City of Fresno Design Guidelines

California High-Speed Train Project

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10/26/2012 ADDENDUM 5 - RFP HSR 11-16

CONTRIBUTORS:

City of Fresno Staff
Scott Mozier, *City Engineer / Assistant Public Works Director*
Scott Tyler, City *Traffic Engineer*
Efren Banuelos, *Assistant Public Works Director, Capital Management Division*
Scott Krauter, *Assistant Public Works Director, Street Maintenance Division*
Brian Russell, *Street Maintenance Manager*
David Row, *Traffic Signals & Streetlights Supervisor*
Hilary Kimber, *Parks Supervisor II*
Keith Bergthold, *Assistant Director, Development and Resource Management Department*
Darrell Unruh, *Planning Manager*
Michelle Zumwalt, *Architec*t
Elliott Balch, *Downtown Revitalization Manager*
Wilma Quan, *Urban Planning Specialist*

Consultant Team
ZGF Architects LLP, *Urban Design Consultant*

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INTRODUCTION

Project Overview & Purpose Statement

From the California High Speed Rail Website:

Vision
"Inspired by successful high-speed train systems worldwide, California's electrically-powered high-speed trains will help the state meet ever-growing demands on its transportation infrastructure. Initially running from San Francisco to Los Angeles/Anaheim via the Central Valley, and later to Sacramento and San Diego, high-speed trains will travel between LA and San Francisco in under 2 hours and 40 minutes, at speeds of up to 220 mph, and will interconnect with other transportation alternatives, providing an environmentally friendly option to traveling by plane or car."

Scope
"800 miles of track… up to 24 stations… the most thorough environmental review process in the nation. Due to the large scope of the project, the planning process proceeded in phases: first, program-level review assessing the need and service area for a statewide system, presenting broad policy choices, and identifying corridors for further study, and second, project-level review in more detail for determining the best alignment and station locations within each of nine system sections. Why? Greater community input, resulting in the best system for all Californians."

The first phase of design and construction of HSR will be the Merced to Fresno section.

"The Merced to Fresno high-speed train section is approximately 65 miles long and will follow a route know as the "Hybrid" alternative. This alignment was identified as the preferred alternative out of three primary alternatives studies in 2011. The "Hybrid" alternative generally parallels the Union Pacific railroad tracks and State Route 99 between Merced and Fresno and is responsive to community and civic feedback. To avoid impacts to downtown Madera, the alignment travels east of Madera and generally parallels the existing Burlington Northern Sante Fe (BNSF) railroad corridor. The board also selected the Downtown Merced Station location, and the Downtown Fresno Station at the Mariposa Street location as part of the statewide High-Speed Train System."

The CHSRA has released a request for proposal to the industry for design and construction of the Merced to Fresno section and has now selected five engineering-construction teams to advance to bidding and final design. From this effort, a single winning team will be selected.

Purpose of this document
The Design-Build proposal and bidding process is now underway and the City of Fresno is concerned about the look and feel of HSR infrastructure in Fresno. To that end, the City desired an independent review of the current 15% design documents that are the basis of design for the five Design-Build Teams. This abbreviated report is a summary of that independent review and recommendations for additional design requirements to be considered by CHSRA as addenda in the design documents being used by the Design-Build teams currently.

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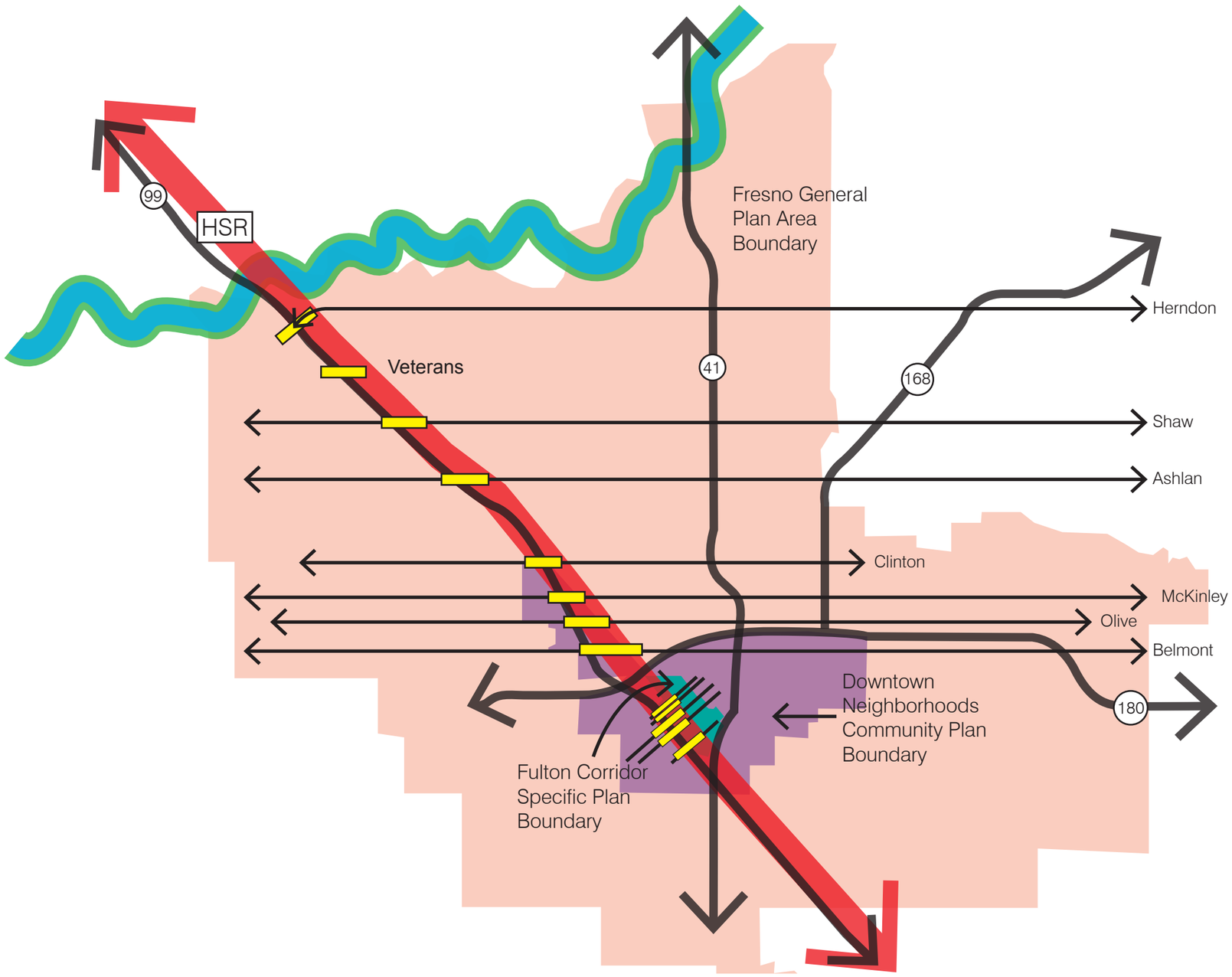

Overview of the Fresno alignment
The alignment enters the city from the north on an elevated guideway, crossing the San Joaquin River on a bridge structure, then coming to roughly parallel with Highway 99 and following a narrow corridor on straddle bent structures and single piers until finally touching down to an at-grade alignment near Veteran's Boulevard. From there, the remaining alignment is mostly at-grade through the rest of the city. At one section, from approximately Olive Avenue to SR 180, the alignment dips below grade, then returns to grade just north of the Stanislaus Viaduct. The alignment continues through downtown,then transitions back to an elevated guideway as it leaves Fresno.

The elevated guideway is normally a simple, double-track structure on single flared piers with a solid parapet-type edge barrier and twin, side-mounted Overhead Catenary (OCS) Poles.

The at-grade sections generally include a heavy duty track bed flanked by robust fencing, twin OCS poles and, where freight rail is near, a substantial concrete crash barrier for separation. In some locations, a solid concrete sound wall is also included.

The segment that is below grade is generally in an open trench with side retaining walls and a minor tunnel under Highway 180 itself.

A major, at-grade, station is planned for Downtown Fresno with overhead passenger connections to twin side platforms.

All existing street crossings will be converted to either overcrossings, undercrossings or the street will be dead-ended. There will be no surface crossings due to safety.

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INTRODUCTION
Continued

Areas of concern in the current design
Without a City design requirements for crossings, the Conceptual Engineering documents have naturally relied on Caltrans highway design standards. This includes radii, shoulders, crash barriers and pedestrian and bicycle facilities related to busy arterial streets or highways. Concurrent with the development of HSR, the City of Fresno, in the last five years, has developed two major planning efforts that aim to redirect Fresno's future growth back towards the city center with an emphasis on mixed use, urban density and pedestrian, bicycle and transit mobility. The infrastructure for pedestrians and bicyclists at many of the existing crossings of freight rail in the same vicinity, are minimal and inadequate to truly attract a bigger share of users. The construction of new crossings represents an opportunity to physically connect the east and west sides of Fresno for all modes in a way that they haven't been connected historically. If this opportunity is missed and the crossings offer very minimal accommodations for pedestrians and bicyclists, HSR will merely reinforce a barrier down the middle of Fresno today.

Recommendation: increase the space devoted to pedestrian/bicycle travel on all overcrossings and undercrossings associated with HSR in Fresno. Provide 14' minimum space on both sides; where space is limited, provide 14'-16' on one side with a smaller emergency sidewalk on the opposite side. Design the pedestrian-bicycle space for shared use with color or texture differentiation for each mode.

Concept Approach to HSR Design
High-speed rail is a 21st century mode, will represent our best technology and will provide a very convenient alternative for intrastate travel. Its vehicles will be streamlined for speed and efficiency. There is great potential for the fixed infrastructure to express this characteristic in form by being smooth, monolithic (without small scale details), aerodynamic and visually "light" as it steps across the California landscape. CHSRA's general guidelines propose a guideway design that is consistent with this approach with smooth deck sides and flared, round piers. The independent design team adopts this direction and our recommendations in this report are intended to advance that design aesthetic.

Some of the proposed treatments of HSR corridor edges (Walls, Fences, Berms) need to be more context responsive. There should be variation in treatment next to industrial, residential, parks and historic structures while still staying within the unified family of elements. In general discussions with the City, the following concept refinement emerged:

- Overcrossings should embrace the HSR design aesthetic of smooth, monolithic/aerodynamic forms.
- The inner Downtown section from approximately SR 180 to SR 41 – undercrossings, fences and barriers can take on additional design treatments that are more conducive to an established urban context with more density of pedestrians, including smaller scale detail that can be appreciated at slower speeds and close distance. This is intended as minor variation within the unified family of elements.

Subsequent pages will address more detailed recommendations for individual components.

Recommendation: employ the modern, aerodynamic aesthetic design to all major HDR elements.

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GENERAL GUIDELINES FOR HSR IN FRESNO

Trackway Conditions

Typical Trackway Conditions
Where the HSR track is adjacent to UPRR freight track, its track, ballast, switches and other equipment are similar in appearance to the UPRR environment.

We have no recommended changes to the at-grade HSR alignment.

Tunnel
There is a short tunnel under SR180.

We have no alternative recommendation for tunnel treatments.

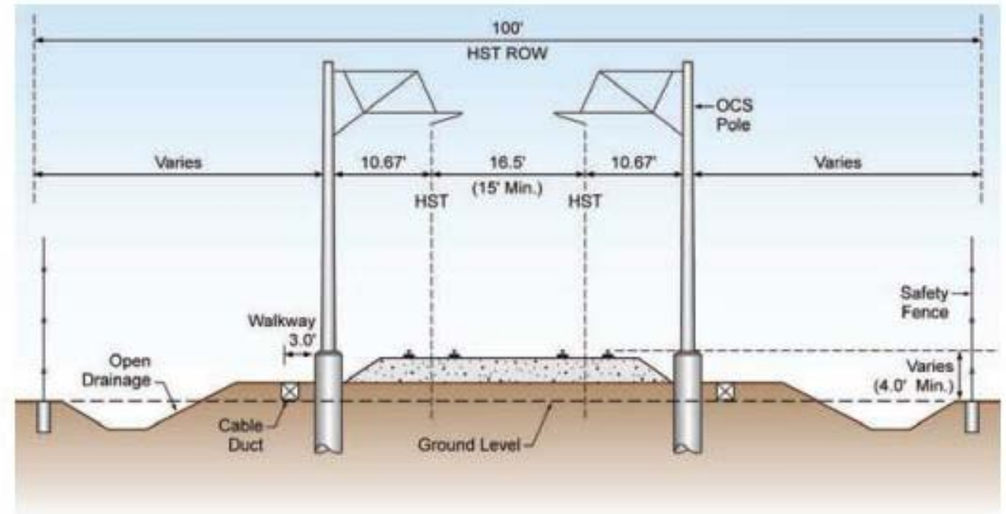

Figure 2-6
At-grade Typical Cross Section

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GENERAL GUIDELINES FOR HSR IN FRESNO

Elevated Structures • Typical Guideway

The design of elevated structures and bridges will be a key element in the overall image of high speed rail as it passes through Fresno. These very visible elements should be coordinated with one another in Fresno, and with the rest of the system throughout the state.

The typical elevated portion of the alignment throughout much of the state-wide alignment and portions of Fresno is a single or twin box girder structure on single, flared piers. As indicated in the Concept Approach to HSR Design above and building on the CHSRA Architectural Guidelines, the recommended aesthetic design is aerodynamic, monolithic and curved/softened edges. The primary components are piers, a flared box section, deck overhangs with parapet type edge barriers and twin OCS poles. Steel superstructure box girder options may require additional work with deck and pier top to create a smooth relationship between pier and flared girders.

Recommendations: aerodynamic forms; curved edges; monolithic surfaces.

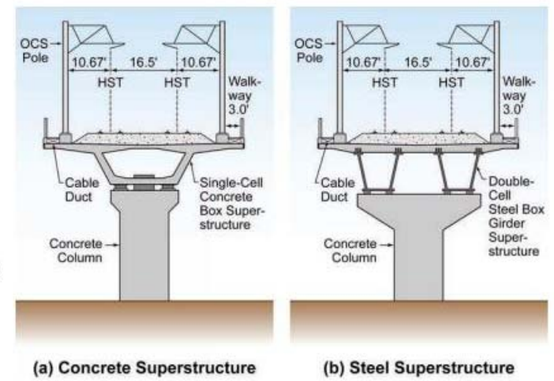

Figure 2-8
Elevated Structure Typical Cross Sections

Example: Flared piers

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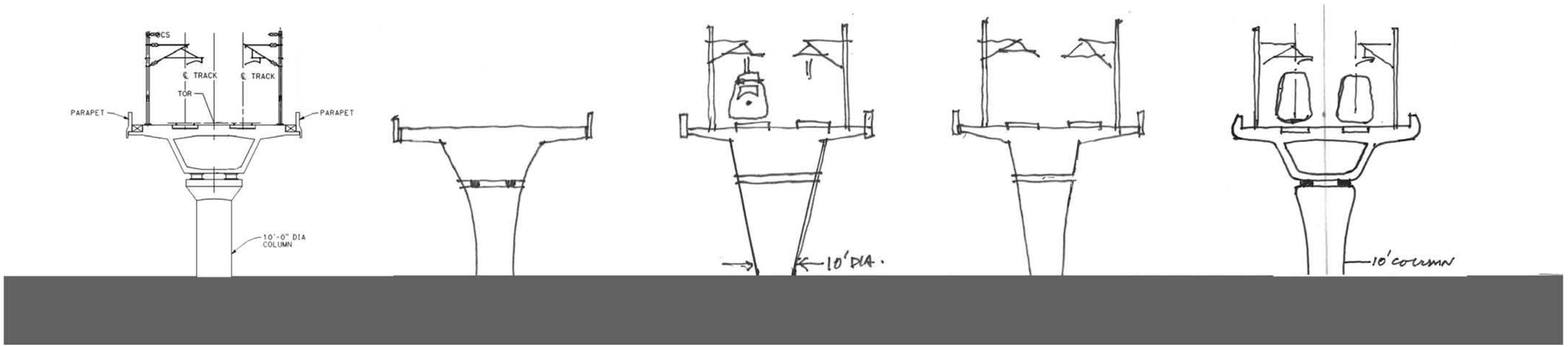
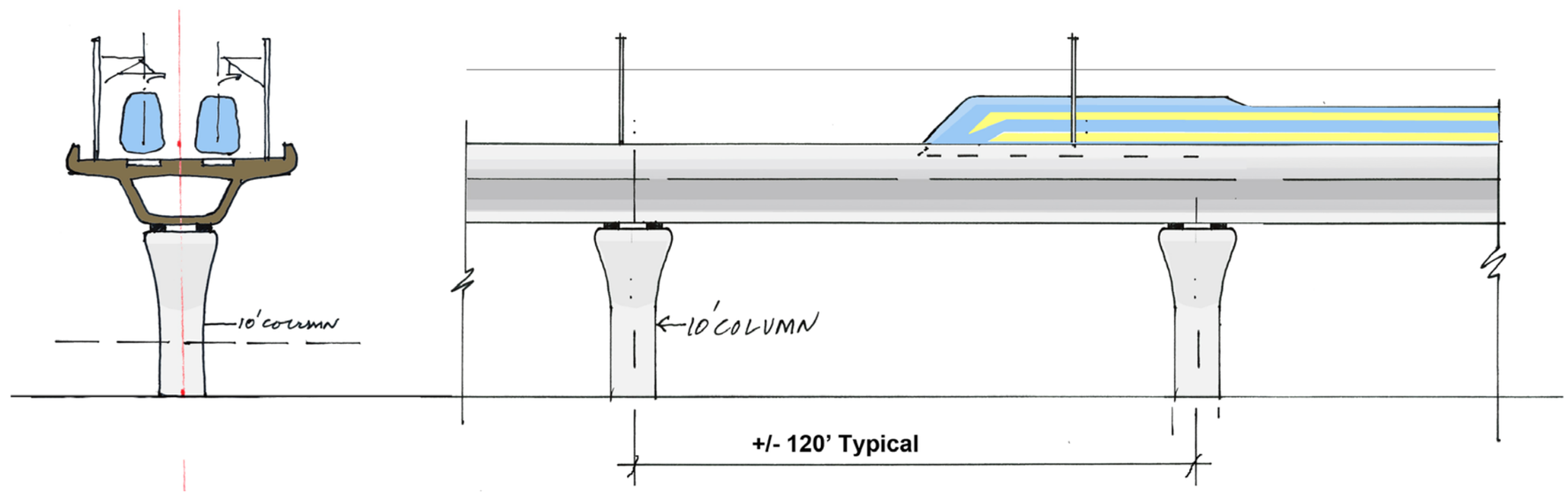


Evolution of the Design Concept: Several variations were explored for the basic form of columns, viaducts and parapet walls.



Recommended Viaduct Section/Elevation: Curved, smooth elevated structures, to match the speed and design of HSR vehicles.

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GENERAL GUIDELINES FOR HSR IN FRESNO

Elevated Structures • Barriers & Piers

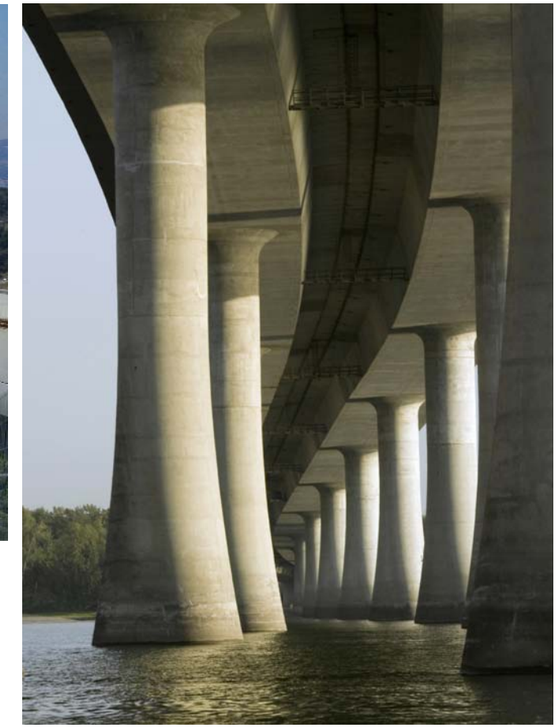
Deck/Barrier Edge
The recommended design calls for the edge between deck bottom and parapet barrier face to be rounded to complete the aerodynamic shape of the composite guideway. The solid parapet barrier also screens views of the track bed, rails and other equipment at track grade from the first few floors of adjacent buildings.

Recommendations: aerodynamic forms; curved edges; monolithic surfaces; solid concrete barrier.

Piers
The recommended pier design is round in cross section, flaring out at the top before intersecting with the box girder.

Recommendations: round section; aerodynamic forms; monolithic surfaces.

Example: Integrated viaduct and rounded parapet barrier



Example: Rounded, flared piers

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GENERAL GUIDELINES FOR HSR IN FRESNO

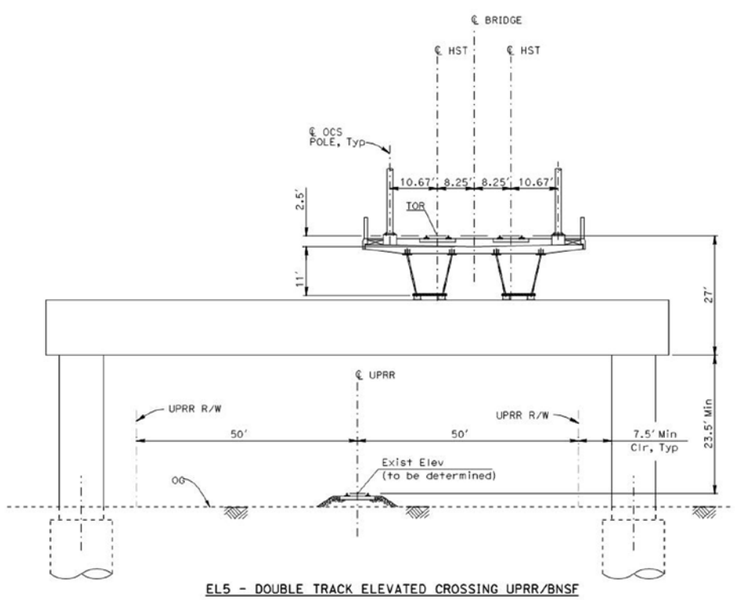
Elevated Structures • Straddle Bents

In several critical segments of the HST project, where single, center piers are impossible due to conflicts at grade such as property, rights-of-way, highway and street lanes, straddle bents will be used to provide for continuity of support. While the scale and form of straddle bents will diverge from many of the other standard elevated structures, straddle bents should be viewed as being in the same family as viaduct and bridge structures.

