

CALIFORNIA HIGH-SPEED TRAIN

Project Environmental Impact Report/Environmental Impact Statement

PRELIMINARY

Palmdale to Los Angeles Section Alternatives Analysis Report Volume 2

California High-Speed Rail Authority



U.S. Department of Transportation
Federal Railroad Administration



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APPENDIX A - DETAILED EVALUATION TABLES

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LAUS to CMF Subsection – Evaluation Matrix						
Measurement Criteria	Alternative LAPT1 Tunnel from At-Grade LAUS (Carried Forward)	Alternative LAPT2 Tunnel from At-Grade or Elevated LAUS (Carried Forward)	Alternative LAPT3 Tunnel from At-Grade LAUS (Carried Forward)	Alternative LAP1A Viaduct from At-Grade or Elevated LAUS (Withdrawn)	Alternative LAP1B West bank option (Withdrawn)	Alternative LAP1C Viaduct from Elevated LAUS - East bank option (Carried Forward)
Design Objectives						
Journey time	2.3 minutes	3.8 minutes	3.2 minutes	6.9 minutes	5.3 minutes	5.5 minutes
	2.36 miles	2.69 miles	2.46 miles	2.73 miles	2.51 miles	2.72 miles
Intermodal Connections	Connections with Amtrak, Metrolink, Metro rail and bus at Los Angeles Union Station	Connections with Amtrak, Metrolink, Metro rail and bus at Los Angeles Union Station	Connections with Amtrak, Metrolink, Metro rail and bus at Los Angeles Union Station	Connections with Amtrak, Metrolink, Metro rail and bus at Los Angeles Union Station	Connections with Amtrak, Metrolink, Metro rail and bus at Los Angeles Union Station	Connections with Amtrak, Metrolink, Metro rail and bus at Los Angeles Union Station
Operating Costs	Higher because of tunnel ventilation	Higher because of tunnel ventilation	Higher because of tunnel ventilation	1.0	1.0	1.0
Capital Costs	1.5	1.5	1.5	1.0	1.1	1.2
Land Use						
Transit Oriented Development (TOD) Potential	Currently, the Los Angeles Union Station is in operation and serves as a transfer location terminus for metro rail transportation through the Los Angeles Basin. The TOD potential is high as the terminus is located in dense industrial, public, and commercial uses.	Similar	Similar	Similar	Similar	Similar

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Consistency with Other Planning	<p>All alternatives would be consistent with:</p> <ul style="list-style-type: none"> Land uses in the Los Angeles City Community Plans: Central City, Silver Lake-Echo Park-Elysian Valley, Northeast Los Angeles, and Boyle Heights. the City of Los Angeles Central City Community Plan objectives to: keep downtown as the focal point of the regional mobility system accommodating internal access and mobility needs as well. Encourage rail connections that will serve the downtown traveler, and improve freeway movement and capacity adjacent to the Downtown area. the City of Los Angeles Central City North Community Plan objectives to: Develop a public transit system that improves mobility with convenient alternatives to automobile travel, encourage alternative modes of transportation to the use of single occupant vehicles (SOV) in order to reduce vehicular trips, and encourage the expansion of transit programs aimed at enhancing the mobility of senior citizens, disabled persons, and the transit-dependent population. the City of Los Angeles Boyle Heights Community Plan objectives to: Maximize the effectiveness of public transportation to meet the travel needs of transit-dependent residents, encourage alternate modes of travel and provide an integrated transport system, and a transportation system that is coordinated with land uses and which can accommodate the total travel needs of the Community. City of Los Angeles – Northeast Los Angeles Community Planning Area to: Develop an intermodal mass transportation plan to implement linkages to future mass transit service. City of Los Angeles – Los Angeles State Historic Park General Plan to: Explore opportunities to link pedestrian and cycling trails within the Park with neighborhood and regional transportation systems, including regional trails. <p>All alternatives would be inconsistent with:</p> <p>City of Los Angeles – Northeast Los Angeles Community Planning Area to: Require that any proposed development be designed to enhance and be compatible with adjacent development. However, the project team will work with the City and the stakeholders during the project development phase to minimize any incompatibilities with the adjacent developments.</p>					

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Consistency with Other Planning (cont'd)	<p>Alternative LAPT1 would be consistent with the land uses in the Los Angeles City Community Plans: Central City North</p> <p>This alternative would be inconsistent with City of Los Angeles – Los Angeles State Historic Park General Plan to:</p> <ul style="list-style-type: none"> Promote a “Touchstone” Landscape for reflecting on Los Angeles’ Natural and Cultural Heritage Emphasize the Importance of the Historic Site to Los Angeles, California, and the World <p>This alternative would be compatible with planned developments under the following plans:</p> <ul style="list-style-type: none"> CRA/LA Clean Tech Corridor Plan <p>This alternative would not be compatible with planned developments under the following plans:</p> <ul style="list-style-type: none"> Los Angeles River Revitalization Master Plan, Cornfield Arroyo Seco Specific Plan, Los Angeles State Historic Park General Plan (during construction) 	<p>Alternative LAPT2 would be consistent with the land uses in the Los Angeles City Community Plans: Central City North.</p> <p>This alternative would be compatible with planned developments under the following plans:</p> <ul style="list-style-type: none"> Los Angeles State Historic Park General Plan, although a tunnel portal will be placed near the east end of the park, resulting in temporary construction impacts. CRA/LA Clean Tech Corridor Plan <p>This alternative would not be compatible with planned developments under the following plans:</p> <ul style="list-style-type: none"> Los Angeles River Revitalization Master Plan Cornfield Arroyo Seco Specific Plan 	<p>Alternative LAPT2 would be consistent with the land uses in the Los Angeles City Community Plans: Central City North.</p> <p>This alternative would be compatible with planned developments under the following plans:</p> <ul style="list-style-type: none"> Los Angeles State Historic Park General Plan, although a tunnel portal will be placed near the east end of the park, resulting in temporary construction impacts. CRA/LA Clean Tech Corridor Plan <p>This alternative would not be compatible with planned developments under the following plans:</p> <ul style="list-style-type: none"> Los Angeles River Revitalization Master Plan Cornfield Arroyo Seco Specific Plan 	<p>Alternative LAP1A would not be consistent with the land uses in the Los Angeles City Central City North Community Plan as the alignment will travel on a high (40'-50')viaduct very close to residential land uses</p> <p>This alternative would be compatible with planned developments under the following plans:</p> <ul style="list-style-type: none"> Los Angeles River Revitalization Master Plan (on the west bank), Cornfield Arroyo Seco Specific Plan, Los Angeles State Historic Park General Plan, and the CRA/LA Clean Tech Corridor Plan <p>This alternative would not be compatible with planned developments under the following plans:</p> <ul style="list-style-type: none"> Los Angeles River Revitalization Master Plan (on the east bank) 	<p>Alternative LAP1B would not be consistent with the land uses in the Los Angeles City Central City North Community Plan as the alignment will travel on a high (40'-50')viaduct very close to residential land uses</p> <p>This alternative would be compatible with planned developments under the following plans:</p> <ul style="list-style-type: none"> Los Angeles State Historic Park General Plan, CRA/LA Clean Tech Corridor Plan <p>This alternative would not be compatible with planned developments under the following plans:</p> <ul style="list-style-type: none"> Los Angeles River Revitalization Master Plan Cornfield Arroyo Seco Specific Plan 	<p>Alternative LAP1C would not be consistent with the land uses in the Los Angeles City Central City North Community Plan as the alignment will travel on a high (40'-50')viaduct very close to residential land uses</p> <p>This alternative would be compatible with planned developments under the following plans:</p> <ul style="list-style-type: none"> Los Angeles State Historic Park General Plan CRA/LA Clean Tech Corridor Plan <p>This alternative would not be compatible with planned developments under the following plans:</p> <ul style="list-style-type: none"> Los Angeles River Revitalization Master Plan Cornfield Arroyo Seco Specific Plan

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Measurement Criteria	Alternative LAPT1 Tunnel from At-Grade LAUS (Carried Forward)	Alternative LAPT2 Tunnel from At-Grade or Elevated LAUS (Carried Forward)	Alternative LAPT3 Tunnel from At-Grade LAUS (Carried Forward)	Alternative LAP1A Viaduct from At-Grade or Elevated LAUS (Withdrawn)	Alternative LAP1B West bank option (Withdrawn)	Alternative LAP1C Viaduct from Elevated LAUS - East bank option (Carried Forward)
Constructability						
Constructability	Bored tunnel beneath park, houses and Los Angeles River will require easements. Cut and cover through LASHP will be less complex than beneath Broadway, but will require approval.	Constructing the viaduct in a narrow strip of land between the Gold Line and Broadway, and constructing the cut and cover section of tunnel under Broadway will be complex	Bored tunnel beneath park, houses and Los Angeles River will require easements. Cut and cover beneath Spring Street will be complex.	Constructing the viaduct over the Metrolink tracks as they approach LAUS while keeping Metrolink services running will be particularly complex	Construction in the congested rail corridor on the west bank, and the long skew crossing of the Los Angeles River beneath existing bridges will be particularly complex	Constructing the viaduct crossing over the Los Angeles River and the Metrolink tracks on a skew will be complex.
Disruption to Existing Railroad	Interface with existing railroads is limited to a small section immediately north of LAUS. Gold Line on viaduct emerging from LAUS would need to be diverted	Interface with existing railroads is limited to a small section immediately north of LAUS. Gold Line on viaduct emerging from LAUS would need to be diverted for the at-grade station option.	Interface with existing railroads is limited to a small section immediately north of LAUS. Gold Line on viaduct emerging from LAUS would need to be diverted.	Construction of HST viaduct directly above the Metrolink tracks over a long length on the approach to LAUS and over the Los Angeles River will cause some disruption. Gold Line on viaduct emerging from LAUS would need to be diverted for the at-grade station option.	There will be significant disruption to UPRR/Metrolink operations and to Gold Line operations during construction. Access to the Metrolink Central Maintenance Facility will be permanently affected. Gold Line on viaduct emerging from LAUS would need to be diverted for the at-grade station option.	Interface with existing railroads is limited to a small section immediately north of LAUS, the crossing near the Los Angeles River and running alongside the east bank tracks. Gold Line on viaduct emerging from LAUS would need to be diverted for the at-grade station option.

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Disruption to and Relocation of Utilities	<p>Most of this segment is in tunnel, thereby minimizing impact on utilities, except in trench segments transitioning to tunnel. Utility conflicts include:</p> <ul style="list-style-type: none"> 2 x 20" high pressure (HP), 8 MP gas crossings 2 x 20" oil crossings 1 x 230 KV electrical crossing 2 telecom crossings 11 storm crossings, 2 over 7.5' wide Los Angeles River crossing 19 sewer crossings, one 48" diameter 21 water crossings including 6 x 36" diameter and up Elysian Reservoir crossing <p>Of these utilities, crossings in trench areas include: 7 MP gas, one 20" oil, 3 storm, 8 sewer, and 3 water. There is also one longitudinal storm conflict in the trench area. Storm and sewer crossings in trench areas may require siphons or pump stations.</p>	<p>Most of this segment is in tunnel, thereby minimizing impact on utilities, except in trench segments transitioning to tunnel. Utility conflicts include:</p> <ul style="list-style-type: none"> 1 HP, 2 MP gas crossings 2 x 20" oil crossings 1 x 230 KV electrical crossing 2 telecom crossings, 1 longitudinal ½ mile 7 storm crossings, one 7.5' wide Los Angeles River crossing 10 sewer crossings, one 48" diam, 1 longitudinal ¼ mile 23 water crossings including 8 x 36" diameter and up Elysian Reservoir crossing <p>Of these utilities, crossings in trench areas include: 1 storm, 2 sewer, and 2 water. There is also one longitudinal conflict for each of telecom, storm, sewer, and water. Storm and sewer crossings in trench areas may require siphons or pump stations.</p>	<p>Most of this segment is in tunnel, thereby minimizing impact on utilities, except in trench segments transitioning to tunnel. Utility conflicts include:</p> <ul style="list-style-type: none"> 2 x 20" HP, 9 MP gas crossings, 320 ft longitudinal MP 1x 20" oil crossing 1 telecom crossing 6 storm crossings, 1 over 10' wide, 2 longitudinal (both under ¼ mile) Los Angeles River crossing 12 sewer crossings 12 water crossings <p>Of these utilities, crossings in trench areas include: 6 MP gas, 2 storm (one over 10' wide), 6 sewer, and 3 water. The longitudinal conflicts (both storm and one gas) lie within the trench area. Storm and sewer crossings in trench areas may require siphons or pump stations.</p>	<p>Most of this segment is elevated or at grade, thereby minimizing disruption to utilities. However, longitudinal conflicts will be relocated. Utility conflicts include:</p> <ul style="list-style-type: none"> 3 medium pressure (MP) gas crossings 1 oil crossing 230 KV electrical – 2 crossings, 1/6 mile longitudinal conflict 1 telecom crossing 15 storm drain crossings: 6 channels over 5' wide, 1 over 10' wide Los Angeles River crossing 11 sewer crossings, 5 at least 48" diam 12 water crossings 	<p>Most of this segment is elevated, minimizing the impact on utilities, except the north end which goes into a trench. Utility conflicts include:</p> <ul style="list-style-type: none"> 9 MP gas crossings, ½ mile longitudinal MP 20" oil ¼ mile longitudinal 230 KV electrical – 1 crossing, ½ mile longitudinal 1 telecom crossing, ¼ mile longitudinal 7 storm crossings; 3 channels over 5' wide Los Angeles River crossing 8 sewer crossings, one 48" diam 10 water crossings <p>The trenched area is north of the utilities listed above.</p>	<p>Most of this segment is elevated, minimizing the impact on utilities, except the north end which goes into a trench. Utility conflicts include:</p> <ul style="list-style-type: none"> 7 MP gas crossings, 650 feet longitudinal MP 1 oil crossing 230 KV electrical – 2 crossings, 790 ft longitudinal 1 telecom crossing 12 storm crossings; 3 channels over 5' wide Los Angeles River crossing 14 sewer crossings, 3 x 48" diam, ¼ mile longitudinal 12 water crossings <p>The trenched area is north of the utilities listed above.</p>
Disruption to Communities						
Displacements						
Residential Displacements	None	None	None	1 parcel impacted (small take at corner of housing project site, buildings not affected)	1 parcel impacted (small take at corner of housing project site, buildings not affected)	None

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Business Displacement	18 – industrial parcels impacted 1 – non profit parcel impacted (Post Office Terminal Annex)	9 – industrial parcels impacted 1 – non profit parcel impacted (Post Office Terminal Annex)	22 – industrial parcels impacted 2 – non profit parcels impacted (Post Office Terminal Annex and Ttokamsa Home Mission Church)	4 -commercial parcels impacted 27- industrial 2 – non profit parcels impacted (Post Office Terminal Annex and Lincoln Heights Jail)	18 – industrial parcels impacted 1 – non profit parcel impacted (Post Office Terminal Annex)	6 – commercial parcels impacted 36 – industrial parcels impacted 2 – non profit parcels impacted (Post Office Terminal Annex and Lincoln Heights Jail)
Properties with Access Affected	2	0	2	1	3	1
Local Traffic Effects near stations	See station evaluation (Los Angeles to Anaheim AA)	See station evaluation (Los Angeles to Anaheim AA)	See station evaluation (Los Angeles to Anaheim AA)	See station evaluation (Los Angeles to Anaheim AA)	See station evaluation (Los Angeles to Anaheim AA)	See station evaluation (Los Angeles to Anaheim AA)
Highway Grade Separations and Closures	1 grade separation (Main Street), 2 closures (local roads)	Temporary diversions on Broadway during construction, no others for elevated or at-grade LAUS	1 grade separation (Main Street), 2 closures (local roads), plus bridges over trench	None for elevated or at grade LAUS	None for elevated or at grade LAUS	None for elevated or at grade LAUS
Environmental Resources						
Biological Resources	The HST Station and approaches would be located below flood level of Los Angeles River, flooding risks would be avoided by flood-proofing techniques designed to protect ventilation and portal structures. There are no sensitive habitat areas within the LAUS area.	The HST Station and approaches would be located below flood level of Los Angeles River, flooding risks would be avoided by flood-proofing techniques designed to protect ventilation and portal structures. There are no sensitive habitat areas within the LAUS area.	The HST Station and approaches would be located below flood level of Los Angeles River, flooding risks would be avoided by flood-proofing techniques designed to protect ventilation and portal structures. There are no sensitive habitat areas within the LAUS area.	The HST Station and approaches would be at grade or elevated above the Los Angeles River floodplain. There are no sensitive habitat areas within the LAUS area.	The HST Station and approaches would be at grade or elevated above the Los Angeles River floodplain. There are no sensitive habitat areas within the LAUS area.	The HST Station and approaches would be at grade or elevated above the Los Angeles River floodplain. There are no sensitive habitat areas within the LAUS area.

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Cultural Resources	<p>Impacts to previously recorded archaeological resources in LASHP would occur as a result of cut and cover construction through the park.</p> <p>These could be mitigated by removal or modification of the intact resource to accommodate the proposed track</p> <p>Previously Recorded Historical Resources</p> <ul style="list-style-type: none"> • 2 properties adjacent to or near the alignment • 24 properties within the ½ mile zone <p>Previously Recorded Archeological Resources</p> <ul style="list-style-type: none"> • 1 previously recorded site which would be displaced (in LASHP). • 25 previously recorded sites within the ½ mile zone 	<p>Previously Recorded Historical Resources</p> <ul style="list-style-type: none"> • 4 properties adjacent to or near the alignment • 26 properties within the ½ mile zone <p>Previously Recorded Archeological Resources</p> <ul style="list-style-type: none"> • 3 previously recorded site adjacent to or near the alignment • 25 previously recorded sites within the ½ mile zone 	<p>The proposed route would directly impact the Raphael Junction Block Building, a Historic Cultural Monument.</p> <p>Previously Recorded Historical Resources</p> <ul style="list-style-type: none"> • 4 properties adjacent to or near the alignment • 26 properties within the ½ mile zone <p>Previously Recorded Archeological Resources</p> <ul style="list-style-type: none"> • 3 previously recorded site adjacent to or near the alignment <p>25 previously recorded sites within the ½ mile zone</p>	<p>The LAP1A alignment would be placed on a viaduct to avoid undermining historic Main Street Bridge, and would avoid demolition of the historic Spring Street and Broadway bridges. The route would cross these historic-period properties on viaduct. The route would displace the historically and culturally significant San Antonio Winery.</p> <p>Previously Recorded Historical Resources</p> <ul style="list-style-type: none"> • 3 properties adjacent to or near the alignment • 28 properties within the ½ mile zone <p>Previously Recorded Archeological Resources</p> <ul style="list-style-type: none"> • 1 previously recorded site adjacent to or near the alignment <p>23 previously recorded sites within the ½ mile zone</p>	<p>The LAP1B alignment would be placed on a viaduct to avoid undermining historic Spring Street, and Broadway bridges. The route would cross these historic-period properties on viaduct.</p> <p>Previously Recorded Historical Resources</p> <ul style="list-style-type: none"> • 2 properties adjacent to or near the alignment • 31 properties within the ½ mile zone <p>Previously Recorded Archeological Resources</p> <ul style="list-style-type: none"> • 2 previously recorded sites adjacent to or near the alignment • 25 previously recorded sites within the ½ mile zone 	<p>The LAP1C alignment would be placed on a viaduct to avoid undermining historic, Spring Street, and Broadway bridges. The route would cross these historic-period properties on viaduct.</p> <p>Previously Recorded Historical Resources</p> <ul style="list-style-type: none"> • 2 properties adjacent to or near the alignment • 31 properties within the ½ mile zone <p>Previously Recorded Archeological Resources</p> <ul style="list-style-type: none"> • 2 previously recorded site adjacent to or near the alignment • 25 previously recorded sites within the ½ mile zone
Cultural Resources (cont'd)	<p>Common to all alternatives</p> <p>The proposed route has the potential to indirectly impact portions of historic-period properties as a result of noise and vibration from construction activities, and from operation of the high speed train, as well as changes to historic integrity aspects of feeling and setting.</p> <p>Impacts to previously recorded archaeological resources have the potential to occur as a result of direct impacts, such as removal or modification of the intact resource to accommodate the proposed track</p> <p>No impacts to human remains are anticipated.</p>					

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Cultural Resources (cont'd)	Common to all tunnel alternatives Impacts to buried archaeological resources have the potential to occur as a result tunneling or trenching. Impacts to paleontological resources have the potential to occur as a result of deep excavation to accommodate proposed tunnels along the project right-of-way. Deep excavation is likely to encounter the Monterey Formation, which is a fossil-bearing stratum.			Common to all viaduct alternatives Impacts to buried archaeological resources have the potential to occur as a result of construction of footings for elevated structures.		
Parklands	Impacts to Los Angeles State Historic Park due to trenching during construction, but low impact after completion. 2 parks and recreational uses adjacent to or intersecting the alignment.	Impacts from passing close to Los Angeles State Historic Park and Elysian Park due to placement and construction of tunnel portals. 3 parks and recreational uses adjacent to or intersecting the alignment.	Impacts from passing close to Los Angeles State Historic Park due to placement and construction of tunnel portals. 2 parks and recreational uses adjacent to or intersecting the alignment.	Likely direct impacts from passing close to Los Angeles Youth Athletic Club and Downey Recreation Center , and the future Albion Dairy River Park on viaduct. Likely indirect impacts (visual) to Los Angeles State Historic Park and Elysian Park. Likely impacts to bike trails along Los Angeles River. 4 parks and recreational uses adjacent to or intersecting the alignment. Likely impacts from passing close to Los Angeles Youth Athletic Club on viaduct and Cypress Recreation Center at grade.	Likely impacts from passing close to Los Angeles Youth Athletic Club and Elysian Park on viaduct. Impacts to bike trails along Los Angeles River. 4 parks and recreational uses adjacent to or intersecting the alignment.	Likely direct impacts from passing close to Los Angeles Youth Athletic Club and Downey Recreation Center, and the future Albion Dairy River Park on viaduct. Likely indirect impacts (visual) to Los Angeles State Historic Park and Elysian Park. Likely impacts to bike trails along Los Angeles River. 4 parks and recreational uses adjacent to or intersecting the alignment. Likely impacts from passing close to Los Angeles Youth Athletic Club on viaduct and Cypress Recreation Center at grade.

