings were not based on detailed designs, but rather represented idealizations of generic features that complied with the parametric criteria.

Alternatives Eliminated from Further Discussion

Prior to being considered technically feasible, further design refinements were developed for each concept and additional wind testing was performed as necessary to confirm the satisfactory aerodynamic performance of the Bridge. Following this testing, each concept was further evaluated against the Board-adopted criteria to identify those alternatives that best met these criteria. Based on this evaluation, four of the nine concepts were rejected. Below are brief descriptions of the four concepts which were removed from consideration and the rationale for removing them from consideration. The five remaining technically feasible concepts are the alternatives evaluated in this EIR/EA.

Additionally, another No-Build Alternative was initially considered, but was removed from consideration.

No Public Access to Sidewalks

This alternative would close the Bridge sidewalks to pedestrian and bicycle traffic. It was removed from further consideration because the sidewalks are currently used by approximately 10 million visitors a year and by up to 5,000 bicyclists a day (commuters and recreational users). Their closure to the public would remove this very popular tourist destination. The sidewalks are also an integral link in the California Coastal Trail, The Ridge Trail and the Bay Trail. The closure would eliminate this important link to the state and regional trail systems and would prevent bicycle commuting in this corridor. This alternative would therefore not be prudent.

Vertical and Horizontal Wire Mesh Added to Railing

This alternative would construct a 10-foot-high barrier of vertical and horizontal wire mesh on top of the railing for a total height of 14 feet. It was removed from further consideration because of its excessive height and the visual impact it would not meet the following District criteria.

Criterion 8. Must have minimal visual and aesthetic impact on the Bridge

Curved Top Horizontal Cable Members Replacing Railing

This alternative would construct a 14-foot-high barrier using horizontal cable members and a curved top. It was removed from further consideration because of its excessive height and the visual intrusion from the curved top. It would not meet the following District criteria.

Criterion 8. Must have minimal visual and aesthetic impact on the Bridge

Curved Top Diagonal Wire Mesh Replacing Railing

This alternative would construct a 12-foot-high diagonal wire mesh barrier with a curved top. It was eliminated because the diagonal wire mesh conflicted with the horizontal and vertical elements of the Bridge. It would not meet the following District criteria.

Criterion 8. Must have minimal visual and aesthetic impact on the Bridge

Vertical Glass Pickets Replacing Railing

This alternative would construct a 12-foot-high vertical glass barrier along the Bridge. It was eliminated from further consideration because it would introduce a new source of light and glare, which could cause safety concerns, it could not be maintained as a routine part of the Bridge maintenance program, it would be difficult to allow access to the underside of the Bridge, and it would not utilize the existing architectural vocabulary of the Bridge. Therefore, it would not meet the following District criteria.

Criterion 2. Must not cause safety or nuisance hazards to sidewalk users, including pedestrians, bicyclists, District staff, and District contractors/security partners

Criterion 3. Must be able to be maintained as a routine part of the District's ongoing Bridge maintenance program and without undue risk of injury to District employees

Criterion 5. Must continue to allow access to the underside of the Bridge for emergency response and maintenance activities

Criterion 9. Must be cost effective to construct and maintain

1.8 PERMITS AND APPROVALS NEEDED

The Bridge and staging areas are located on land owned by the Federal Government and currently administered by the National Park Service (NPS)/GGNRA. Installation of the proposed physical suicide deterrent system may need a permit from the U.S. Coast Guard for construction activities over navigable waters and San Francisco Bay Conservation and Development Commission (BCDC).

Based on the findings of the Natural Environment Study, attached as Exhibit F, no "take" of endangered species would occur. Therefore, no permits would be required under the California Endangered Species Act. Additionally, the project will have "no effect" pursuant to Section 7 of the Federal Endangered Species Act. Further, no other permits for the loss or alteration of biological resources would be required.

As part of the Section 106 process, it will be necessary to obtain concurrence from the State Historic Preservation Officer on the Finding of Effect and approval of the Memorandum of Agreement. The District, as the CEQA Lead Agency, would certify the EIR and the Department, as the NEPA lead agency, would approve the EA and issue the FONSI.