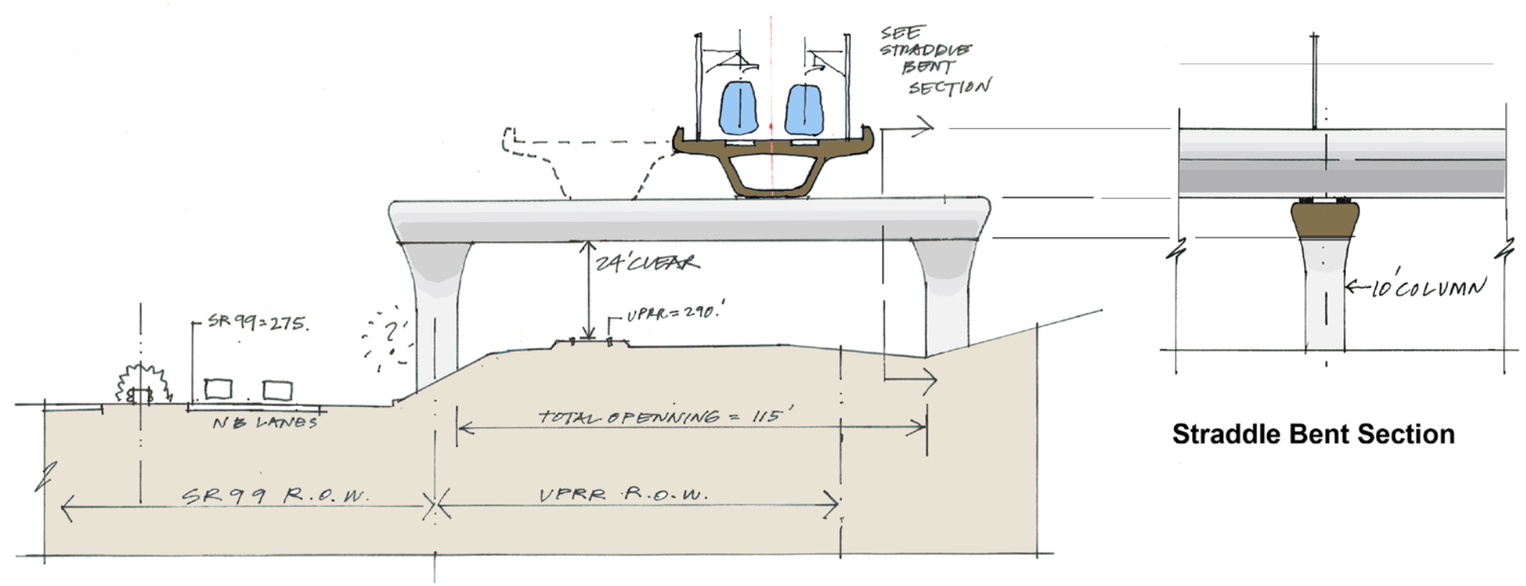
Our recommendation is that straddle bents follow the same aesthetic guidelines applied to the general guideway: twin piers of the same flared form as the single, center pier, joined by a robust beam with curved edges and ends and cross section that approximate the flare of the piers. In order to convey the uniform and smooth appearance, integrated bents are preferred over composite bents. This will give a continuous line to both structures and keep straddle bents in the unified family of forms.

Recommendations: round pier section; aerodynamic forms; curved edges; monolithic surfaces.

Example: Straddle bents over two roadways



15% Engineering Drawings: Typical straddle bent design concept



Recommendation: Curved, smooth saddle bents to match the speed and design of HSR vehicles.

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GENERAL GUIDELINES FOR HSR IN FRESNO

Train Crash Barriers

Intrusion Barrier Wall

To prevent head-on collisions between opposing trains in a derailment, Federal Railroad Administration and California Public Utilities Commission requires mitigating design features: one, a significant horizontal distance between tracks; two, a deep swale between tracks; three, a heavy duty crash barrier called an Intrusion Barrier Wall. In Fresno, the HSR and UPRR tracks are close enough that the alignment will require approximately 8 miles of Intrusion Barrier Wall. These walls are made of cast-in-place (CIP). In the HSR trench section going under SR 180 at Roeding Park and north of the Stanislaus Viaduct, the Intrusion Barrier Wall is on top of the eastside retaining wall and creates a combined height of 15'. From street level on Golden Gate Blvd. and at Roeding Park the Intrusion Barrier Wall is tall enough to be above the horizon line. An 8 mile long Intrusion Barrier Wall is one of the most significant elements of CHSR in Fresno.

Recommendation

Similar to the other cast-in-place (CIP) or MSE walls of the project (see CHSR Typical Treatments), the Intrusion Barrier Wall should use a fractured fin texture, supplemented by an architectural jointing system corresponding to construction joints vertically and horizontally and a pre-determined module. At street crossings where the Intrusion Barrier Wall is most visible, an opportunity exists for site specific, commissioned, art projects.

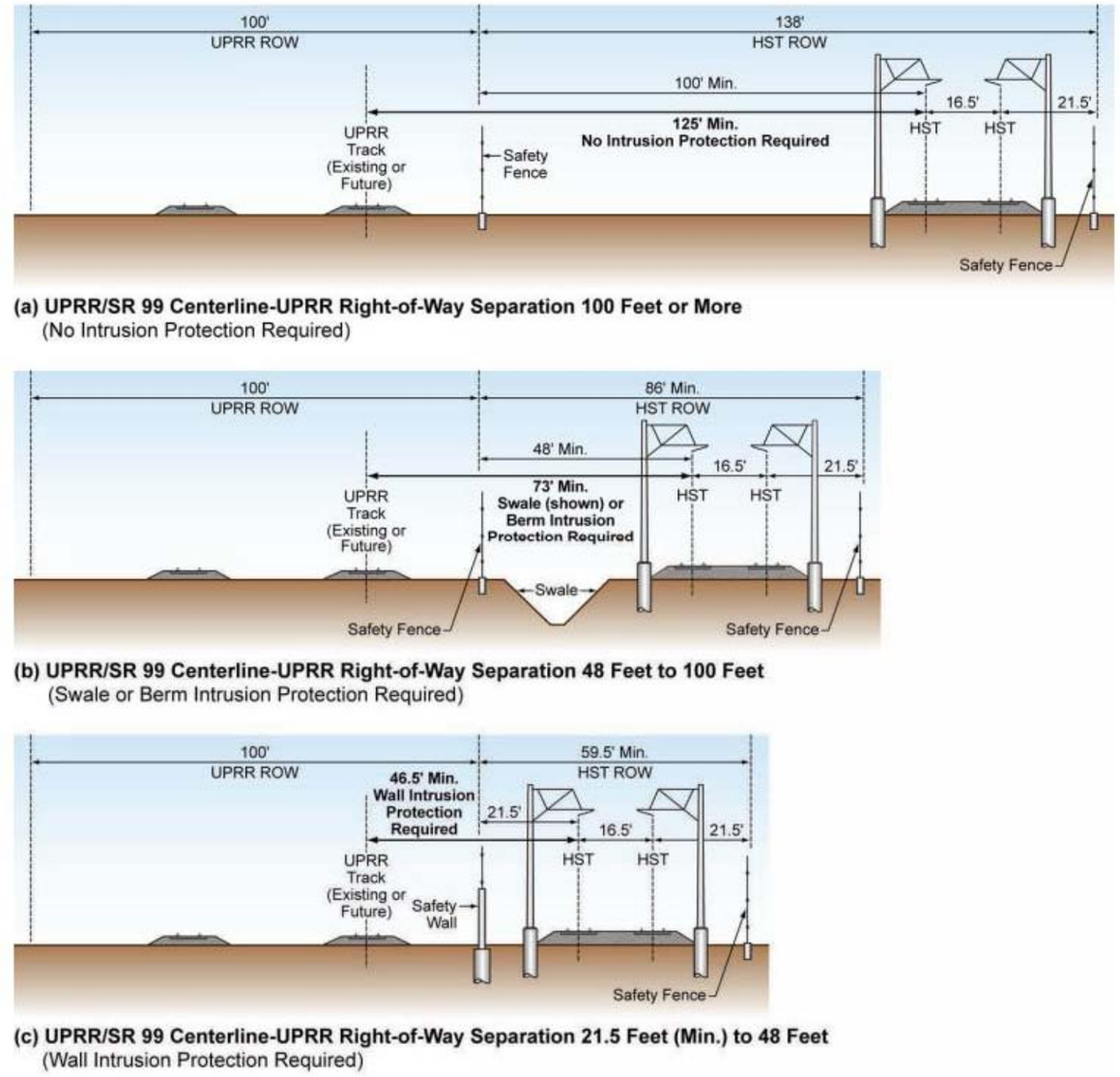

Figure 2-29

UPRR/SR 99 Alternative – UPRR Right-of-way Cross Section Configurations

Recommended train-to-train crash protection required for HSR

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GENERAL GUIDELINES FOR HSR IN FRESNO

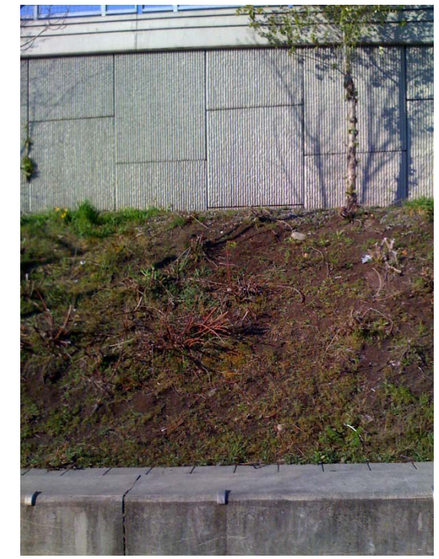
Fill Wall Sections

Fill wall sections/approaches to overcrossings
Either cast in place or Mechanically Stabilized Earth (MSE) are acceptable. For either type, a fractured fin texture is preferred to deter graffiti.

- MSE Fill walls: typical required elements are cast-in-place corner pilasters (unless special corner pieces are available) and a cast in place wall cap/railing or barrier foundation. The independent design team recommends the combined wall cap/parapet type barriers be designed to look similar to the parapet barriers in the HSR guideway.
- Cast-in-place (CIP) Fill walls: a fractured fin texture can be supplemented by an architectural jointing system corresponding to construction joints vertically and horizontally and a pre-determined module. The parapet barrier can be integral with the wall top since it does not have to cover the tops of saw-cut MSE panels.
- Fill wall visual impact can be reduced by using landscape berms to diminish the amount of wall surface shown. Berms should use xeriscape (desert/drought-resistant) landscape for erosion control.

Recommendations: fractured fin concrete wall texture; coordinated joint pattern; concrete cap at MSE options; finished wall top at CIP options; integrate design of wall top with other elements such as railing, lights and sign bridge mounts.

Example: Cast-in-place wall with architectural modulation



Example: MSE wall with fractured fin finish

Example: MSE Fill Wall with custom texture

Example: Combined wall cap and parapet barrier

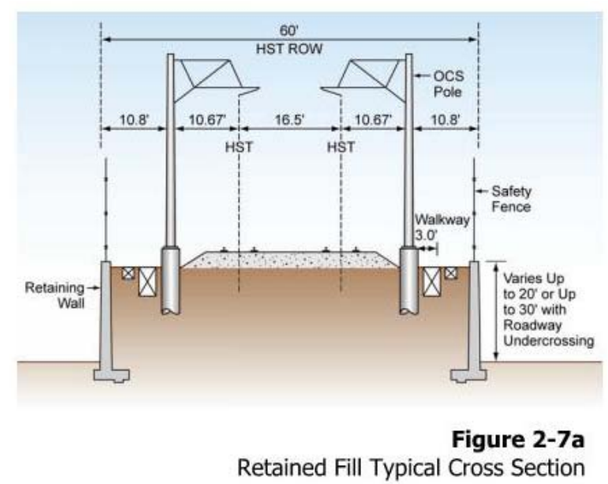


Figure 2-7a
Retained Fill Typical Cross Section

Example: Typical fill wall from CHSR Design Guidelines

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Trench/Cut Walls

Trench/Cut Walls
Trench/Cut Walls will likely be cast-in-place construction using technologies to mitigate excavation for tie backs and water table. Similar broken fin texture and jointing modules should be applied. In some cases the wall top may be a vehicular parapet type barrier. In other cases, the wall top will include a pedestrian-only railing. The module of railing sections, light poles and wall joints should be coordinated to achieve architectural resolution between all elements.

Recommendation: broken fin texture; modular jointing; coordinate jointing with railing and light fixture spacing; refer to general recommendations for downtown undercrossings on page 6.

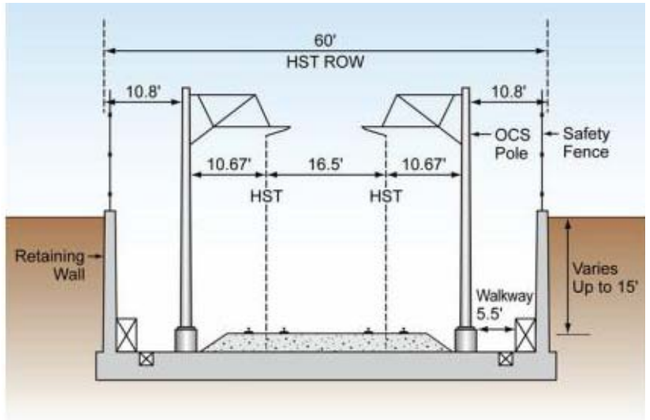
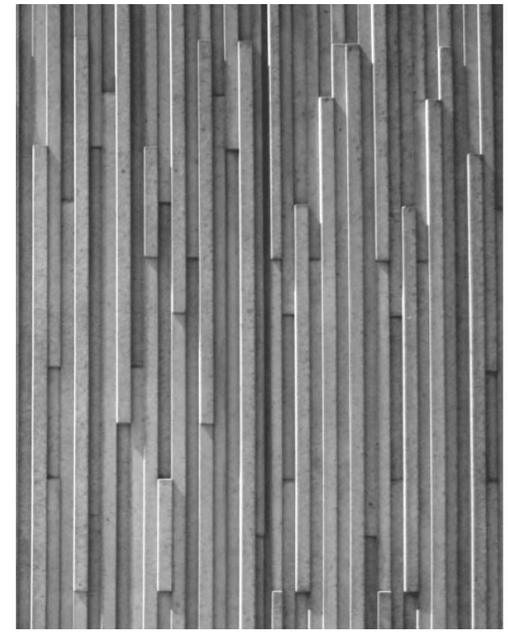


Figure 2-7b
Retained Cut Typical Cross Section

Example: Typical cut wall from CHSR Design Guidelines

Example: Cast-in-place wall with exposed aggregate finish



Example: Board-form finish

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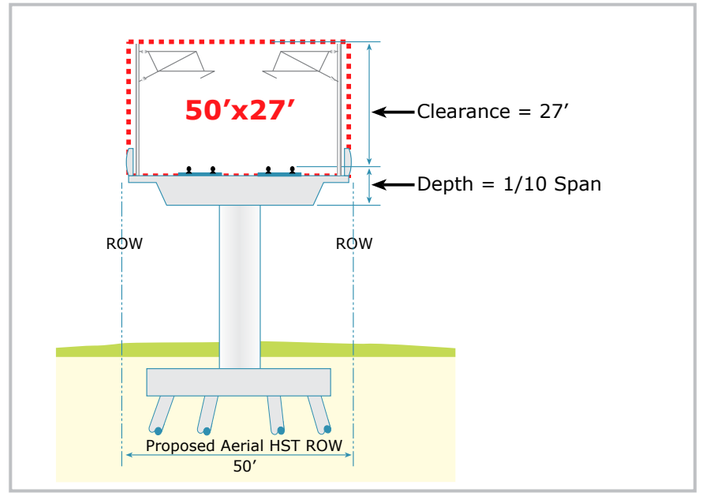
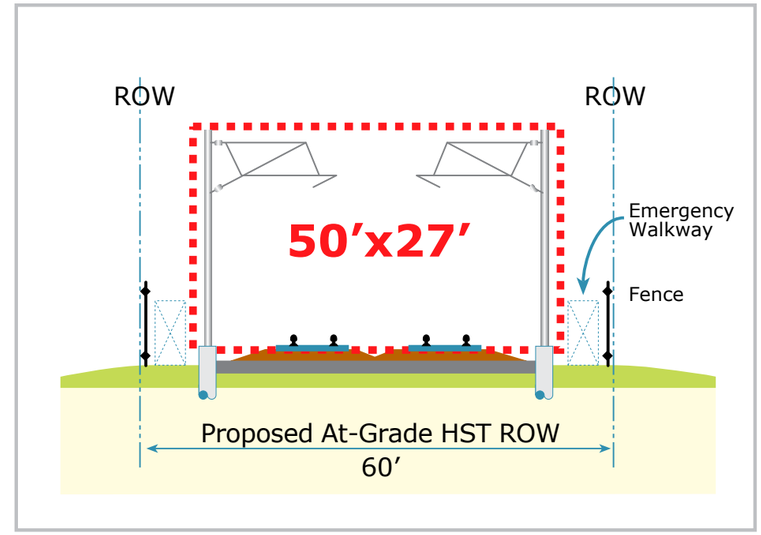
Overhead Catenary System

Overhead Catenary System (OCS)
The basic components of OCS are twin, ground-mounted steel poles with cantilever arms over the individual trackways to hold the contact wire. At the trench section on either side of SR180, a pole and overhead beam is proposed to suspend the contact wire assemblies. The independent design team acknowledges the basic support system.

No recommendations



Typical: OCS on aerial structure
(San Jose Visual Design Guidelines)



Typical: OCS on at-grade segment
(San Jose Visual Design Guidelines)

Example: OCS with cantilever arms

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Traction Power SubStations

Traction Power Substations (TPSS)
Two TPSS locations are proposed: one is proposed near the Clinton overcrossing and the other, near the Ventura undercrossing. The independent design team considers Clinton within the Downtown Fresno influence area, hence attention needs to given to its appearance from surrounding properties and buildings. Landscape screening with trees may be considered or required by the City. The Ventura TPSS is particularly critical to blend into surroundings that are going to change as Fresno redevelops former railroad industrial lands to mixed use. This TPSS also includes a 100' electrical service tower which needs to be in its appearance. See Fencing below.

Recommendations: evaluate site plans and landscape screening plans for TPSS and provide additional screening as needed to blend facilities into their surroundings.

Example: Traction Power Substation

Example: Switching Station

Example: Paralelling Station

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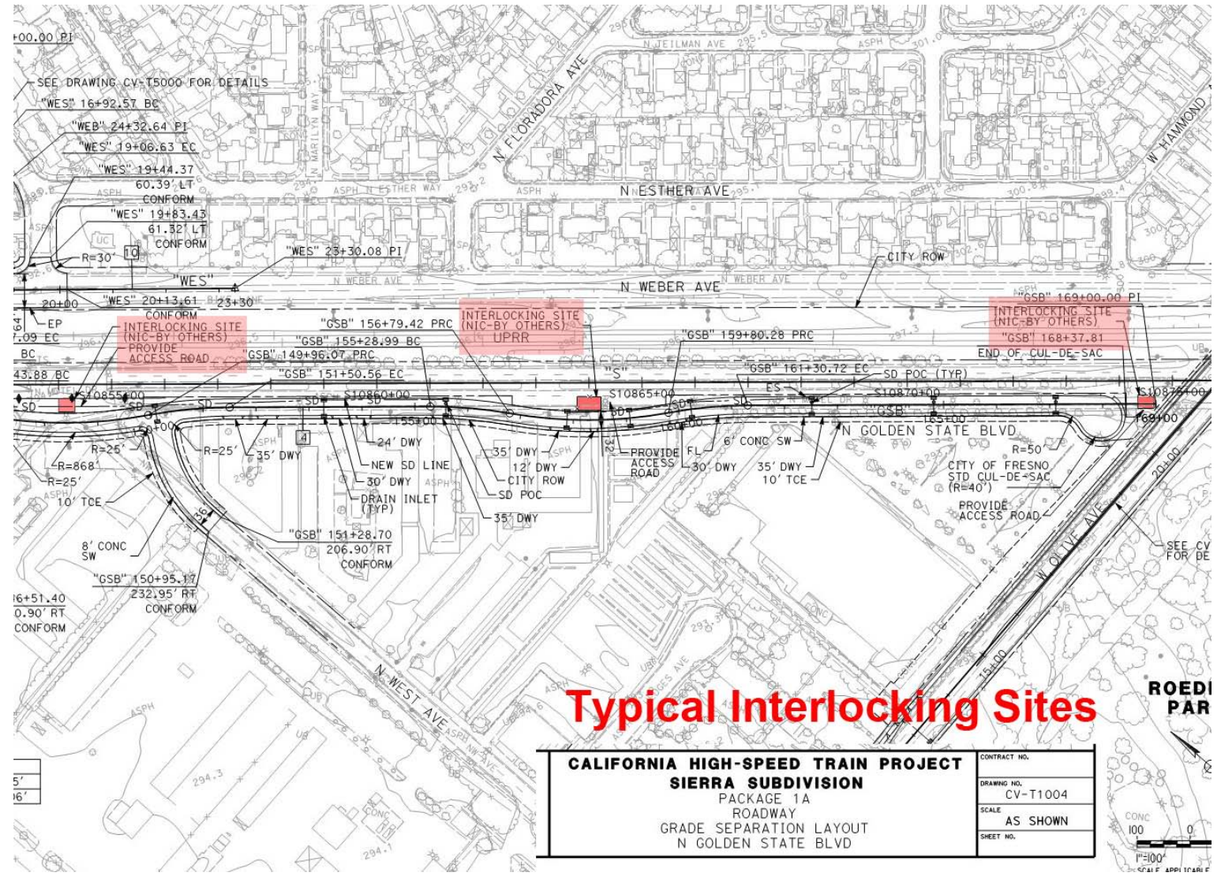
Interlocking Sites

Interlocking Sites
These include a smaller equipment enclosure and are often co-located with TPSS. We recommend that its fencing be coordinated with and look similar to security fencing in other locations.

Recommendations: evaluate site plans and landscape screening plans for Interlocking Sites and provide additional screening as needed to blend facilities into their surroundings; integrate interlocking sites into the HSR ROW and avoid causing streets or other infrastructure outside the ROW to make "eccentric" accommodations.



Typical: Proposed conceptual engineering for a segment of HSR alignment, illustrating approximate spacing and orientation

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GENERAL GUIDELINES FOR HSR IN FRESNO

Lighting

Street Lighting
Fresno has a limited number of fixtures that are used for street and sidewalk lighting that should be incorporated into lighting requirements for overcrossing structures. See included photographs. As part of the Fulton Corridor Specific Plan and Downtown Neighborhoods Plan, there are recommendations to add pedestrian scale light fixtures on some streets. These new light fixtures could be appropriate to include with undercrossing pedestrian facilities in the Downtown area. They can be sidewalk mounted or pedestal mounted where concrete pedestals are used as a secondary railing support at wider intervals. It is assumed these new fixtures will meet current energy, performance, dark sky and light pollution criteria.