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Agricultural Lands	No impact to agricultural lands.	No impact to agricultural lands.	No impact to agricultural lands.	No impact to agricultural lands.	No impact to agricultural lands.	No impact to agricultural lands.
Natural Environment						
Noise and Vibration	This alternative would leave LAUS on viaduct then immediately transition into a trench before entering a tunnel portal near Main Street, then emerging near Rio De Los Angeles Park. Primary noise and vibration impacts would be to Los Angeles State Historic Park and nearby noise-sensitive land uses during construction activities, but lower impacts after completion. Due to the greatest extent of trench and tunnel sections, this alternative would result in the fewest number of potential operational noise and vibration impacts.	This alternative would leave LAUS on viaduct and continue on viaduct until entering a tunnel portal north of Alameda Street, then emerging near Rio De Los Angeles Park. This alternative would generally result in a greater number of potential operational noise and vibration impact than LAPT1 primarily within Los Angeles State Historic Park and nearby noise-sensitive land uses (due to the longer viaduct portion), but fewer impacts than LAP1A (which is entirely above ground).	This alternative would leave LAUS on viaduct then immediately transition into a trench before entering a tunnel portal near Spring Street, then emerging near Rio De Los Angeles Park. Primary noise and vibration impacts would be to Los Angeles State Historic Park and nearby noise-sensitive land uses during construction activities, but lower impacts after completion.	This alternative would leave LAUS on elevated viaduct just to the south of several multifamily dwelling units just north of LAUS (William Mead Public Housing Development) and then run at-grade or on elevated viaduct near several noise sensitive properties (homes, churches, parklands) on the east side of the Los Angeles River (south of SR-110) and along San Fernando Road (North of SR-110). This increased exposure to sensitive receivers would result in the highest number of potential operational noise and vibration impacts.	This alternative, would leave LAUS on viaduct and continuing north on Main Street and then tracking north along the West side of the Los Angeles River. This alignment would generate considerable noise impacts passing immediately north of the William Mead Housing Project and the Anne Street School on Main Street. This alignment would result in the second highest number of noise impacts.	This alternative, leaving LAUS on viaduct and continuing north on Main Street. This alignment would generate considerable noise impacts passing immediately north of the William Mead Housing Project and the Anne Street School on Main Street. It would then run at-grade or on elevated viaduct near several noise sensitive properties (homes, churches, parklands) on the east side of the Los Angeles River (south of SR-110) and along San Fernando Road (North of SR-110). This increased exposure to sensitive receivers would result in the highest number of potential operational noise and vibration impacts.

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Change in Visual and Scenic Resources	<p>This alternative would have a low impact compared to the other alternatives for the following reasons:</p> <ul style="list-style-type: none"> It goes into trench and then tunnel immediately after leaving LAUS 	<p>This alternative would have a high impact relative to LAPT1 for the following reasons:</p> <ul style="list-style-type: none"> A larger portion of the alignment is above ground than for Alternative LAPT1; therefore, the visual impact would be more significant. A larger portion of the alignment would pass through open space area on viaduct than LAP1A; therefore the impact to recreational users would be more significant. 	<p>This alternative would have a low impact compared to the other alternatives for the following reasons:</p> <ul style="list-style-type: none"> It goes into trench and then tunnel soon after leaving LAUS 	<p>The LAP1A alternative would have the highest impact for the following reasons:</p> <ul style="list-style-type: none"> A larger portion of the alignment is above ground than for Alternative LAPT1; therefore, the visual impact would be more significant. This alternative reaches heights up to 60 feet on the viaduct as the alignment crosses over the San Antonio Winery site, and reaches heights of 70 feet as it crosses over three historically significant bridges – the Main Street Bridge, North Spring Bridge, and North Broadway Viaduct. The viaduct option reaches heights up to 80 feet as it crosses over Young Nake Presbyterian Church, Downey Recreation Center, and a historic jail located along the east bank of the Los Angeles River south of the Pasadena Freeway. It is on a high viaduct in close proximity to multifamily dwelling units just north of LAUS. 	<p>The LAP1B alternative would have high impact for the following reasons:</p> <ul style="list-style-type: none"> A larger portion of the alignment is above ground than for Alternative LAPT1; therefore, the visual impact would be more significant. This alternative reaches heights up to 40-50 feet on the viaduct as the alignment goes over Main Street close to residential areas and reaches heights up to 50-60 feet as it crosses over historically significant bridges – North Spring Bridge, and North Broadway Viaduct. <p>The viaduct option remains at a height of 50-60 feet as it passes close to Elysian Park and the west bank of the Los Angeles River.</p>	<p>The LAP1C alternative would have equally high impact to LAP1A for the following reasons:</p> <ul style="list-style-type: none"> A larger portion of the alignment is above ground than for Alternative LAPT1; therefore, the visual impact would be more significant. This alternative reaches heights up to 60 feet on the viaduct as the alignment crosses over the Los Angeles River and reaches heights up to 70 feet as it crosses over three historically significant bridges – the Main Street Bridge, North Spring Bridge, and North Broadway Viaduct. The viaduct option reaches heights of up to 80 feet as it crosses over Young Nake Presbyterian Church, Downey Recreation Center, and a historic jail located along the east bank of the Los Angeles River south of the Pasadena Freeway. It is on a high viaduct in close proximity to multifamily dwelling units just north of LAUS.

LAUS to CMF Subsection – Evaluation Matrix						
Measurement Criteria	Alternative LAPT1 Tunnel from At-Grade LAUS (Carried Forward)	Alternative LAPT2 Tunnel from At-Grade or Elevated LAUS (Carried Forward)	Alternative LAPT3 Tunnel from At-Grade LAUS (Carried Forward)	Alternative LAP1A Viaduct from At-Grade or Elevated LAUS (Withdrawn)	Alternative LAP1B West bank option (Withdrawn)	Alternative LAP1C Viaduct from Elevated LAUS - East bank option (Carried Forward)
Geological and Soil Constraints	<p>Alternative is located outside of known fault rupture zones.</p> <p>0.75 miles of the alternative's non-tunnel reaches are located within liquefaction hazard zone, with an additional 0.2 miles of cut and cover tunnel. Bored tunnel reaches are expected to be either in bedrock or below the liquefiable soil zone.</p> <p>2.3 miles of the alternative are within a half-mile radius of city of Los Angeles Methane Zones.</p> <p>0.75 miles are in the Hansen Dam Flood Inundation Zone.</p>	<p>Alternative is located outside known fault rupture zones.</p> <p>1.3 miles of the alternative's non-tunnel reaches are located within liquefaction hazard zone. Tunnel reaches are expected to be either in bedrock or below the liquefiable soil zone.</p> <p>2.4 miles of the alternative are within a half-mile radius of city of Los Angeles Methane Zones.</p> <p>1.3 miles are in the Hansen Dam Flood Inundation Zone.</p>	<p>Alternative is located outside of known fault rupture zones.</p> <p>1.2 miles of the alternative's non-tunnel or cut and cover tunnel reaches are located within liquefaction hazard zone. Bored tunnel reaches are expected to be either in bedrock or below the liquefiable soil zone.</p> <p>2.4 miles of the alternative are within a half-mile radius of city of Los Angeles Methane Zones.</p> <p>1 mile is in the Hansen Dam Flood Inundation Zone.</p>	<p>Alternative is located outside known fault rupture zones.</p> <p>3.3 miles of the alternative are within liquefaction hazard zone.</p> <p>2.8 miles of the alternative are within a half-mile radius of city of Los Angeles Methane Zones (half-mile radius is the resource study area [RSA] for hazardous subsurface gases).</p> <p>3.3 miles are in the Hansen Dam and Devils Gate Dam Flood Inundation Zones.</p>	<p>Alternative is located outside known fault rupture zones.</p> <p>3.3 miles of the alternative are located within liquefaction hazard zone.</p> <p>2.8 miles of the alternative are within a half-mile radius of city of Los Angeles Methane Zones.</p> <p>3.2 miles are in the Hansen Dam Flood Inundation Zone.</p>	<p>Alternative is located outside known fault rupture zones.</p> <p>3.1 miles of the alternative are located within liquefaction hazard zone.</p> <p>2.8 miles of the alternative are within a half-mile radius of city of Los Angeles Methane Zones.</p> <p>2.7 miles are in the Hansen Dam Flood Inundation Zone.</p>
Avoidance of Hazardous Materials	<p>Increased risk of encountering hazardous materials due to substantially greater volume of soil excavation.</p> <p>Some risk of encountering aerially deposited lead and other metals in surface soil.</p> <p>Construction may encounter contaminated groundwater if it extends below grade. The area north of I-5 is located within the San Fernando Valley Superfund Area 3, which has groundwater contaminated by volatile organic compounds.</p>	<p>Increased risk of encountering hazardous materials due to substantially greater volume of soil excavation.</p> <p>Some risk of encountering aerially deposited lead and other metals in surface soil.</p> <p>Construction may encounter contaminated groundwater if it extends below grade. The area north of I-5 is located within the San Fernando Valley Superfund Area 3, which has groundwater contaminated by volatile organic compounds.</p>	<p>Increased risk of encountering hazardous materials due to substantially greater volume of soil excavation.</p> <p>Some risk of encountering aerially deposited lead and other metals in surface soil.</p> <p>Construction may encounter contaminated groundwater if it extends below grade. The area north of I-5 is located within the San Fernando Valley Superfund Area 3, which has groundwater contaminated by volatile organic compounds.</p>	<p>Moderate risk of encountering hazardous materials in excavating soil for pier foundations due to the numerous regulatory database sites in the vicinity.</p> <p>Some risk of encountering aerially deposited lead and other metals in soil.</p> <p>Demolition of existing structures may encounter asbestos, lead-paint, and other hazardous materials.</p> <p>Construction may encounter contaminated groundwater if it extends below grade. The area north of I-5 is located within the San Fernando Valley Superfund Area 3, which has groundwater contaminated by volatile organic compounds.</p>	<p>Moderate risk of encountering hazardous materials in excavating soil for pier foundations due to the numerous regulatory database sites in the vicinity.</p> <p>Some risk of encountering aerially deposited lead and other metals in soil.</p> <p>Demolition of existing structures may encounter asbestos, lead-paint, and other hazardous materials.</p> <p>Construction may encounter contaminated groundwater if it extends below grade. The area north of I-5 is located within the San Fernando Valley Superfund Area 3, which has groundwater contaminated by volatile organic compounds.</p>	<p>Moderate risk of encountering hazardous materials in excavating soil for pier foundations due to the numerous regulatory database sites in the vicinity.</p> <p>Some risk of encountering aerially deposited lead and other metals in soil.</p> <p>Demolition of existing structures may encounter asbestos, lead-paint, and other hazardous materials.</p> <p>Construction may encounter contaminated groundwater if it extends below grade. The area north of I-5 is located within the San Fernando Valley Superfund Area 3, which has groundwater contaminated by volatile organic compounds.</p>

LAUS to CMF Subsection – Evaluation Matrix						
Measurement Criteria	Alternative LAPT1 Tunnel from At-Grade LAUS (Carried Forward)	Alternative LAPT2 Tunnel from At-Grade or Elevated LAUS (Carried Forward)	Alternative LAPT3 Tunnel from At-Grade LAUS (Carried Forward)	Alternative LAP1A Viaduct from At-Grade or Elevated LAUS (Withdrawn)	Alternative LAP1B West bank option (Withdrawn)	Alternative LAP1C Viaduct from Elevated LAUS - East bank option (Carried Forward)
Agency and Public Input						
Agency and Public Input	The City of LA, Mayor's office, and Metro prefer this alignment; however State Parks said that it is non-negotiable as the alignment goes straight through the park and will impact the archeological artifacts beneath the site.	This alignment is in conflict with the proposed Metro/Riboli Family/State Parks Midway yards development.	State Parks prefer this option to LAPT1 because it avoids cut and cover through the park. Potential conflict with the City of Los Angeles General Plan for the redevelopment between Spring Street, Main Street, Vignes and the Los Angeles River	This alignment alternative is not supported by the City of Los Angeles, Metro, and the Mayor's Office. The reasoning is that it conflicts with the San Antonio Winery, Downey Recreation Center, proposed park at the Dairy site, old city historic jail, and limits accessibility to the Los Angeles River from the east bank. The 60 foot viaduct will create visual impacts to all of the communities north of LAUS to I-5.	No stakeholders prefer this option as it will require relocation of the Gold Line Yard, cut off Metro CMF and limit accessibility to the Los Angeles River.	This alignment would preserve the San Antonio Winery, but conflicts with the Downey Recreation Center, proposed park at the Dairy site, old city historic jail, and limits accessibility to the Los Angeles River from the east bank. The 60 foot viaduct will create visual impacts to all of the communities north of LAUS to I-5. Potential conflict with the City of Los Angeles General Plan for the redevelopment between Spring Street, Main Street, Vignes and the Los Angeles River

Table A-2 Metrolink CMF to SR 2 Subsection – Evaluation Matrix

Metrolink CMF to SR 2 Subsection – Evaluation Matrix			
Measurement Criteria	Metrolink Alignment Alternative At-Grade for LAP1A, LAP1B, LAP1C (Withdrawn)	Metrolink Alignment Alternative in Trench for all options (Carried Forward)	San Fernando Rd. Align. Alternative in Trench for all options (Carried Forward)
Design Objectives			
Journey time	94 seconds (Speed limited to 60 mph)	LAP1A, LAP1B, LAP1C - 94 seconds (Speed limited to 60 mph) LAPT1, LAPT2, LAPT3 – 56 seconds (100 mph)	48 seconds (135 mph)
	1.8 miles	1.8 miles	1.8 miles
Intermodal Connections	No station in this part of the route	Similar	Similar
Operating Costs	1.0	Greater because of pumping to drain trench	Greater because of pumping to drain trench
Capital Costs	1.0	2.5	2.8
Land Use			
Transit Oriented Development (TOD) Potential	No station in this part of the route	Similar	Similar
Consistency with Other Planning	This alternative has the highest impacts to the community due to the at-grade option dividing the Los Angeles River from the Rio De Los Angeles State Park (RDLASP). This option would conflict with plans in the Los Angeles River Revitalization Master Plan to connect the park with the river, and efforts for river-edge improvements and restoration to native habitat, and the creation of passive (park) recreation, education, and cultural facilities. The at-grade option would also impact an under-construction high school campus located on the eastern side of the existing Metrolink alignment adjacent to the RDLASP.	Since the trench would be partially covered for lengths up to 800 feet, this alternative will not impede connectivity to the Rio De Los Angeles State Park and the Los Angeles River since it would create land bridges that would support the Los Angeles River Revitalization Master Plan efforts, favor landscaping improvements, and allow for compatible uses such as parking. This alternative will result in temporary construction impacts to Taylor Yard related to trenching. However, since this alternative would not impede connectivity to the Los Angeles River, it is consistent with the long term goals of the Los Angeles River Revitalization Master Plan and would allow access to planned river edge improvements.	This alternative would require taking land from the edge of Rio De Los Angeles State Park and an under-construction high school site in order to create the trench. The trench portions would be partly covered for lengths up to 800 feet, maintaining connectivity by creating land bridges that would allow pedestrian and vehicular access to the RDLASP and so be compatible with Los Angeles River Revitalization Master Plan efforts, favor landscaping improvements, and allow for compatible uses such as parking. This alternative will result in temporary construction impacts to RDLASP and an under-construction high school site related to trenching. However, since this alternative would not impede connectivity to the Los Angeles River, it is consistent with the long term goals of the Los Angeles River Revitalization Master Plan and would allow access to planned river edge improvements.
Constructability			
Constructability	This alternative will be the simplest to construct, but requires work alongside the operating railway.	Construction of a trench in Taylor Yard will be less complex than along San Fernando Road, but more complex than at grade construction.	This option will be the most complex to construct, with a deep trench created in a narrow strip of land beside San Fernando Road.

Metrolink CMF to SR 2 Subsection – Evaluation Matrix			
Measurement Criteria	Metrolink Alignment Alternative At-Grade for LAP1A, LAP1B, LAP1C (Withdrawn)	Metrolink Alignment Alternative in Trench for all options (Carried Forward)	San Fernando Rd. Align. Alternative in Trench for all options (Carried Forward)
Disruption to Existing Railroad	Metrolink/UPRR tracks relocated to allow HST to share right-of-way	Metrolink/UPRR tracks relocated to allow HST to share right-of-way. To give maximum community benefit these tracks would be placed in a parallel partially covered trench alongside HST, but this would need further relocation of the access track to the central maintenance facility and FRA / Rail operator approval.	Least disruption to Metrolink/UPRR tracks, unless they were moved into a trench beside HST which would need further relocation of the access track to the central maintenance facility and FRA / Rail operator approval.
Disruption to and Relocation of Utilities	Most of this segment is at grade, which has a minor impact on existing utilities; longitudinal conflicts will require relocation and crossings will require protection. Utility conflicts include: <ul style="list-style-type: none"> • 1 HP, 2 MP gas crossings • 1 x 20" oil crossing, one ¼ mile longitudinal • 1 x 69 KV electrical crossing • 1 telecom crossing, one ¼ mile longitudinal • 7 storm crossings, 2 over 10' wide • 3 sewer crossings • 3 water crossings, one 70" diameter 	Most of this segment is in trench, which has a major impact on existing utilities; both longitudinal conflicts and crossings. Storm and sewer crossings in trench areas may require siphons or pump stations. Utility conflicts include: <ul style="list-style-type: none"> • 1 HP, 2 MP gas crossings • 1 x 20" oil crossing, one ¼ mile longitudinal • 1 x 69 KV electrical crossing • 1 telecom crossing, one ¼ mile longitudinal • 7 storm crossings, 2 over 10' wide • 3 sewer crossings • 3 water crossings, one 70" diameter 	Most of this segment is in trench, which has a major impact on existing utilities; both longitudinal conflicts and crossings. Storm and sewer crossings in trench areas may require siphons or pump stations. Utility conflicts include: <ul style="list-style-type: none"> • 1 HP, 3 MP, 3 LP gas crossings, 2 longitudinal conflicts • 1 x 20" oil crossing • 69 KV electrical - 2/3 mile longitudinal • 1 telecom crossing • 8 storm crossings, 3 over 10' wide • 5 sewer crossings, one 48" diameter, 1 longitudinal • 3 water crossings, one 70" diameter • Shaft for NEIS sewer is close to this alignment
Disruption to Communities			
Displacements			
Residential Displacements	Planned housing development south of the Park would be affected.	Planned housing development south of the Park would be affected.	Planned housing development south of the Park would be affected.
Business Displacements	2 parcels impacted – commercial	2 – commercial parcels impacted (LAP1A, LAP1B, LAP1C) 15 – industrial parcels impacted (LAPT1, LAP1T2, LAPT3)	5 – commercial parcels impacted 8 – industrial parcels impacted
Properties with Access Affected	0	0	1
Local Traffic Effects near stations	No station in this part of the route	Similar	Similar
Highway Grade Separations and Closures	None	None	One closure (access road to displaced industrial sites). Bridges over trench give access to park and high school.

Metrolink CMF to SR 2 Subsection – Evaluation Matrix			
Measurement Criteria	Metrolink Alignment Alternative At-Grade for LAP1A, LAP1B, LAP1C (Withdrawn)	Metrolink Alignment Alternative in Trench for all options (Carried Forward)	San Fernando Rd. Align. Alternative in Trench for all options (Carried Forward)
Environmental Resources			
Biological Resources	No known biologically sensitive habitats affected.	Similar	No known impacts (park, which is affected, has been recently constructed)
Cultural Resources	Impacts to previously recorded archaeological resources have the potential to occur as a result of direct impacts, such as removal or modification of the intact resource to accommodate the proposed track or footings.	Impacts to previously recorded archaeological resources have the potential to occur as a result of direct impacts, such as removal or modification of the intact resource to accommodate the proposed track or footings or the trench. Impacts to paleontological resources have the potential to occur as a result of deep excavation to accommodate proposed trenching along the project right-of-way. Deep excavation is likely to encounter the Monterey Formation, which is a fossil-bearing stratum.	Impacts to previously recorded archaeological resources have the potential to occur as a result of direct impacts, such as removal or modification of the intact resource to accommodate the proposed track or footings or the trench. Impacts to paleontological resources have the potential to occur as a result of deep excavation to accommodate proposed trenching along the project right-of-way. Deep excavation is likely to encounter the Monterey Formation, which is a fossil-bearing stratum.
Parklands	Indirect impact to the adjoining Rio de Los Angeles State Park but no direct impact. The at-grade option will inhibit connectivity with the Los Angeles River which would need to be provided by bridging over tracks. Impact on the proposed park on the 'bow-tie' site.	Indirect impact to the adjoining Rio de Los Angeles State Park but no direct impact. Impact on the proposed park on the 'bow-tie' site.	2.5 acres taken from the adjoining Rio de Los Angeles State Park, mitigated by partially covering the trench
Agricultural Lands	No impact to agricultural lands.	No impact to agricultural lands.	No impact to agricultural lands.
Natural Environment			
Noise and Vibration	This Alternative, running entirely at grade along the existing Metrolink corridor would generally result in the greatest number of potential operational noise and vibration impacts, especially at the Rio De Los Angeles State Park, and adjacent high school site	This Alternative, running entirely in a trench along the existing Metrolink corridor with several portions covered would generally result in the fewest number of potential operational noise and vibration impacts, especially at the Rio De Los Angeles Park, and the high school site.	This Alternative, running entirely in a trench along San Fernando Road with several portions covered would generally result in a moderate number of potential operational noise and vibration impacts relative to other alternatives, due to its proximity to both the Rio De Los Angeles Park, and the high school site as well as to sensitive receivers east of San Fernando Road.

Metrolink CMF to SR 2 Subsection – Evaluation Matrix			
Measurement Criteria	Metrolink Alignment Alternative At-Grade for LAP1A, LAP1B, LAP1C (Withdrawn)	Metrolink Alignment Alternative in Trench for all options (Carried Forward)	San Fernando Rd. Align. Alternative in Trench for all options (Carried Forward)
Change in Visual and Scenic Resources	During construction activities, this alternative would have a relatively lower visual impact compared to the other two alternatives because the construction period would be shorter and would require less use of heavy equipment than the “in trench” alternatives. However, during the operation of the rail line, this alternative would have a relatively higher visual impact than the other two alternatives because it would be visible to recreational users within the Rio de Los Angeles state park area, and to occupants of and visitors to the high school.	During construction activities, the two “in-trench” alternatives would have a relatively higher visual impact compared to the other (at-grade) alternative because the construction period would be longer and would require the use of more heavy equipment with the in-trench alternatives than with an at-grade alternative. However, during the operation of the rail line, the in-trench alternatives would have a relatively lower visual impact than the at-grade alternative because the rail line would not be visible to recreational users within the Rio de Los Angeles state park area or to occupants of and visitors to the high school (as it would be with the at-grade alternative). During operation of the rail line, the two in-trench alternatives would have equal impact, from a visual standpoint, since neither would be visible to individuals passing through, or working, or residing in the area, and recreational users.	During construction activities, the two “in-trench” alternatives would have a relatively higher visual impact compared to the other (at-grade) alternative because the construction period would be longer and would require the use of more heavy equipment with the in-trench alternatives than with an at-grade alternative. However, during the operation of the rail line, the in-trench alternatives would have a relatively lower visual impact than the at-grade alternative because the rail line would not be visible to recreational users within the Rio de Los Angeles state park area or to occupants of and visitors to the high school (as it would be with the at-grade alternative). During operation of the rail line, the two in-trench alternatives would have equal impact, from a visual standpoint, since neither would be visible to individuals passing through, or working, or residing in the area, and recreational users.
Geological and Soil Constraints	Located outside known fault rupture zones. 1.5 miles of the alternative are located within a liquefaction hazard zone. 1.6 miles of the alternative are in the Hansen Dam and Eagle Rock Dam Flood Inundation Zones.	Located outside known fault rupture zones. 1.5 miles of the alternative are located within a liquefaction hazard zone. 1.6 miles of the alternative are in the Hansen Dam and Eagle Rock Dam Flood Inundation Zones.	Located outside known fault rupture zones. 1.5 miles of the alternative are located within a liquefaction hazard zone. 1.5 miles of the alternative are in the Hansen Dam and Eagle Rock Dam Flood Inundation Zones.
Avoidance of Hazardous Materials	Metrolink’s Taylor Yard is located adjacent to the west of the alignment and is listed in numerous regulatory databases. Routine maintenance and major diesel locomotive service and repair have been conducted at this site for nearly 100 years. Contaminants of concern in soil and groundwater are principally oil, grease, diesel, solvents, and metals. There is some risk of encountering aerially deposited lead and other metals in soil. Demolition of existing structures may encounter asbestos, lead-paint, and other hazardous materials.	Metrolink’s Taylor Yard is located adjacent to the west of the alignment and is listed in numerous regulatory databases. Routine maintenance and major diesel locomotive service and repair have been conducted at this site for nearly 100 years. Contaminants of concern in soil and groundwater are principally oil, grease, diesel, solvents, and metals. Construction may encounter contaminated groundwater if it extends below grade. The alignment is located within the San Fernando Valley Superfund Area 3, which has groundwater contaminated by volatile organic compounds. There is some risk of encountering aerially deposited lead and other metals in soil. Demolition of existing structures may encounter asbestos, lead-paint, and other hazardous materials.	Some risk of encountering hazardous materials in soil from numerous listed hazardous materials release sites adjacent to the east of the alignment. Construction may encounter contaminated groundwater if it extends below grade. The alignment is located within the San Fernando Valley Superfund Area 3, which has groundwater contaminated by volatile organic compounds. There is some risk of encountering aerially deposited lead and other metals in soil. Demolition of existing structures may encounter asbestos, lead-paint, and other hazardous materials.