Recommendations: incorporate new Downtown Fresno pedestrian lights on new overcrossings and undercrossing where called for in recent downtown planning documents as designated street types; incorporate current City street lights as continuity of existing lighting treatments on crossing corridors.

Decorative Bridge Lighting
Decorative lighting of the North and South Gateway structures is encouraged. Design should emphasize the major structure components such as the through arch and convergence of the through-arch and return-arch where the bridge begins and ends. To the extent the fixtures can be concealed or de-emphasized visually, is also encouraged. Finally, design should take into account dark skies principles and not waste lighting energy where significant light pattern is spread into the sky; keep light patterns focused on bridge structure.

Example: Newer cobra-style light with attached signals

Existing: Pedestrian-scaled lighting

Example: decorative lighting of major bridge structure features

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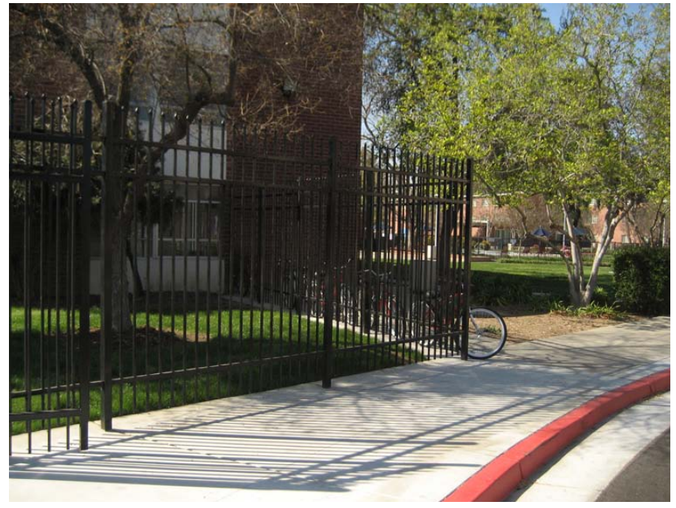
Fencing

Fencing
Fencing will be a substantial element in the HSR corridor to control access for safety. There are several fence applications in the project:

- HSR Right-of-Way fencing: any mesh type fences will have robust post and rails to carry the overturning and sag forces. Provision for dark vinyl coatings or paint will help make this fence less conspicuous in the at-grade, urban landscape.
- Security Fencing at TPSS, Interlocking Sites and other HSR equipment sites: should be related to the r.o.w. fencing.
- Fencing at overcrossing structures over trackways: the adopted design by CHSRA is the tight mesh, backstop style fencing that curves back, partially over the pedestrian zone to minimize a bridge user from inadvertently reaching over and touching high voltage contract wires and as a discouragement for throwing any objects from the bridge onto passing trains.

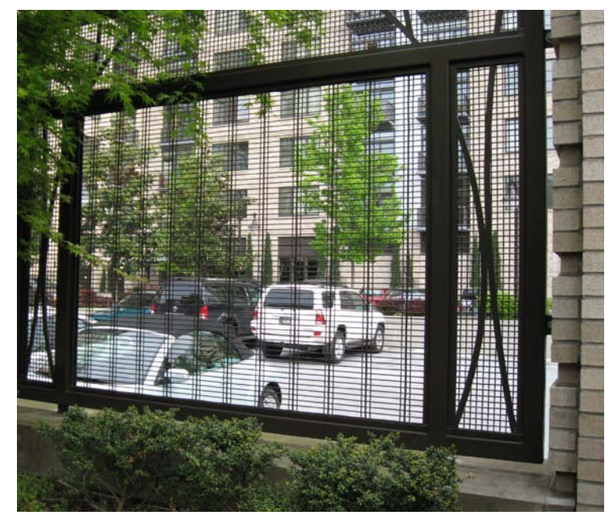
Recommendations: provide a consistent material and design for right-of-way fencing through the Fresno city limits. Dark colors for mesh are recommended for the Downtown Area and at all new overcrossings.



Example: Standard iron fence along an urban street ROW

Example: Decorative screen along an urban street

Example: Required fencing for overcrossings of HSR ROW



Example: Wall and decorative screen along an urban street

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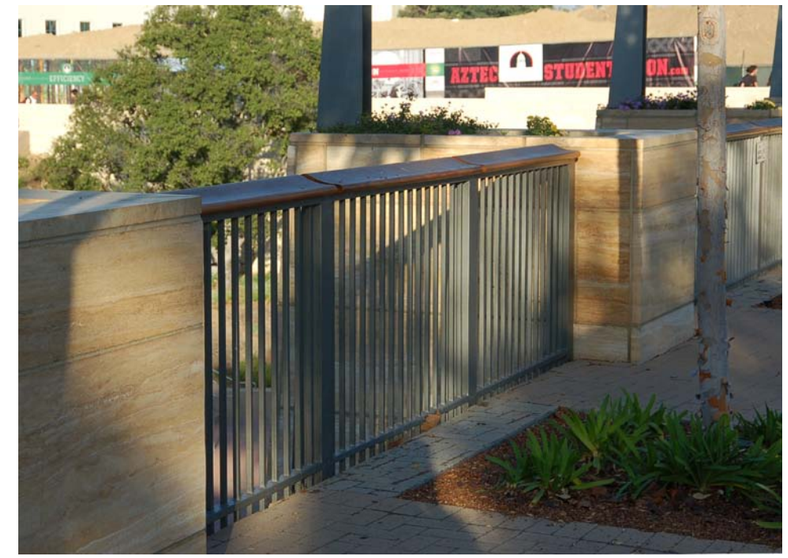
GENERAL GUIDELINES FOR HSR IN FRESNO

Railings

Railings
Some of the undercrossings in the downtown area will require pedestrian railing at sidewalk/ top of retaining wall for fall protection. These should be architecturally designed to complement their setting, relate to wall jointing module, integrate with the wall top and be straightforward to install and replace panels in the future. These railings will be required to meet International Building Code and California requirements for height above paving and maximum opening dimension.

Recommendation: coordinate railing design to be derivative of Downtown's best steel picket railing designs.

Example: Existing railing on Stanislaus Bridge that does not meet current code



Example: Pedestrian railing and wall barrier

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GENERAL GUIDELINES FOR HSR IN FRESNO

Integrated Railings & Barriers

Railing and Barriers

As described previously, reinforced concrete parapet-type barriers are planned for the edge of HSR guideway, HSR bridge structures and overcrossing structures with vehicular traffic. There are two primary applications:

- An all-concrete parapet at the HSR guideway and bridge structures where there should be no public access
- A combination concrete parapet with added tubular steel top rails to meet the pedestrian height requirements; the top railing assembly would be bolted or embedded to the top of concrete barrier.
- Crash attenuators: at locations on the approach spans where the outside travel lanes and proximity of barrier is relatively close, a barrier transition is required to prevent a vehicle from ramming the end of a barrier. The highway industry has several mechanical designs for this application from collapsing metal barrier segments to water filled tubes. The requirement for these may be able to be mitigated by re-designing the approach sections for wider sidewalks where the travel is now further from the barrier end. Options to minimize these devices should be explored. They are not appropriate elements in a pedestrian-oriented downtown streetscape.

Recommendations: concrete parapet-type barrier at HSR guideway and bridge structures.

Example: Integrated concrete parapet HSR guideway

Example: Crash attenuator/cushion at barrier end

Example: Concrete parapet, tube rail, fence and light pedestal

Example: Combination concrete parapet with metal tube railing

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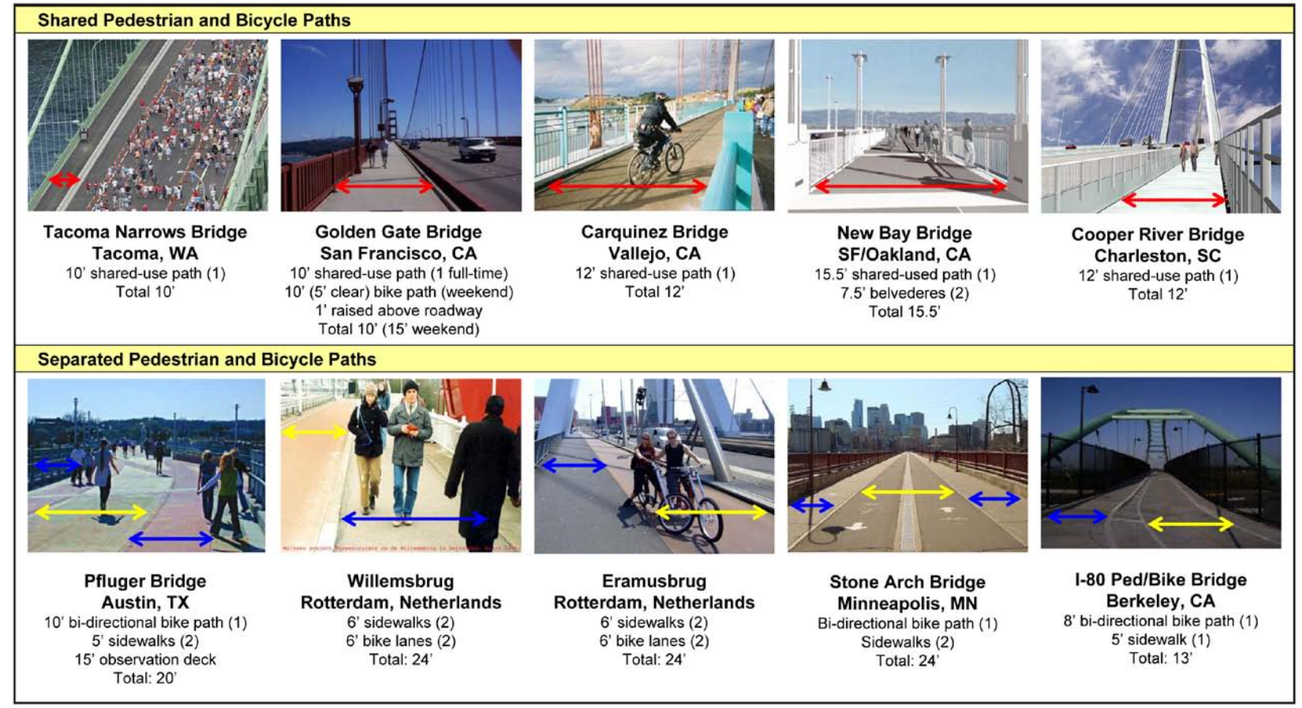
GENERAL GUIDELINES FOR HSR IN FRESNO

Sidewalks, Pedestrian Bridges and Bike Facilities

Most of the local street crossings over and under the HST corridor are high volume streets. Where possible, bike and pedestrian facilities on high-volume streets should be separated vertically and horizontally from auto lanes.

When pedestrians and bicyclists share a multi-use facility, at least 12' of width should be provided, but 14' is preferable. 14' of width provides space to delineate separate bicycle and pedestrian zones within the facility, and to provide enough room for users traveling in opposite directions to pass one another safely.

The 15% engineering documents currently show two new pedestrian bridges crossing the CHSR alignment, with one adjacent to Ventura, and the other between Stanislaus and the Tuolomne right-of-way. In general, pedestrian access should be provided in line with the downtown street grid, rather than midblock or separated from the street network. Circulation is most intuitive and convenient when it is organized in street rights-of-way, or in a way that reinforces the patterns established by a grid of rights-of-way.



Example: Columbia River Crossing Project pedestrian-bicycle reference image

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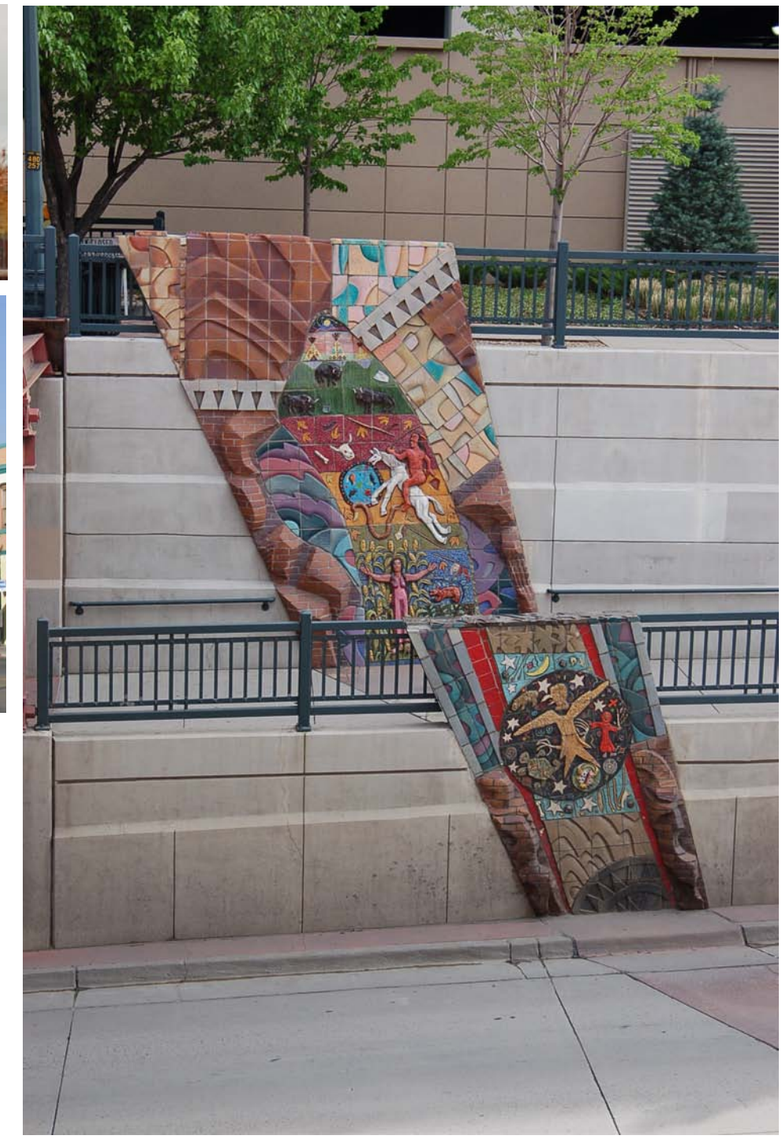
GENERAL GUIDELINES FOR HSR IN FRESNO

Other Opportunities for Unique-to-Fresno HSR Design Treatments

Public Art
HSR in Fresno is a very large and conspicuous element of infrastructure and should consider inclusion of public art at appropriate locations. The process for a public art program associated with HSR should be taken up with the City, local arts commissions and CHSRA.

Special Materials
In general, material recommendations follow those of CHSRA and its Architectural Design Guidelines with minor exceptions noted in this summary.

Signage or branding
To be determined in another contract.



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SPECIFIC AREAS
Northern Gateway

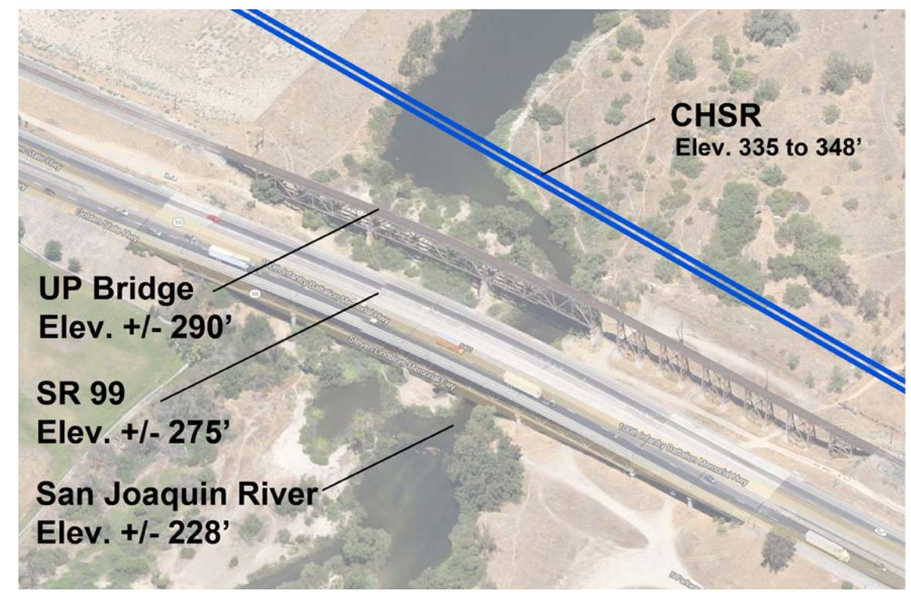
The Northern and Southern gateways are two areas of special interest in the HSR alignment through Fresno. The recommended concept calls for gateway treatments at both of the locations as introductions into the city from either direction.

The Northern Gateway occurs where HSR will cross the San Joaquin River and regional greenway park. This location is complex visually as the HSR alignment begins converging on the Highway 99 and UPRR freight alignments. The profile requirements set the HSR trackway at approximately 30 feet above the UPRR trestle trackway grade so it will be visually above the horizon line and conspicuous. The span requirements here lend themselves to a bridge structure that can gracefully fly over the river and park at an elevation that preserves light, air and views at park grade. The structure most suited to this requirement is a through-arch. The through-arch allows the thinnest depth of deck structure and the overhead arch makes a signature statement about the HSR alignment as it enters the city. It also allows HSR, as a 21st century element of infrastructure, to contrast with earlier railroad and highway structures.

The change from box girder guideway to through-arch needs be designed as a planned transition. A traditional transition at through-arch bridges is the inclusion of a lower, return-arch that can terminate either at an abutment wall or a straddle bent pier on both ends. Since the arch structure is on the outside of the deck, a higher straddle bent allows the return-arch to terminate near the straddle bent ends and the box girder to terminate at the straddle bent center. The included sketches demonstrate this concept.

There is a section of guideway south of the river crossing where, due to conflicts with the UPRR right-of-way and proximity of the Highway 99 right-of-way, the standard piers directly below the guideway will not be possible. For approximately 1200 feet, straddle bent piers will be required. This type of structure uses two side piers located in acceptable right-of-way and a connecting beam section to provide support for the box girder and deck structure. Our recommendation here is that the same aesthetic guidelines as applied to the general guideway, be applied to the straddle bent piers: round pier sections with flared tops and flared ends of the beam with rounded corners at all edges. The goal is the consistent, smooth, aerodynamic appearance.

Recommendations: through-arch primary span over the San Joaquin River with return arches; straddle bent transition to box girder; aerodynamic forms for all piers, straddle bents; concrete or steel arch structures.



Above: Aerial image of existing conditions
Below: Diagram overlay of horizontal and vertical relationships

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Recommendation: A single through-arch span over the San Joaquin RIver

Existing

Example: A through-arch bridge with a lower return-arch

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SPECIFIC AREAS
Southern Gateway

At the Southern Terminus, Cedar Avenue crosses over Highway 99 at approximately at 40 degree angle. HSR will cross both at an even sharper angle as it exits the city. The conceptual Engineering drawings show a 3-span structure with two, 245' spans over Highway 99 and a single, 355' span over Cedar Avenue. The documents show a steel trestle bridge based on previous discussion about structure types and an idea that HSR honor California's railroad history with a traditional rail bridge structure for HSR. However, in recent discussions with the City, the concept that HSR should be a modern infrastructure of its time, is what Fresno prefers. Further, the city and independent design team see merit in "bookending" the Northern and Southern gateways with the same through-arch structure type. The same design parameters regarding shapes, forms, transition from box girder guideway to though-arch to and back to box girder guideway apply to the Southern Gateway. The included sketches show a concept that would span Highway 99 in a single through-arch of approximately 490' and a smaller through-arch of 355' over Cedar Avenue.

There is an added dynamic at the Southern Gateway with the angle that HSR crosses the two roadways, allowing more of a side elevation to be seen from the highway. The included sketches demonstrate this opportunity.

Recommendations: through-arch spans over the SR99 and Cedar Avenue, with return arches; straddle bent transition to box girder; aerodynamic forms for all piers, straddle bents; concrete or steel arch structures.

Above: Early studies of Southern Gateway design alternatives.

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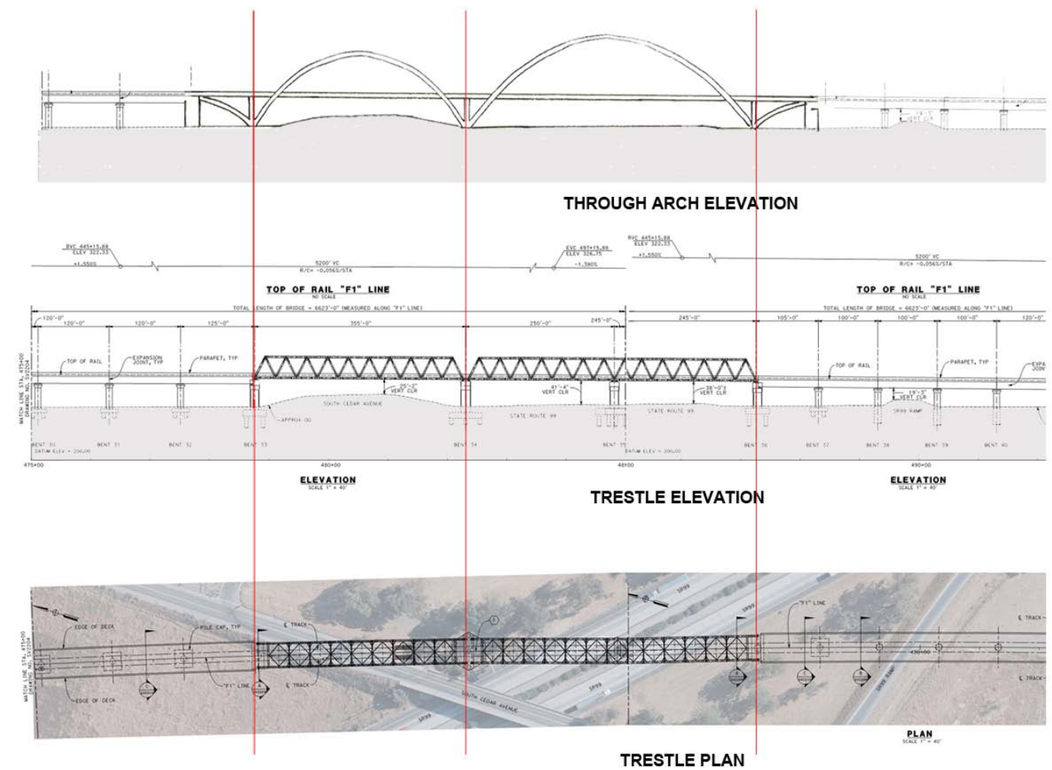
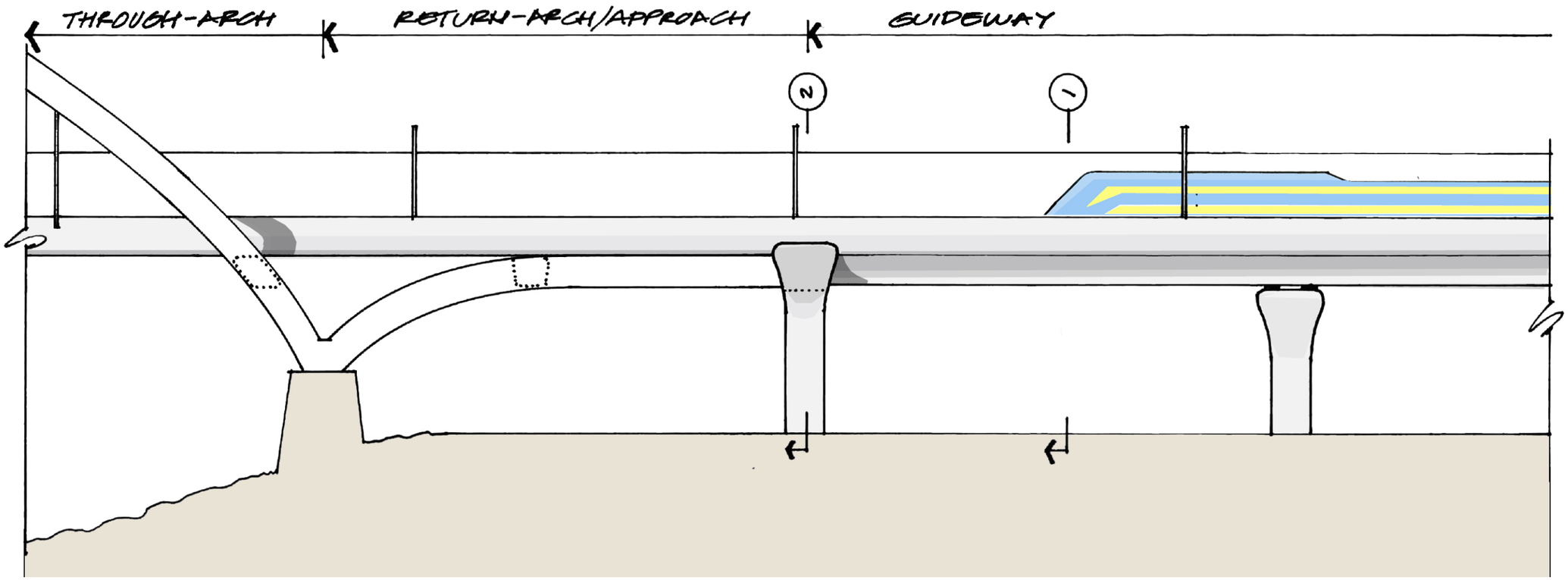
Recommendation: A single through-arch over Highway 99, with a smaller through-arch over Cedar Avenue.

Existing: View of Cedar Avenue crossing over Highway 99





Example: Transition to Gateway Through-arch bridge structure elevation from center-pier guideway.

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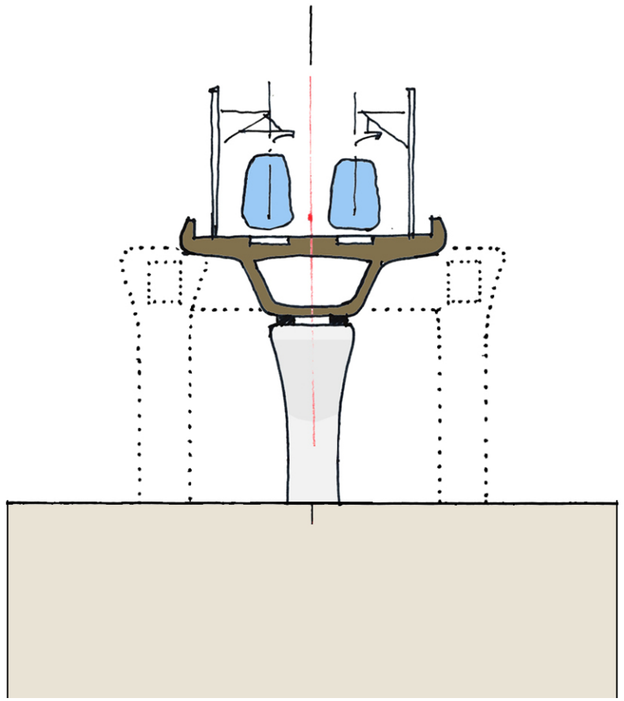
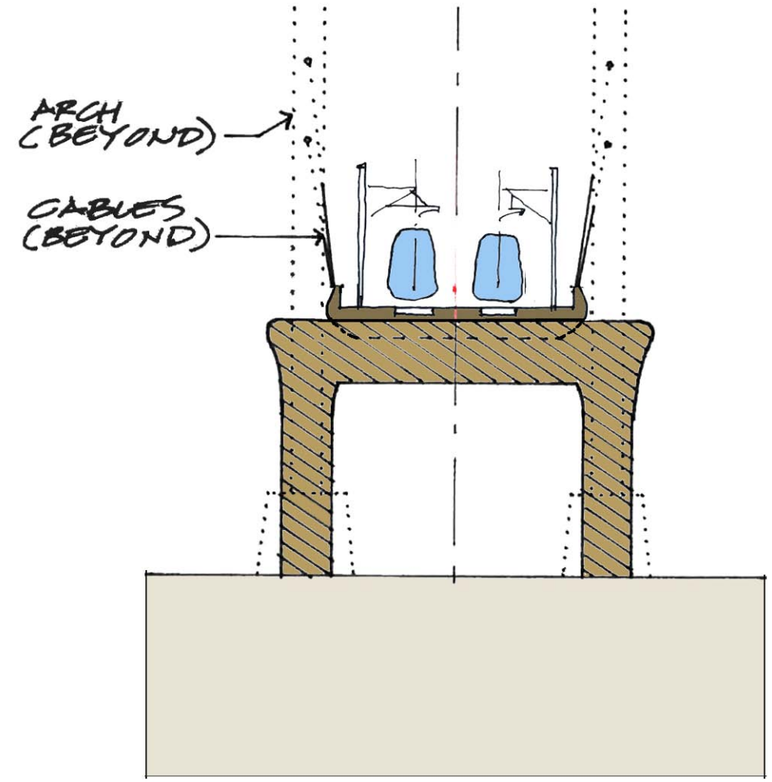


Example: Section 1 Through center-pier guideway.



Example: Section 2 Through straddle bent pier at beginning of arch structure.

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NORTHERN NEIGHBORHOOD CONDITIONS

Alignment Characteristics

The large section north of SR180 is comprised primarily of existing neighborhoods east and west of he HSR alignment with light industrial and other uses flanking the UPRR alignment. Crossings are much farther spaced than the city center. The crossings also tend to be at major arterial streets like Herndon, Veterans, Shaw and Ashlan.

Development in the Northern Neighborhoods is mostly low density, auto-oriented land uses. Presently this section is not a pedestrian or bicycle modal area. However, the maturation to a more pedestrian and bicycle-friendly character happens organically on a project-by-project basis. The HSR overcrossings represent an opportunity to begin a more robust pedestrian and bicycle system.

The 15% Conceptual Engineering drawings indicate Caltrans style overcrossings with constant depth, square concrete box girders and closely spaced cylindrical piers. This is an aesthetic departure from the aerodynamic form of the HSR structures, diminishing an opportunity for continuity.

- Herndon Avenue connects areas of agriculture and dispersed residential development to the west of the alignment and major commercial development to the east.
- Veteran's Boulevard is a new boulevard, designed to connect Herndon and Shaw, with the intent to relieve congestion. The street is planned to be a 146'6" wide multi-lane arterial street. The 15% engineering drawings indicate a 12' sidewalk on one side of the bridge.
- Shaw Avenue is an intensly developed corridor that is likely to carry significant movements linking neighborhoods east and west of the HSR corridor. We assume that these movements will include pedestrian and bicycle trips, which should be encouraged. Shaw incudes one of FAX's busiest bus routes and is also designated as a future Bus Rapid Transit corridor.
- Ashlan Avenue is planned as a very long structure bridging over Weber Avenue, SR-99, and the HSR corridor. The 15% engineering documents appear to call for a finished structure that is 70' wide, including one 7' sidewalk. A full-width, combined pedestrian-bicycle facility on each side of the bridge would add width to the structure, but would assist in connecting the neighborhoods east and west of this crossing.

Recommendations for these crossings:

- **Aerodynamic, monolithic forms for box girders, piers, decks and parapet edges, consistent with the HSR alignment;**
- **Revised pedestrian-bicycle space in the cross section; provide 14' shared pedestrian-bicycle space on both sides where space permits; at space-confined corridors, provide 14'-16' pedestrian-bicycle space on one side and emergency small sidewalk on opposite side**
- **Where proposed crossings will become part of a larger overcrossing and interchange with SR99, design for continuity of aesthetic treatments and pedestrian-bicycle accommodations. The Shaw Avenue and Ashlan Avenue overcrossings also provide an opportunity to use landscaped berms to reduce the apparent height of walls.**

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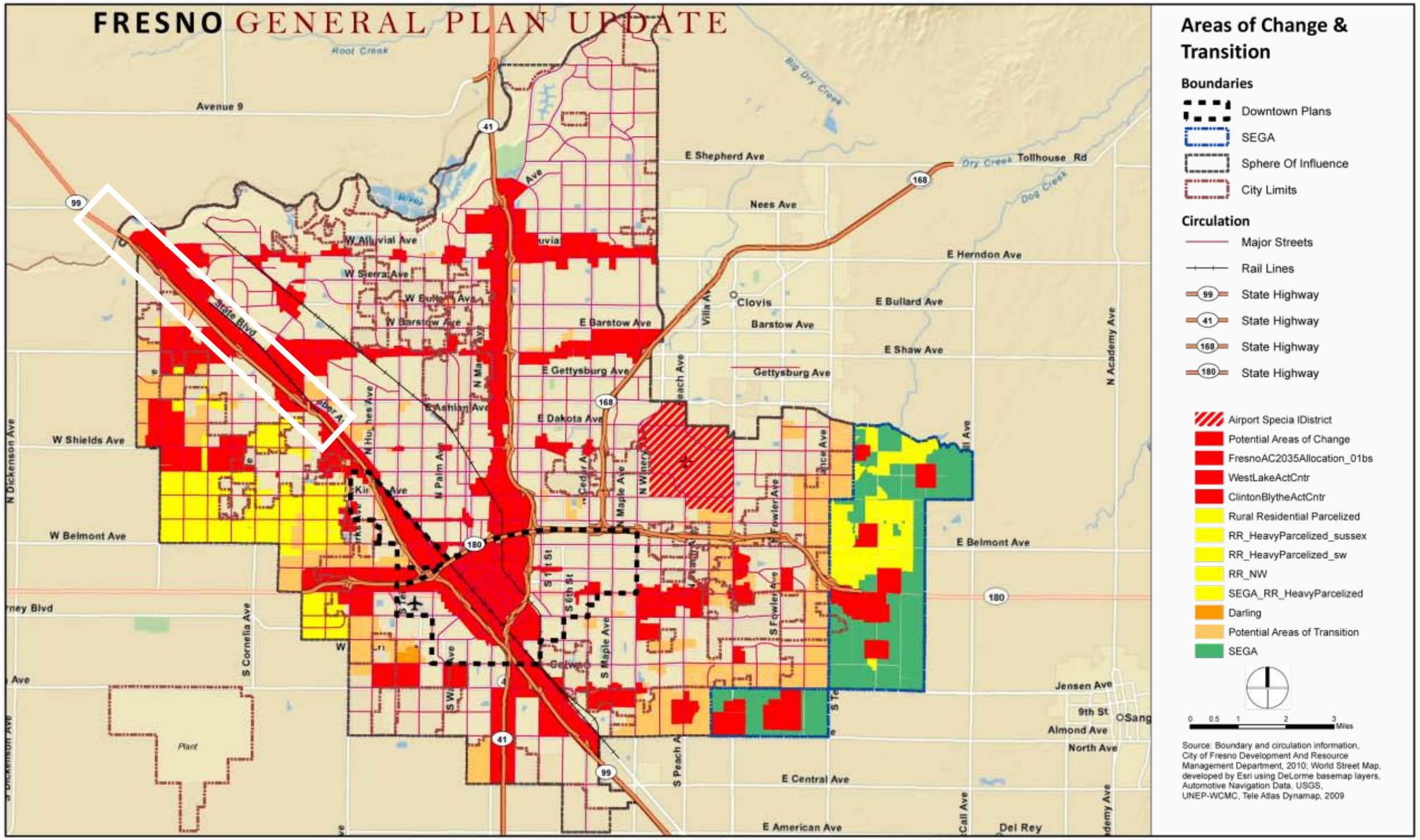

Context: Excerpt from Fresno General Plan Update, with white box highlighting the area of crossings within the northern neighborhoods.

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NORTHERN NEIGHBORHOOD CONDITIONS

Prototypical Grade Separated Crossing

New overcrossings are planned for several major and intermediate streets throughout the City alignment. Some of those locations have existing grade crossings, others have original overcrossings of various designs.

Current HSR design documents, represented by the illustration at right, indicate new overcrossings with standard composite box girders and round, straight piers at close spacing. This is a departure from the form and look of the HSR guideway itself.

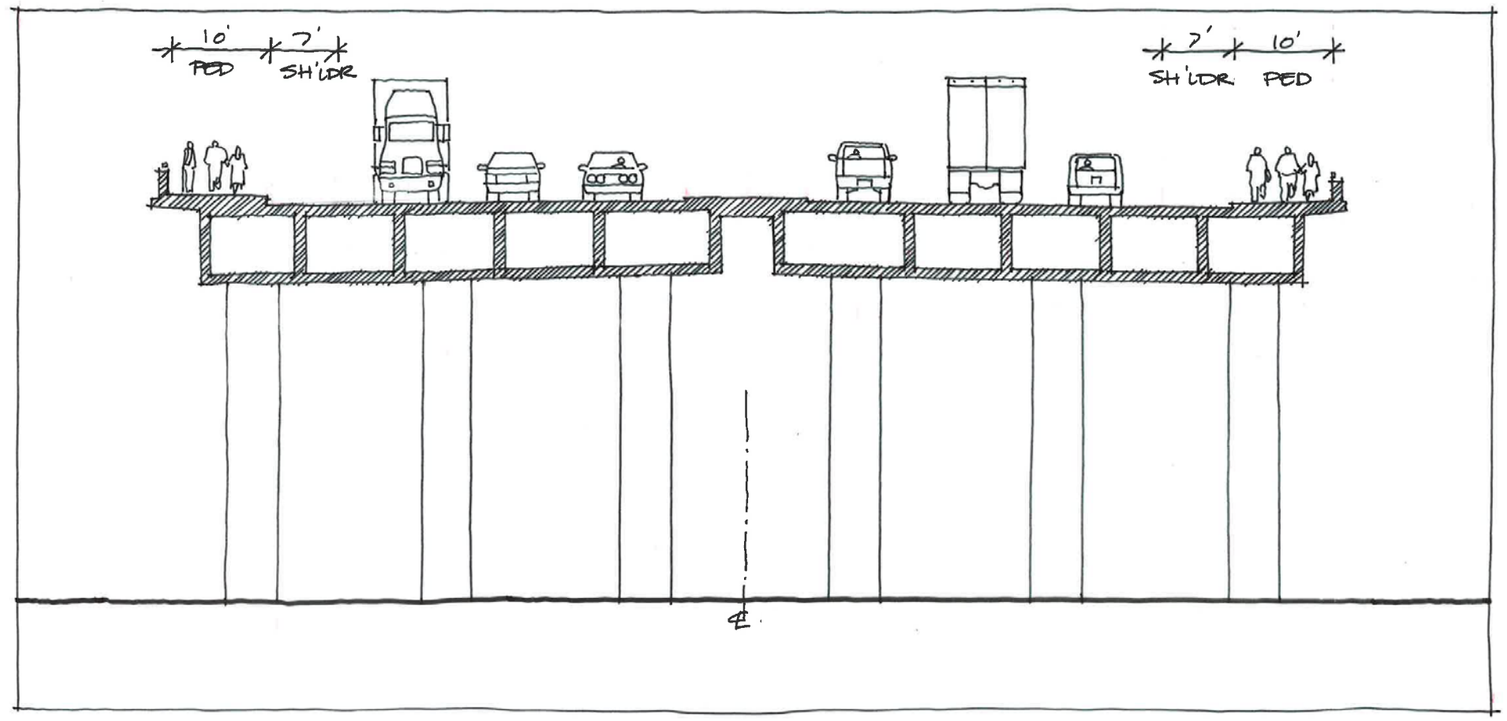
The illustration on page 31 portrays a recommended overcrossing section, with fewer columns that are flared to match the recommended design for the HSR viaducts and straddle bents.

Additionally, varying levels of pedestrian and bicycle accommodation are planned for streets crossing over the HSR alignment. At right, the 15% preliminary engineering concept for Shaw Avenue is illustrated with a 10' sidewalk and a 7' shoulder on each side, but some crossings include only one sidewalk.

Given that these crossings are the only connection between neighborhoods to the east and west of the rail alignment, it is important that accommodations for all modes are robust and as safe as possible.

The drawing on page 31 portrays a recommended set of elements for these crossings, with combined 14' pedestrian and bicycle facilities, separated from auto lanes on both sides of each overpass

Recommendations: integrate the architecture of the HSR and overcrossings and undercrossings using common design treatments that feature aerodynamic forms and curved edges similar to the HSR Guideway; provide generous separated facilities for pedestrians and cyclists.



Proposed: typical conceptual engineering design for most overcrossings in the northern neighborhoods

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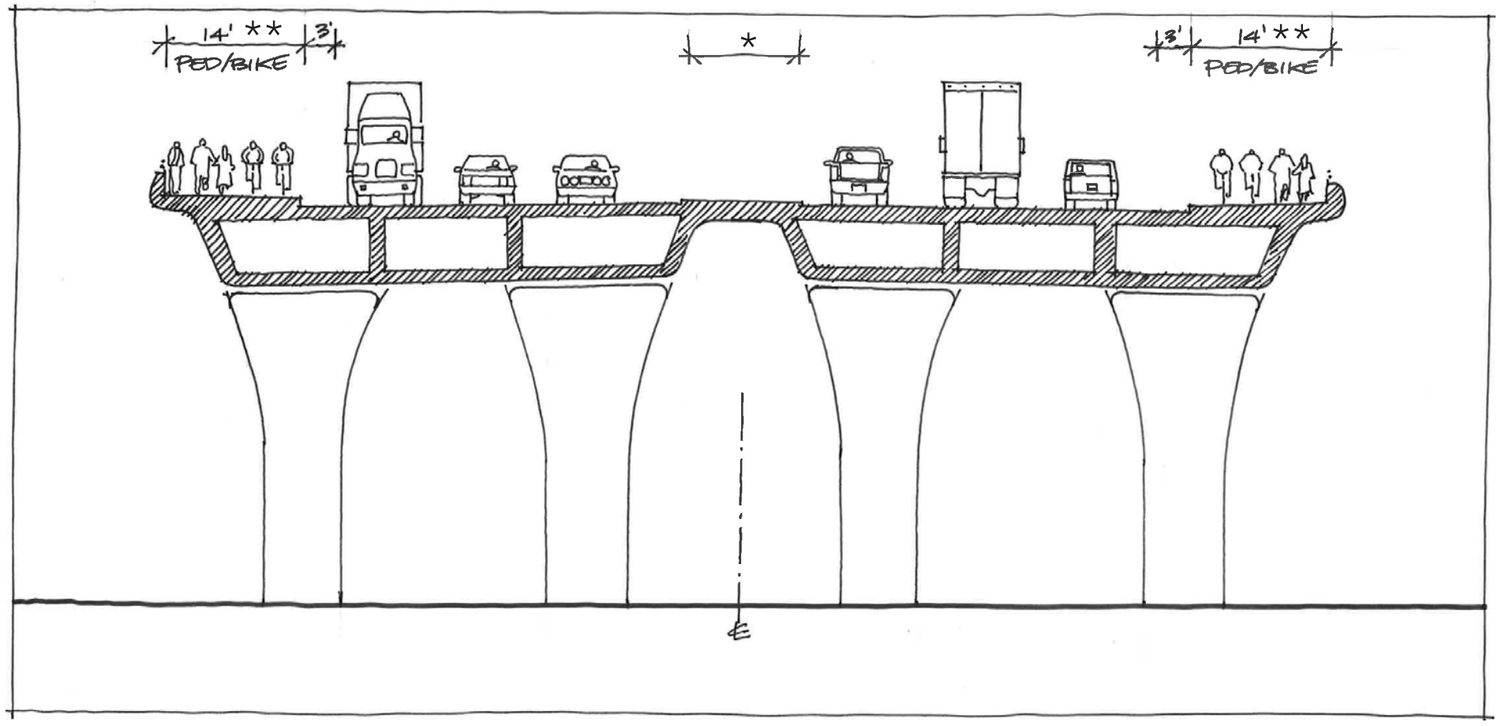

Recommended Design: incorporate HSR design themes and provide usable pedestrian and bicycle facilities

Option:
* diminish median space on structure to 3 feet
** add recovered space from median to pedestrian/bike facilities on both edges of bridge structure.