Metrolink CMF to SR 2 Subsection – Evaluation Matrix			
Measurement Criteria	Metrolink Alignment Alternative At-Grade for LAP1A, LAP1B, LAP1C (Withdrawn)	Metrolink Alignment Alternative in Trench for all options (Carried Forward)	San Fernando Rd. Align. Alternative in Trench for all options (Carried Forward)
Agency and Public Input			
Agency and Public Input	FOLAR, Councilmember Reyes' office, Metro and other downtown Los Angeles stakeholders including Mt. Washington Homeowners Alliance, Glassell park Neighborhood Council, Greater Cypress Park Neighborhood Council and Lincoln Heights Neighborhood Council do not favor this alignment as it will only provide pedestrian access to the Los Angeles River via a pedestrian bridge or tunnel under the rail line. This alignment does not impact any of LAUSD's policies pertaining to the new school site.	The City of Los Angeles prefers this alignment because it does not encroach on Rio de Los Angeles Park. Metrolink and UPRR have operational and safety concerns with HSR sharing a trench. The community generally favors this alignment because it will provide pedestrian access from the park to the Los Angeles River without being in a pedestrian tunnel or a bridge – access would be level.	If this alignment also relocated Metrolink/freight into a shared trench along San Fernando Road between the park and Los Angeles River it would provide for better connectivity than either of the other alignments. FOLAR prefers this alignment because it doesn't impact long-term plans for river revitalization. LAUSD did not prefer this alignment because it will disrupt their playing fields during construction.

Table A-3 SR2 to Sylmar Subsection Vertical Profiles – Evaluation Matrix

SR 2 to Sylmar Subsection Vertical Profiles – Evaluation Matrix				
Measurement Criteria	Profile A Elevated HST (with option to elevate Metrolink/freight) (Carried Forward)	Profile B1 At-Grade HST and Metrolink/freight, Crossing Roads Over (Carried Forward)	Profile B2 At-Grade HST and Metrolink/freight, Crossing Roads Under (Carried Forward)	Profile C Depressed HST, At-Grade Metrolink/freight and Crossroads (Carried Forward)
Design Criteria				
Journey time	7.2 minutes	Similar	Similar	Similar
	18.9 miles	Similar	Similar	Similar
Intermodal Connections	See station evaluation	Similar	Similar	Similar
Operating Costs	1.0	1.0	Higher, pumping to drain trench required	Higher, pumping to drain trench required
Capital Costs	1.8 (or 3.5 if Metrolink/freight tracks are elevated as well on a separate structure)	1.0 (less marked difference to A when there are several road crossings close together spanned by a single HST viaduct or where significant additional right-of-way is needed.)	1.6	2.9
Land Use				
Potential for TOD	See station evaluation	Similar	Similar	Similar
Consistency with other planning efforts	Similar	Similar	Similar	Similar
Constructability				
Constructability	Straightforward construction, subject to restrictions working over active railway for the full length of the viaduct.	Straightforward construction, subject to restrictions working over active railway at the crossing.	Most complex to construct, trench beneath active railway at the crossing.	Complex to construct, trench adjacent to active railway over full length of trench, beneath active highway at the crossing.
Disruption to existing Railroads	Temporary and then permanent diversion of existing tracks likely to be needed	Single diversion likely to be possible.	Temporary and then permanent diversion of existing tracks likely to be needed	Single diversion likely to be possible.
Disruption to and Relocation of Utilities	Local diversions to avoid columns	Local diversions to avoid columns	Many diversions needed to avoid trench	Many diversions needed to avoid trench

SR 2 to Sylmar Subsection Vertical Profiles – Evaluation Matrix				
Measurement Criteria	Profile A Elevated HST (with option to elevate Metrolink/freight) (Carried Forward)	Profile B1 At-Grade HST and Metrolink/freight, Crossing Roads Over (Carried Forward)	Profile B2 At-Grade HST and Metrolink/freight, Crossing Roads Under (Carried Forward)	Profile C Depressed HST, At-Grade Metrolink/freight and Crossroads (Carried Forward)
Disruption to Communities				
Displacements				
Residential Displacements	Minimum parcels affected, elevated structures need smallest right-of-way width.	Most parcels affected since road viaduct extends furthest from existing right-of-way into community	Many parcels affected as trench extends from existing right-of-way into community	Some parcels adjacent to right-of-way affected by increased width of right-of-way required.
Business Displacements	Minimum parcels affected, elevated structures need smallest right-of-way width.	Most parcels affected since road viaduct extends furthest from existing right-of-way into community	Many parcels affected as trench extends from existing right-of-way into community	Some parcels adjacent to right-of-way affected by increased width of right-of-way required.
Property with Access Affected	Typically none	New frontage roads needed since access to properties alongside elevated road will have to be maintained	New frontage roads needed since access to properties alongside depressed road will have to be maintained	Typically none
Local Traffic Effects around Stations	See station evaluation	Similar	Similar	Similar
Local Traffic Effects along Route	Improves highway connections by eliminating grade crossing if Metrolink tracks elevated as well.	Significant disruption to highway connections, breaking link between cross street and San Fernando Road requiring diversions and additional connecting roads	Significant disruption to highway connections, breaking link between cross street and San Fernando Road	No change to existing highway connections if grade crossing for metro remains.
Highway Grade Separations and Closures	No effect	Grade separation or closure required	Grade separation or closure required	No effect
Environmental Resources				
Waterways / Sensitive Habitat Areas	No known biologically sensitive habitats affected.	No known biologically sensitive habitats affected.	No known biologically sensitive habitats affected.	No known biologically sensitive habitats affected.
Cultural resources	No effect	Extending viaduct into community could affect cultural resources	Trench could affect archaeological resources, and extending into community could affect cultural resources	Trench could affect archaeological resources
Parklands	No effect	Extending viaduct into community could affect parklands	Extending trench into community could affect parklands	No effect
Agricultural Lands	No impacts to agricultural lands in the study area.			

SR 2 to Sylmar Subsection Vertical Profiles – Evaluation Matrix				
Measurement Criteria	Profile A Elevated HST (with option to elevate Metrolink/freight) (Carried Forward)	Profile B1 At-Grade HST and Metrolink/freight, Crossing Roads Over (Carried Forward)	Profile B2 At-Grade HST and Metrolink/freight, Crossing Roads Under (Carried Forward)	Profile C Depressed HST, At-Grade Metrolink/freight and Crossroads (Carried Forward)
Natural Resources				
Noise and Vibration	An elevated profile would generally lead to greater noise impacts relative to other alternatives, but no vibration impacts.	Noise impact from elevated highways at grade separation would increase noise in adjacent neighborhoods.	At-grade railway largely screened by industrial buildings	Least noise impact
Visual/scenic resources	Elevated railway partially screened by industrial buildings beside the right-of-way	Elevated highway extending into community will have greatest impact	At-grade railway largely screened by industrial buildings	Least visual impact
Geotechnical Constraints	Not acceptable when crossing a fault	Bridge foundations required	Retained cut required	To be avoided where possible when crossing a fault.
Hazardous Materials	Some risk of encountering hazardous materials in excavating for pier foundations	Some risk of encountering hazardous materials in excavating for pier foundations	Increased risk of encountering hazardous materials due to substantially greater volume of soil excavation.	Increased risk of encountering hazardous materials due to substantially greater volume of soil excavation.
Agency and Public Input				
Agency and Public Input	Concern about visual and noise impacts. Cities strongly in favor of grade separating Metrolink/freight tracks as well.	General concern about traffic impacts and community impacts.	General concern about traffic impacts and community impacts.	Cities strongly in favor of grade separating Metrolink/freight tracks as well. Metrolink/freight operators have concerns about going in to trench with HST.

Table A-4 SR 2 to Sylmar Subsection Stations – Evaluation Matrix

SR 2 to Sylmar Subsection Stations – Evaluation Matrix				
Evaluation Measure	Alternative BVS Buena Vista Station Location (Carried Forward)	Alternative BSS Branford Street Station Location (Carried Forward)	Alternative PWS Pacoima Wash Station Location (Carried Forward)	Alternative SFS San Fernando Station Location (Carried Forward)
Design Objectives				
Journey Time	Included within alignment data	Similar	Similar	Similar
Intermodal Connections	Best linkage with Bob Hope Airport and its planned transit center. Within half a mile of I-5 freeway, reached along Hollywood Way or North Buena Vista Blvd. Co-located Metrolink stop would be 3 miles from existing Burbank Station. Currently bus routes 94, 169, 222, and 794 pass within 1000 feet of the station site. Route 292 passes within 1500 feet. Some of these routes would be adjusted and new routes introduced to serve the HST station.	One mile from I-5, with a partial interchange at Branford St., and a full interchange at Osborne St. Within a half mile of Whiteman Airport. Potential for co-locating one of two Metrolink stations within 4 miles. Currently bus routes 224 and 794 pass by the station site. In addition, Route 166 traverses the HST alignment within 1000 feet of the station site. Some of these routes would be adjusted and new routes introduced to serve the HST station.	In close proximity to SR 118, with a full interchange along San Fernando Road that also leads to I-5 and I-210. Currently bus routes 224 and 794 pass by the station site. In addition, Route 168 traverses the HST alignment within 1000 feet of the station site. Some of these routes would be adjusted and new routes introduced to serve the HST station.	Half a mile from SR 118 along San Fernando Road, within 1 mile of I-5 along Brand Boulevard. Currently bus routes 224 and 794 pass by the station site. In addition, Routes 234 and 734 traverse the HST alignment within 1000 feet of the station site. Some of these routes would be adjusted and new routes introduced to serve the HST station.
Operating Costs	1	1	Higher because station is elevated (60 feet up)	1
Capital Costs	1.0	1.1	3.0	1.1

SR 2 to Sylmar Subsection Stations – Evaluation Matrix				
Evaluation Measure	Alternative BVS Buena Vista Station Location (Carried Forward)	Alternative BSS Branford Street Station Location (Carried Forward)	Alternative PWS Pacoima Wash Station Location (Carried Forward)	Alternative SFS San Fernando Station Location (Carried Forward)
Land Use				
Transit Oriented Development (TOD) Potential	The proposed station platform location is within the City of Burbank. The platform location lies within the Burbank Center Specific Plan (BCSP) and the Burbank Redevelopment Plan – Gold State. The planned land uses within a quarter mile are Industrial, Residential, and Public. Though there is significant airport industrial land uses currently, there is potential to create a substantial mixed-use TOD Planning area, that takes advantage of the large land area that can be assembled proximate to the station.	The proposed station lies within the City of Los Angeles – Arleta/Pacoima Community Plan Area. The majority of the area immediately surrounding the proposed station location is currently industrial land, both developed and open space (water recharge ponds). The city Redevelopment Agency has identified this area for redevelopment, and, as such, could enhance TOD opportunity if sufficient acreage can be assembled. There is the potential to assemble a significant site that could be redeveloped as a TOD opportunity.	The proposed station lies within the City of Los Angeles – Arleta/Pacoima Community Plan Area. The planned land uses within a quarter mile are industrial, public, and residential. The station platform height could be detrimental to any station area development opportunities, given the disconnect from ground level land uses and development. However, the City has identified this area for redevelopment and this could enhance the potential for TOD opportunities.	The proposed station lies within the City of San Fernando, Corridors Specific Plan and Redevelopment Project Area #1. The planned land uses within a quarter mile are commercial, public, and residential. The presence of commercial and public uses appears to have a high potential for TOD, however, since most of the area immediately adjacent to the station area is developed as low density residential, it may be challenging to create a significant parcel to support an ambitious TOD opportunity.
Consistency with Other Planning	Overall, the potential station platform location is consistent with local planning efforts and adopted plans. The Burbank Center Specific Plan (BCSP), and Burbank Redevelopment Plan – Golden State objectives, policies and goals emphasize integration and enhancement of multi-modal transportation systems.	Overall, the potential station platform location is consistent with local planning efforts and adopted plans. The City of Los Angeles – Arleta/Pacoima Community Plan Area objectives, policies, and goals emphasize integration and enhancement of multi-modal transportation systems.	Overall, the potential station is consistent with local planning efforts and adopted plans. The City of Los Angeles – Arleta/Pacoima Community Plan Area, Tujunga /Pacoima Watershed Plan objectives, policies, and goals emphasize integration and enhancement of multi-modal transportation systems.	Overall, the potential station is consistent with some of the objectives of the San Fernando General Plan (GP) (attract new commercial activities, promote economic vitality), while inconsistent with others (retain the small town character, conserve single family neighborhoods).
Constructability				
Constructability	Expected to be most straightforward to construct.	Expected to be more difficult to construct because of the need for a grade separation.	Expected to be most difficult to construct because station is on high viaduct and this viaduct needs to cross over the SR 118 freeway.	Expected to be more difficult to construct because of the need for a grade separation
Disruption to existing railroads	Included within alignment data	Similar	Similar	Similar
Disruption to and relocation of utilities	Included within alignment data	Similar	Similar	Similar
Disruption to Communities				
Displacements				
Residential Displacements	None	None	None	None

SR 2 to Sylmar Subsection Stations – Evaluation Matrix				
Evaluation Measure	Alternative BVS Buena Vista Station Location (Carried Forward)	Alternative BSS Branford Street Station Location (Carried Forward)	Alternative PWS Pacoima Wash Station Location (Carried Forward)	Alternative SFS San Fernando Station Location (Carried Forward)
Business Displacement (in excess of No Station)	14 – commercial parcels impacted (6.4 acres) 25 – industrial parcels impacted (10.9 acres)	1 – industrial parcel impacted	17 – industrial parcels impacted (22.9 acres) 1 – school parcel impacted (0.1 acres). Land take on the western boundary of San Fernando Middle School property is marginally greater for this station alternative.	5 – commercial parcels impacted (3.9 acres) -8 – industrial parcels impacted (5.1 acres) -2 – schools parcels impacted (-0.7 acres). Land take on the western boundaries of San Fernando Middle School and Kinder Care Learning Center are lower for this station alternative. Note: the No Station alignment has a marginal impact on a number of small parcels to the east of the alignment. The station alignment has no impact on the east side but a major impact on a smaller number of large parcels on the west of the alignment; hence the excess number of parcels affected by the station is negative.
Properties with Access Affected	0	0	0	0

SR 2 to Sylmar Subsection Stations – Evaluation Matrix				
Evaluation Measure	Alternative BVS Buena Vista Station Location (Carried Forward)	Alternative BSS Branford Street Station Location (Carried Forward)	Alternative PWS Pacoima Wash Station Location (Carried Forward)	Alternative SFS San Fernando Station Location (Carried Forward)
Local Traffic Effects	<p>All four station sites are projected to generate comparable boarding levels, with similar overall increases in traffic. Differences in effect on local traffic relate primarily on the areas roadway network's completeness and capacity.</p> <p>Local traffic impacts will be studied in detail in the EIR/EIS.</p> <p>Arterials, including San Fernando Road and N. San Fernando Road, Cohasset Street, Glenoaks Blvd., N. Ontario Street, Buena Vista Street and Hollywood Way, would be affected by increased traffic generated by the station.</p> <p>Hollywood Way would be expected to see an increase in traffic between the station and Bob Hope Airport.</p> <p>The area around the airport currently experiences high levels of traffic congestion. It can be anticipated that the location of the HST station proximate to the airport will increase congestion levels. This impact is likely to be most pronounced on surface streets in the vicinity of the airport, and less pronounced on the I-5 and SR 134 freeways.</p>	<p>All four station sites are projected to generate comparable boarding levels, with similar overall increases in traffic. Differences in effect on local traffic relate primarily on the areas roadway network's completeness and capacity.</p> <p>Local traffic impacts will be studied in detail in the EIR/EIS.</p> <p>The limited network of existing arterial streets would result in traffic increases that will likely be most pronounced on San Fernando Road. Other local roadways that are likely to be affected include Branford Street, Montague Street, Osborne Street, Laurel Canyon Blvd. and Glenoaks Blvd. The impacts on I-5, and its partial interchange at Branford St. and full interchange at Osborne St. will be affected, though the relative impacts will be less pronounced given current high traffic volumes.</p>	<p>All four station sites are projected to generate comparable boarding levels, with similar overall increases in traffic. Differences in effect on local traffic relate primarily on the areas roadway network's completeness and capacity.</p> <p>Local traffic impacts will be studied in detail in the EIR/EIS.</p> <p>As the primary means of access to the station location SR 118 and San Fernando Road, would experience the most significant traffic increases. Impacts are likely to be more pronounced on San Fernando Road; less so on SR 118. The limited arterial network proximate to the station location would result in concentrated traffic increases east-west on Paxton Street and Vaughn Street, and north-south on Laurel Canyon Blvd., Bradley Avenue, Herrick Avenue, and Glenoaks Blvd.</p>	<p>All four station sites are projected to generate comparable boarding levels, with similar overall increases in traffic. Differences in effect on local traffic relate primarily on the areas roadway network's completeness and capacity.</p> <p>Local traffic impacts will be studied in detail in the EIR/EIS.</p> <p>SR 118 and San Fernando Road, as important access routes to the station location would experience traffic increases. Traffic impacts are likely to most pronounced along San Fernando Road since this arterial street would be the primary point of access to the station location. Traffic increases would also be experienced at the I-5 interchanges at Brand Blvd. and San Fernando Mission Blvd. though are likely to be relatively modest given current traffic volumes. Other arterials expected to experience increase demand include Truman Street, Maclay Street, Laurel Canyon Blvd., 4th Street, 5th Street and Glenoaks Blvd.</p>
Environmental Resources				
Biological Resources	No known biologically sensitive habitats affected.	The Branford Street station may affect potential special aquatic resources areas that may exist in the quarry or ponds.	No known biologically sensitive habitats affected.	No known biologically sensitive habitats affected.

SR 2 to Sylmar Subsection Stations – Evaluation Matrix				
Evaluation Measure	Alternative BVS Buena Vista Station Location (Carried Forward)	Alternative BSS Branford Street Station Location (Carried Forward)	Alternative PWS Pacoima Wash Station Location (Carried Forward)	Alternative SFS San Fernando Station Location (Carried Forward)
Cultural Resources	The CHRIS records search (June 2009) did not identify previously recorded cultural resources within a half-mile search radius of this station. Therefore, no previously recorded cultural resources are anticipated to be adversely affected by station construction.	The CHRIS records search (June 2009) did not identify previously recorded cultural resources within a half-mile search radius of this station. Therefore, no previously recorded cultural resources are anticipated to be adversely affected by station construction.	The CHRIS records search (June 2009) identified three properties within a half-mile search radius of the station that were previously assigned NRHP Status Code 2S2 (NRHP-Eligible, CRHR-listed) These cultural resources are located outside of the area of direct impact for the station construction, and therefore are not anticipated to be adversely affected by the project.	The CHRIS records search (June 2009) identified one NRHP-listed property within the half-mile search radius: (Lopez Adobe – NR-71000157/19-186580). In addition, the CHRIS records search (June 2009) identified six properties previously assigned NRHP Status Code 2S2 (NRHP-Eligible, CRHR-listed) within the half-mile search radius. Three properties were not evaluated for NRHP eligibility, and one property was previously assigned NRHP Status Code 5S2 (Local Register-eligible) within the half-mile search radius, per the CHRIS records search (June 2009). These cultural resources are located outside of the area of direct impact for the station construction, and therefore are not anticipated to be adversely affected by the project.
Parklands	May impact trail system along San Fernando Road.	May impact trail system along San Fernando Road.	May impact trail system along San Fernando Road.	May impact trail system along San Fernando Road.
Agricultural Lands	No agricultural lands within or adjacent to station footprint.	No agricultural lands within or adjacent to station footprint.	No agricultural lands within or adjacent to station footprint.	No agricultural lands within or adjacent to station footprint.
Natural Environment				
Noise and Vibration	This station alternative is just north of San Fernando Road near the Burbank airport and also within 200 feet of several blocks of existing residential structures just north of San Fernando Road. The noise impacts due to this alternative are likely moderate.	This station alternative is centered in an undeveloped area approximately 2000 feet from residential developments to the west and south. The opportunity for noise impacts is low to moderate.	This station alternative is located in the middle of an existing industrial area with established residential neighborhoods to the south-east and north-east. The opportunity for noise impacts is moderate.	This station alternative is situated in the midst of the San Fernando civic area and is within several hundred feet of San Fernando Middle School, multi family dwelling units, a police station and court building, representing a moderate noise impact scenario.
Change in Visual and Scenic Resources	This station alternative is on low embankment and located in close proximity to sensitive receptor locations such as residential uses and would have a potential moderate impact.	This station alternative is on low embankment and located in close proximity to sensitive receptor locations such as designated open space uses and would have a potential moderate impact.	This station alternative is elevated and located in close proximity to sensitive receptor locations such as public facilities, residential uses, and open space, and would have a potential high impact.	This station alternative is on low embankment and located in close proximity to sensitive receptor locations such as public facilities and residential uses, and would have a potential moderate impact.