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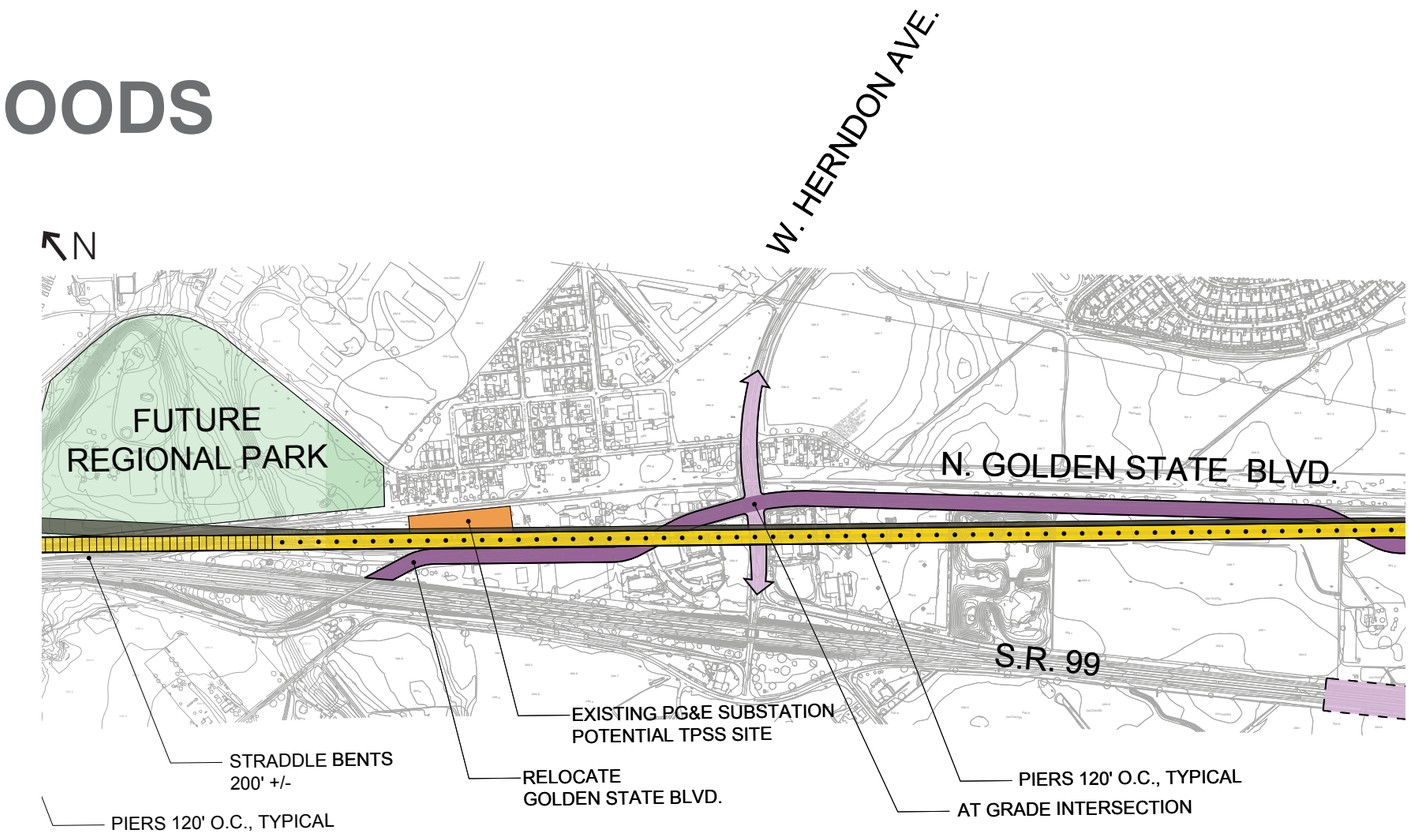
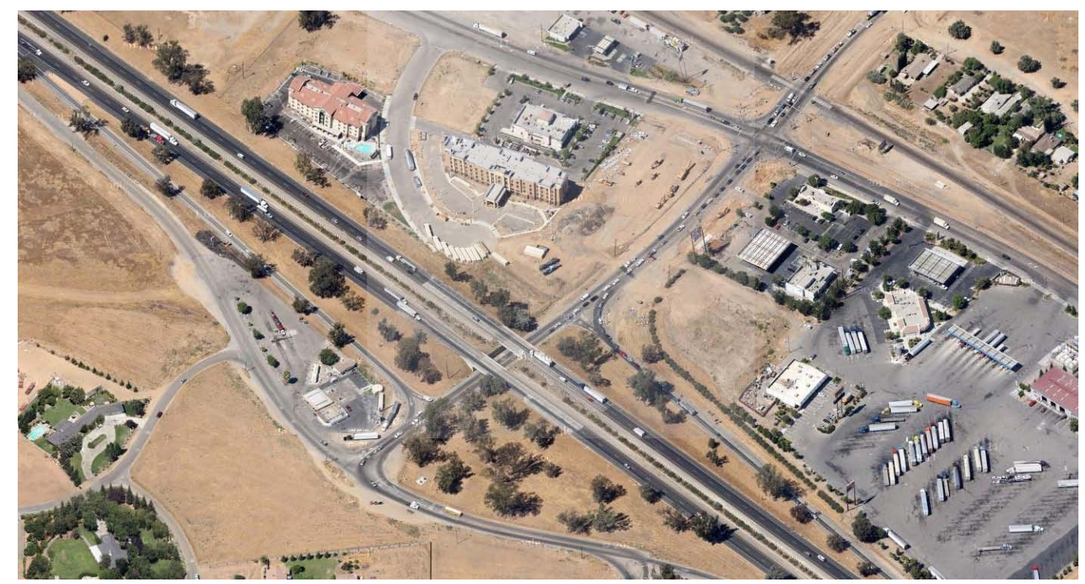
NORTHERN NEIGHBORHOODS

Golden State Blvd/Herndon Ave

The eastern end of Herndon Ave. is the most northern of the Fresno's east/west major commercial corridors. CHSR crosses Herndon at the western end connecting areas of agriculture and spare residential development. Commercial uses consist of roadside services. The CHSR alignment splits in half properties such as the Holiday Inn. From Herndon Ave. to the future Veterans Blvd, CHSR is elevated through the corridor approximately 1.5 miles before it comes to grade north of Veterans Blvd. Golden State Blvd. is realigned in this area as well; the 15% Preliminary Engineering documents show Golden State crossing in an at grade intersection with Herndon Ave. west of SR 99.

Recommendations: While Herndon Avenue and the northwest part of Fresno seem far from future development, it is recommended that Herndon Avenue and Golden State Boulevard are rebuilt to city of Fresno standards: 12' sidewalks and 7' bike lanes on both sides of the street(s), with crosswalks developed at the intersection of Herndon and Golden State Blvd. This will set the tone for new development in the corridor and support the goals of Fresno's 2030 long range plan. The CHSR viaduct that crosses over Herndon Ave. will be highly visible and it should be designed as recommended in the elevated structure section of this document.





Existing: Aerial photo of Herndon Avenue intersecting SR99 and Golden State Blvd.

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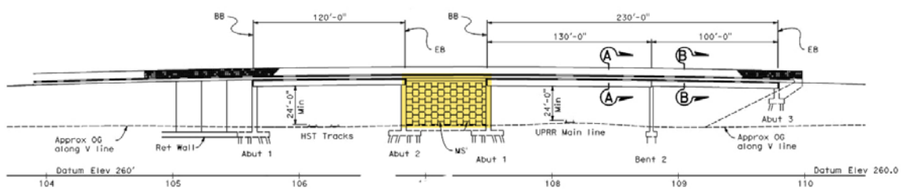
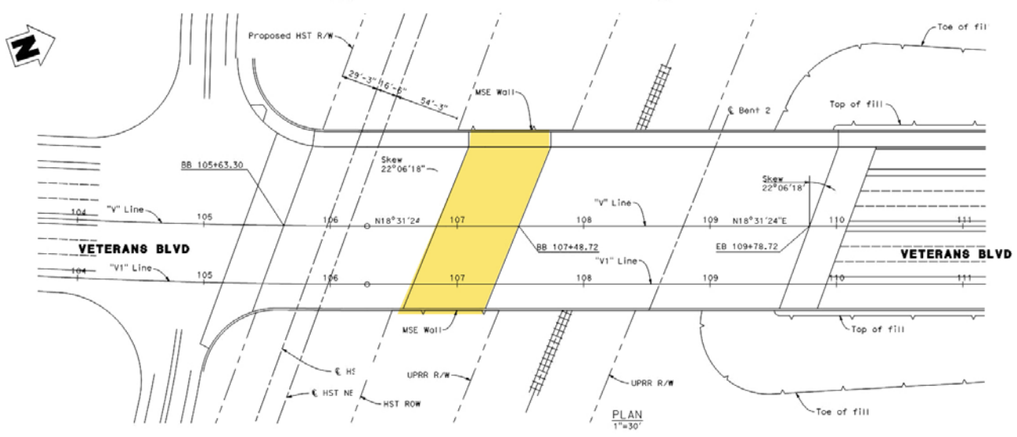
NORTHERN NEIGHBORHOODS

Veterans

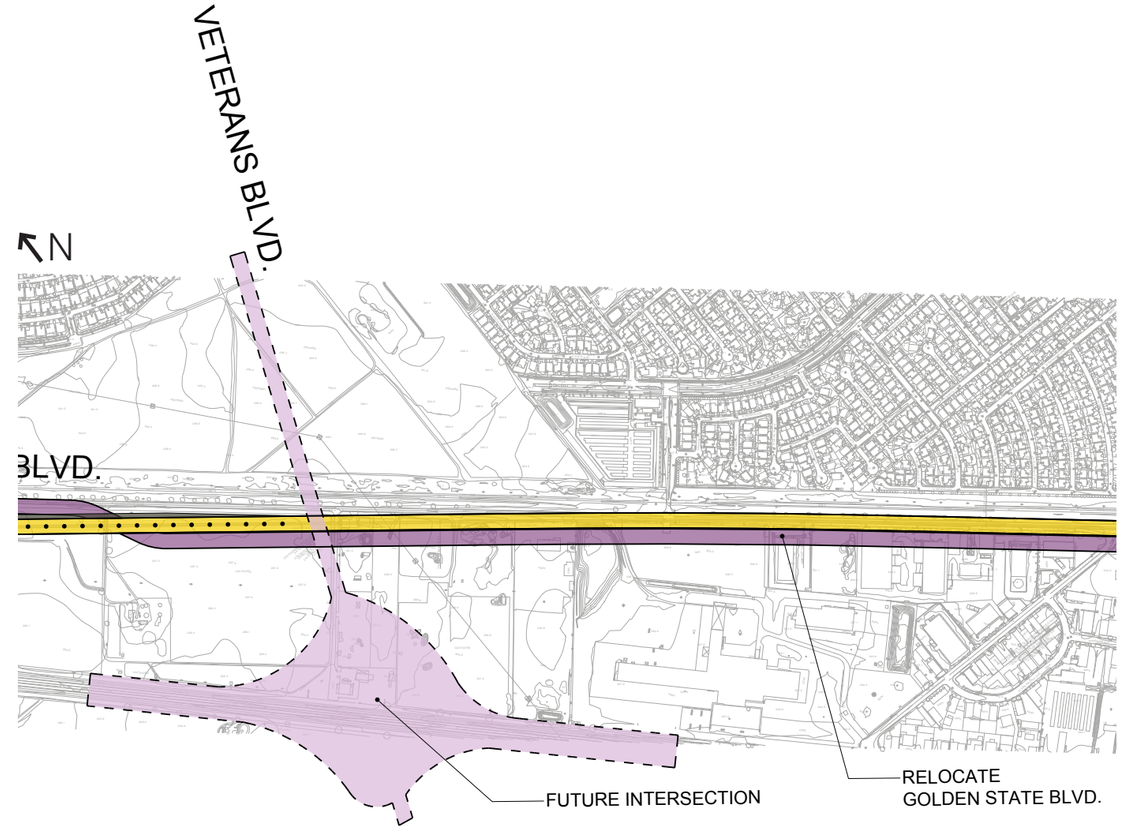
Veterans Boulevard is a new bypass connecting Herndon and SR 99, with the intent to relieve traffic congestion on Herndon. The street is planned to be a 146'-6" wide multi-lane arterial viaduct that crosses over the on grade trackway of CHSR and continues to SR 99 interchange. The 15% Preliminary Engineering drawings indicate a 12' sidewalk on only one side of the bridge.

Recommendation: Veterans Blvd. should have 14' minimum sidewalk/bikeway on both sides of the boulevard along its entire length and through the new interchange at SR 99 creating the only other pedestrian crossing of CHSR and SR 99 in the 3.2 mile corridor between Herndon and Shaw Ave. Veterans Blvd is on a viaduct for most of its length; periodic pedestrian and bike connections up to the sidewalks on the viaduct should be provided. The use of bermed and landscaped structures should be considered to reduce the apparent heights of walls and headwalls. The recommendation for Veterans Blvd. is only for the sections that CHSR are constructing and should be coordinated with City of Fresno and Caltrans pedestrian plans for Veterans Blvd.





Proposed: Plans for Veterans Blvd, which does not exist today



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NORTHERN NEIGHBORHOODS

Shaw Ave Grade Separation

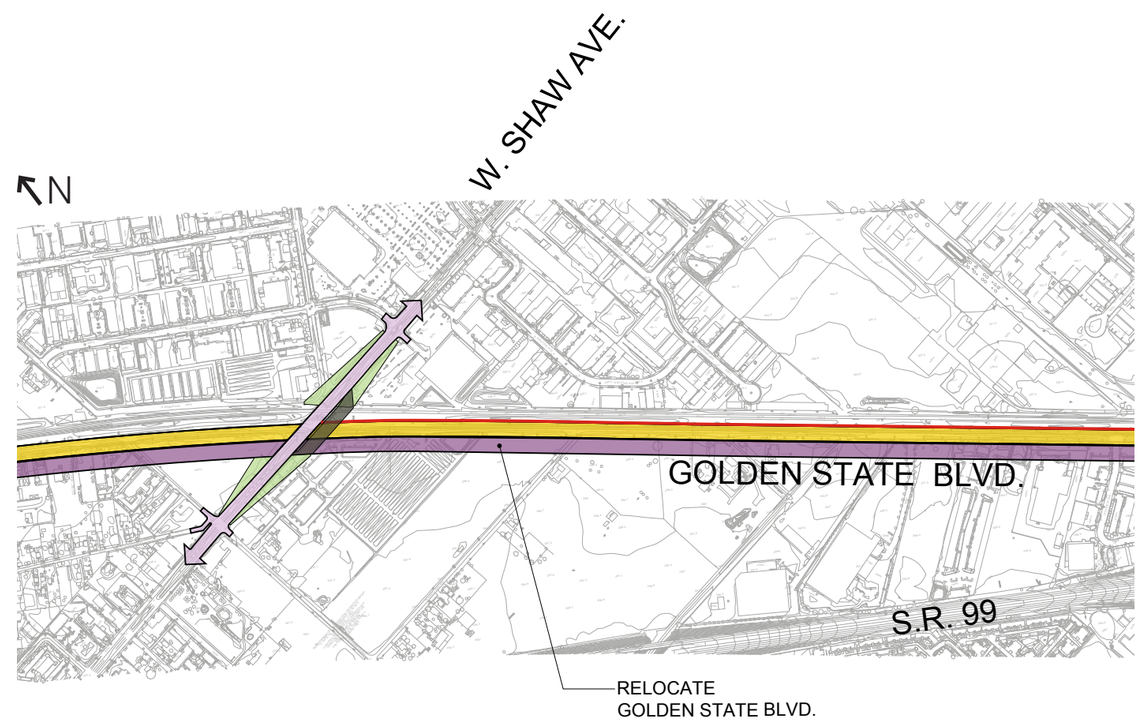
The Shaw Avenue crossing will include a new overpass to replace the existing at-grade crossing.

The general plan shows Shaw as an intensive development corridor, that is likely to carry significant movements linking neighborhoods east and west of the HST corridor. We assume that these movements will include pedestrian and bicycle trips, which should be accommodated. Given the high volume and speed of traffic projected for Shaw, pedestrians and bicyclists should be accommodated in a combined multi-use facility that is 14 feet wide on each side of the bridge.

The 15% engineering documents portray a bridge structure that employs six tubular columns without articulation. Using a similar column that is flared similarly to the HST aerial structures proposed in this document, the structure may be supported with four columns instead. Similarly, the use of an integrated concrete box girder parapet would also help to strengthen the relationship between the design of HST and the associated structures that it passes.

The Shaw Avenue overpass also provides an opportunity to use landscaped berms to reduce the apparent height of walls.

Finally, design of the project should account for the possible future introduction of BRT on the bridge structure. Consideration of the unique needs of a BRT system can help to reduce negative impacts in the future.



Existing: View looking Northwest on Golden State Boulevard toward intersection with Shaw, with at-grade crossing of UPRR ROW at right

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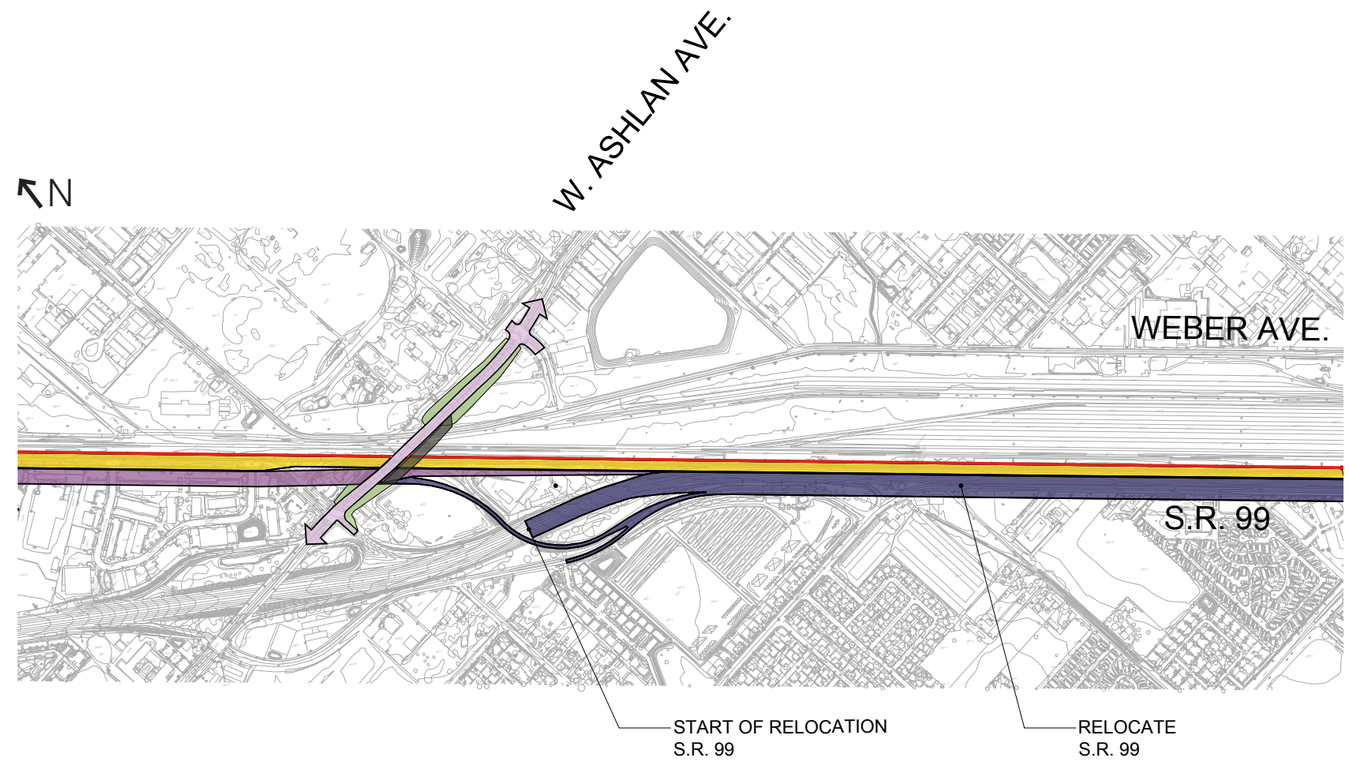
NORTHERN NEIGHBORHOODS

Ashlan Avenue

Ashlan Avenue is planned as a long viaduct structure bridging over Weber Avenue, Golden State Blvd, the UPRR and CHSR corridors. The 15% Preliminary Engineering documents appear to call for a finished structure that is 70' wide, including a 7' sidewalk on one side of the roadway. The extent of the work terminates east of the Ashlan interchange with SR99. It appears that there are no sidewalks on Ashlan as it crosses SR 99. The existing Ashlan overcrossing is on landscaped berms. It appears from the 15% documents that walls would be built on top of the existing landscaped berms to gain the height required for Ashlan to make the 27' clearance for CHSR.

Recommendation: Sidewalks and bike lanes 14' wide on both sides of the Ashlan would assist in connecting the neighborhoods east and west of this crossing. Extending the height and enlarging the footprint of the landscaped berms to gain the height required to pass over CHSR are preferable to walls on top of the berms. Similar to Veterans Blvd., the sidewalks and bike lanes should be coordinated with sidewalks and bike lanes on Ashlan as it passes over SR 99, taking into consideration plans by the City of Fresno and Caltrans.



Existing: View looking south on Golden State Boulevard toward Ashlan Avenue overcrossing of Golden State Boulevard and UPRR

Existing: View looking North toward Ashlan Avenue overcrossing of Weber Avenue and UPRR ROW

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DOWNTOWN

Urban Alignment Characteristics

The historic Downtown Fresno section represents patterns of the original settlement – a tightly spaced grid of streets and blocks, perpendicular to the rail corridor, a dense mix of uses with a mature pedestrian environment. The proposed HSR Station buildings and related parking facilities occupy a central location between Fresno and Inyo streets, fronting on H Street. There are major commercial, civic, retail, entertainment and sports venues within easy walking distance of station. Additionally there are major pedestrian-only corridors on Mariposa Street and Fulton Street Mall.

Today there are approximately eight crossings of the rail corridor, mostly at-grade with one overcrossing and one undercrossing. For HSR, there are under-crossings proposed for Fresno, Tulare and Ventura streets as well as an overcrossing proposed for Stanislaus Street. Two separate pedestrian bridges are proposed: one mid-block between Stanislaus and Tuolumne streets and one directly adjacent to the Ventura undercrossing. It is critical that pedestrian, bicycle and local traffic connections are frequent and convenient across HSR and UPRR rail alignments to meet the objectives of Fresno's long range plans for an intensified, mixed use, pedestrian-friendly city center. That means each of the planned crossing carries a responsibility to encourage and invite pedestrian and bicycle access.

Recommendations:

- **Each crossing section should be closely evaluated to accommodate all pedestrian and bicycle movements. It is important at undercrossing approach blocks that there is viable commercial frontage and pedestrian space at street level as well as an inviting pedestrian underpass. The crossing portions of these corridors should feel like a natural extension of the streetscape of downtown as envisioned in recent downtown plans.**
- **Most of the local street crossings over and under the HST corridor are high volume streets. Where possible, bike and pedestrian facilities on high-volume streets should be separated vertically and horizontally from auto lanes.**
- **At-grade sidewalks flanking the undercrossing approach should be 12' minimum on both sides to accommodate normal pedestrian circulation and street furnishings. For the underpass sidewalk, 14' minimum (16' preferred) should be provide as a shared facility. This profile can have grade that meets ADA criteria and be set higher than roadway profile at the bottom of underpass since its clearance requirements are considerably less than that for the vehicular travel lanes.**
- **All engineering profiles for proposed overcrossings and undercrossings, should be refined to minimize the length of sloped transition so that no more commercial frontage is affected by the dropping/rising grades than necessary**

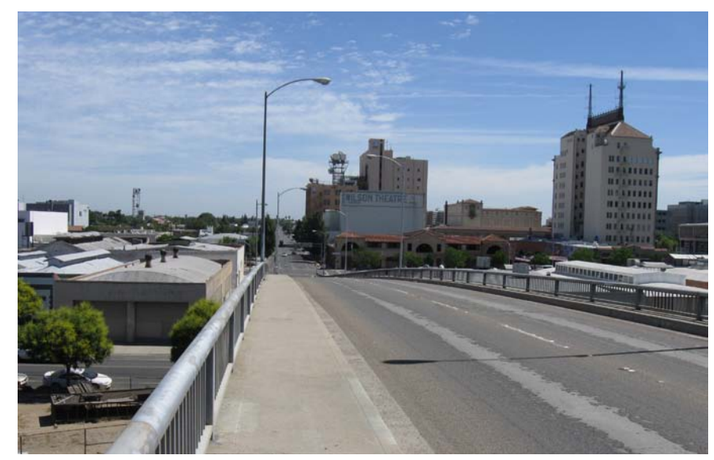

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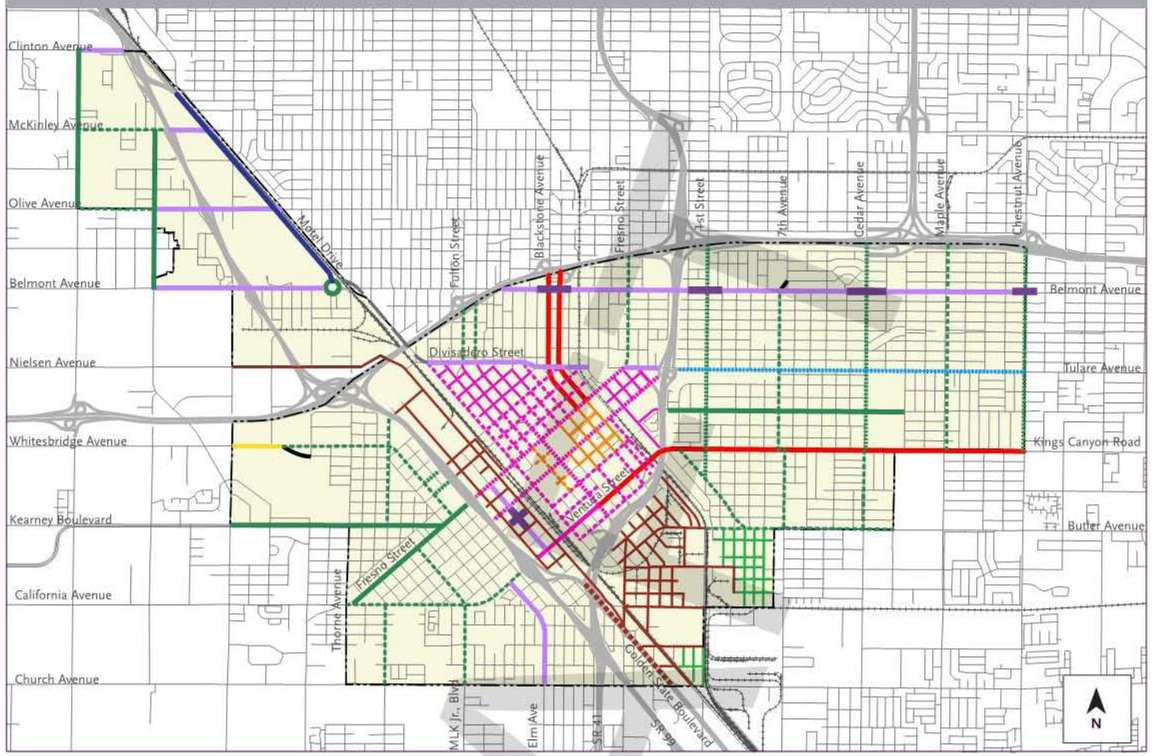
FIGURE 3-3 - STREET TYPOLOGIES



Key

- Transit Boulevard
- Downtown Main
- Downtown Mixed
- Retail Mall
- Civic Mall
- Civic
- Commercial Arterial
- Neighborhood Commercial
- Neighborhood Commercial Core
- Highway Service
- Downtown Neighborhood
- Residential Greenway
- Residential Arterial
- Residential Collector
- Residential Lane
- Rural Residential Street
- Industrial Arterial
- Industrial Street
- Street Vacation

Figure 9.7A - Railroad Crossing Improvements (subject to confirmation of final HST alignment, whether it be at-grade, below-grade, or elevated).

Key

- Reconfigure Fresno Street railroad underpass so a standard, four-way vehicular intersection occurs at H Street in addition to Broadway Street
- Introduce sidewalk and bicycle improvements across at-grade crossing
- Introduce bicycle improvements

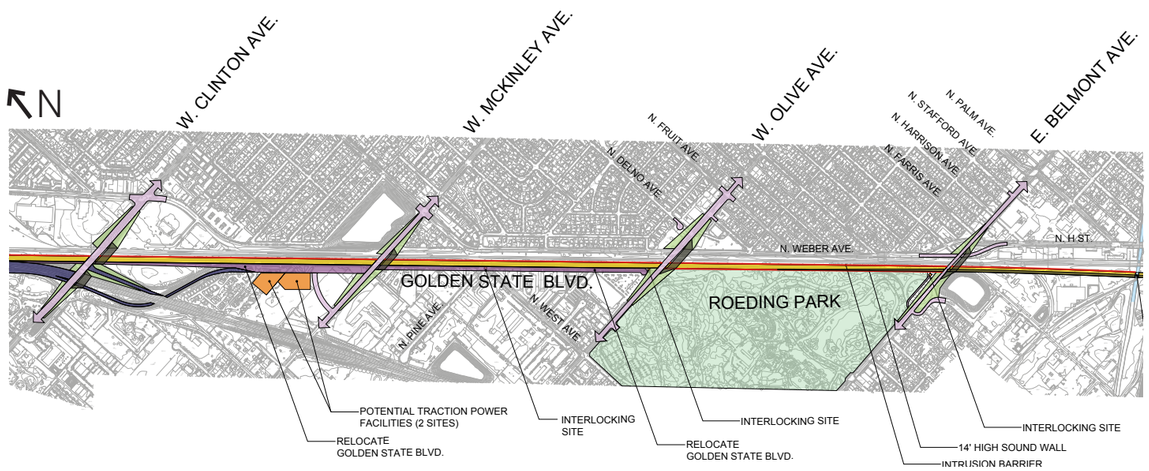
DRAFT

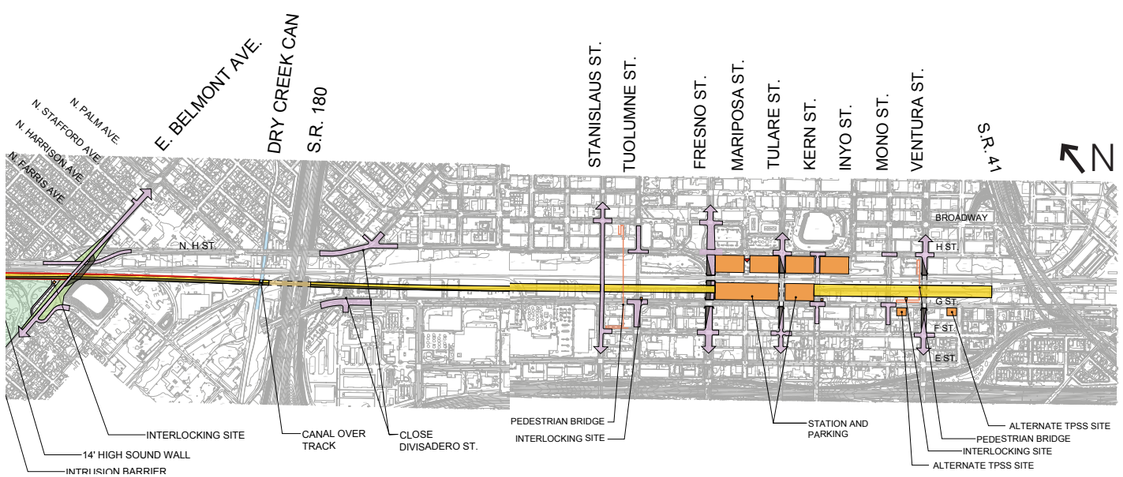
DRAFT

DOWNTOWN

HSR Street Crossing Matrix

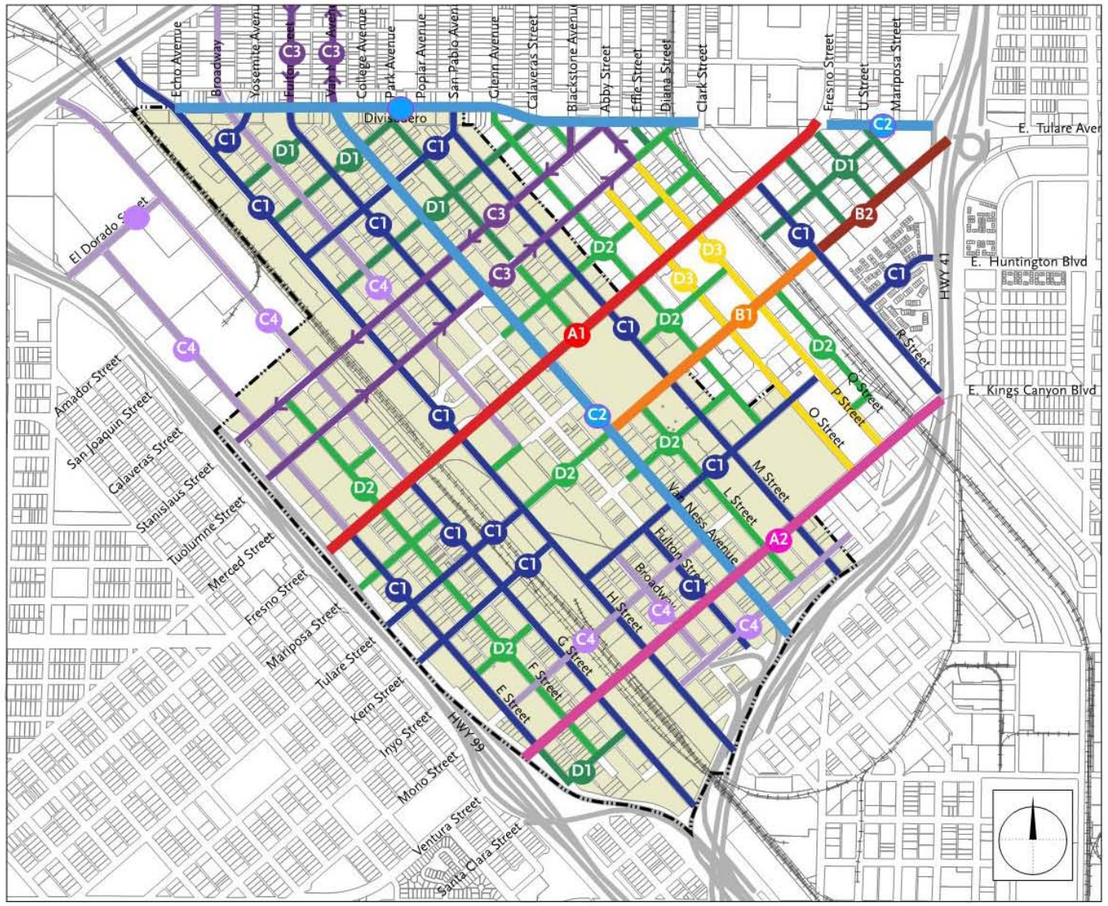
This table includes the downtown streets that will have direct interaction with HSR. The checked cells indicate the proposed design typology for each corridor, based on the Block and Street Standards section of the Fresno Downtown Code (excerpts on opposite page).





		Sidewalk: 16' Bike Lane: 5' C1	Sidewalk: 11'-6" Bike Lane: 5' C2	Sidewalk: 18'-6" Bike Lane: 5' C3	Sidewalk: 11' Bike Lane: 5' A2	Sidewalk: 12-16' Bike Lane: None D2	OVERCROSSING	UNDERCROSSING
Central City	CLINTON		X				X	
	BELMONT		X				X	
	MCKINLEY		X				X	
	OLIVE		X				X	
	STANISLAUS			X			X	
	G STREET	X					n/a	
	FRESNO		X					X
	TULARE	X						X
	VENTURA				X			X
	F STREET					X	n/a	
	H STREET	X					n/a	

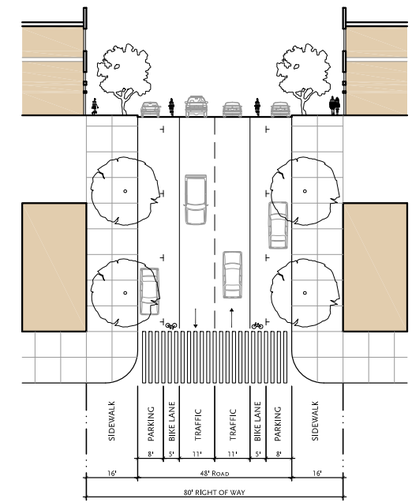
FIGURE 9.1: DOWNTOWN STREET NETWORK REGULATING PLAN



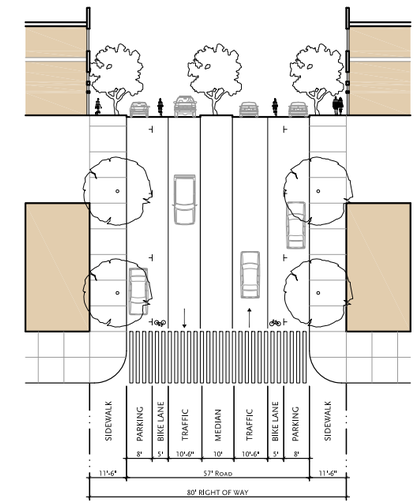
Key to Figure 9.1

	Major Streets	Grid
A1	100' Major Boulevard	A
A2	100' Boulevard with Bike Lanes	A
B1	80' Boulevard	A
B2	80' Boulevard with Bike Lanes	A
	Minor Street with Bike Lanes	
	High Pedestrian Priority, Low Volume	A
C2	High Pedestrian Priority, High Volume	A
C3	High Volume, One-Way	B
C4	Low Pedestrian Priority	B
	Minor Streets without Bike Lanes	
D1	Low Volume Residential	A
D2	Low Volume Commercial or	A
	Low Volume Diagonal Parking or	A
	Low Volume Diagonal/Parallel	A
D3	High Volume	B

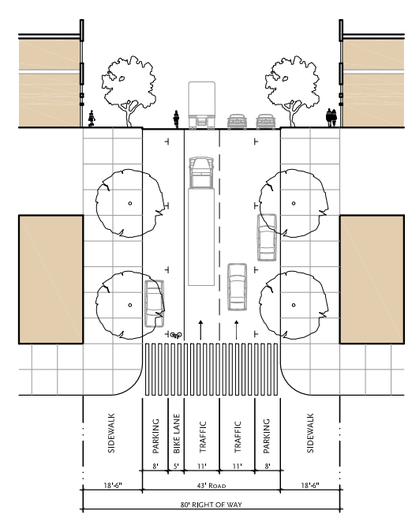
C1 High Pedestrian Priority, Low Volume



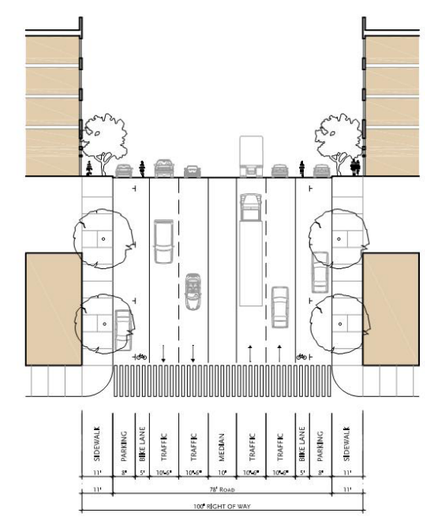
C2 High Pedestrian Priority, High Volume



C3 High Volume, One-Way



A2 100' Boulevard with Bike Lanes



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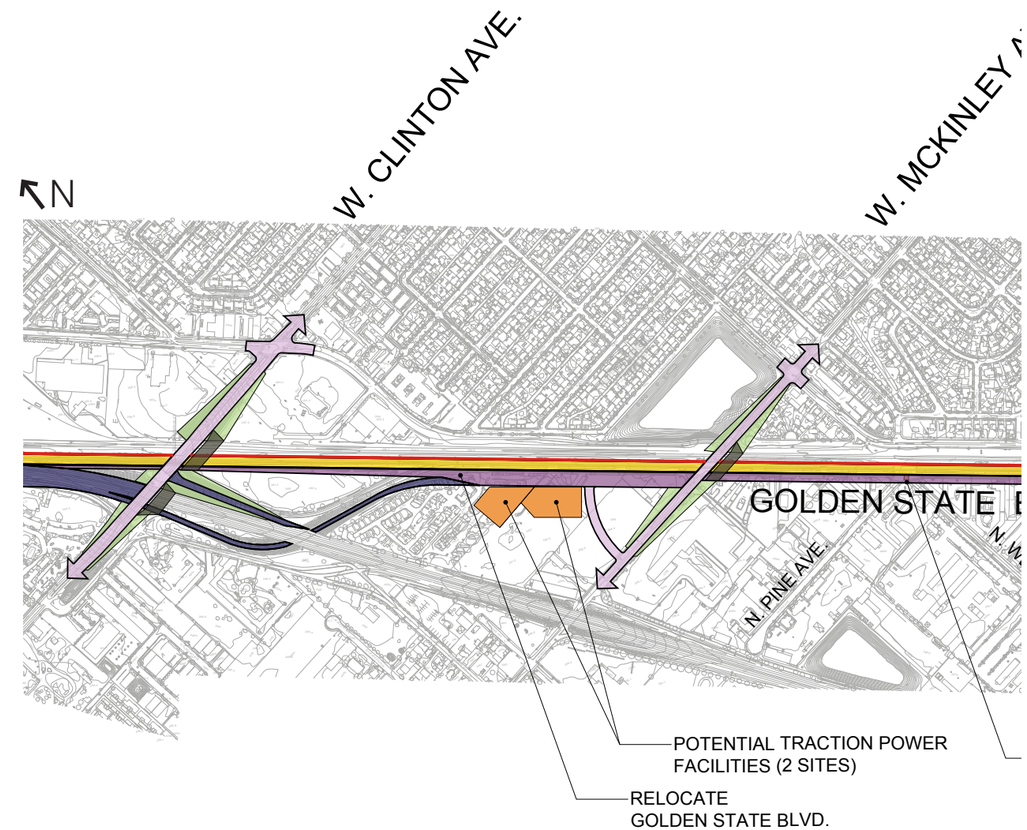
DOWNTOWN

Clinton Avenue Interchange Reconstruction

Clinton Avenue is designated as a C2 (high-pedestrian priority, high-volume) street, providing a link between neighborhoods east and west of the rail and highway corridors. The future bridge will be part of the Clinton interchange with SR-99.

Recommendations: To accommodate pedestrians and bicyclists in this multi-modal corridor, 14' combined pedestrian-bicycle shared facilities should be included on each side of the bridge structure.



Existing: View looking South on Parkway Drive toward Clinton Avenue overcrossing of Golden State Highway and UPRR ROW

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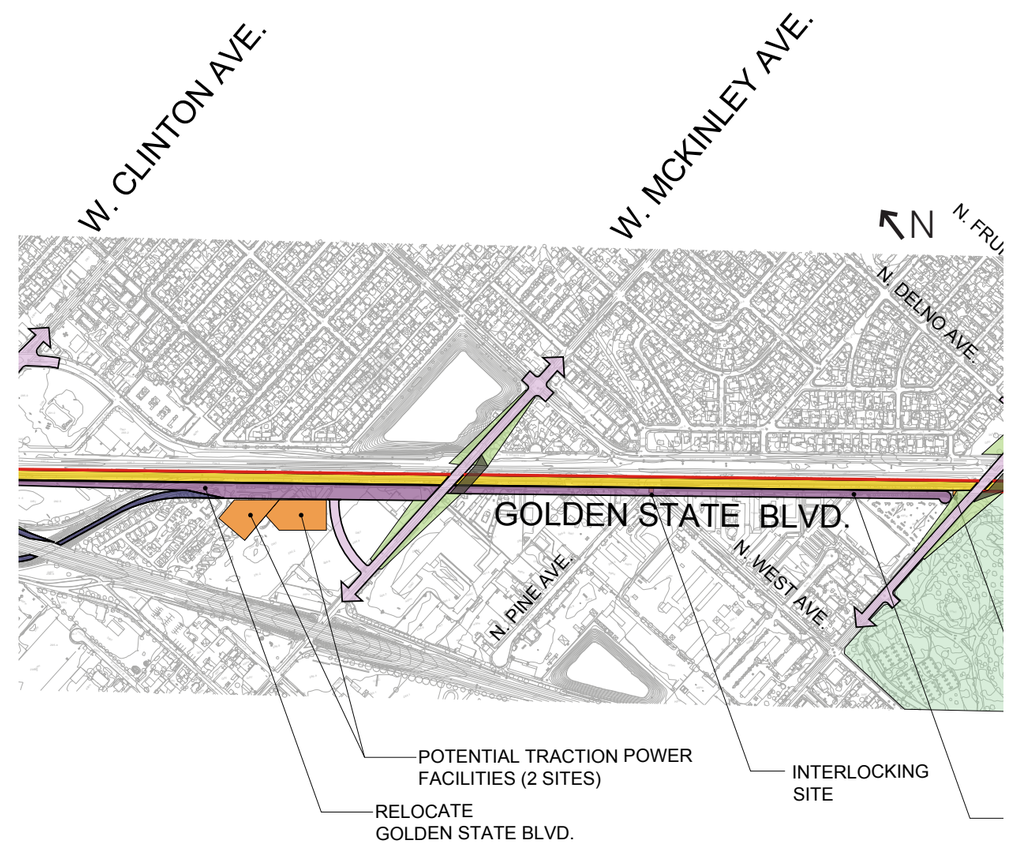
DOWNTOWN

McKinley Avenue Grade Separation

McKinley Avenue is designated as a C2 (high-pedestrian, high-volume) street, providing a link between neighborhoods east and west of the rail and highway corridors, and a connection to Golden State Boulevard.

Recommendations: Pedestrian and bicycle connections should be accommodated by 14' combined pedestrian-bicycle shared facilities on each side of the bridge. The existing at-grade crossing will be replaced by a bridge that will be adjacent to an existing stormwater retention pond. Project designers should explore the extension of slopes around the pond to reduce the apparent height of the planned retaining wall. The area around McKinley Avenue is also designated as an alternate site for two Traction Power Substations (TPSS). See recommendations for TPSS.