SR 2 to Sylmar Subsection Stations – Evaluation Matrix				
Evaluation Measure	Alternative BVS Buena Vista Station Location (Carried Forward)	Alternative BSS Branford Street Station Location (Carried Forward)	Alternative PWS Pacoima Wash Station Location (Carried Forward)	Alternative SFS San Fernando Station Location (Carried Forward)
Geological and Soil Constraints	<p>The site is located outside known fault rupture and liquefaction hazard zones.</p> <p>In Hansen Dam Flood Inundation Zone.</p>	<p>The site is located outside of known fault-rupture and liquefaction hazard zones. However the CGS-mapped Verdugo Fault runs within and parallel to the alignment inside of 150 feet for a distance of approximately 2.1 miles in the area south of the SR 118, including the entire length of this station location. The Verdugo fault is considered potentially active and will be subject to further study. Ground rupture is possible and weaker bearing soils may also be present.</p> <p>The northern end of the station footprint is located within the city of Los Angeles Methane Zone.</p> <p>In Pacoima and Hansen Dam Flood Inundation Zones.</p>	<p>The site is located outside of known fault-rupture and liquefaction hazard zones. However, the CGS-mapped Verdugo Fault runs parallel to and within the alignment south of SR 118 where this option requires a high viaduct south of the station footprint. The Verdugo fault is considered potentially active and will be subject to further study.</p> <p>In city of Los Angeles Methane Zone and Pacoima Dam Flood Inundation Zone.</p>	<p>The northern end of the station footprint is located within the Alquist-Priolo earthquake fault zone for the San Fernando fault. The fault is active and will be subject to further study. Ground rupture is possible and weaker bearing soils may also be present.</p> <p>The northern end of the station footprint is located within a liquefaction hazard zone.</p> <p>In Pacoima Dam Flood Inundation Zone.</p>
Avoidance of Hazardous Materials	<p>Construction may encounter contaminated groundwater if it extends 30 feet below ground level. The station is located within the San Fernando Valley Superfund Area 1, which has groundwater contaminated by volatile organic compounds.</p> <p>Some risk of encountering aerially deposited lead and other metals in soil.</p> <p>Demolition of existing structures may encounter asbestos, lead-paint, and other hazardous materials</p>	<p>Construction may encounter contaminated groundwater if it extends 30 feet below ground level. The station is located within the San Fernando Valley Superfund Area 1, which has groundwater contaminated by volatile organic compounds.</p> <p>Also, located within the former Branford Landfill which has reported methane issues</p> <p>Some risk of encountering aerially deposited lead and other metals in soil.</p>	<p>Some risk of encountering hazardous materials in soil or groundwater from a nearby former metal parts manufacturer listed as a hazardous materials release site.</p> <p>Some risk of encountering aerially deposited lead and other metals in soil.</p> <p>Demolition of existing structures may encounter asbestos, lead-paint, and other hazardous materials</p>	<p>It is expected that no hazardous materials will be encountered in the soil and/or groundwater.</p> <p>Some risk of encountering aerially deposited lead and other metals in soil.</p> <p>Demolition of existing structures may encounter asbestos, lead-paint, and other hazardous materials.</p>

SR 2 to Sylmar Subsection Stations – Evaluation Matrix				
Evaluation Measure	Alternative BVS Buena Vista Station Location (Carried Forward)	Alternative BSS Branford Street Station Location (Carried Forward)	Alternative PWS Pacoima Wash Station Location (Carried Forward)	Alternative SFS San Fernando Station Location (Carried Forward)
Agency and Public Input				
Agency and Public Input	<p>Metro, the City of Burbank and the Bob Hope Airport Authority requested a study of a possible station option near the airport. The city does not want an HST station to disrupt their community via right-of-way encroachment into neighborhoods nor do they want the downtown Metrolink station moved. The city stated that the HST station should minimize cut-through traffic between SR 134 and I-5. All the above parties are supportive of the proposed station at the Burbank Airport.</p> <p>There is support in the San Fernando Valley for a one station concept providing it has good connectivity for public transit and road access.</p>	<p>The Mayor's office, Metro, Councilmember Alarcon, and the City of Los Angeles prefer a station option in the City of LA. The Mayor's office has expressed concern over a Branford location as there is a planned and funded "live/work" development, creating 400 jobs, in the vicinity of the proposed station site. CHSTP has held an initial meeting with the Mayor's office and developer to review the development possibilities that may be available at this site, and how they may co-locate with a HST station. There is concern about access and local connectivity to the station option.</p> <p>There is support in the San Fernando Valley for a one station concept providing it has good connectivity for public transit and road access.</p>	<p>The City of Los Angeles valley planners and the Mayor's office are in favor because it is a CRA, enterprise zone and has good freeway access.</p> <p>There is support in the San Fernando Valley for a one station concept providing it has good connectivity for public transit and road access.</p>	<p>The City of San Fernando is supportive of CHSTP, acknowledges the impact that the right-of-way required would have upon their city, and thereby supports a station location in San Fernando, believing the impact to be positive to the community in allowing for growth and TOD.</p> <p>The City of Los Angeles is concerned that there is not great access to this station.</p> <p>There is support in the San Fernando Valley for a one station concept providing it has good connectivity for public transit and road access.</p>

Table A-5 Sylmar to Palmdale Subsection – Evaluation Matrix

Sylmar to Palmdale Subsection – Evaluation Matrix				
Measurement Criteria	Soledad Canyon Alternative (Withdrawn)	SR 14 East Alternative (Carried Forward)	SR 14 South Alternative (Withdrawn)	SR 14 West Alternative (Carried Forward)
Design Criteria				
Journey time	12.3 minutes 39.5 miles	12 minutes 38.4 miles	11.8 minutes 38.1 miles	11.5 minutes 35.4 miles
Intermodal Connections	Connections to Metrolink and Palmdale Transportation Center at Palmdale station.	Connections to Metrolink and Palmdale Transportation Center at Palmdale station.	Connections to Metrolink and Palmdale Transportation Center at Palmdale station.	No direct connection to Metrolink and Palmdale Transportation Center at Palmdale station.
Operating Costs	Possibly the highest, as it has the longest alignment	Neither highest nor lowest	Neither highest nor lowest	Possibly the lowest, as it has the shortest alignment
Capital Costs	1.0	1.1	1.3	1.0
Land Use				
Potential for TOD	See Option 1 station evaluation.	Similar	Similar	See Option 2 station evaluation.

Sylmar to Palmdale Subsection – Evaluation Matrix				
Measurement Criteria	Soledad Canyon Alternative (Withdrawn)	SR 14 East Alternative (Carried Forward)	SR 14 South Alternative (Withdrawn)	SR 14 West Alternative (Carried Forward)
Consistency with other planning efforts	Crosses portions of Angeles National Forest – incompatible with Los Angeles County plans and policies along portions of alignment.	Very limited interface with Angeles National Forest	Crosses portions of Angeles National Forest – incompatible with Los Angeles County plans and policies along portions of alignment.	Very limited interface with Angeles National Forest
Constructability				
Constructability	Will face major construction phasing challenges owing to multiple Soledad Canyon Road and Metrolink crossings. Modification of dam at Lake Palmdale.	Has deep tunnels through the mountainous areas, which would present challenging construction access. Modification of dam at Lake Palmdale.	Has deep tunnels through the mountainous areas, which would present challenging construction access. Modification of dam at Lake Palmdale.	Has deep tunnels through the mountainous areas, which would present challenging construction access. Construction of siphon on California Aqueduct.
Disruption to Existing Railroads	Has an additional 9 Metrolink crossings through the Soledad Canyon area. All are grade-separated crossing with the HST proposed to go over Metrolink. UPRR right-of-way would need to be acquired and Metrolink/UPRR tracks realigned to accommodate the Palmdale HST station. Metrolink realignment will be necessary near Lost Canyon Road.	UPRR right-of-way would need to be acquired and Metrolink/UPRR tracks realigned to accommodate the Palmdale HST station. Metrolink realignment will be necessary near Lost Canyon Road.	UPRR right-of-way would need to be acquired and Metrolink/UPRR tracks realigned to accommodate the Palmdale HST station. Metrolink realignment will be necessary near Lost Canyon Road.	Metrolink realignment will be necessary near Lost Canyon Road.
Disruption to and Relocation of Utilities	Most of this segment is aerial or in tunnel, thereby minimizing impact on utilities, except in cutting segments transitioning to tunnel. Utility conflicts include: <ul style="list-style-type: none"> 6 x 500 KV, 5 x 230 KV, 18 underground electrical crossings 1 telecom crossing 4 water crossings Crosses the California Aqueduct Of these utilities, none of them cross in cutting areas.	Most of this segment is aerial or in tunnel, thereby minimizing impact on utilities, except in cutting segments transitioning to tunnel. Utility conflicts include: <ul style="list-style-type: none"> 4 x 30" HP, 1 MP gas crossings 6 x 500 KV, 5 x 230 KV, 3 x 69 KV electrical crossings 4 telecom crossings 2 storm crossings 3 sewer crossings 26 water crossings, 2 longitudinal ½ mile Crosses the California Aqueduct Of these utilities, crossings in cutting areas include: 3 x 230 KV electrical, and 4 water.	Most of this segment is aerial or in tunnel, thereby minimizing impact on utilities, except in cutting segments transitioning to tunnel. Utility conflicts include: <ul style="list-style-type: none"> 6 x 500 KV, 5 x 230 KV, 6 underground electrical crossings 1 telecom crossing 15 water crossings Crosses the California Aqueduct Of these utilities, crossings in cutting areas include: 4 underground electrical, 1 telecom, and 3 water. The California Aqueduct will require a siphon.	Most of this segment is aerial or in tunnel, thereby minimizing impact on utilities, except in cutting segments transitioning to tunnel. Utility conflicts include: <ul style="list-style-type: none"> 2 x 30" HP, 1 MP gas crossings 6 x 500 KV, 2 x 230 KV, 4 x 69 KV electrical crossings 3 telecom crossings 3 storm crossings 4 sewer crossings 16 water crossings Crosses the California Aqueduct None of these cross in cutting areas except the California Aqueduct which will require a siphon.
Disruption to Communities				
Displacements				
Residential Displacements	129 parcels impacted Properties within right-of-way easement above tunnel - 128	95 parcels impacted Properties within right-of-way easement above tunnel -226	122 parcels impacted Properties within right-of-way easement above tunnel - 190	85 parcels impacted Properties within right-of-way easement above tunnel - 236

Sylmar to Palmdale Subsection – Evaluation Matrix				
Measurement Criteria	Soledad Canyon Alternative (Withdrawn)	SR 14 East Alternative (Carried Forward)	SR 14 South Alternative (Withdrawn)	SR 14 West Alternative (Carried Forward)
Business Displacements	8 – commercial parcels impacted 13 – industrial parcels impacted	8 – commercial parcels impacted 8 – industrial parcels impacted 1 – school parcel impacted. High Desert School in Acton: adjacent to the eastern edge of the school's playing field.	8 – commercial parcels impacted 13 – industrial parcels impacted	1 – commercial parcel impacted 6 – industrial parcels impacted 1 – school parcel impacted. Palmdale Learning Plaza in Palmdale: adjacent to the western edge of the school's playing field.
Properties with Access Affected	9	0	2	1
Local Traffic Effects near Stations	See Option 1 station evaluation.	Similar	Similar	See Option 2 station evaluation.
Highway Grade Separations and Closures	12 grade separations, 3 closures	9 grade separations, 3 closures	13 grade separations, 3 closures	9 grade separations, 3 closures
Environmental Resources				
Biological Resources	<p>Focuses impacts on the following habitat types: Chamise Chaparral (CCH), Coast Live Oak Woodland (CLO), and Southern Cottonwood-Willow Riparian Forest (COT).</p> <p>Special status species habitats have been documented within the USGS quadrangles that include these habitat types.</p> <p>Biological resources include:</p> <ul style="list-style-type: none"> • 48 Crossings – Streams/Creeks/Canals • 5 acres – Lakes/Ponds/Swamps/Reservoir • 10 acres – Wetlands • 1,575 acres – Special Status Plant/Wildlife Habitat • 513 acres – National Wildlife Refuge/Critical Habitat/Essential Habitat • 61% pedestrian surveyed 2006-2010 • Notable Drainages – Palmdale Ditch, California Aqueduct, Soledad Canyon, Kentucky Springs Canyon, Santa Clara River, Agua Dulce Canyon, Nelson Canyon, Bee Canyon, Oak Spring Canyon, Placerita Creek 	<p>Avoids or minimizes impacts on the following habitat types; Saltbush Scrub (SBS), Scrub Oak Chaparral (SCRUB OAK), Southern Cottonwood-Willow Riparian Forest (COT), Southern Mixed Chaparral (CH), and Alluvial Fan Sage Scrub (AL).</p> <p>Special status species habitats have been documented within the USGS quadrangles that include these habitat types.</p> <p>Biological resources include:</p> <ul style="list-style-type: none"> • 35 Crossings – Streams/Creeks/Canals • 3 acres – Lakes/Ponds/Swamps/Reservoir • 7 acres – Wetlands • 806 acres – Special Status Plant/Wildlife Habitat • 560 acres – National Wildlife Refuge/Critical Habitat/Essential Habitat • 45% pedestrian surveyed 2006-2010 • Notable Drainages – Palmdale Ditch, California Aqueduct, Escondido Canyon, Bee Canyon, Oak Spring Canyon, Sand Canyon, Placerita Creek 	<p>Avoids or minimizes impacts on the following habitat types; Saltbush Scrub (SBS), Scrub Oak Chaparral (SCRUB OAK), and Southern Cottonwood-Willow Riparian Forest (COT). However, impacts are focused on Southern Mixed Chaparral (CH) and Riparian Forest (RIP/WIL).</p> <p>Special status species habitats have been documented within the USGS quadrangles that include these habitat types.</p> <p>Biological resources include:</p> <ul style="list-style-type: none"> • 36 Crossings – Streams/Creeks/Canals • 3 acres – Lakes/Ponds/Swamps/Reservoir • 6 acres – Wetlands • 400 acres – Special Status Plant/Wildlife Habitat • 509 acres – National Wildlife Refuge/Critical Habitat/Essential Habitat • 38% pedestrian surveyed 2006-2010 • Notable Drainages – Palmdale Ditch, California Aqueduct, Long Canyon, Nellus Canyon, Agua Dulce Canyon, Santa Clara River, Bee Canyon, Oak Spring Canyon, Sand Canyon, Placerita Creek 	<p>Avoids or minimizes impacts on the following habitat types; Riparian Forest (RIP/WIL), Scrub Oak Chaparral (SCRUB OAK), and Southern Mixed Chaparral (CH). However, impacts are focused on Southern Cottonwood-Willow Riparian Forest (COT).</p> <p>Special status species habitats have been documented within the USGS quadrangles that include these habitat types.</p> <p>Biological resources include:</p> <ul style="list-style-type: none"> • 30 Crossings – Streams/Creeks/Canals • 0 acres – Lakes/Ponds/Swamps/Reservoir • 1 acre – Wetlands • 990 acres – Special Status Plant/Wildlife Habitat • 560 acres – National Wildlife Refuge/Critical Habitat/Essential Habitat • 39% pedestrian surveyed 2006-2010 • Notable Drainages – Anaverde Creek, California Aqueduct, Escondido Canyon, Bee Canyon, Oak Spring Canyon, Sand Canyon, Placerita Creek

Sylmar to Palmdale Subsection – Evaluation Matrix				
Measurement Criteria	Soledad Canyon Alternative (Withdrawn)	SR 14 East Alternative (Carried Forward)	SR 14 South Alternative (Withdrawn)	SR 14 West Alternative (Carried Forward)
Cultural Resources	<ul style="list-style-type: none"> 9 properties adjacent to or on the alignment 0 properties within the ½ mile zone 	<ul style="list-style-type: none"> 9 properties adjacent to or on the alignment 169 properties within the ½ mile zone 	<p>This alternative runs near concentrations of resources in Palmdale and south of Lake Palmdale. It is also closest to a concentration of historic properties in Acton.</p> <ul style="list-style-type: none"> 9 properties adjacent to or on the alignment 136 properties within the ½ mile zone 	<p>This alternative is near large concentrations of resources near Vasquez Rocks State Park.</p> <ul style="list-style-type: none"> 6 properties adjacent to or on the alignment 96 properties within the ½ mile zone
Parklands	<p>Approximately 12 properties designated for open space, recreation, and/or school uses will be directly intersected by the alignment.</p> <p>About 27.9 acres of Angeles National Forest will be taken for this alignment</p>	<p>Approximately five properties designated for open space, recreation, and/or school uses will be directly intersected by the alignment.</p> <p>About 0.5 acres of Angeles National Forest will be taken for this alignment</p>	<p>Approximately four properties designated for open space, recreation, and/or school uses will be directly intersected by the alignment.</p> <p>About 10.4 acres of Angeles National Forest will be taken for this alignment</p>	<p>Approximately six properties designated for open space, recreation, and/or school uses will be directly intersected by the alignment.</p> <p>Pelona Vista Park: alignment crosses park on a skew angle taking about 7.8 acres of land, but mostly impacts the southeastern quadrant of the property.</p> <p>About 0.5 acres of Angeles National Forest will be taken for this alignment</p>
Agricultural Lands	<p>Second highest potential for impacts to designated agricultural land.</p> <p>This alternative has approximately 211 acres of land locally designated for agricultural use, and approximately 93 acres of land designated as agricultural land by the FMMP within ½-mile zone of the alignment. Specifically, the alternative contains Prime Farmland (56 acres), Unique Farmland (29 acres), and Farmland of Statewide Importance (8 acres).</p>	<p>Highest potential for impacts to designated agricultural land.</p> <p>This alternative has approximately 231 acres of land locally designated for agricultural use, and approximately 112 acres of land designated as agricultural land by the FMMP located within ½-mile zone of the alignment. Specifically, this alternative contains Prime Farmland (53 acres), and Unique Farmland (59 acres),</p>	<p>Lowest potential for impacts to designated agricultural land.</p> <p>This alternative has approximately 182 acres of land locally designated for agricultural use, and approximately 38 acres of land designated as agricultural land by the FMMP located within ½-mile zone of the alignment. Specifically, the alternative contains Prime Farmland (18 acres), and Unique Farmland (20 acres)</p>	<p>Second lowest potential for impacts to designated agricultural land.</p> <p>This alternative has approximately 187 acres of land locally designated for agricultural use, and approximately 56 acres of land designated as agricultural land by the FMMP located within ½-mile zone of the alignment. Specifically, the alternative contains Prime Farmland (22 acres), and Unique Farmland (34 acres).</p>
Natural Environment				
Noise and Vibration	<p>With about 350 residential units within 200 feet and 1750 units within 1000 feet, this alternative has the highest potential for noise and vibration impacts</p>	<p>With about 220 residential units within 200 feet and 1570 units within 1000 feet, this alternative has a moderate potential for noise and vibration impacts</p>	<p>With about 180 residential units within 200 feet and 1640 units within 1000 feet, this alternative has the lowest potential for noise and vibration impacts</p>	<p>With about 215 residential units within 200 feet and 1720 units within 1000 feet, this alternative has a moderate potential for noise and vibration impacts</p>
Change in Visual and Scenic Resources	<p>This alternative has a moderate visual impact to residential areas. However this alternative has the highest level of impact to viewsheds of recreational areas and scenic vistas.</p>	<p>This alternative has a moderate visual impact to residential areas and the least impact to recreational areas near the Angeles National Forest and Vasquez Rocks.</p>	<p>This alternative has a moderate visual impact to residential areas, though the greatest visual impact to the Acton downtown area, and a moderate impact to recreational areas and scenic vistas</p>	<p>This alternative has a moderate visual impact on residential areas and minimizes impacts to recreational areas and scenic vistas.</p>

Sylmar to Palmdale Subsection – Evaluation Matrix				
Measurement Criteria	Soledad Canyon Alternative (Withdrawn)	SR 14 East Alternative (Carried Forward)	SR 14 South Alternative (Withdrawn)	SR 14 West Alternative (Carried Forward)
Geotechnical constraints	<p>Most tunnel portals (16) but the shortest total tunnel length (12.2 miles). Three portals are located in landslide areas. 3.2 miles of the alternative's non-tunnel reaches are within 150 feet of CGS landslide hazard zones.</p> <p>Greatest length of non-tunnel alignment in liquefaction hazard zone (12.8 miles). Tunnel reaches are expected to be either in bedrock or below the liquefiable soil zone.</p> <p>0.7 miles of the alternative is within a half-mile radius of a city of Los Angeles Methane Zone.</p> <p>1.3 miles are in Alquist-Priolo Earthquake Fault Zones. Alignment crosses the active Santa Susana and San Andreas faults and crosses the potentially active San Gabriel, Whitney Canyon and Soledad Canyon faults.</p> <p>0.7 miles are in the Lake Palmdale Dam Flood Inundation Zone.</p> <p>Key issues will be slope stability at tunnel portals and liquefaction mitigation for the at-grade and viaduct portions of alignment.</p>	<p>Has the 2nd greatest length of tunnel (19 miles).</p> <p>1.3 miles of the alternative's non-tunnel reaches are within 150 feet of CGS landslide hazard zones.</p> <p>8.5 miles of the alternative's non-tunnel reaches are located within liquefaction hazard zone. Tunnel reaches are expected to be either in bedrock or below the liquefiable soil zone.</p> <p>0.7 miles of the alternative is within a half-mile radius of a city of Los Angeles Methane Zone.</p> <p>1.3 miles are in Alquist-Priolo Earthquake Fault Zones. Alignment crosses the active Santa Susana and San Andreas faults and crosses the potentially active San Gabriel, Whitney Canyon, Agua Dulce and Little Escondido faults.</p> <p>0.7 miles are in the Lake Palmdale Dam Flood Inundation Zone.</p> <p>Key issues will be those associated with tunneling including ground support and control of groundwater inflows.</p>	<p>Has the greatest length of tunnel (20.5 miles).</p> <p>1.4 miles of the alternative's non-tunnel reaches are within 150 feet of CGS landslide hazard zones.</p> <p>7.1 miles of the alternative's non-tunnel reaches are located within liquefaction hazard zone. Tunnel reaches are expected to be either in bedrock or below the liquefiable soil zone.</p> <p>0.7 miles of the alternative is within a half-mile radius of a city of Los Angeles Methane Zone.</p> <p>1.3 miles are in Alquist-Priolo Earthquake Fault Zones. Alignment crosses the active Santa Susana and San Andreas faults and crosses the potentially active San Gabriel, Whitney Canyon and Soledad Canyon faults.</p> <p>0.7 miles are in the Lake Palmdale Dam Flood Inundation Zone.</p> <p>Key issues will be those associated with tunneling including ground support and control of groundwater inflows.</p>	<p>Has the 3rd greatest length of tunnel (16.7 miles).</p> <p>1.6 miles of the alternative's non-tunnel reaches are within 150 feet of CGS landslide hazard zones.</p> <p>7.8 miles of the alternative's non-tunnel reaches are located within liquefaction hazard zone. Tunnel reaches are expected to be either in bedrock or below the liquefiable soil zone.</p> <p>0.7 miles of the alternative is within a half-mile radius of a city of Los Angeles Methane Zone.</p> <p>1.2 miles are in Alquist-Priolo Earthquake Fault Zones. Alignment crosses the active Santa Susana and San Andreas faults and crosses the potentially active San Gabriel, Whitney Canyon, Agua Dulce and Little Escondido faults.</p> <p>Key issues will be those associated with tunneling including ground support and control of groundwater inflows.</p>