Existing: View looking Northwest on Golden State Boulevard across McKinley Avenue, with at-grade crossing of UPRR ROW at right



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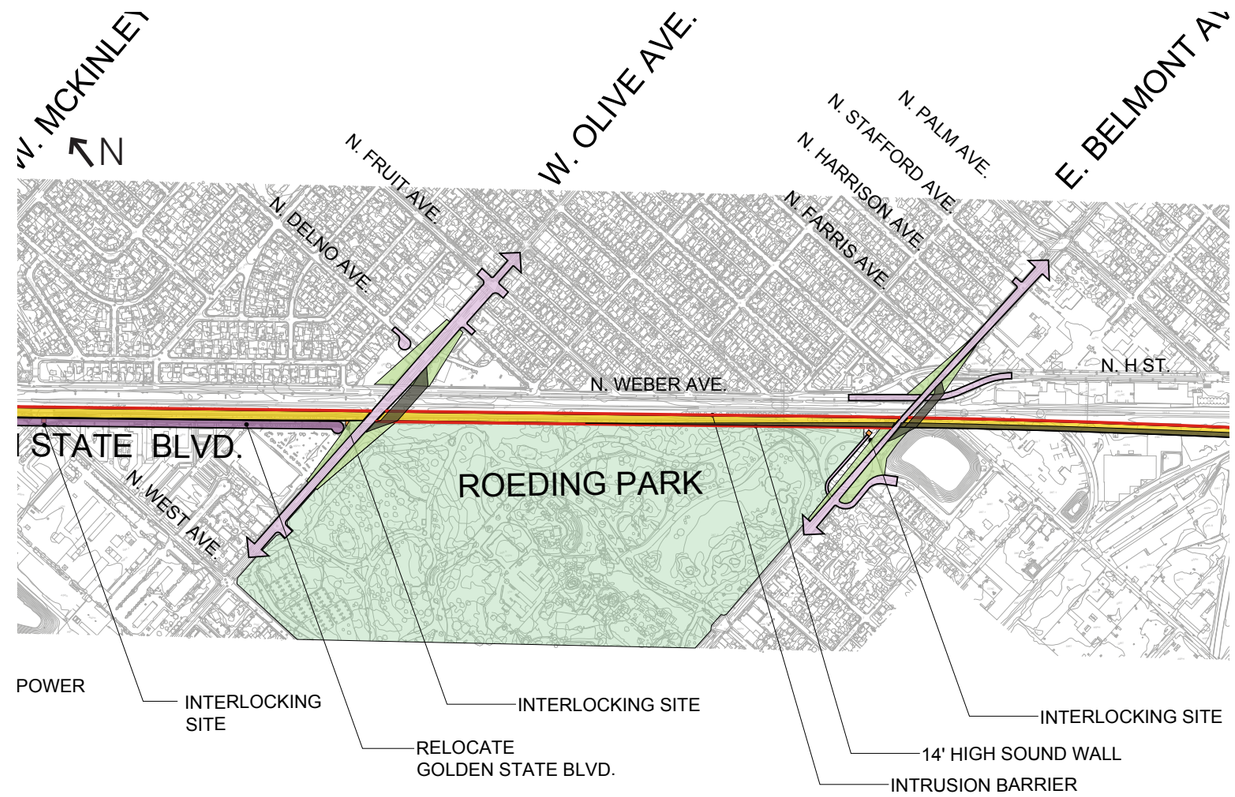
DOWNTOWN

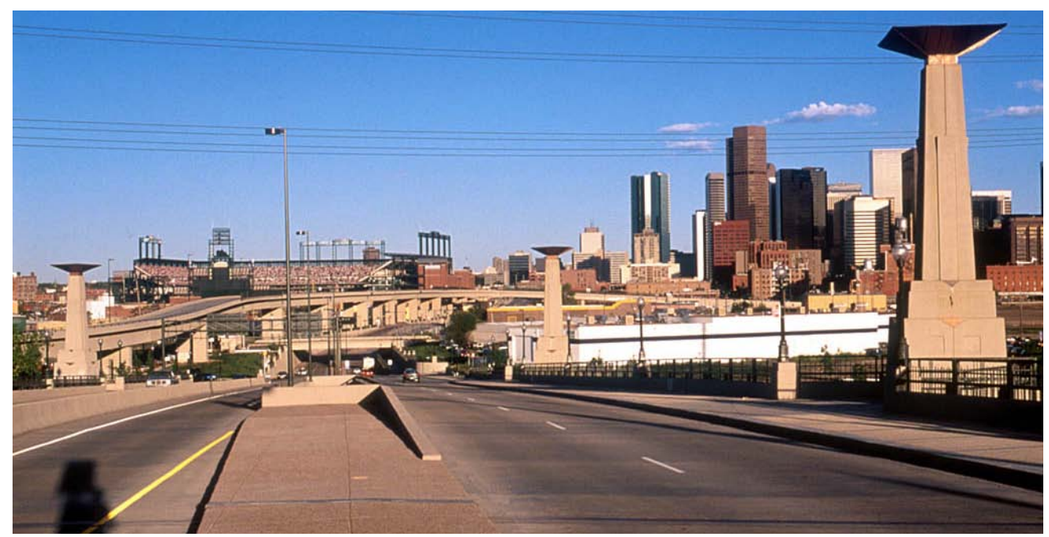
Olive Avenue Grade Separation

Olive Avenue is a C2 designated (high-pedestrian priority, high volume) street. As the street runs along the edge of Roeding Park, landscaped berms should be used to reduce the apparent height of the substantial retaining walls. Currently, retaining wall structures extend to N. Fruit Avenue, preventing driveway access to adjacent properties. The 15% engineering documents also indicate a need for crash cushions around project walls.

Recommendations: The addition of 14' pedestrian-bicycle-multiuse facilities may reduce or eliminate the need for crash cushions.



Existing: View looking Southeast on Golden State Boulevard toward intersection with Olive Avenue, with UPRR ROW at left and Roeding Park at right



Example: Overcrossing into Denver, with pedestrian pathways and gateway features.

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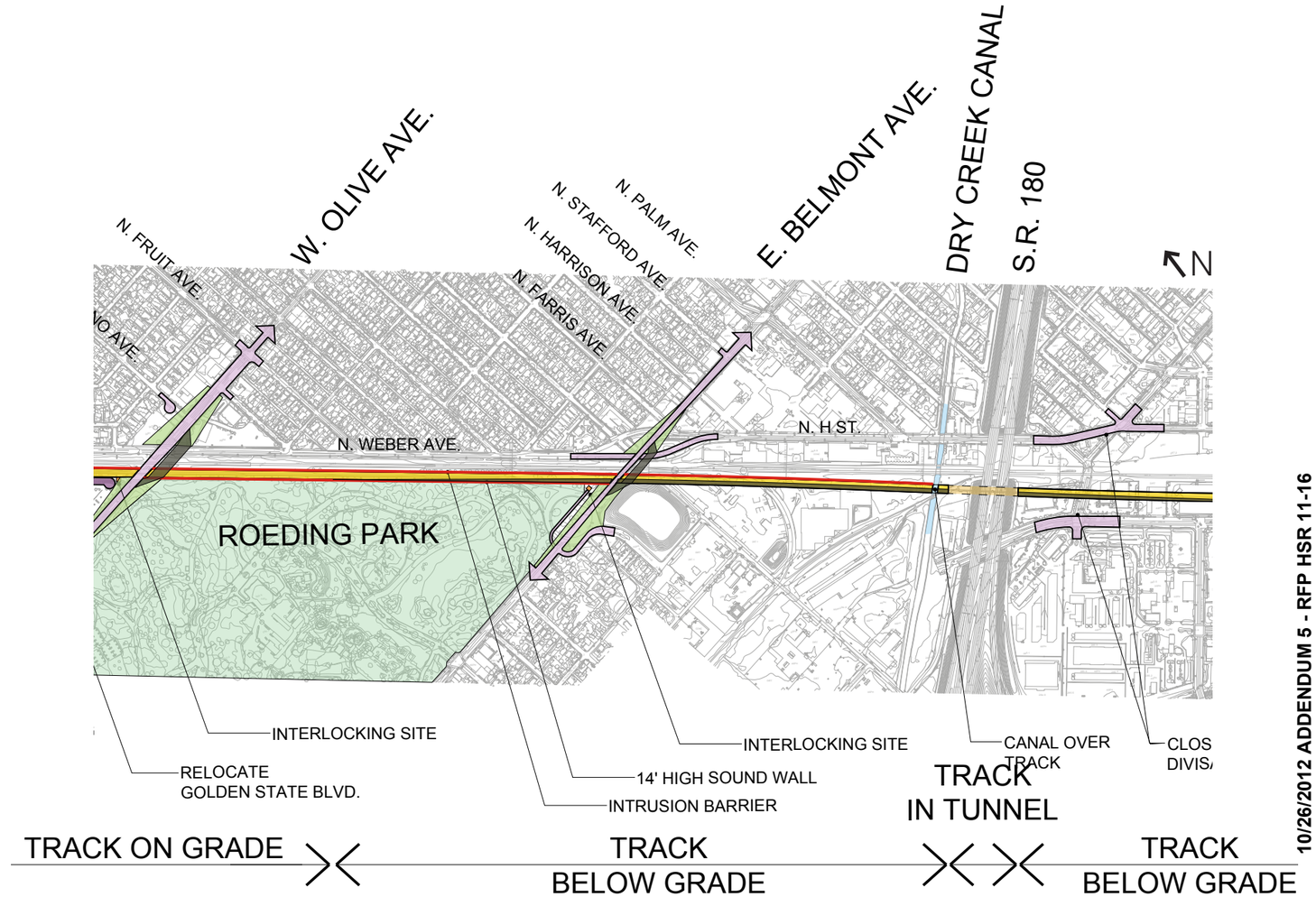
DOWNTOWN

Belmont Avenue Overpass

Belmont is a neighborhood connector with commercial truck access for the Producers facility at the intersection of Belmont and Harrison Avenue. The Belmont underpass will be replaced by an overpass of the HSR and UPRR ROW's and the realignment of Weber and H St. The Profile of the Belmont overpass in the 15% documents show overpass transitions that do not meet existing grade until the intersection of Palm Ave. cutting off access to Harrison Ave. and the Producers truck access to Belmont.

Recommendations: Encourage and accommodate pedestrian and bicycle travel from east to west with 14' combined facilities on both sides of the overcrossing. Review the Belmont Engineering profile to reduce the length of the grade transition so Harrison Avenue and the Producers truck access is not compromised by approach ramps. One option that could reduce the length of the grade separation of Belmont is to move the weaving transition of Harrison from Weber to H Street, south so that the clearance-restrict portion of Harrison, is closer the full height section of the overcrossing. This could allow Belmont to reach grade quicker and lessen impact to the neighborhood - by shortening the approach ramp by approximately 200'.

Existing: View looking east on Belmont Avenue toward the central city.



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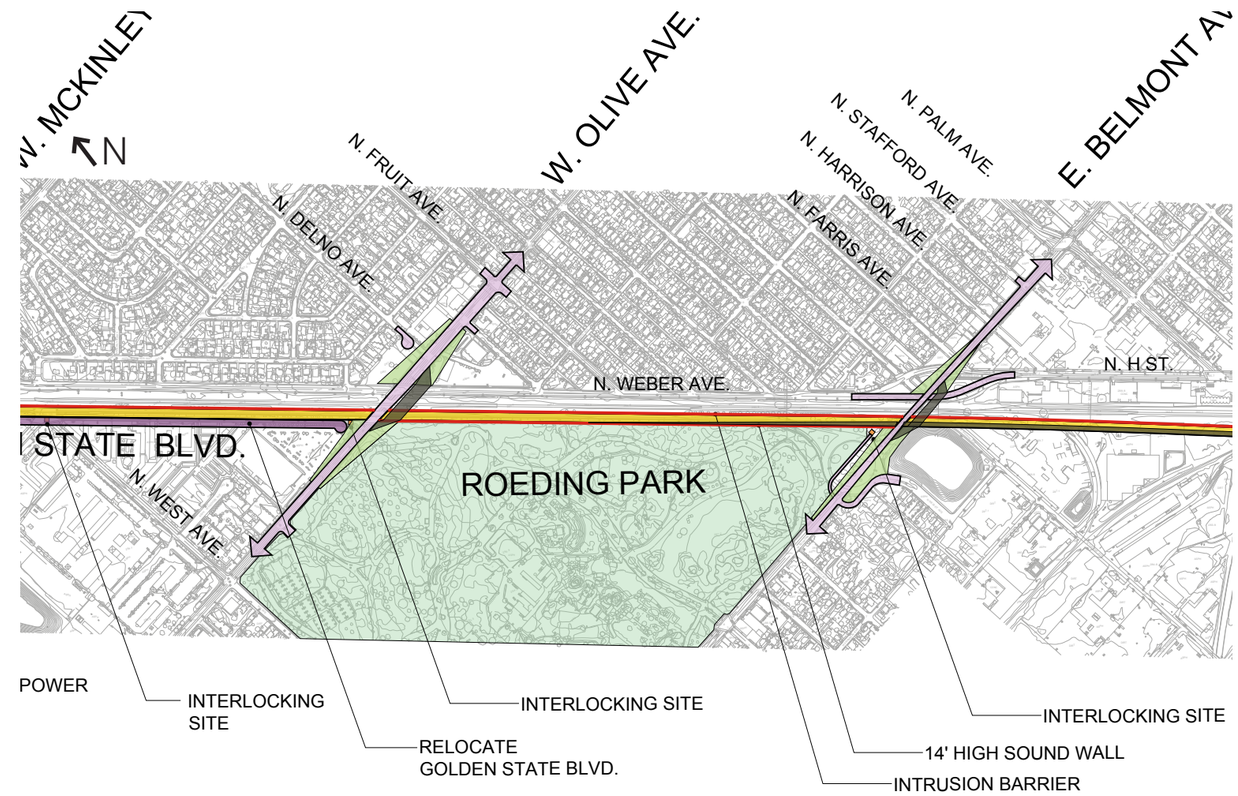
DOWNTOWN

Roeding Park/Golden State Frontage

Roeding Park is a cherished central city park with large trees and a variety of public space. Golden State Boulevard along its eastern edge will be replaced by the HSR alignment. A portion of the alignment is beginning to descend into a trench that tunnel under SR 180. Retaining walls and fencing will change the appearance of the park edge.

Recommendations: visual changes to the park can be made acceptable through carefully placed additional landscaping including the planting of tightly spaced trees to create a linear grove and a green visual barrier along the entire eastern edge of the park from Olive Avenue to the triangle of land given back to the park by the removal of the roundabout at the abandoned alignment of Golden Gate Blvd. and Belmont Avenue.



Existing: View of traffic circle where Golden State Boulevard meets Belmont Avenue

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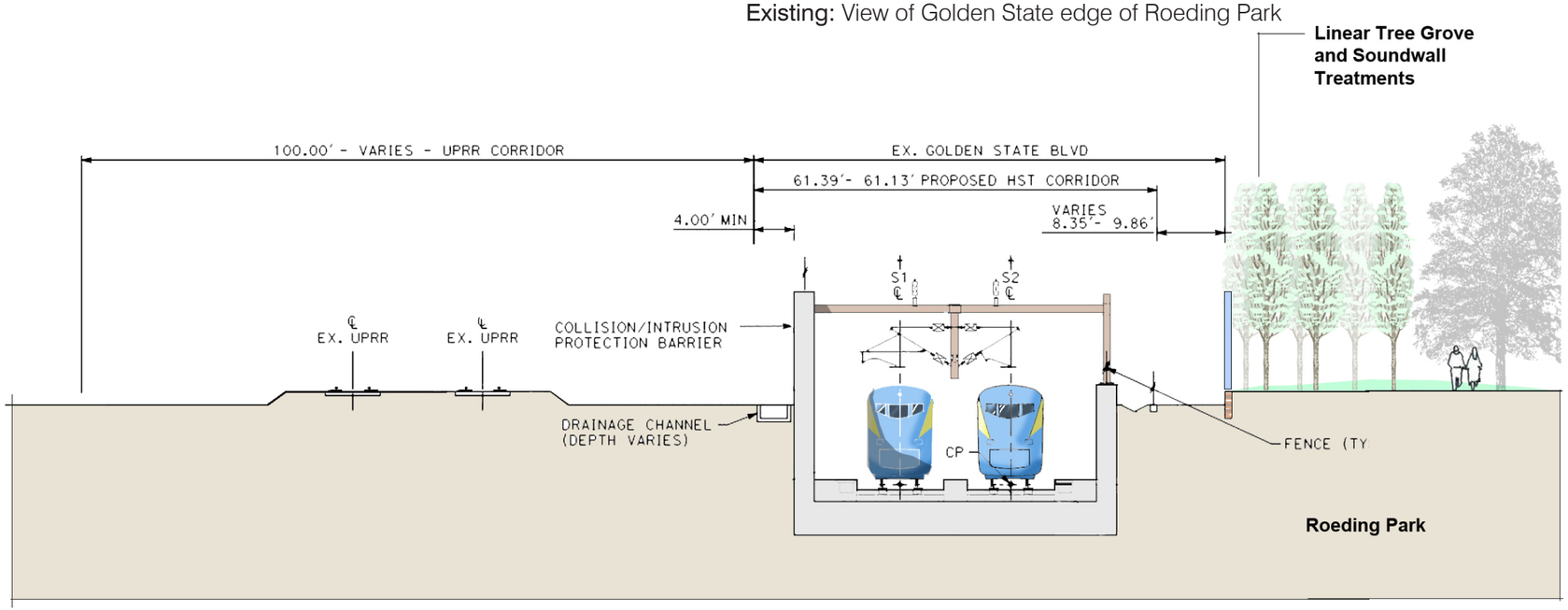
DOWNTOWN

UPRR/HSR Intrusion Barrier Wall near Roeding Park

Existing: View of Golden State edge of Roeding Park



Planned: Illustration of the proposed relationship between Roeding Park and the HSR and UPRR rights of way and safety wall

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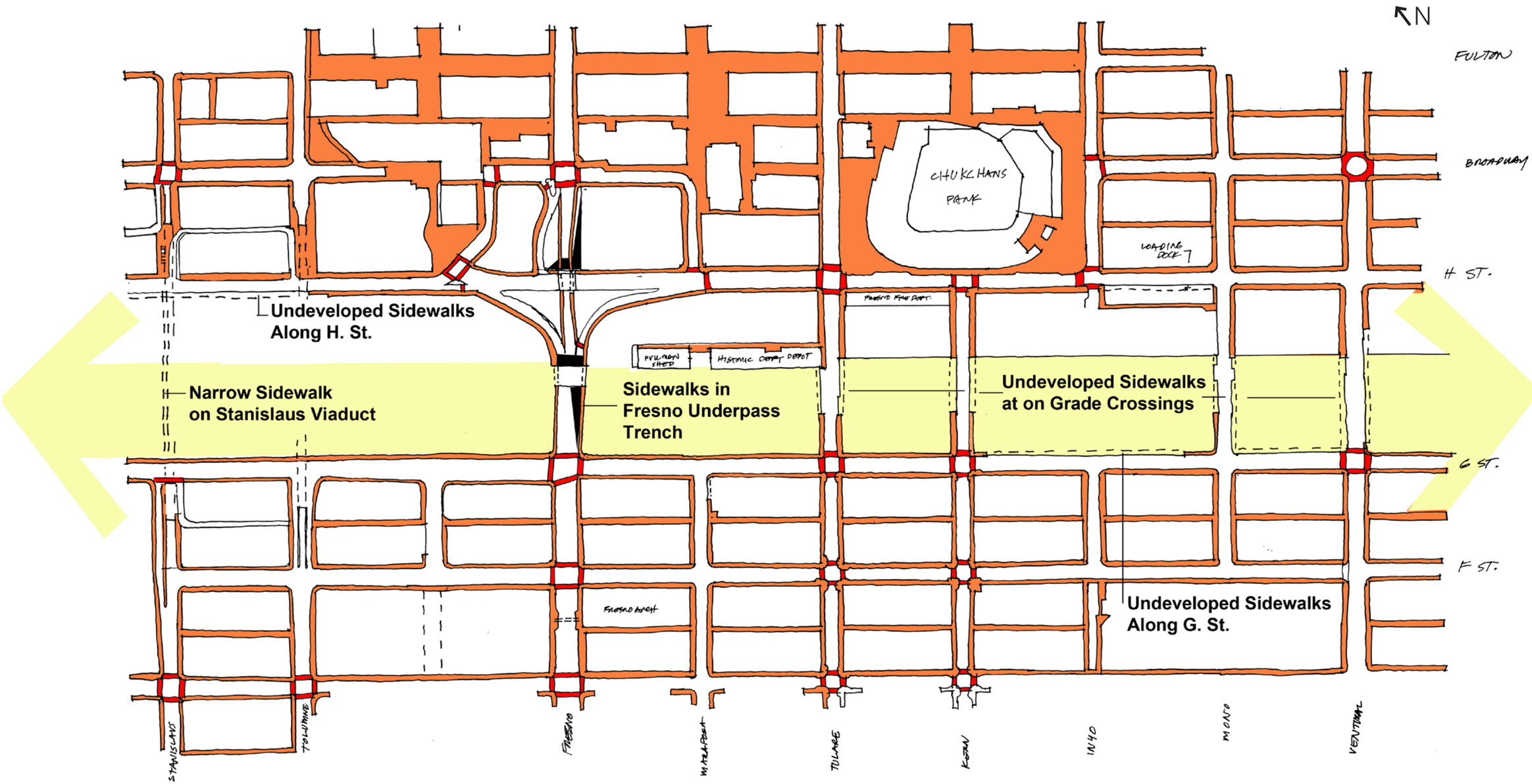
DOWNTOWN

Central City Street Connectivity



Existing: This diagram illustrates the pedestrian network in downtown Fresno in the vicinity of the HSR Alignment, with emphasis on streets that cross the rail ROW (shown in yellow)

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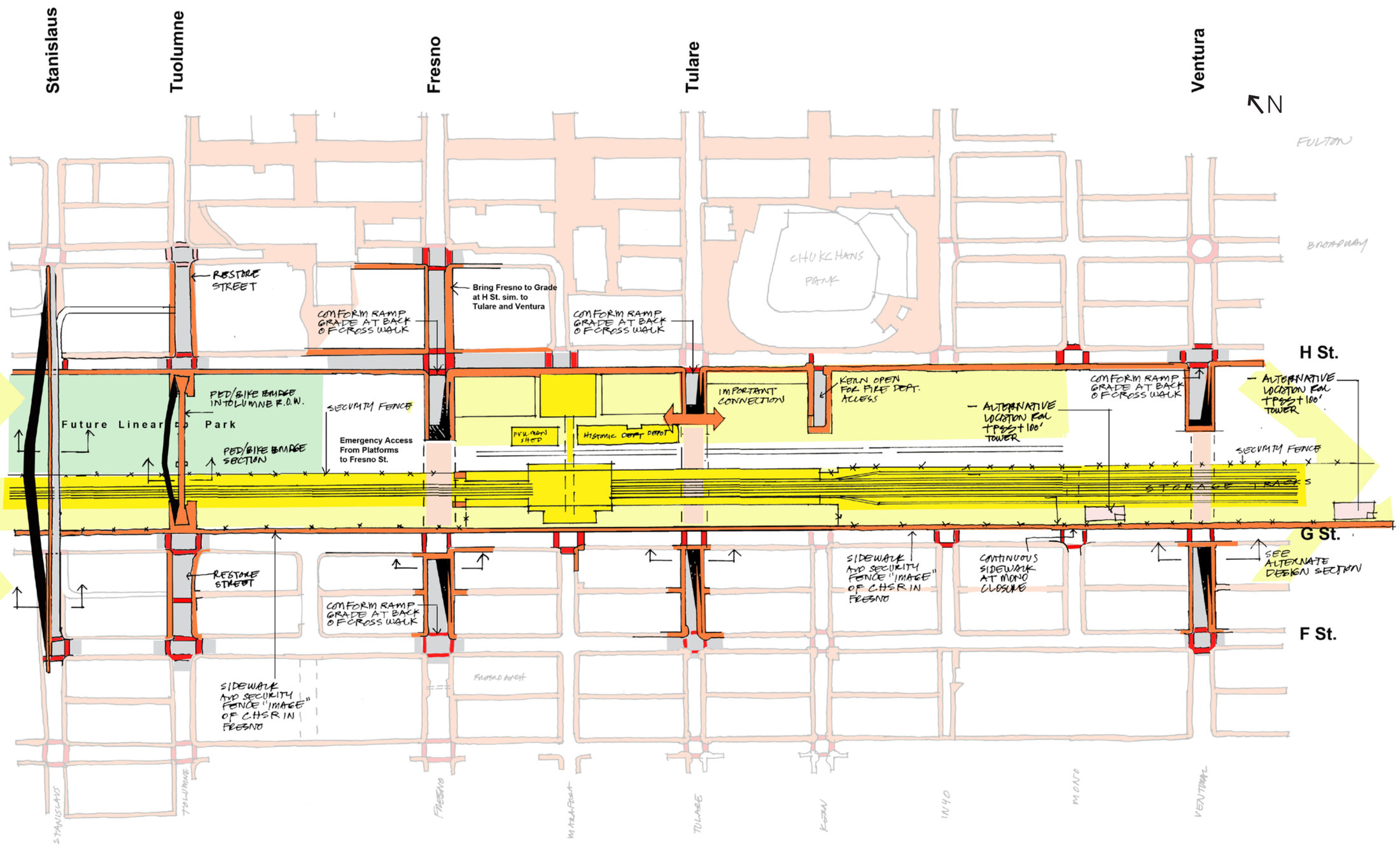

Recommended: This diagram illustrates the recommended pedestrian network in downtown Fresno in the vicinity of the HSR Alignment, with emphasis on streets that cross the rail ROW (shown in yellow). Concepts shown here are described in greater detail on the pages that follow.