Sylmar to Palmdale Subsection – Evaluation Matrix				
Measurement Criteria	Soledad Canyon Alternative (Withdrawn)	SR 14 East Alternative (Carried Forward)	SR 14 South Alternative (Withdrawn)	SR 14 West Alternative (Carried Forward)
Hazardous Materials	<p>Through developed portions and urban areas, hazardous materials are likely to be encountered in the form of contaminated soils and/or contaminated groundwater. Demolition of existing structures may generate hazardous wastes. Hazardous materials likely within existing rail alignments and former rail yards. Through the mountainous region, rock formations may contain naturally occurring crude oil and white oil. This may be encountered during surface construction and tunneling as an asphalt-like and/or kerosene-like substance.</p> <p>Expect hydrocarbons including polynuclear aromatic hydrocarbons (PAHs), total petroleum hydrocarbons (TPH), lead, and arsenic in near surface soils (0 to 5 feet).</p> <p>Has an excavation material quantity of 9.3M cubic yards and lowest dump quantity at 1.8M cubic yards, based on quantities from Quantm.</p>	<p>Through developed portions and urban areas, hazardous materials are likely to be encountered in the form of contaminated soils and/or contaminated groundwater. Demolition of existing structures may generate hazardous wastes. Hazardous materials likely within existing rail alignments and former rail yards. Through the mountainous region, rock formations may contain naturally occurring crude oil and white oil. This may be encountered during surface construction and tunneling as an asphalt-like and/or kerosene-like substance.</p> <p>Expect hydrocarbons including polynuclear aromatic hydrocarbons (PAHs), total petroleum hydrocarbons (TPH), lead, and arsenic in near surface soils (0 to 5 feet).</p> <p>Has an excavation material quantity of 9.9M cubic yards and second highest dump quantity at 5.3M cubic yards, based on quantities from Quantm.</p>	<p>Through developed portions and urban areas, hazardous materials are likely to be encountered in the form of contaminated soils and/or contaminated groundwater. Demolition of existing structures may generate hazardous wastes. Hazardous materials likely within existing rail alignments and former rail yards. Through the mountainous region, rock formations may contain naturally occurring crude oil and white oil. This may be encountered during surface construction and tunneling as an asphalt-like and/or kerosene-like substance.</p> <p>Expect hydrocarbons including polynuclear aromatic hydrocarbons (PAHs), total petroleum hydrocarbons (TPH), lead, and arsenic in near surface soils (0 to 5 feet).</p> <p>Has the least excavation material quantity at 10.4M cubic yards and highest dump quantity at 6.3M cubic yards, based on quantities from Quantm.</p>	<p>Through developed portions and urban areas, hazardous materials are likely to be encountered in the form of contaminated soils and/or contaminated groundwater. Demolition of existing structures may generate hazardous wastes. Hazardous materials likely within existing rail alignments and former rail yards. Through the mountainous region, rock formations may contain naturally occurring crude oil and white oil. This may be encountered during surface construction and tunneling as an asphalt-like and/or kerosene-like substance.</p> <p>Expect hydrocarbons including polynuclear aromatic hydrocarbons (PAHs), total petroleum hydrocarbons (TPH), lead, and arsenic in near surface soils (0 to 5 feet).</p> <p>Has the most excavation material quantity at 8.0M cubic yards and second lowest dump quantity at 4.0M cubic yards, based on quantities from Quantm.</p>
Agency and Public Input				
Agency and Public Input	<p>U.S. Environmental Protection Agency have written to the Authority confirming their belief that the other three alignments being studied provide a much greater opportunity to find the Least Environmentally Damaging Practicable Alternative along this segment because of the sensitive habitat in the canyon. The Nature Conservancy is interested in protecting the Santa Clarita River Valley including the river in Soledad Canyon and wildlife migration areas; they propose this alignment not be studied further.</p> <p>This alignment will impact the CEMEX development and Una Lake which is a concern of the AV Conservancy. The towns of Acton and Agua Dulce are concerned about groundwater impacts to wells in the area during construction as well as noise and access across the rail line; they are interested in preserving their rural community makeup. However this is the most favored alignment by Supervisor Antonovich's office because it decreases impacts to Acton and Agua Dulce and other residential areas. It will also have the least development impacts.</p>	<p>Acton and Agua Dulce do not want to see this alignment move forward because of the potential impacts to schools and some residential properties. CHSTP has explained at Stakeholder Working Groups that all alignment options will be refined as the environmental process develops, with a view to removing/minimizing any impacts and implementing mitigation measures where appropriate</p> <p>This alignment will impact Una Lake which is a concern of the AV Conservancy. The towns of Acton and Agua Dulce are concerned about groundwater impacts to wells in the area during construction as well as noise and access across the rail line; they are interested in preserving their rural community makeup.</p>	<p>This alignment will impact CEMEX development and Una Lake which is a concern of the AV Conservancy. The towns of Acton and Agua Dulce are concerned about groundwater impacts to wells in the area during construction as well as noise and access across the rail line; they are interested in preserving their rural community makeup.</p>	<p>The towns of Acton and Agua Dulce are concerned about groundwater impacts to wells in the area during construction as well as noise and access across the rail line; they are interested in preserving their rural community makeup. In Palmdale this alternative would require new right-of-way that is currently not rail alignment on potential developable land. It also puts the Palmdale station away from the PTC.</p>

Table A-6 Palmdale Station Options - Evaluation Matrix

Palmdale Station Options – Evaluation Matrix		
Evaluation Measure	Option 1 (Soledad Canyon, SR 14 East, & SR 14 South Alternatives) (Carried Forward)	Option 2 (SR 14 West Alternative) (Carried Forward)
Design Objectives		
Estimated Travel time	Similar	Similar
Intermodal Connections	HST Station would be adjacent to existing Metrolink Station with easy access to Palmdale Airport via Avenue P.	HST Station would be separated from Metrolink Station but would have easy access to Palmdale Airport via Avenue P.
Capital Costs	At-grade HST Station partially located on acquired UPRR right-of-way might reduce encroachment onto existing industrial property.	At-grade HST Station located on open land might be the least expensive option.
Land Use		
Transit Oriented Development (TOD) Potential	These station locations lie within the City of Palmdale. Planned land uses within ½ mile of the alignment include Business Parks, Single Family Residential, Regional Commercial, Neighborhood Commercial, Open Space, Lockheed Specific Plan, and Airport and related uses, and Medium Density Residential uses. This location has high potential for TOD due its close proximity to existing residential, commercial areas, business parks, and the existing Palmdale Airport. Further development could occur adjacent to the Airport, which would increase development potential.	This station location lies within the City of Palmdale. Planned land uses within ½ mile of the alignment include the Palmdale Business Park Center Specific Plan area, surrounding Business Parks, Commercial Manufacturing, Community Commercial, and Airport and Related Uses. This location also has high potential for TOD due to it being surrounded by business parks. The HST Station would be adjacent to the existing Palmdale Airport. Future development could occur in the open parcels in this area that would increase its potential for TOD.
Consistency with Other Planning Efforts	The station is consistent with the Palmdale General Plan's objectives such as the support of regional efforts to connect the Palmdale Regional Airport with the Los Angeles International Airport with a high-speed rail line, the promotion of rail service to support industry within the City, the coordination with other jurisdictions to integrate circulation networks, the encouragement of commuter rail options between the Los Angeles Basin and Palmdale, and the establishment of a regional transportation center for improved access to major commercial centers.	Similar
Constructability		
Constructability	Station is proposed to be at-grade, but constructed alongside existing operating railway	Station is proposed to be at-grade
Disruption to Existing Railroads	Metrolink and UPRR tracks need to be relocated to construct this station	No disruption

Palmdale Station Options – Evaluation Matrix		
Evaluation Measure	Option 1 (Soledad Canyon, SR 14 East, & SR 14 South Alternatives) (Carried Forward)	Option 2 (SR 14 West Alternative) (Carried Forward)
Disruption to and Relocation of Utilities	Included with alignment data	Included with alignment data
Disruption to Communities		
Displacements		
Residential Displacements	No direct impacts. The station area is adjacent to an area of housing along E Avenue P-14.	No direct impacts. The station area is close to an area of housing south of E Avenue P.
Business Displacements	1 – commercial parcel impacted	None
Properties with Access Affected	0	0
Local Traffic Effects	<p>Both station sites are projected to generate comparable boarding levels with similar overall increase in traffic.</p> <p>Since station is to be located proximate to existing Metrolink facility, and on Sierra Highway, a major arterial route, traffic impacts are likely to be manageable. There will be some increase in cross town traffic from SR-14 to the station, likely along Avenues N & P, as regional traffic seeks to access the station.</p> <p>Local traffic impacts will be studied in detail in the EIR/EIS</p>	<p>Both station sites are projected to generate comparable boarding levels with similar overall increase in traffic.</p> <p>This HST station option is closest to the SR 14 highway. This will provide more direct access to/from the HST station, and reduce traffic impacts in Palmdale broadly. However, the proposed station is immediately adjacent to residential communities, and so, while broader community traffic impacts may be lessened at this location, the specific impacts to the adjacent residential communities are likely to be quite significant and will require careful study to assess the full range of potential impacts.</p> <p>Local traffic impacts will be studied in detail in the EIR/EIS</p>
Environmental Resources		
Biological Resources	There are no waterways; includes 33 acres of Special Status Plant/Wildlife Habitat within 1000 feet of the station location.	There are no waterways; includes 11 acres of Special Status Plant/Wildlife Habitat within 1000 feet of the station location.
Cultural Resources	<ul style="list-style-type: none"> 8 previously recorded properties within ½ mile zone 	<ul style="list-style-type: none"> 14 previously recorded properties within ½ mile zone
Parklands	No impacts to parklands	No impacts to parklands

Palmdale Station Options – Evaluation Matrix		
Evaluation Measure	Option 1 (Soledad Canyon, SR 14 East, & SR 14 South Alternatives) (Carried Forward)	Option 2 (SR 14 West Alternative) (Carried Forward)
Agricultural Lands	No impacts to agricultural lands	No impacts to agricultural lands
Natural Environment		
Noise/Vibration	There is a potential for construction and operational noise and vibration impacts to adjacent commercial areas.	There is a potential for construction and operational noise and vibration impacts to adjacent rural residential areas.
Visual/Scenic Resources	Would co-locate an HST Station with an existing Metrolink Station. Least impact to residential areas.	Would change the land use from rural residential properties to a HST Station. Would pose greatest impacts to residential areas.
Geologic/Soil Constraints	No significant constraints. Routine geotechnical investigations and development of geotechnical design parameters would be required for station foundations.	similar
Hazardous Materials	Hazardous materials likely within existing rail alignments and former rail yards. Expect hydrocarbons including polynuclear aromatic hydrocarbons (PAHs), total petroleum hydrocarbons (TPH), lead, and arsenic in near surface soils (0 to 5 feet).	Any demolition of existing structures may generate hazardous wastes.
Agency and Public Input		
Agency and Public Input	The City of Palmdale stated some preference for the east routes along the existing rail corridor following existing alignments as closely as possible. But they recognized the significant value HSR will bring to the community and stated that compromises may be made to ensure that a station stop does not go elsewhere. The United States Air Force states that if the alignment is sandwiched between the UP right-of-way and Sierra Highway, it would not be as problematic as if it was on the west side of Sierra Highway. Supervisor Antonovich supports the Palmdale Transit Center (PTC) station option and said that the Avenue M station option would be a political compromise, but the PTC would be the optimal station option for Palmdale. Both options 1 and 2 coordinate effectively with the High-Dessert Corridor project and access to the Palmdale Airport.	This will be a new alignment through the City of Palmdale and With a new station location. While the City of Palmdale has expressed a preference for the HST station to be co-located at the existing Palmdale Transit Center, they are not in opposition to this location. Both options 1 and 2 coordinate effectively with the High-Dessert Corridor project and access to the Palmdale Airport.

APPENDIX B - SYLMAR TO PALMDALE – ADDITIONAL TABLES

Statistics for the four alignments which are not measured in the evaluation matrices are included here for comparison purposes.

Table B-1 Statistics for Sylmar to Palmdale Alternative Alignments

Category (Measurement)	Soledad Canyon Alternative	SR 14 East Alternative	SR 14 South Alternative	SR 14 West Alternative
Total Tunnel Length (miles)	12.2	19.0	20.5	16.7
Number of Tunnels (each)	8	5	5	5
Maximum Tunnel Length (miles)	7.0	7.0	7.4	7.0
50' to 100' high: Viaduct Length (feet)	34,600	16,100	7,200	16,700
100' to 150' high: Viaduct Length (feet)	120	0	0	11,100
150' to 200' high: Viaduct Length (feet)	0	0	0	5,100
Design Speed (mph) [using the Exceptional Standard Criteria where necessary]	250 (one horizontal curve at 220 mph just north of the Sylmar area)	250 (two horizontal curves at 220 mph - one just north of the Sylmar area & one just south of Palmdale)	250 (two horizontal curves at 220 mph - one just north of the Sylmar area & one just south of Palmdale)	250 mph (one horizontal curve at 220 mph just north of the Sylmar area)

All highways, local roadways, and other rail operator crossings will need to be grade separated to ensure maximum safety for rail passengers and road users. The following tables list the crossings of major highways, rail operators, and local roadways for the different sections and alternatives between Sylmar and Palmdale and the approach that is proposed at each crossing. Station references (i.e. 1500+00) refer to the alignment centerline stationing shown on the plan and profile drawings in the subsequent appendices.

Table B-2 Proposed Crossings Between Sylmar and Sand Canyon (Common to All Alternatives)

#	Crossing Name	Station	Crossing Facility	Proposed HST Configuration	Proposed Improvement to Existing Facility
1	Roxford Street	1503+90	Arterial	Under	<ul style="list-style-type: none"> Raise Roxford Street 10 feet to 15 feet and San Fernando road also. Metrolink in Trench

#	Crossing Name	Station	Crossing Facility	Proposed HST Configuration	Proposed Improvement to Existing Facility
2	Olden Street	1518+70	Street	HST approximately 10 feet above existing ground	<ul style="list-style-type: none"> Shortened by approximately 180 feet; new turning circle. Spears Manufacturing is demolished
3	Pala Avenue	1532+50	Street	Over	Shortened by approximately 450 feet at west end; new turning circle
4	Yarnell Street	1537+10	Street	Viaduct Over	None
5	Bradley Avenue	1539+50	Street	Over	None
6	N. Carol Lane	1549+80	Street	HST on viaduct	None
7	Foothill Boulevard	1551+60	Arterial	Over, 120-foot span	None
8	I-210	1554+00	Freeway	Over, 180-foot span (2x90 feet) abutment on north side	None
9	Bridle Ridge Road	1558+40	Street	Over	New connection to Filbert Street
10	Filbert Street	1559+20	Street	Over	<ul style="list-style-type: none"> Close connection to Saddle Tree Court. Becomes cul-de-sac
11	Saddletree Court	1563+10	Street	Over	<ul style="list-style-type: none"> Close connection to Filbert Street Close Saddletree Court
12	Grapevine Mountainway	1624+20	Street	Under (Tunnel)	None
13	Whitney Canyon Road	1721+80	Street	Under (Tunnel)	None
14	Placerita Canyon Road	1760+10	Arterial	Under (Tunnel)	None
15	Delden Road	1774+20	Street	Under (Tunnel)	None
16	Pacerita Mountainway	1832+60	Street	Under (Tunnel)	None
17	Cedar Valley Way	1878+00	Street	Under (Tunnel)	None
18	SR 14 NB Off-Ramp	1886+50	Freeway	Under (Tunnel)	None

#	Crossing Name	Station	Crossing Facility	Proposed HST Configuration	Proposed Improvement to Existing Facility
19	Via Princessa	1897+30	Street	Under (Tunnel)	None
20	SR 14 NB Ramps	1899+00	Freeway	Under (Tunnel)	None
21	Canyon Park Boulevard	1924+00	Arterial	Under (Tunnel)	None
22	Cross Gate Court	1928+50	Street	Under (Tunnel)	None
23	Medley Ridge Drive	1930+60	Street	Under (Tunnel)	None
24	Sterling Grove Lane	1932+80	Street	Under (Tunnel)	None
25	Cloverhurst Place	1935+00	Street	Under (Tunnel)	None
26	Fieldwood Court	1937+20	Street	Under (Tunnel)	None
27	Marlewood Point Court	1939+50	Street	Under (Tunnel)	None
28	Popular Point Lane	1939+60	Street	Under (Tunnel)	None
29	Medley Ridge Drive	1942+10	Street	Under (Tunnel)	None
30	Lost Canyon Road	1948+00	Arterial	Under (Tunnel)	None
31	Metrolink	1949+60	Railroad	Under (Tunnel)	Realigned to north clear of tunnel portal at 1958+50
32	Metrolink	1970+00	Railroad	Under	Realigned to north clear of tunnel portal at 1958+50
33	Rolling Hills Avenue	1997+50	Street	<ul style="list-style-type: none"> • Viaduct, limited clearance pedestrian access only • Possible new access to north of HST 	Close

Table B-3 Proposed Crossings – SR 14 East Alternative

#	Crossing Name	Station	Crossing Facility	Proposed HST Configuration	Proposed Improvement to Existing Facility
34	Sand Canyon Road	2009+30	Arterial	Viaduct Over	None
35	Oak Springs Canyon Road	2032+70	Street	Viaduct Over	None
36	Metrolink	2132+30	Railroad	Viaduct over	None
37	Forsman Court	2134+00	Street	Viaduct Over	None
38	Lang Station Road	2150+00	Street	Over	None
39	Metrolink	2150+10	Railroad	<ul style="list-style-type: none"> • Viaduct over (double track with 200 foot spans). • Cross Metrolink twice without need to realign Metrolink 	None
40	Metrolink	2166+10	Railroad	Viaduct Over (100 ft spans)	Realign Metrolink over distance of 3000 feet
41	Soledad Canyon Road	2197+70	Regional Connector	Viaduct over	None
42	Agua Dulce Canyon Road	2340+07	Street	Viaduct Over	None
43	Briggs Road	2355+62	Street	Over	None
44	Big Springs Road	2500+70	Street	Under (Tunnel)	None
45	Margarita Hills Drive	2571+20	Street	Under (Tunnel)	None
46	Hubbard Road	2580+80	Street	Under (Tunnel)	None
47	Rainbow Bend Drive	2587+00	Street	Under (Tunnel)	None
48	Hisey Ranch Road	2667+00	Street	Under (Tunnel)	None
49	Escondido Canyon Road	2698+00	Street	Viaduct Over	None
50	Crown Valley Road	2759+00	Street	Viaduct Over	None
51	Wisconsin Street	2799+60	Street	Over	Bridge Over HST
52	Palomino Lane	2835+50	Street	Under (Tunnel)	None

#	Crossing Name	Station	Crossing Facility	Proposed HST Configuration	Proposed Improvement to Existing Facility
53	Stallion Meadows Trail	2842+30	Street	Under (Tunnel)	None
54	SR 14	2863+50	Freeway	Under (Tunnel)	None
55	Sierra Highway	2869+79	Regional Connector	Under (Tunnel)	None
56	Santiago Road	2870+00	Arterial	Under (Tunnel)	None
57	Rose Avenue	2877+50	Street	Under (Tunnel)	None
58	Listie Avenue	2884+50	Street	Under (Tunnel)	None
59	Via Gabriel Avenue	2932+00	Street	Under (Tunnel)	None
60	Peakland Road	2938+50	Street	Under (Tunnel)	None
61	Edison Power Road	2956+50	Street	Under (Tunnel)	None
62	Peaceful Valley Road	2982+00	Street	Under (Tunnel)	None
63	SR 14 (Antelope Valley Freeway)	3090+00	Freeway	Under (Tunnel)	None
64	Carob Court	3120+90	Street	Under	Shorten by 200 feet
65	E Barrel Springs Road	3128+40	Arterial	Under	<ul style="list-style-type: none"> Bridge Over HST. New Access to Rozalee Drive via Harold 5th Street
66	Harold 3 rd Street	3134+50	Street	At-grade	Shorten by 300 feet
67	Metrolink	3153+50	Railroad	At-grade	Realign Metrolink to follow HST
68	Sierra Highway	3157+00	Regional Connector	At-grade	Realign to either cross Una Lake (lake filled) or divert around Una Lake
69	Sierra Highway	3159+00	Regional Connector	At-grade	Realign to either cross Una Lake (lake filled) or divert around Una Lake

#	Crossing Name	Station	Crossing Facility	Proposed HST Configuration	Proposed Improvement to Existing Facility
70	E Avenue S	3186+40	Arterial	At-grade	Lower Avenue S from 10 th street to pass beneath HST and Metrolink
71	Sierra Highway	3189+00	Regional Connector	At-grade	Sierra Highway stays low after passing beneath UPRR
72	Metrolink	3205+00	Railroad	At-grade	None
73	E Avenue R	3240+00	Street	AT-grade	<ul style="list-style-type: none"> Slip Road from Avenue R to Sierra Highway New bridge over Sierra Highway and HST/UPRR right-of-way Realign 6th Street
74	E Palmdale Boulevard (SR 138)	3265+50	Arterial	HST and UPRR in trench beneath Palmdale Boulevard	Grade Separate
75	Sierra Highway	3314+10	Regional Connector	See Rancho Vista Comments	See Rancho Vista Comments
	E Avenue P (Rancho Vista Blvd)	3347+10	Arterial	At-grade	<ul style="list-style-type: none"> Rancho Vista Boulevard to be grade separated from the UPRR tracks. (Involves exhaustive highway modifications from Sierra Highway to Division Street and Technology Drive to Rancho Vista Boulevard). Current alignment has station on 0.00% grade so that the alignment is high at Rancho Vista, therefore station on falling grade 0.2% for Palmdale Boulevard Move station as far south as possible (consider 6000-foot station loops). Sierra Highway over HST. May require Technology drive to be remodeled to intersect with Sierra Highway at P7 or P6.