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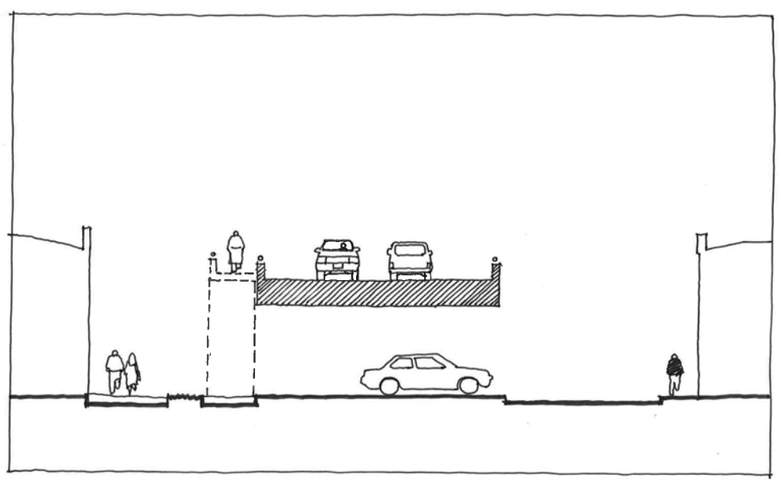
DOWNTOWN

Stanislaus Street Bridge

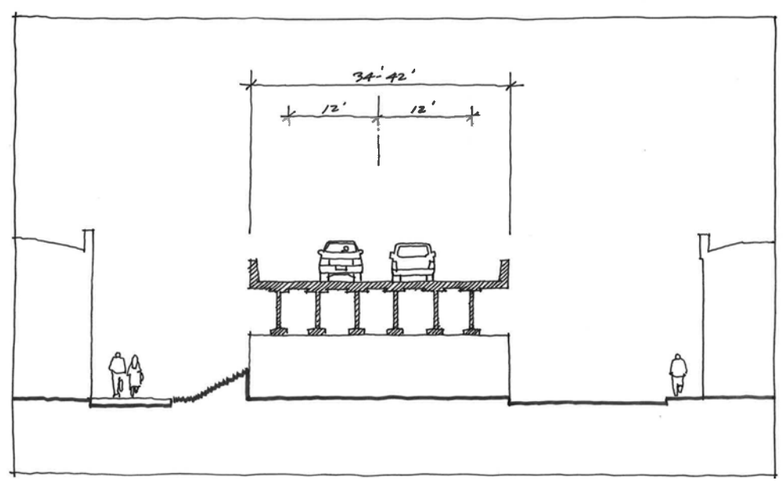
Stanislaus is currently a C3-designated (high-volume, one-way) street. Together with Tuolumne, it forms a one way couplet. As part of the CHSR project, the Stanislaus Street Bridge will be rebuilt as a two-way, four lane facility to replace the function and capacity of the couplet. The Design-Build teams need to confirm if the full-width pedestrian- bicycles facility can be added to the travel lanes and still fit within the 100' right-of-way.

Recommendations: include an expanded pedestrian and bicycle space for both sides of the overcrossing or at least one side if right-of-way is constrained.

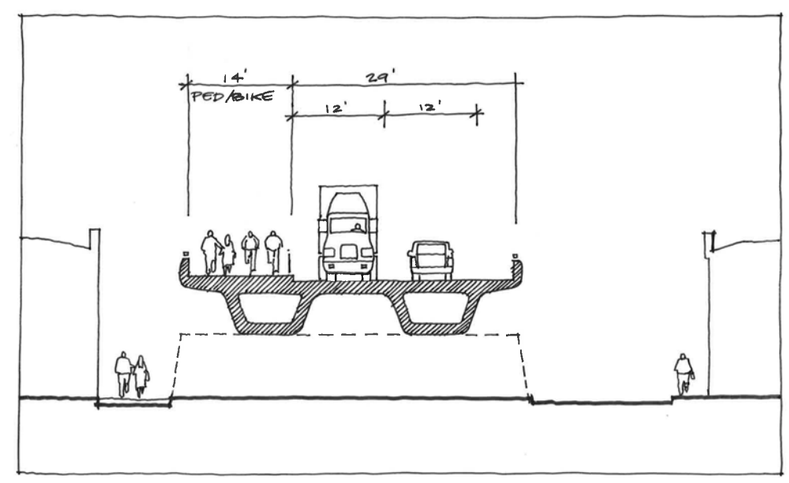
Existing: Views of Stanislaus overcrossing from Broadway (left) and H Street (right).



Existing Conditions



Proposed conceptual engineering design*



Recommended design*

* Cross section has been recently revised to four travel lanes.

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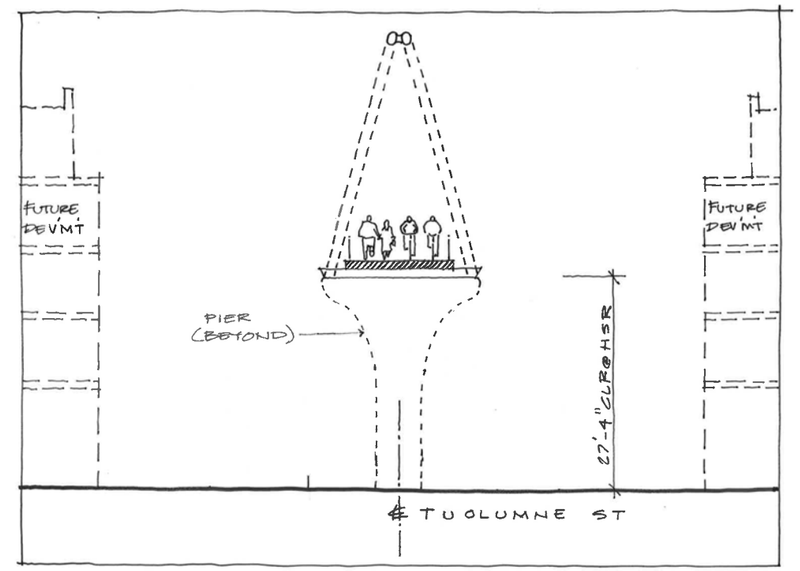
DOWNTOWN
Tuolumne Street

Tuolumne Street is a C3-designated (high-volume, one-way) street that currently serves as the NE-bound partner in the Stanislaus-Tuolumne one-way couplet. The CHSR 15% engineering drawings assume elimination of the Tuolumne overpass.

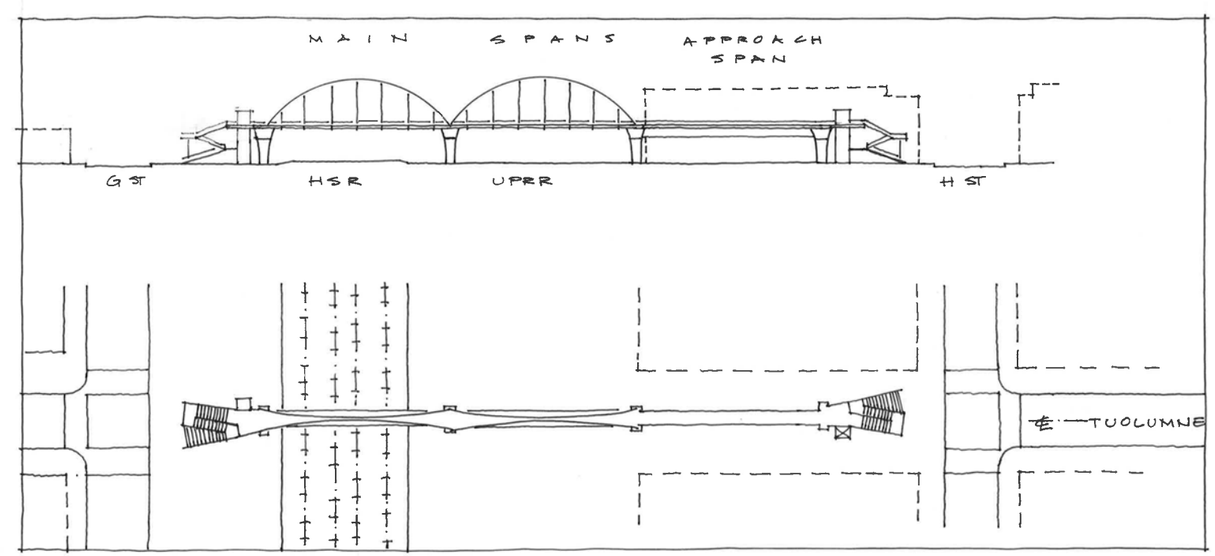
Re-use of the Tuolumne right-of-way for a pedestrian-bicycle access bridge is preferable to a mid-block pedestrian bridge that does not line up with the desired pathways of pedestrians and bicyclists, on the street grid. Circulation is most intuitive and convenient when it is organized in street rights-of-way, or in a way that reinforces the patterns established by a grid of rights-of-way. By creating starting and ending points at G and H Street, the new pedestrian bridge would increase connectivity, and allow restoration of normal frontage for Tuolumne Street between Broadway and F Street (which is currently occupied by the approach to the existing bridge).

Recommendations: re-align the proposed pedestrian bridge in the Tuolumne right-of-way and provide vertical connection at H and G streets to expose more commercial frontage.



Recommended design: pedestrian bridge section

Example: pedestrian bridge over active rail tracks



Recommended design: pedestrian bridge elevation and plan

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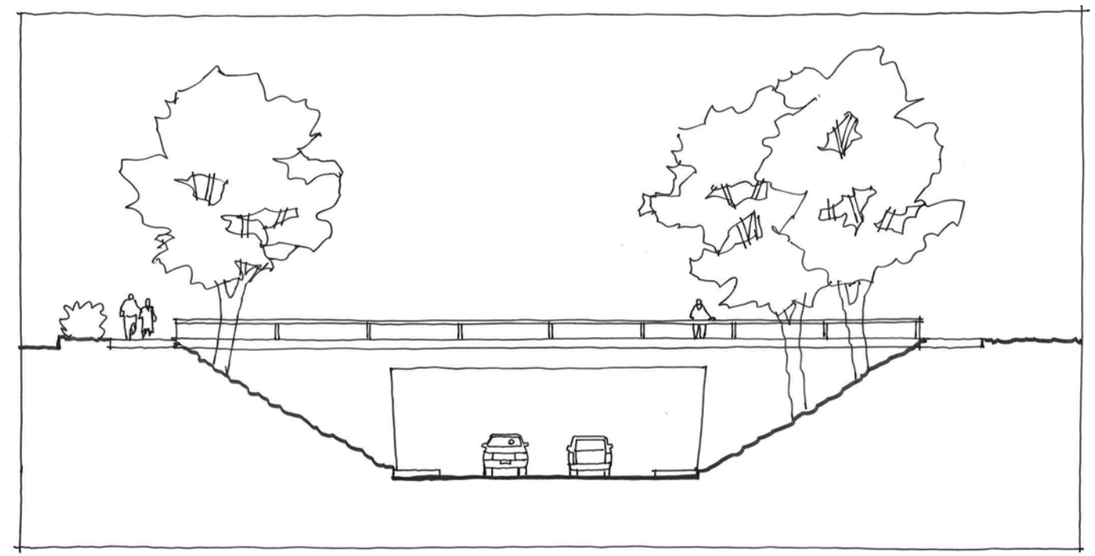
DOWNTOWN
Fresno

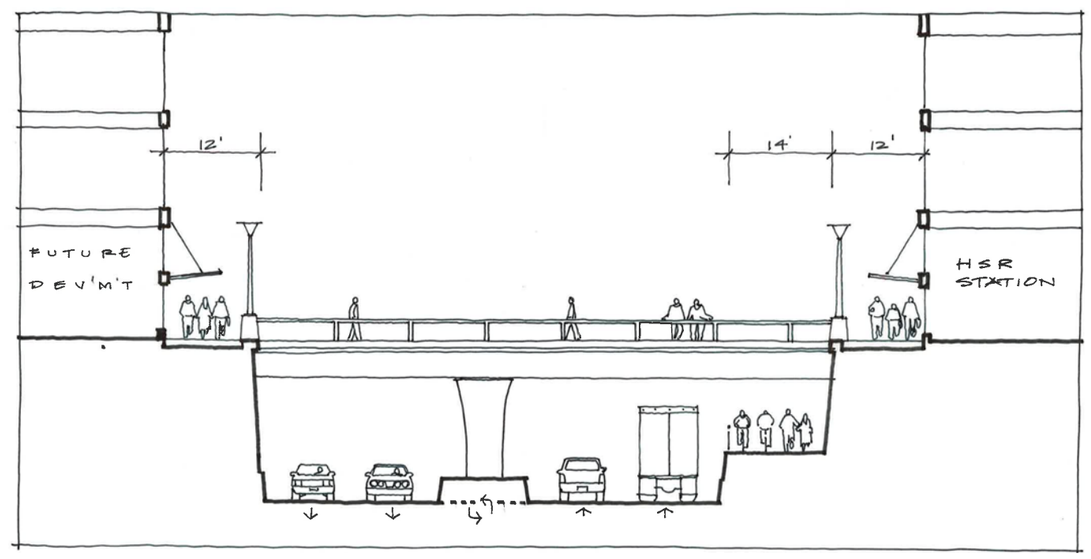
Fresno Street is a C2 designated (high pedestrian and high auto priority) street that links several important downtown destinations and SR99. The existing curving ramps and sloped landscape banks will be removed to allow tighter urban development on both sides of the 100' right-of-way.

Recommendations: provide generous at-grade sidewalks and underpasses for pedestrian and bicyclists; if possible, bring Fresno Street to grade at H Street and eliminate the below grade underpass that previously came to grade at Broadway; this reduces the commercial frontage flanked by undercrossing approaches.

Existing: View looking Southwest on Fresno Street toward the H Street overpass.



Existing: Fresno Street undercrossing section



Recommended undercrossing design concept for Fresno, Tulare and Ventura.

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DOWNTOWN

Tulare St

Tulare Street is a C1 designated (high ped priority) street in an 80' ROW. It is part of the main pedestrian entry to Chukchansi Baseball Park. Because of event surges and its location, Tulare is a very important pedestrian and bicycle link.

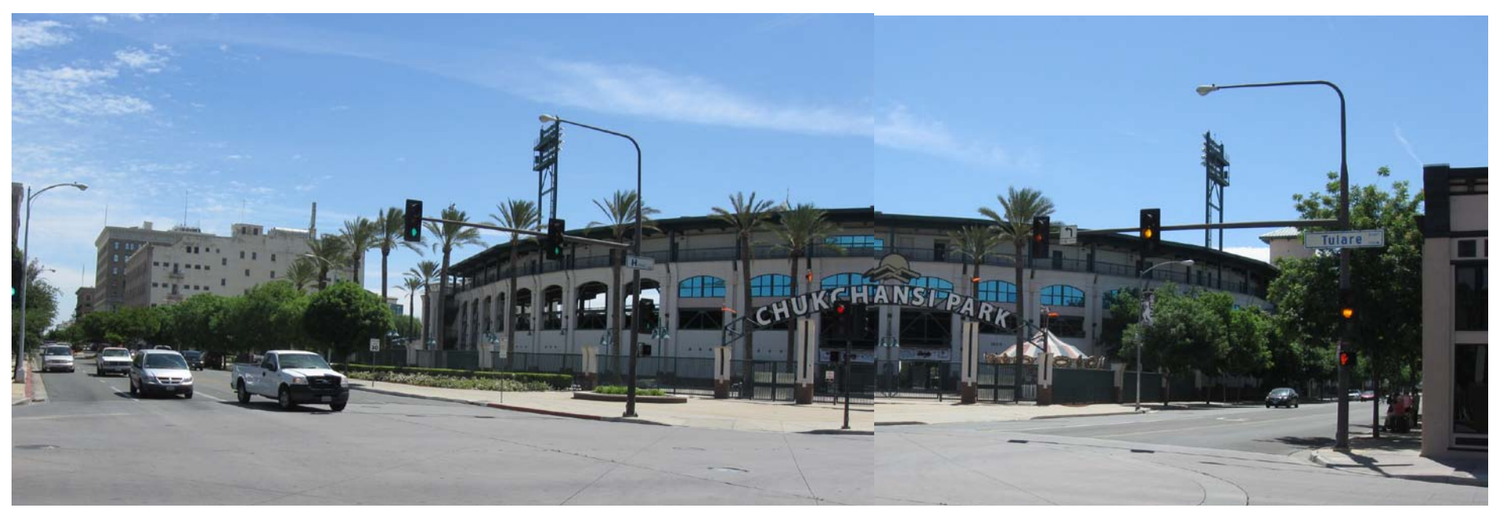
Recommendations: Provide a 16' sidewalk on one side and a 12' sidwalk on the other, with on-street bike lanes in both directions.

Example: 16' pedestrian-bicycle undercrossing sidewalk, Denver, CO.

Ventura Ave

Ventura Street is an A2 designated (boulevard) street, with a 100' ROW and multiple travel lanes. It also indicates a separate pedestrian bridge to the west side. East of SR41, Ventura Street becomes Kings Canyon Boulevard. It is one the busiest bus corridors in Fresno and will become part of the Blackstone-Kings Canyon Bus Rapid Transit route in the next few years.

Recommendations: an integrated pedestrian facility with at-grade and underpass sidewalks for pedestrians and bicyclist should be evaluated to see if a separate pedestrian bridge may not be needed.



Existing: Chukchansi Park, at the intersection of Tulare and H Street, drives high pedestrian volumes around events.

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DOWNTOWN
G and H Streets

G and H streets will serve as entrances to the HSR Station. They are also C1 designated (high ped. priority) streets. It is important that the perimeter security fencing for the station be integrated into a pleasant and inviting streetscape as many walk-in HSR riders will use these streets to enter and exit the station. These streets will also serve new mixed use development on candidate blocks. Well-designed landscape elements such as street trees, vertical trellis vines and other elements can make this an integral part of Downtown Fresno.

Recommendations: integrate the design of G and H streets into the station and the high quality pedestrian environment of Downtown.

Example: Reverse-view of Denver undercrossing sidewalk

Example: Street-level and underpass sidewalks. Street-level sidewalks are connected by pedestrian-bicycle bridges at the rail corridor, avoiding dead-end circulation.

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City of Fresno Design Guidelines CHSR

Summary of Fresno CHSR Recommendations 7/6/2012

Crossing Streets	Ref. Report Page #	CHSR Proposed 15% Design: Roadway: Crossing Closed	Overpass	underpass	Fill Walls	Berm Fill	Cut Walls	Pedestrian Facilities: Standard or narrower Sidewalk 1 Side	Standard or narrower Sidewalk 2 Sides	7' Bike & Breakdown Lane	Pedestrian Bridge	City of Fresno Design Guidelines Proposed: Roadway: Crossing Closed	Overpass	underpass	Fill Walls	Berm Fill *	Cut Walls	Pedestrian Facilities: **Enhanced Sidewalk/Bike 2 Sides**	**Enhanced Sidewalk Bike 1 Side**	**Grade Separate Walk**	**Pedestrian Bridge**	Source of Rec'd Street Design: General Plan, 2030	Downtown Plan(s)	Street Type	Comments
Herndon Ave.	34			■										■				■				■			Herndon under elevated guideway
Veterans Blvd.	35		■					■		■			■			■		■				■			C of F to determine ped/bike connect'ns to viaduct
Shaw Ave.	36		■		■	■			■				■			■		■				■			Future BRT accommodation?
Ashlan Ave.	37		■		■	■		■					■			■		■				■			
Clinton Ave.	42		■		■			■					■			■		■					■	C2	
KcKinley Ave.	43		■		■			■					■			■		■					■	C2	Blend Fill and Landscape with FMFOD Basin
Olive Ave.	44		■		■			■					■			■		■					■	C2	Coordinate fill and landscape with Roeding Park
Belmont Ave.	45		■		■			■					■			■		■					■	C2	Blend Fill and Landscape with FMFOD Basin.
																									Coordinate Fill and landscape with Roeding Park
Divisadero St.		■										■													
Stanislaus St.	50		■		■						■		■		■				■	■			■	C3	instead, combine ped/bike with bridge
Toulumne St.	51	■										■									■				relocate ped bridge to align with Tuolumne r.o.w.
Fresno St.	52			■			■							■			■		■	■			■	C3	important to reach grade by H St intersection; include a pedestrian connection at end of surface sidewalks/beginning of tunnel on both ends (see photo page 54)
Mariposa St.																									Closed and will be main entry to CHSR Station
Tulare St.	53			■			■							■			■		■	■			■	C1	same comment as Fresno St
Kern St.		■										■													Closed and part of Station area development
Inyo St.		■										■													Closed and part of Station area development
Mono St.		■										■													Closed and part of Station area development
Ventura St.	53			■			■				■			■			■		■	■			■	A2	same comment as Fresno St

Notes: ■ * Indicates which attributes apply to which street corridors and where information or policy originates from

Berm Fill enlarges Overpass footprint, may require additional ROW.

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