#	Crossing Name	Station	Crossing Facility	Proposed HST Configuration	Proposed Improvement to Existing Facility
76	E Avenue M	3509+00	Arterial	At-grade	Grade Separate

Table B-4 Proposed Crossings – SR 14 West Alternative

#	Crossing Name	Station	Crossing Facility	Proposed HST Configuration	Proposed Improvement to Existing Facility
34	Sand Canyon Road	2009+00	Arterial	Over	None
35	Oak Springs Canyon Road	2032+30	Street	Over	None
36	Metrolink	2131+90	Railroad	Viaduct Over	None
37	Metrolink	2150+00	Railroad	<ul style="list-style-type: none"> • Viaduct Over (double track with 200 feet spans) • Cross Metrolink twice without need to realign Metrolink 	None
38	Lang Station Road	2151+10	Street	Over	None
39	Metrolink	2165+70	Railroad	Viaduct Over (100-foot spans)	Realign Metrolink over distance of 3000 feet
40	Soledad Canyon Road	2197+40	Street	Viaduct Over	None
41	Agua Dulce Canyon Road	2340+00	Street	Viaduct Over	None
42	Biggs Road	2355+30	Street	Over	None
43	Bradley Canyon Road	2488+80	Street	Viaduct Over. Abutment immediately to east	None
44	Big Springs Road	2496+50	Street	Under	None
45	Margarita Hills Drive	2570+60	Street	Under (Tunnel)	None
46	Hubbard Road	2580+70	Street	Under (Tunnel)	None

#	Crossing Name	Station	Crossing Facility	Proposed HST Configuration	Proposed Improvement to Existing Facility
47	Rainbow Bend Drive	2588+00	Street	Under (Tunnel)	None
48	Escondido Canyon Road	2669+00	Street	Over	None
49	Ward Road	2674+30	Highway	<ul style="list-style-type: none"> • Viaduct from portal at 2663+00 • Crosses <ul style="list-style-type: none"> • Escondido Canyon Road • Ward Road (minimum clearance) • SR 14 (two carriageways) • Eastbound exit ramp • Sierra Highway 	
50	SR 14	2676+60	Freeway	Over	None
51	Sierra Highway	2682+30	Highway	Over	None
52	Red Rover Mine Road	2706+00	Street	Viaduct Over. (portal at 2889+00 out to be moved 200 feet east)	None
53	Sache St	2719+80	Street	Under	Close
54	Governor Mine Road	2750+00	Street	Under (Tunnel)	None
55	Brinville Road	2778+50	Street	Under (Tunnel)	None
56	Crown Vally Road	2785+00	Street	Under (Tunnel)	None
57	Carrolos Street	2790+00	Street	Under (Tunnel)	None
58	Rolandee Street	2803+30	Street	Under (Tunnel)	None
59	Dwight Lee Road	2813+90	Street	Under (Tunnel)	None
60	Valley Road Lane	2915+00	Street	Under (Tunnel)	None
61	Valley Road Lane	2930+00	Street	Under (Tunnel)	None
62	High Springs Road	2957+40	Street	Under (Tunnel)	None

#	Crossing Name	Station	Crossing Facility	Proposed HST Configuration	Proposed Improvement to Existing Facility
63	Lakeview Drive	2958+70	Street	Under (Tunnel)	None
64	W Avenue S14	2966+50	Street	Under (Tunnel)	None
65	Barrel Springs Road	2974+90	Street	Under (Tunnel)	None
66	Camares Drive	2980+30	Street	Under (Tunnel)	None
67	Hacienda Drive	2990+30	Street	Under	May be realigned to west of portal
68	Tierra Subida Avenue	3008+60	Street	Under	Bridge over HST. New siphon in Aqueduct
69	E Avenue S	3024+50	Arterial	Portal structure in earth embankment	None
70	Rayburn Road	3077+80	Street	Viaduct Over	None
71	SR 14 (Antelope Valley Freeway)	3083+30	Freeway	Skew crossing of SR 14 on viaduct.	None
72	SR 14 Ramps	3107+00	Freeway	Over	None
73	E Palmdale Boulevard (SR 138)	3110+00	Arterial	<ul style="list-style-type: none"> • Viaduct Over. • Crosses <ul style="list-style-type: none"> • SR 14 northbound off-ramp. • SR 14 northbound on-ramp. • SR 138. • "Clover leaf" from SR 138 to northbound SR 14 	None
74	E Avenue Q	3133+50	Street	Over	Avenue Q lowered from Division Street, staying low to pass beneath SR 138.
75	Technology Drive	3160+60	Street	See Rancho Vista comments	See Rancho Vista Comments

#	Crossing Name	Station	Crossing Facility	Proposed HST Configuration	Proposed Improvement to Existing Facility
76	E Avenue P (Rancho Vista Blvd)	3187+50	Street	At-grade	<p>Rancho Vista Boulevard is to be grade separated from the UPRR track and involves extensive highway modification from the Sierra Highway to Division Street and Technology Drive to Rancho Vista Boulevard.</p> <p>The current alignment puts the station between Technology Drive and Rancho Vista Boulevard. But this would conflict with design proposals (90%) from AECOM.</p> <p>Earth embankment from Avenue Q must be preferable, with Technology Drive and Rancho Vista passing beneath HST.</p>
77	Avenue O	3241+80	Street	At-grade	Grade Separate
78	E Avenue N-12	3251+50	Street	At-grade	Close
79	Avenue N-4	3281+00	Street	At-grade	Close
80	Sierra Highway	3300+00	Highway	At-grade	Grade Separate
81	Avenue N	3294+80	Street	At-grade	Grade Separate
82	E Avenue M	3348+80	Arterial	At-grade	Grade Separate

Table B-5 Proposed Crossings – SR 14 South Alternative

#	Crossing Name	Station	Crossing Facility	Proposed HST Configuration	Proposed Improvement to Existing Facility
34	Sand Canyon Road	2009+00	Arterial	Over	None
35	Oak Springs Canyon Road	2032+30	Street	Over	None
36	Lang Station Road	2164+20	Street	Viaduct Over	None
37	Lang Station Road	2173+90	Street	Viaduct Over	None
38	Metrolink	2189+80	Railroad	Viaduct Over	None
39	Soledad Canyon Road	2197+40	Regional Connector	Viaduct Over	None
40	Agua Dulce Canon Road	2294+40	Regional Connector	Viaduct Over	Grade Separate
41	Briggs Ed Road	2378+90	Regional Connector	Under (Tunnel)	None
42	Burke Mountainway	2409+00	Street	Under (Tunnel)	None
43	Briggs Road	2440+00	Regional Connector	Under (Tunnel)	None
44	Hughes Canyon Road	2623+40	Street	Under (Tunnel)	None
45	Parker Mountain Road	2630+00	Street	Under (Tunnel)	None
46	Hubbard Road	2672+80	Street	Under (Tunnel)	None
47	Escondido Canyon Road	2703+80	Street	Viaduct Over	None
48	Crown Valley Road	2724+10	Street	Viaduct Over	None
49	Wisconsin Street	2763+00	Street	Viaduct Over	Lower street
50	Michigan Avenue	2770+00	Street	Under	Bridge over HST track
51	Athos Street	2803+80	Street	Under	Local road underpass of cut/fill or close dirt road
52	Santiago Road	2820+00	Street	Over	None
53	Old Miner Road	2820+80	Street	Over	None

#	Crossing Name	Station	Crossing Facility	Proposed HST Configuration	Proposed Improvement to Existing Facility
54	Chantada Avenue	2831+50	Street	Over	None
55	Tindal Avenue	2838+50	Street	Viaduct Over	None
56	Tortuga Street	2846+30	Street	Over	Local road underpass of embankment construction
57	SR 14	2852+80	Freeway	Under in trench	Highway bridging over
58	Sierra Highway	2864+40	Regional Connector	Under in trench	Highway bridging over
59	San Gabriel Avenue	2885+50	Street	Under (Tunnel)	None
60	Star View Trail	2895+30	Street	Under (Tunnel)	None
61	W Avenue W4	2898+50	Street	Under (Tunnel)	None
62	Via Gabriel Avenue	2899+50	Street	Under (Tunnel)	None
63	N Arksey Avenue	2904+80	Street	Under (Tunnel)	None
64	Sunriseview Street	2907+80	Street	Under (Tunnel)	None
65	Edison Power Road	2938+50	Street	Under (Tunnel)	None
66	Peaceful Valley Road	2968+50	Street	Under (Tunnel)	None
67	SR 14 (Antelope Valley Freeway)	3069+00	Freeway	Under (Tunnel)	None
68	Sierra Hills Lane	3099+70	Street	At-grade	Shorten by 200 feet
69	Carob Court	3104+70	Street	At-grade	Shorten by 200 feet
70	Barrel Springs Road	3112+10	Arterial	Bridge over	New access to Rozalee Drive via Harold 5 th Street.
71	Harrold 3 rd Street	3118+00	Street	At-grade	Shorten by 300 feet
72	Metrolink	3137+70	Railroad	At-grade	Re-Align to follow HST

#	Crossing Name	Station	Crossing Facility	Proposed HST Configuration	Proposed Improvement to Existing Facility
73	Sierra Highway	3142+00	Highway	At-grade	Either Grade Separate to cross Una Lake (lake filled) or Re-Align to divert around Una Lake
74	E Avenue S	3171+10	Arterial	At-grade	Lower from 10 th Street to pass beneath HST and Metrolink
75	Sierra Highway	3175+50	Highway	At-grade	Stays low passing beneath UPRR
76	Metrolink	3190+00	Railroad	At-grade	Re-Align
77	E Avenue R	3223+55	Street	At-grade	Slip road from Avenue R to Sierra Highway. New bridges over Sierra Highway and HST/UPRR right-of-way. 6 th Street realigned.
78	E Palmdale Boulevard (SR 138)	3249+20	Arterial	In trench beneath Palmdale Blvd	Grade Separate
79	Sierra Highway	3298+00	Highway	At-grade	Over HST (see Rancho Vista comments)

#	Crossing Name	Station	Crossing Facility	Proposed HST Configuration	Proposed Improvement to Existing Facility
80	E Avenue P (Rancho Vista Blvd)	3331+00	Arterial	At-grade	<p>To be Grade Separate from UPRR tracks, involves exhaustive highway modifications from Sierra Highway to Division Street and Technology Drive to Rancho Vista Boulevard</p> <p>Current alignment has station on 0.00% grade so that the alignment is high at Rancho Vista</p> <p>Therefore station on falling grade 0.2% for Palmdale Boulevard</p> <ul style="list-style-type: none"> • Move station as far south as possible (consider 6000-foot station loops) • Sierra Highway over HST • May require Technology Drive to be remodeled to intersect with Sierra Highway at P7 or P6
81	E Avenue N	3438+50	Arterial	At-grade	Grade Separate
82	E Avenue M	3490+50	Arterial	At-grade	Grade Separate

Table B-6 Proposed Crossings – Soledad Canyon Alternative

#	Crossing Name	Station	Crossing Facility	Proposed HST Configuration	Proposed Improvement to Existing Facility
34	Sand Canyon Road	2009+30	Arterial	Over	None
35	Oak Springs Canyon Road	2036+70	Street	Over	None
36	Lang Station Road	2168+30	Street	Viaduct Over	None
37	Lang Station Road	2173+10	Street	Viaduct Over	None
38	Metrolink	2192+20	Railroad	Viaduct Over	None
39	Soledad Canyon Road	2197+40	Regional Connector	Viaduct Over	None
40	Agua Dulce Canyon Road	2290+00	Regional Connector	Viaduct Over	None
41	Metrolink	2314+00	Railroad	Viaduct Over	None
42	Metrolink	2324+10	Railroad	Viaduct Over	Grade Separate
43	Metrolink	2343+20	Railroad	Viaduct Over	None
44	Soledad Canyon Road	2357+30	Regional Connector	Viaduct Over	None
45	Soledad Canyon Road	2372+30	Regional Connector	Viaduct Over	None
46	Burke Mountain Way	2388+00	Regional Connector	Viaduct Over	None
47	Metrolink	2388+00	Railroad	Viaduct Over	None
49	Soledad Canyon Road	2399+80	Regional Connector	Viaduct Over	None
50	Soledad Canyon Road	2410+00	Regional Connector	Viaduct Over	None
51	Soledad Canyon Road	2444+20	Regional Connector	Viaduct Over	None
52	Metrolink	2465+60	Railroad	Viaduct Over	None
53	Youngs Canyon Road	2502+90	Regional Connector	Viaduct Over	None
54	Soledad Canyon Road	2526+80	Regional Connector	Viaduct Over	None

#	Crossing Name	Station	Crossing Facility	Proposed HST Configuration	Proposed Improvement to Existing Facility
55	Soledad Canyon Road	2549+50	Regional Connector	Viaduct Over	None
56	Metrolink	2547+20	Railroad	Viaduct Over	None
57	Soledad Canyon Road	2558+80	Regional Connector	Viaduct Over	None
58	Metrolink	2567+00 to 2575+002	Railroad	Viaduct Over	None
59	Soledad Canyon Road	2576+20	Regional Connector	Viaduct Over	None
60	Soledad Canyon Road	2605+30	Regional Connector	Viaduct Over	None
61	Metrolink	2609+70	Railroad	Viaduct Over	None
62	Metrolink	2622+00	Railroad	Viaduct Over	None
63	Bootlegger Canyon Road	2622+70	Regional Connector	Viaduct Over	None
64	Metrolink	2636+40	Railroad	Viaduct Over	None
65	Moody Truck Trail	2694+80	Street	Over	None
66	Arrastre Canyon Road	2697+10	Street	Under in trench	Grade Separate with local road bridging over
67	W Avenue Y-8	2837+00	Street	Over	Realign by lowering road under HST. Drainage would need to be addressed or end road at HST
68	Aliso Canyon Road	2840+80	Street	Viaduct Over	None
69	Blumm's Ranch Road	2844+00	Street	Viaduct Over	None
70	El Sastre Road	2918+60	Street	At-grade	Close or build bridge over HST
71	Calle del Rosa	2928+10	Street	Bridge Over	Lower road
72	Kentucky Springs Road	2942+10	Street	Viaduct Over	None
73	Foreston Road	2968+30	Street	At-grade	Grade Separate

#	Crossing Name	Station	Crossing Facility	Proposed HST Configuration	Proposed Improvement to Existing Facility
74	Rockyford Road	2994+50	Street	Bridge Over	Close or local road underpass
75	Carson Mesa Road	3003+80	Street	Viaduct Over	None
76	Metrolink	3005+80	Railroad	Viaduct Over	None
77	Sierra Highway	3028+50	Regional Connector	HST embankment/ Bridge Over	Depress roadway
78	Mountain Springs Road	3035+00	Street	HST embankment/ Bridge Over	Depress roadway
79	SR 14 (Antelope Valley Freeway)	3038+00 to 3043+00	Freeway	Viaduct Over	None
80	SR 14 (Antelope Valley Freeway)	3112+20	Freeway	Under (Tunnel)	None
81	Courson Ranch Road	3160+00	Street	Bridge Over	None
82	Sierra Hills Lane	3172+30	Street	Over	Shorten by 200 feet
83	Carob Court	3178+00	Street	Over	Shorten by 200 feet
84	E Barrel Springs Road	3185+40	Arterial	Bridge Over	New access to Rozalee Drive via Harold 5 th Street
85	Harold 3 rd Street	3187+80	Street	Over	Shorten by 300 feet
86	Metrolink	3210+80	Railroad	At-grade	Re-align to follow HST
87	Sierra Highway	3214+80	Regional Connector	At-grade	Either Grade Separate to cross Una Lake (lake filled) or divert around Una Lake
88	Sierra Highway	3240+00	Regional Connector	At-grade	Either Grade Separate to cross Una Lake (lake filled) or divert around Una Lake

#	Crossing Name	Station	Crossing Facility	Proposed HST Configuration	Proposed Improvement to Existing Facility
89	E Avenue S	3243+50	Arterial	At-grade	Lower from 10 th Street to pass beneath HST and Metrolink
90	Sierra Highway	3251+80	Regional Connector	At-grade	Stays low passing beneath UPRR
91	Metrolink	3262+50	Railroad	At-grade	None
92	E Avenue R	3297+00	Street	At-grade	Slip road from Avenue R to Sierra Highway. New bridges over Sierra Highway and HST/UPRR right-of-way. 6 th Street realigned.
93	Palmdale Boulevard (SR 138)	3322+50	Arterial	HST and UPRR in trench	Grade Separate
94	Sierra Highway	3370+90	Regional Connector	At-grade	Over HST (see Rancho Vista comments)
95	E Avenue P (Rancho Vista Blvd)	3404+30	Arterial	At-grade	<p>To be Grade Separated from UPRR tracks, involves exhaustive highway modifications from Sierra Highway to Division Street and Technology Drive to Rancho Vista Boulevard</p> <p>Current alignment has station on 0.00% grade so that the alignment is high at Rancho Vista</p> <p>Therefore station on falling grade 0.2% for Palmdale Boulevard</p> <ul style="list-style-type: none"> • Move station as far south as possible (consider 6000-foot station loops) • Sierra Highway over HST • May required Technology Drive to be remodeled to intersect with Sierra Highway at P7 or P6

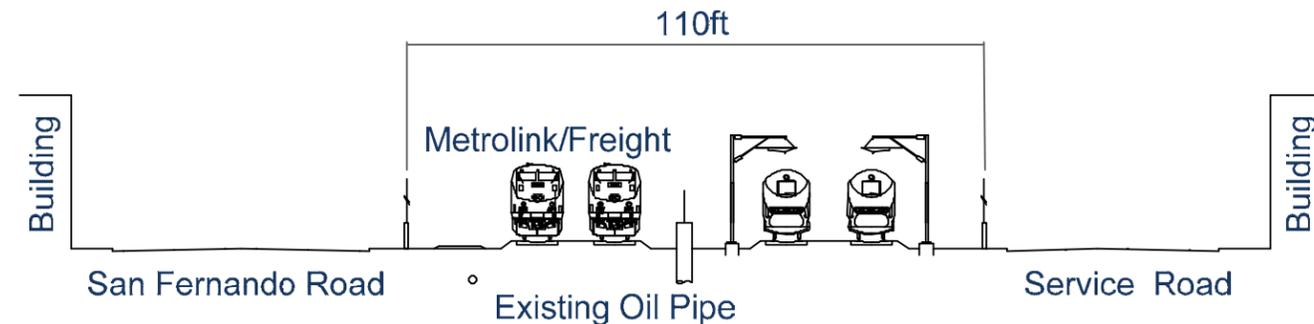
#	Crossing Name	Station	Crossing Facility	Proposed HST Configuration	Proposed Improvement to Existing Facility
96	E Avenue M	3566+00	Arterial	At-grade	Grade Separate

APPENDIX C - IMPACTS COMMON TO ALL ALTERNATIVES

Displacements and access – SR 2 to Sylmar

Track placement and horizontal alignment for the sub-section between SR 2 and Sylmar were decided in the initial review of alternatives in chapter 3. The impacts resulting from sharing the Metrolink right-of-way are therefore common to all alternatives, and so listed here.

Figure C-1 Typical ESS Cross Section (Looking North)



The selected track location, alternative ESS locates the HST tracks generally on the east side of the existing rail right-of-way and the Metrolink tracks on the west side (see Figure C-1, a typical cross section looking north). This arrangement would allow the HST tracks to remain at-grade alongside Burbank Junction, but would introduce some complexity in providing access from the Metrolink tracks to existing rail freight customers on the east side of the corridor.

There are two industrial properties that are currently served by rail within the study area: a quarry north of Tuxford Street and a plywood factory north of SR 118. Possible solutions need to be worked in concert with Metro, Metrolink, UPRR and the freight customers as the project progresses. Possible means of dealing with these freight links include:

- Elevate the HST tracks over the freight links or depress them under the freight links to maintain rail access to the properties
- Provide an unloading point on the west side of the alignment with grade-separated material transfer facilities to move the materials to the east side
- Transition the HST tracks to the west side through one or both sites
- Remove the rail freight links and address the loss of utility.

Alternative ESS is shown on drawings LAP-CB2201 to 2217 in Appendix D.

The selected hybrid horizontal alignment has curvatures corresponding to varying design speeds along its length, aimed at achieving good time performance while limiting the impacts associated with the different site conditions along its path. From south to north the design speed profile accommodates:

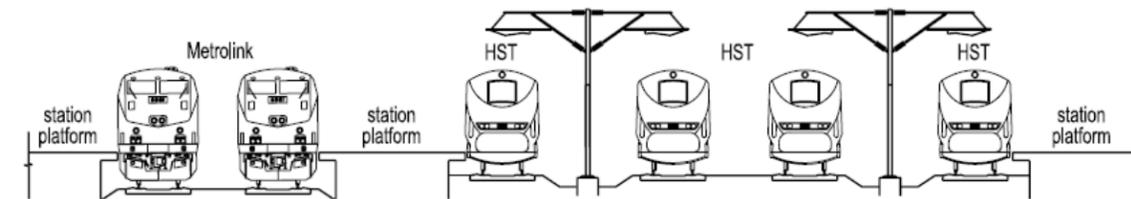
- 140 mph between SR 2 and Sonora Avenue—the 140mph speed restriction is caused by the proximity to LAUS and the desire to pass under the SR 134 bridge without reconstruction,
- 160 mph between Sonora Avenue and North Buena Vista Street—the 160mph speed restriction is caused by the desire to pass under the bridges in the Burbank area with little reconstruction,

- 210 mph between North Buena Vista Street and Tuxford Street—the 210mph speed restriction is caused by the desire to pass under the I-5 bridge without reconstruction,
- 220mph between Tuxford Street and Bledsoe Street.

The alignment generally follows the existing rail right-of-way for the entire distance between SR 134 (Glendale) and Bledsoe Street (Sylmar) but diverges slightly in some areas because of the curve radii required by the design speeds. These are in the vicinities of Burbank Junction, Tuxford Street, and Hubbard Avenue.

Some parcels of additional right-of-way would be required along the length of the subsection because the proposed HST-Metrolink cross section, at 110 to 115 feet is wider than the existing rail right-of-way, which is generally 100 feet wide, but reduces to 80 feet in places. Significant amounts of additional right-of-way and possible displacements would be required to accommodate two additional tracks and platforms at any proposed station location, as indicated in Fig. C-2. This would be the case for all alignment options.

Figure C-2 Typical Cross Section at Station



The alignment based on incremental design speeds is to be refined and taken forward into full environmental review. The design speed profile will be refined during preliminary engineering design once detailed survey information is obtained, to confirm that the highest design speeds that will fit through existing physical constraints are used.

Land Use

The land use immediately adjacent to the proposed HST route varies along the route; residential, transportation, and commercial uses in downtown Los Angeles; industrial and commercial uses adjacent to the Metrolink right-of-way with areas of residential use behind the adjacent areas; vacant land and residential in the mountains; and residential and commercial in Palmdale.

Land use areas within ½ mile of the alignment as shown on Figures C-3 to C-7 include:

Residential Areas:

- City of Los Angeles
- City of Glendale
- City of Burbank
- Sun Valley-La Tuna Canyon (City of Los Angeles)
- Arleta-Pacoima (City of Los Angeles)
- City of San Fernando
- Sylmar (City of Los Angeles)
- City of Santa Clarita

- Acton
- City of Palmdale

Parks, Open Space, and Recreational Amenities:

- Rio de Los Angeles State Park
- Los Angeles State Historic Park
- Elysian Park
- Cypress Park
- Elysian Valley Recreation Center Park
- Los Feliz Municipal Golf Course
- North Atwater Park
- Griffith Park
- Harding and Wilson Municipal Golf Course
- Pacific Community Center and Park
- Forest Lawn Memorial Park
- Griffith Manor Park
- Pelanconi Park
- Robert E. Ludigan Parkland Sun Valley Recreation Center and Park
- McCambridge Park and Recreational Center
- Nickelodeon Studios
- Robert Gross Park
- Sun Valley Speedway
- Permanent Charities Earth Walk Park
- Roger Jessup Park
- Pacoima Recreation Center and Park
- Historic Lopez Adobe House
- City of San Fernando Mission City Trail
- City of San Fernando Recreational Park
- San Fernando Regional Pool Facility
- Las Palmas Park
- Heritage Park
- Angeles National Forest
- Castaic Lake State Recreation Area
- Bureau of Land Management
- Santa Clara River
- Vasquez Rocks Park (County Park)
- Pelona Vista Park (City of Palmdale)

Transportation:

- Union Station
- Metrolink Combined Maintenance Facility
- Taylor Yard
- Los Angeles Amtrak

- Glendale Amtrak/Metro
- Metrolink Downtown Burbank Station and Park and Ride
- Metrolink Burbank Junction
- Bob Hope Airport
- Metrolink Sun Valley Station and Park and Ride
- Whiteman Airport
- San Fernando/Greyhound Bus Station
- Metrolink Sylmar/San Fernando Station and Park and Ride
- Metrolink rail crossings
- Union Pacific rail crossings
- Metrolink Vincent Grade/Acton Station
- Palmdale Transportation Center
- Palmdale Airport

Legend for following figures

Legend	Land Use	Area (Acres)	Area (%)
	Agriculture	497.0230	0.79%
	Commercial	2299.9256	3.66%
	Extraction	508.1237	0.81%
	Industrial	3591.2582	5.71%
	Low Density Residential	7076.9468	11.26%
	Medium to High Density Residential	2299.0022	3.66%
	Open Space & Recreation	1186.9345	1.89%
	Public Facilities & Institutions	1043.1518	1.66%
	Rural Density Residential	1979.8989	3.15%
	Transportation & Utilities	5192.5074	8.26%
	Vacant	37050.4470	58.93%
	Water & Floodways	147.1091	0.23%

Figure C-3 Existing Land Use between Los Angeles Union Station and SR 134

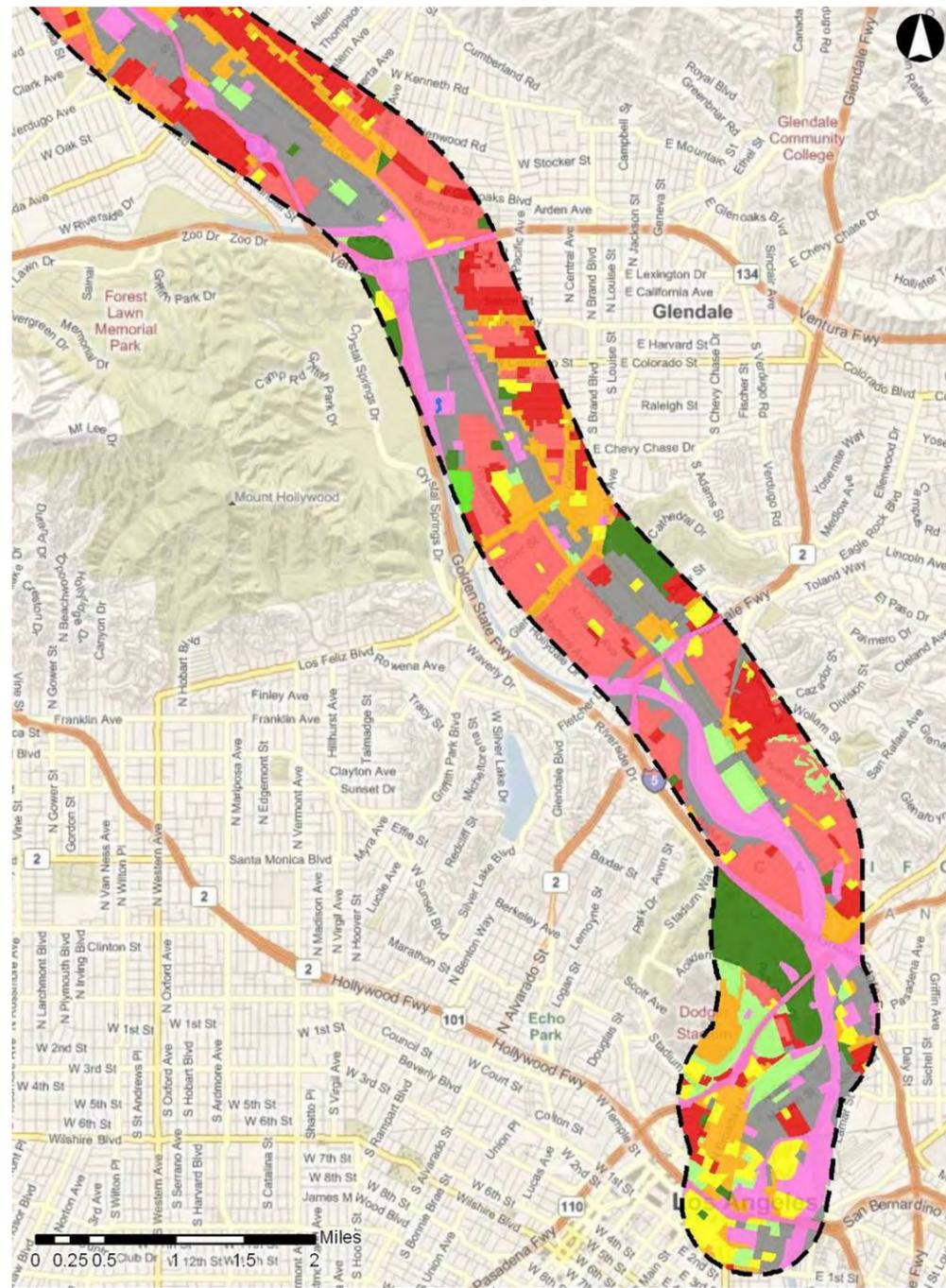


Figure C-4 Existing Land Use between SR 134 and Sun Valley

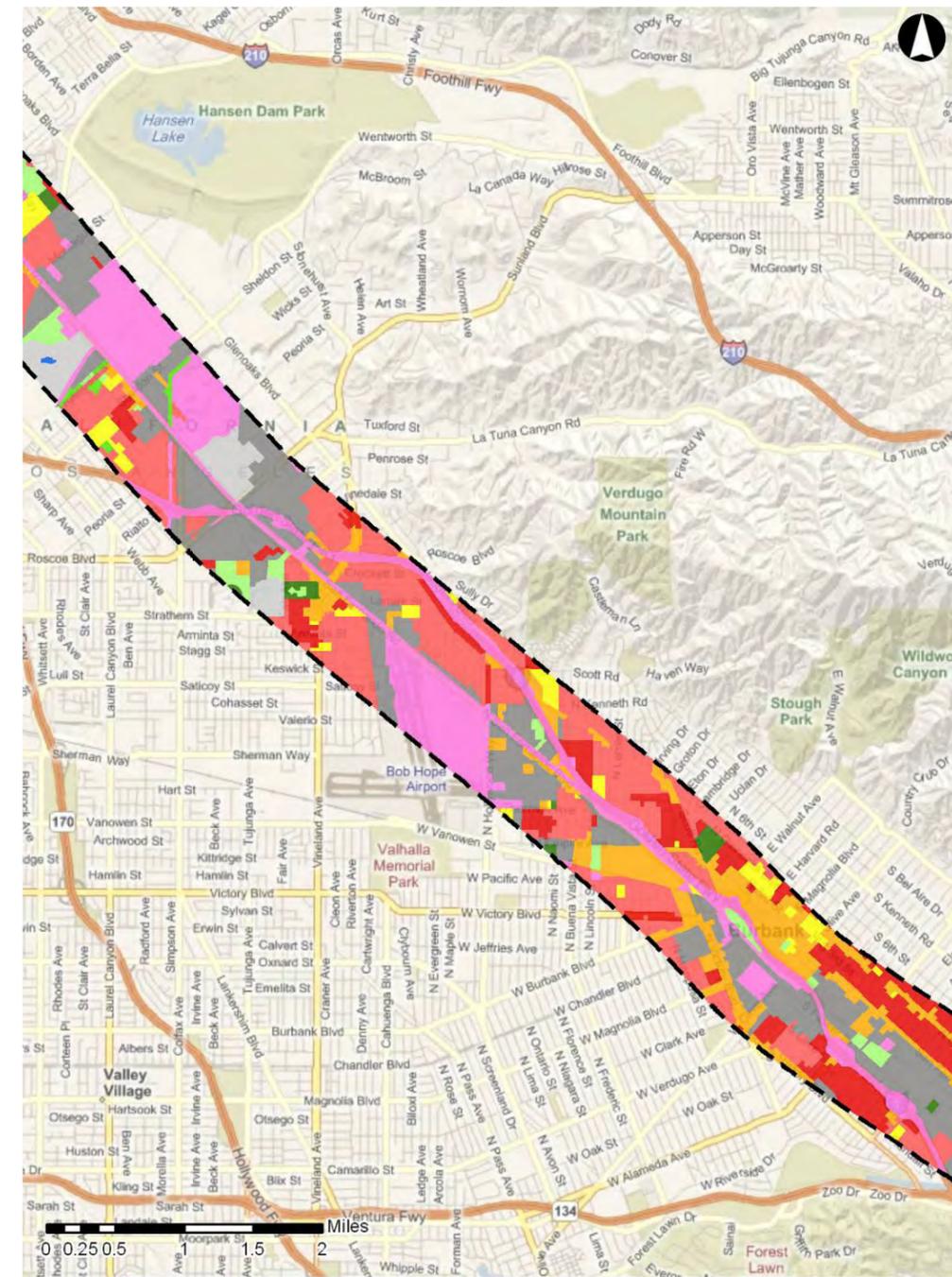


Figure C-5 Existing Land Use between Sun Valley and I-210

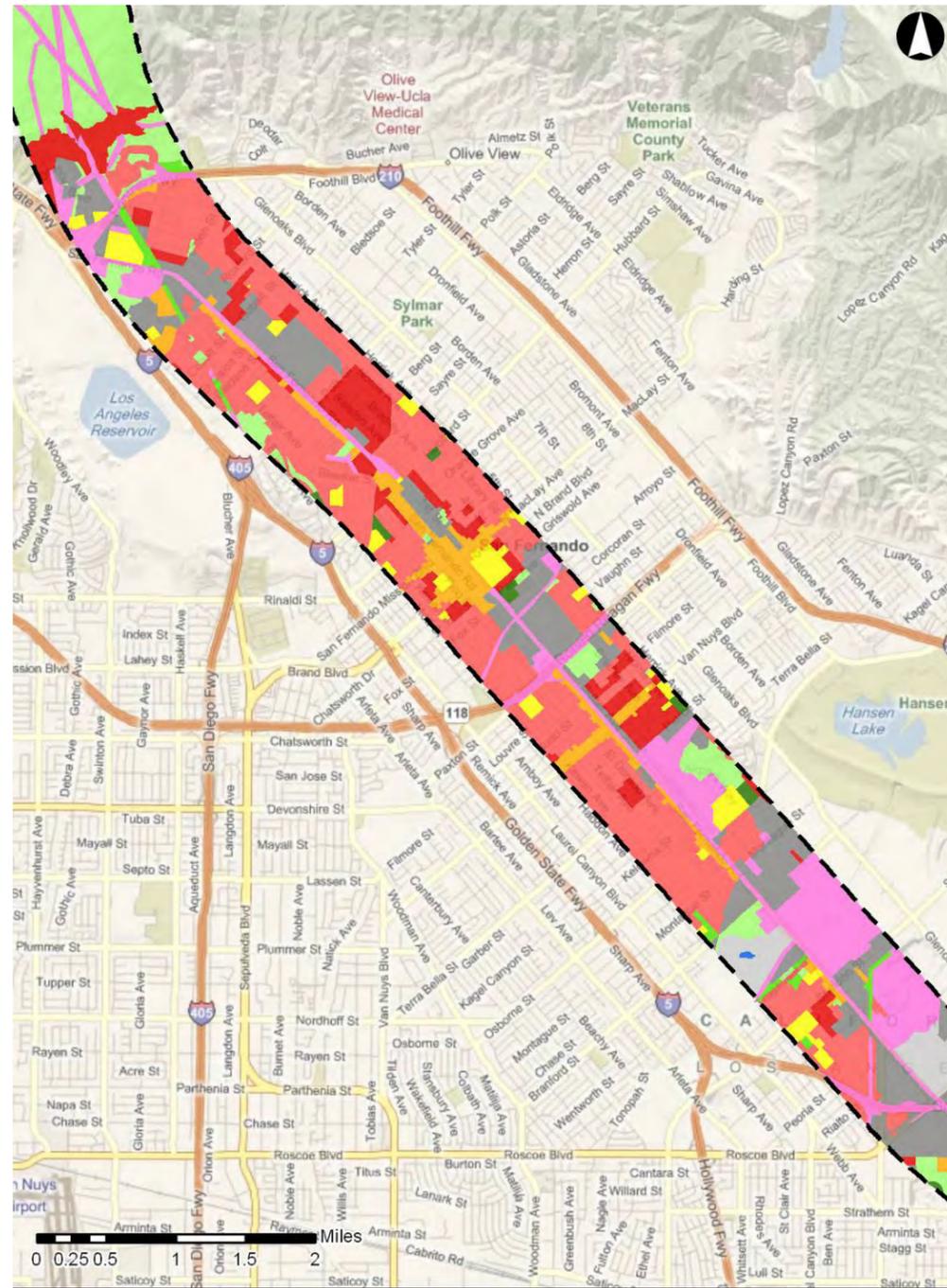


Figure C-6 Existing Land Use in the Santa Clarita area

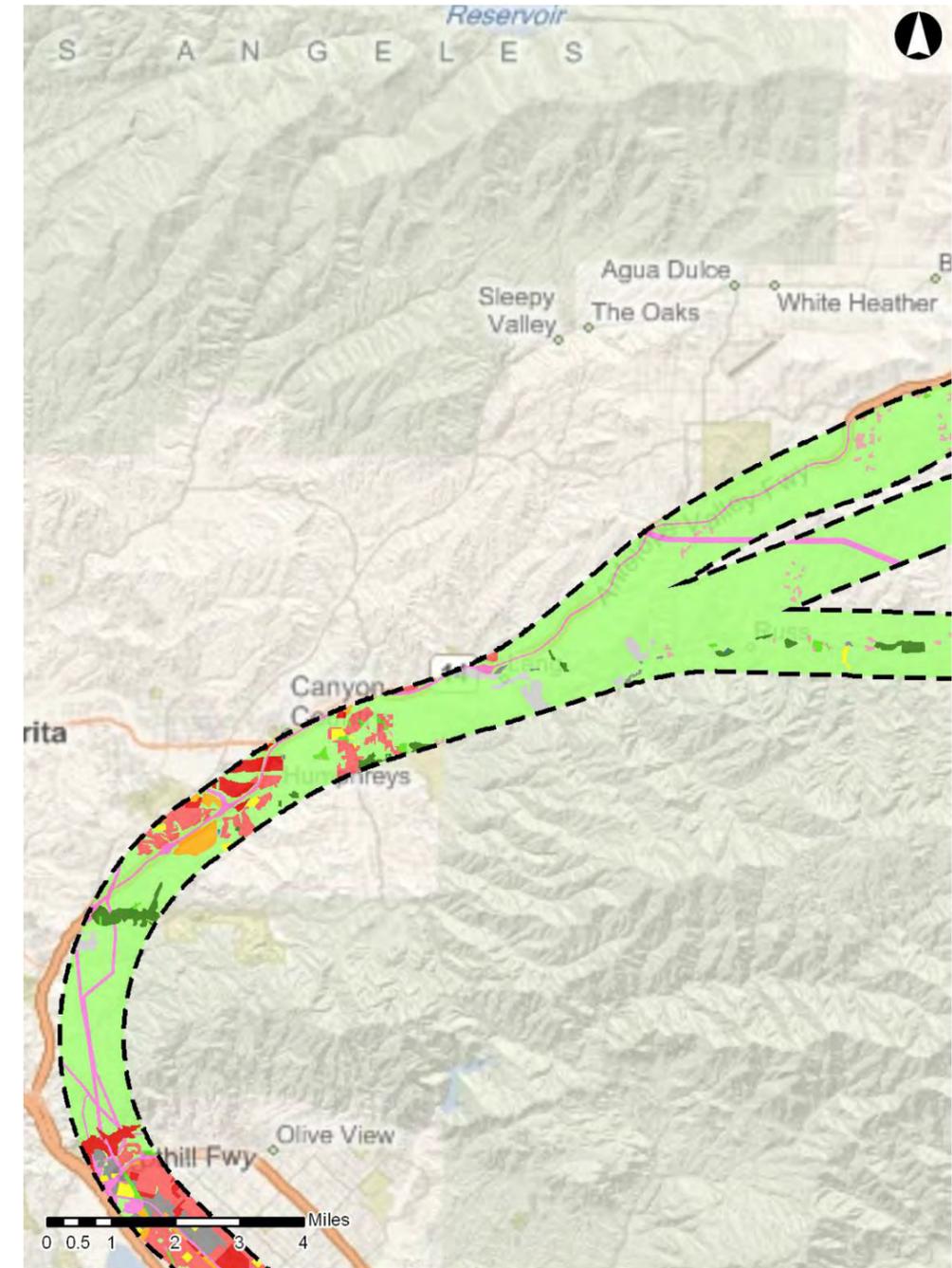
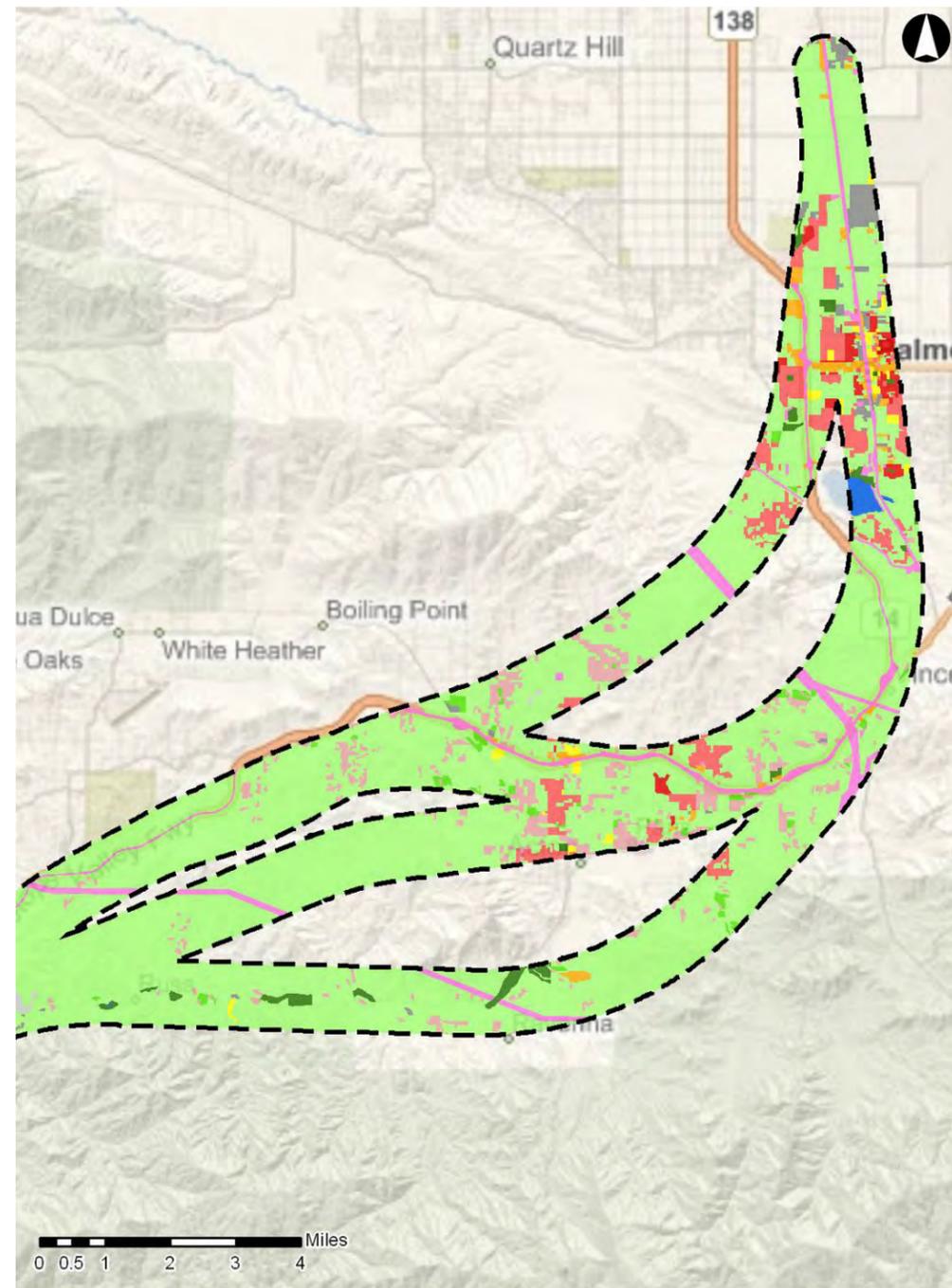


Figure C-7 Existing Land Use in the Palmdale area



Los Angeles River Constraints

The project has the potential to impact the implementation of Los Angeles River Revitalization Master Plan (LARRMP), which includes the Rio de Los Angeles State Park (RDLASP) and the Los Angeles Historic Park (LASHP), in areas within a half-mile radius of the potential HST alignments. Figure C-8 illustrates the potential areas of impact to the Los Angeles River. The LARRMP defines the Los Angeles River corridor as a half-mile on each side of the 32 miles of Los Angeles River within the City of Los Angeles, and outlines several areas along the Los Angeles River as areas of opportunity for river restoration and revitalization. These areas have been identified as zones of influence and include the intersection of SR 134 and the Los Angeles River, the RDLASP, the intersection of the I-5 and the Los Angeles River, the intersection of I-110 and the Los Angeles River, and the LASHP. Restoration of the Los Angeles River may include the expansion of the river corridor, river and channel framework, and the creation of an open space and recreation plan. In addition to restoration, the LARRMP will modify and unify land uses and zoning along the river corridor to provide more consistent land uses and zoning between jurisdictions and to allow more recreational uses and the redevelopment of underutilized industrial sites. The HST alignments identified may conflict with the LARRMP goals of creating open space and recreation areas, improving the visual character of the river corridor, providing adjacent bike lanes, and preserving habitat.

Figure C-8 Potential Areas of Impact to the Los Angeles River



Source: HMM, URS & Arup JV

Waterways, Wetlands and Nature Preserves

In addition to the Los Angeles River itself, described above, three watercourses cross the Antelope Valley line in the San Fernando Valley. All of these washes flow within concrete flood control channels and are considered potential special

aquatic resources areas¹. They are major tributaries to the Los Angeles River, and are owned and maintained by the Los Angeles County Department of Public Works.

- Verdugo Wash – crosses the proposed alignment about 250 feet north of SR 134 on the north side of Fairmont Avenue in a 95-foot-wide concrete channel. This crossing is approximately 900 feet east of the wash’s confluence with the Los Angeles River.
- Tujunga Wash – crosses the proposed alignment approximately half a mile north of Sheldon Street in a 66-foot-wide concrete channel.
- Pacoima Wash – crosses the proposed alignment approximately a third of a mile north of SR 118 in a 141-foot-wide concrete channel.

In the San Gabriel mountains the alignment crosses the Santa Clara River and some of its tributaries. The Santa Clara River system remains in a relatively natural state. Notable drainages in this section include Palmdale Ditch, California Aqueduct, Soledad Canyon, Kentucky Springs Canyon, Santa Clara River, Agua Dulce Canyon, Nelson Canyon, Bee Canyon, Oak Springs Canyon, Sand Canyon, and Placerita Creek

Cultural Resources

Direct impacts to historic-period properties may occur. These include removal or modification of the built environment to accommodate the proposed alignment or stations and visual changes to the historic context and visual narrative of a property, landscape, or district.

Indirect impacts to historic-period properties may occur as result of noise, vibration from construction activities and from operation of the high-speed train and as changes to historic integrity aspects of feeling and setting.

Implementation of avoidance and mitigation measures (such as the Secretary of the Interior’s Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings) would minimize or resolve adverse effects and significant impacts to properties.

Impacts to archaeological resources may occur, such as removal or modification of an intact resource to accommodate the proposed track, catenaries, tunnels, trenches or footings for elevated structures.

LAUS to SR 2

Details of direct and indirect impacts for individual options are given in Appendix A - Detailed Evaluation Matrices.

No impacts to human remains are anticipated given there are no known cemeteries within the proposed right-of-way. Two former historic period cemeteries are located within a 0.5-mile radius of the project, but all known remains were moved to other cemeteries and are no longer active. With implementation of mitigation measures, potential impacts to human remains would be reduced to a less than significant level.

SR 2 to Sylmar

¹ For the purposes of this analysis, special aquatic resource areas are defined as potential: USACE jurisdiction pursuant to Section 404 of the Clean Water Act (CWA); RWQCB legal authority in accordance with Section 401 o, f the CWA; and CDFG jurisdiction pursuant to Section 1600 (et seq.) of the CFG Code.

The San Fernando Valley is underlain by alluvium which may contain significant paleontological resources. These resources may be encountered at shallow depths because of the folded and uplifted nature of the sedimentary material.

The study area contains communities with structures built prior to 1950; therefore, during construction there is a potential to encounter intact sub-surface archaeological resources eligible for the National Register Historical Places (NRHP) and the Californian Register Historical Resources (CRHR). This is because older construction techniques often disturbed only a few feet of soil, thereby leaving intact archaeological deposits. San Fernando Road was once San Fernando Mission Road, a part of the Mission San Fernando Rey de Espana, and portions of this road within the study area will require assessment for significance. Portions of San Fernando Road are also known as Historic Route 99, which was the main north-south highway on the West Coast of the United States until 1964. A United States Numbered Highway (assigned in 1926) US 99 was an important route in California throughout much of the 1930s as a means for Dust Bowl immigrant farm workers to traverse the state. It was replaced, for the most part, by Interstate 5.

There are 4 National Register eligible or listed properties within the study area (within half a mile of the alignment): Glendale Station, Burbank Post Office, Valhalla Cemetery and Lopez Adobe. In addition there is one listed Los Angeles Historic Cultural Monument within the study area: Shadow Ranch House. To accommodate the HST, Glendale Station may need to be relocated. The Authority would actively consult with the City of Glendale, SHPO and other key stakeholders to determine the best location for the historic station building, either as part of the reconfigured Metrolink station or nearby, in order to avoid, minimize, or resolve adverse effects to historic properties.

Located within one-mile of the rail corridor is Heritage Park, which is considered a Traditional Tribal Cultural Site, since it was designed and built in honor of the Fernandeno-Tataviam tribal culture and heritage, especially in honor of the history of Rogerio Rocha's (Tataviam member) life.

A recently constructed memorial dedicated to Cesar Chavez is immediately adjacent to the rail corridor at the corner of Truman and Wolfskill Streets in San Fernando.

Sylmar to Palmdale

Details of direct and indirect impacts for individual options are given in Appendix A - Detailed Evaluation Matrices.

Prehistoric and historic era cultural resources (both archaeological and built environment) have been identified throughout the area considered for the HST alternatives. The quantity and significance of these resources have not been determined for much of the areas under consideration. Prehistoric resources include those related to both secular and religious activities such as occupation sites, subsistence activities and rock art sites (such as Vasquez Rocks County Park) associated with ceremonial activities. Historic era resources include remains of activities ranging in age from early Spanish exploration to cold-war era facilities such as ranching, mining, railroad and homestead activities.

A large percentage of the areas transected by the alternatives are on and/or within sedimentary geologic formations. These sedimentary formations vary in age from and include late Miocene, Pliocene and Pleistocene formations of both marine and non-marine origins. These formations are known to contain fossil resources and are of varying degrees of sensitivity. Given the frequency and extent of proposed tunnels, there is a high potential for impacts to paleontological resources.

Geological and Soil Constraints

LAUS to SR 2

All alternatives are subject to ground rupture, strong ground shaking, seismic settlement, and liquefaction resulting from seismic events. There is a potential for migration of potentially explosive and/or toxic gases into subsurface facilities due to being within Methane Hazard Zones. The alternatives are all subject to failure of natural or construction cut slopes or retention structures.

SR 2 to Sylmar

The route is underlain predominately by unconsolidated alluvial gravel, sand, and clay and superficial deposits of fill also occur locally.

The subsection route is in a seismically active area and crosses three faults:

- The Raymond-Hollywood Fault – this fault crosses the alignment between Glendale Freeway (SR-2) and Glendale Boulevard.
- The Verdugo Fault – this fault crosses the proposed alignment near Tuxford Street and Interstate 5 and then runs approximately parallel to it for just under 4 miles where it veers off to the northwest when the alignment crosses Van Nuys Boulevard.
- The San Fernando Fault – this fault crosses the proposed alignment near the existing Sylmar Station between Hubbard Avenue and Sayre Street

There is an Alquist-Priolo Zone associated with the San Fernando fault. The Alquist-Priolo Fault Zoning Act of California State Law controls the construction of buildings used for human occupancy on the surface trace of active faults.

Two liquefaction hazard zones have been identified along the route:

- between SR 134 and North Buena Vista Street
- between Hubbard Avenue and Sayre Street

California Geological Survey contour maps of the San Fernando Valley indicate that historic high groundwater levels along the alignment are between 20 feet and 50 feet below ground surface, except in the area between Paxton Street and Burbank Airport where it drops to 200 feet below ground level.

Sylmar to Palmdale

The alternative alignments for the Palmdale to Sylmar subsection are located in one of the most seismically active regions of California. Consequently, all alignments could be subjected to strong ground motions during future seismic events. The potential for surface fault rupture exists for all alternative alignments. The alternative alignments are crossed by six faults considered active or potentially active which could potentially produce surface rupture.

- The Santa Susana Fault – this fault crosses the proposed alignment north of the I-210.
- The Whitney Canyon Fault – this fault crosses the proposed alignment near Whitney Canyon Road
- The San Gabriel fault – this fault crosses the proposed alignment at significant depth within the Santa Susana Tunnel between Placerita Canyon Road and Golden Valley Road
- The Agua Dulce Fault – this fault crosses the proposed alignment just northeast of Soledad Canyon Road near Bee Canyon Road
- The Little Escondido Fault - this fault crosses the proposed alignments near Big Springs Road
- The San Andreas Fault Zone – this fault zone consists of the Cemetery, Little Rock, San Andreas, and Nadeau Faults and crosses the proposed alignments between Palmdale Boulevard and Barrel Springs Road/Tierra Subida Road

The alternative alignments cross the Agua Dulce in portal cutting and Santa Susana Fault at-grade, the Whitney Canyon and San Gabriel faults within the Santa Susana Tunnel, the Little Escondido Fault within the Hubbard Road Tunnel or at-grade for the West Alignment, and the San Andreas Fault Zone at-grade. Other seismic hazards such as liquefaction will be a constraint to varying degrees based on local geologic conditions along each alignment.

In the vicinity of the alternative alignments, the Transverse Ranges are characterized by generally moderate to high relief terrain that is dissected by the Santa Clara River and its tributaries. Such terrain is generally susceptible to landslides and flooding. Landslide and flood hazards will be a geotechnical constraint of varying degrees for the alternative alignments based on local geologic conditions along each alignment. The alternative alignments all include tunnels in sedimentary rock and traverse adjacent to the Placerita Oil Field in tunnel. Consequently, the potential for hazardous gasses would be a consideration of varying degree for all alignments. Abandoned oil wells as well as active and abandoned water wells exist within close proximity to the tunnels of all alignments and also present a hazard. Abandoned mine workings exist in the area north of Acton but at present are not thought to exist along any current alignment alternatives.

Hazardous materials

The project may generate hazardous materials or waste from building demolition, excavation through contaminated soils, and/or dewatering in areas where groundwater may be contaminated.

Hazardous materials are likely within existing rail alignments and former rail yards. Hydrocarbons, lead and arsenic are expected in near surface soils (0 to 5 ft). Contaminated soil and groundwater are likely to require removal during construction of trenches (volatile organic compounds and hydrocarbons in vicinity of Taylor Yard). Building demolition will generate debris, asbestos, lead and universal wastes. There is a strong possibility that underground storage tanks will also be encountered.

A Federal National Priorities List (NPL)/Superfund site, San Fernando Valley Area 4, Pollock Wellfield Area, Los Angeles, and a State of California Solid Waste Landfills site, E.L. Flemming Dump, located at 5431 San Fernando Road, Los Angeles are in close proximity to the alignment.²

The project has the potential to generate large quantities of materials related to demolition of pavements, clearing and grubbing, excavation of soil and rock (for tunneling and trenches), and dewatering of groundwater (for tunneling and trenches). Potential alternative uses for certain materials included aggregate for concrete, and fill materials for other parts of the route. In operation the project would generate a much smaller volume of waste such as product packaging, broken equipment, and litter. The project may experience minor hydraulic fluid, motor oil, and fuel spills that would result in the disposal of contaminated soil.

Through the mountainous region, rock formations may contain naturally occurring crude oil and white oil. This may be encountered during surface construction and tunneling as an asphalt-like and/or kerosene-like substance. Oil fields are present along SR 14. Specifically, the Newhall and Placerita Canyon Oil Fields would be encountered. Soils generated will require analytical testing and special handling as contaminated. This would affect all alignments of the route between the Interstate 5 and SR 14 interchange and Sand Canyon Road.

Biological Resources

Special status species are reported to occur within the USGS quadrangles surrounding the study area. Special status species were determined to have an absent or low potential for occurrence.

Adverse indirect effects of the Project will include noise, construction traffic, and shading. Indirect impacts are anticipated along viaduct routes and minimal impacts are anticipated as the viaducts approach grade and trench levels. Indirect impacts are anticipated to be short-term and/or spatially constrained to the study area.

Overall, the alternatives are not anticipated to significantly adversely affect habitat for common or special status species; riparian habitat; sensitive natural communities; native plants and wildlife; natural watercourses and wetlands; or any local policies or ordinances within the study area. Implementation of avoidance, minimization, and mitigation measures will mitigate the impacts that Project construction will have regarding destruction of nests, mortality of nestlings or adults, disruption of breeding activities, annual production, or changing migration or foraging patterns of common or special status species.

Sylmar to Palmdale

Any choice of alignment may affect special aquatic resources areas that exist within the study area – examples include but are not limited to Newhall Creek, Los Angeles Aqueduct, Placerita Creek, Santa Clara River, and their tributaries.

Additionally, any alignment has the potential to affect raptors, migratory birds and their nests due to the large number of trees and shrubs within this portion of the Sylmar to Palmdale study area. These dominant crown-class trees and their associated vegetation may support common species, which have the potential to forage and nest in the study area and on adjacent lands. Construction, maintenance, and operational activities may include potential displacement of common species in the immediate vicinity of the alignment and on adjacent lands due to Project activities (i.e. increased amounts of noise, light, dust, vibration, and traffic).

Project activities may temporarily or permanently deter individual common species from utilizing portions of the Project alignment and adjacent lands from foraging and breeding. This impact could be associated with construction, maintenance, and operational activities and may result in long term or substantial changes in migration or foraging patterns. Project activities could destroy individual animals, nests, or cause mortality of nestling, juveniles, or adults affecting annual production.

Landscape Resources - LAUS to SR 2

Eight Key Observation Points (KOPs) were identified in this section. These are viewing locations chosen to be representative of the most visually sensitive areas that would view the project. The KOPs identified were:

- KOP 1 – West Bound Traveler View - Corner of Cesar Chavez and Vignes
- KOP 2 – Southwesterly Student View – Ann Street School
- KOP 3 – Easterly Recreational User View – Elysian Park
- KOP 4 – Northeasterly Recreational User View – LASHP (the Cornfield)
- KOP 5 – Westerly Recreational User View – RDLASP
- KOP 6 – Southerly Recreational User View – Taylor Yard
- KOP 7 – Westerly Visitor View – Forest Lawn Memorial Park
- KOP 8 – Westerly Residential View – Gardena Avenue

² California High-Speed Train Program EIR/EIS, Bakersfield to Los Angeles Region, Hazardous Materials/Wastes Technical Evaluation, January 2004

Further details are provided in the November 2008 *Aesthetics and Visual Quality Report* which makes up part of the *LAUS to SR 134 Baseline Conditions Report*.

Visual Resources – SR 2 to Palmdale

All of the proposed alignments go through residential and commercial areas. Visual impacts common to all alternatives in these areas include signage and lighting associated with crossings and stations. Viaduct alignments will be elevated so they may be viewed at a greater distance and therefore pose more potential for visual impacts to a greater number of viewers.

Utilities

The Palmdale to Los Angeles section of the HST runs through a developed urban and suburban area and seven municipalities. Consequently, there are numerous utilities crossing the proposed route, which are owned and operated by various companies and agencies:

- Storm Drainage – City of Los Angeles Department of Public Works, County of Los Angeles Department of Public Works (LADPW), City of Burbank, City of San Fernando, City of Glendale, City of Santa Clarita and City of Palmdale.
- Sanitary Sewers – City of Los Angeles Department of Public Works, County of Los Angeles Department of Public Works, City of Burbank, City of San Fernando, , City of Glendale, City of Santa Clarita and City of Palmdale.
- Potable & Recycled Water – Los Angeles Department of Water & Power (LADWP), Glendale Water & Power, City of San Fernando, Burbank Water & Power, Metropolitan Water District (MWD), California Department of Water Resources (DWR), Palmdale Water District, Santa Clarita Water Department and Los Angeles County Water Works
- Natural Gas –, SoCal Gas, SoCal Landfill Gas, Kinder Morgan, and Walt Disney Imagineering
- Electrical – Southern California (SoCal) Edison, Los Angeles County Metropolitan Transportation Authority (LACMTA), Los Angeles Department of Water & Power (LADWP), Kinder Morgan, and Walt Disney Imagineering
- Petroleum/Oil – Kinder Morgan, ExxonMobil, Arco Pipeline Company, and Plains All American Pipeline (PAAP)
- Cable – Time Warner Cable, Metromedia Fiber, Century Cable, West Valley Cablevision, Marcus Cable, Eller Media Company, and Champion Broadband
- Telephone – Verizon, AT&T, Qwest, Sprint, Level 3 Communications, and Air Touch Cellular

Although many utility improvements, diversions, and relocations will be required regardless of the HST horizontal alignment and vertical alignment, several utilities are subject to operational constraints that will hinder relocation or diversions.

This section focuses on identifying the utilities and waterways that will either result in major disruptions, or incur substantial cost impacts for relocations.

Table C-1 lists the major facilities between SR 2 and Sand Canyon, in order from south to north. Major facilities for the rest of the section are covered in the Appendix A tables.

Table C-1 Major Utilities – SR 2 to Sand Canyon

Size & Utility Type	Intersection/Location	Orientation	Conflict Length (LF)	Owner	Location/Notes/Description	HST Vertical Alignment
138" storm	north of Verdugo Rd.	Crossing		Los Angeles County Flood Control		Trench
120" storm	Edward Ave.	Crossing		Los Angeles County Flood Control		Trench
70" water	Fletcher Dr.	Crossing		LADWP		At-grade
12' storm box	Central Ave.	Crossing		Los Angeles County Flood Control		At-grade
10' storm box	Goodwin Ave.	Crossing		Los Angeles County Flood Control		Aerial Transition
20" oil	Verdugo Wash to Fletcher	Parallel	14,940	Pacific Pipeline Systems, Inc.	East side CHSR, crosses to west side Metrolink at Riverdale, west of R/W Los Feliz to Glendale (length excludes this), crosses to east side CHSR, crosses at Fletcher to west of R/W.	Aerial
78"-120" storm	Alma St.	Crossing		Los Angeles County Flood Control	Affected by grade crossing?	Aerial
30" gas H	Allen Ave.	Crossing		Southern California Gas		At-grade
28' storm box	south of Burbank Blvd.	Crossing		Los Angeles County Flood Control	Burbank Western System	Aerial Transition
20" oil	Delia to Thompson	Parallel	21,900	Pacific Pipeline Systems, Inc.	Metrolink mostly west, CHSR mostly east Broadway to Thompson, same line as other 20" oil	Trench
20" oil	Case to Sunland	Parallel	1,050	Pacific Pipeline Systems, Inc.	Metrolink west edge, same line as other parallel 20" oil	Trench
48" water	Tuxford to Claybeck	Parallel	12,070	Municipal Water District (MWD)	CHSR east side	At-grade
20" oil	Lankershim to Dora	Parallel	5,450	Pacific Pipeline Systems, Inc.	Metrolink west edge	Aerial
500 kV elec	Art St.	Crossing		LADWP		Aerial
230 kV elec	Truesdale St.	Crossing		LADWP		Aerial
16' storm box	north of Branford	Crossing		Los Angeles County Flood Control	Same as listed parallel	Trench
11'+7' box parallel storm	north of Branford to Tujunga Wash	Parallel	3,080	Los Angeles County Flood Control	CHSR east edge, crosses to west side at Tujunga Wash, CBs connecting	Trench

16' storm box	Pierce to north of Branford	Parallel & Crossing	6,600	Los Angeles County Flood Control	CHSR east to middle, crosses to larger channel at Branford, CBs connecting	Trench
141' storm channel	Pacoima Wash	Crossing		Los Angeles County Flood Control		Aerial Transition
20" oil	Wolfskill to Sheldon	Parallel	19,990	Pacific Pipeline Systems, Inc.	CHSR west side to Pacoima Wash, west side Metrolink, west edge to Tuxford	Aerial
22' storm box	Bleeker St.	Crossing		Los Angeles County Flood Control	Same as listed Parallel	Trench
22' storm box	Astoria to Sayre, Bleeker	Parallel & Crossing	1,600	Los Angeles County Flood Control	East Canyon Channel - middle CHSR alignment, crosses CHSR to west side at Bleeker	Trench
30" HP gas	Bledsoe St.	Crossing		Southern California Gas		At-grade
20" oil	Roxford to Hubbard	Parallel & Crossing	10,000	Pacific Pipeline Systems, Inc.	Middle Metrolink, crosses CHSR to east side at Hubbard	At-grade
2x500kv elec	SR-210	Crossing		LADWP	OH approx. 1,300' north of SR-210	Aerial
18' I.D. tunnel	SR-210	Crossing		MWD	San Fernando Tunnel - water feeder	Aerial
3x230kv, 115kv elec	Elsmere Mountainway	Parallel & Crossing	5,000	LADWP	Overhead electrical	Tunnel
1kv elec	Elsmere Mountainway	Parallel & Crossing	5,000	Bonneville Power Admin.	Overhead electrical	Tunnel
22" gas	Elsmere Mountainway	Parallel & Crossing	1,200	Southern California Gas		Tunnel
26" gas	Elsmere Mountainway	Crossing		Southern California Gas		Tunnel
3x230kv elec	Elsmere Mountainway	Crossing		Southern California Edison	Overhead electrical	Tunnel
3x230kv, 115kv elec	Santa Clarita Truck Trail	Crossing		LADWP	Overhead electrical	Tunnel
1kv elec	Santa Clarita Truck Trail	Crossing		Bonneville Power Admin.	Overhead electrical	Tunnel
2x500kv elec	Placerita Creek	Crossing		LADWP	Overhead electrical	Tunnel
Underground elec	Placerita Creek	Crossing		LADWP	Underground electrical	Tunnel
132" storm	Via Princessa	Crossing		City of Santa Clarita		Tunnel
30" HP gas	Canyon Park Blvd	Crossing		Southern California Gas		Tunnel
30" HP gas	Canyon Park Blvd	Crossing		Southern California Gas		Tunnel

30" HP gas	Soledad Canyon Rd. & Mammoth Ln.	Crossing		Southern California Gas	Approximately 3,000' south of Soledad Canyon Rd. & Mammoth Ln.	Cut/Fill
Underground elec	Scott Lane	Crossing		Southern California Edison	Underground electrical	Cut/Fill
Underground elec	Road Runner Rd	Crossing		Southern California Edison	Underground electrical	Cut/Fill
Underground elec	Sand Canyon Rd	Crossing		Southern California Edison	Underground electrical	Aerial

Storm Drains and Channels

In addition to the major watercourses previously discussed, there are a number of other significant drainage crossings. These drainage structures play a significant role in the alignment selection. They operate by gravity, and must maintain a minimum gradient. If the construction of the HST means that these minimum gradients are impossible to attain, the construction of siphons or pump stations would be required.

Sanitary Sewers

There are several existing sewer main crossings of the rail corridor. Sanitary sewers generally operate by gravity and are required to maintain minimum gradients. If the construction of the HST means that these minimum gradients are impossible to attain, the construction of pump stations would be required.

Water Mains

Although water mains are pressurized and can be relocated with less difficulty than gravity systems, there are a few major water main crossings that could impact the proposed alignment selection.

Petroleum/ Oil Pipelines

There is an existing 20 inch oil pipeline, owned by Plains All American Pipelines, that runs within the existing rail right-of-way for the full length where HST will share the right-of-way, between the SR 2 bridge and Roxford Street in Sylmar. A Qwest cable line runs alongside the oil pipeline within the same utility trench.

The oil pipeline generally parallels the existing Metrolink track(s) at an offset of approximately 50 feet, although it crosses over from one side of the right-of-way to the other at several locations. The exact locations of these crossings are subject to further investigation.

In addition to this major oil pipeline running parallel to the alignment, there are also a number of smaller oil and petroleum pipes of unknown size which cross the rail corridor. The locations of these crossings include Grant Avenue, Alma Street, Graynold Avenue, Idlewood Road, and Justin Avenue.

Natural Gas Trunk Mains

There is an existing Southern California Gas Company (SCG) 26 inch gas main that runs within the existing rail right-of-way. This gas main lies on the east side of the rail corridor approximately 3 foot inside the boundary fence. SCG has informed the engineers that this gas main is abandoned. There are also two live 30 inch gas mains that cross the alignment, one at Allen Avenue and the other at Bledsoe Street, and a number of smaller gas main crossings.