



**CITY OF PALO ALTO
CITY COUNCIL
Special Meeting
Monday, June 12, 2023
Council Chambers & Hybrid
5:30 PM**

Agenda Item

6. Approve the Grade Separation Evaluation Criteria For Evaluating Alternatives Under Consideration for Grade Separation Projects. CEQA status – Categorically exempt under CEQA Guidelines section 15262 *Public Comment*



City Council Staff Report

From: City Manager

Report Type: CONSENT CALENDAR

Lead Department: Transportation

Meeting Date: June 12, 2023

Report #:2305-1426

TITLE

Approve the Grade Separation Evaluation Criteria For Evaluating Alternatives Under Consideration for Grade Separation Projects. CEQA status – Categorically exempt under CEQA Guidelines section 15262

RECOMMENDATION

Rail Committee and Staff recommend the City Council approve the proposed updates to the Grade Separation Evaluation Criteria and authorize the staff and Rail Committee to use the updated criteria for evaluating alternatives under consideration for grade separation projects.

EXECUTIVE SUMMARY

On March 29, 2023, the Rail Committee discussed the grade separation evaluation criteria adopted by the City Council in 2017 and directed the staff to incorporate elements from the discussion to update the evaluation criteria. The Rail Committee has reviewed the revisions to the evaluation criteria on April 26, 2023, and unanimously recommend approval of the proposed updates to the City Council.

BACKGROUND

In September 2017, the City Council adopted the evaluation criteria in selecting a preferred solution (a preferred alternative for each crossing) that included elements related to East-West connectivity, Traffic congestion, Pedestrian / Bicycle circulation, Rail Operations, Costs, Environmental Impacts, Visual Impacts, Local Access, Right Of Way Cost, and Construction.

The Matrix with a Summary of Evaluation based on Council Adopted Criteria was later developed and refined through the Extended Community Advisory Panel (XCAP) for review of the alternatives in consideration at Churchill Avenue, Meadow Drive, and Charleston Road crossings. This matrix assisted XCAP in making recommendations of preferred alternatives to the City Council. At the March 29, 2023 Rail Committee meeting the evaluation criteria were further discussed to assess the needs for any additional elements. The Committee directed the

staff to incorporate elements from the discussion in updating the Council Adopted Evaluation Criteria.

ANALYSIS

The existing Council adopted criteria include ten (10) elements. These elements are reflected in the matrix on the scale indicating their level of impact of the particular element. Based on the discussion and direction of the rail committee the proposed evaluation criteria is listed and edits to the criteria are reflected as underlined text as follows:

Proposed Evaluation Criteria

The Council Adopted Evaluation Criteria provides support in reviewing the various alternatives under consideration for grade separation at each location of crossing or combination of the crossings considered as Project. These criteria will be used with subjective weighting by the reviewer in the context of a given location.

- A. *East-West connectivity* – Facilitate movement and connectedness across the corridor for all modes of transportation
- B. *Traffic congestion* – Reduce automobile delay and congestion for automobile traffic at rail crossings to consider corridor travel times and to reduce traffic inducement
- C. *Pedestrian / bicycle circulation* – Provide clear and safe routes for pedestrians and bicyclists seeking to cross the rail corridor, separate from automobile traffic through and after grade separation construction
- D. *Rail operations* – Support continued rail operations and Caltrain service improvements
- E. *Cost* – Consider Project Cost including Utility Relocation, Long Term Maintenance, and Financing of the project with feasible funding sources.
- F. ~~Cost~~ *Private Property Impacts* – Minimize right-of-way acquisition.
- G. *Environmental impacts* – Review Sustainability, Sea Level Rise impacts, and Reduce rail noise and vibration along the corridor.
- H. *Local access* – Maintain or improve access to neighborhoods, parks, schools and other destinations along the corridor while reducing regional traffic on neighborhood streets.
- I. *Visual impacts* – ~~Minimize~~ Consider visual and privacy changes along the rail corridor.
- J. *Construction* – Minimize disruption and the duration of construction

The Rail Committee reviewed the updated evaluation criteria on April 26, 2023 (Staff Report

2304-1269)¹, and unanimously recommended approval of the Agreement to the City Council. Therefore, staff and Rail Committee recommends Council to approve the updated evaluation criteria

FISCAL/RESOURCE IMPACT

The new elements added to the criteria will require consultant support in performing additional review of the proposed project conditions, performing additional studies, and providing updates to the project materials. Staff is working with the Rail Committee to ascertain the extent of work that the Consultant needs to undertake in order to review additional elements and to narrow down the alternatives under consideration for the selection of preferred alternative(s) at these crossings. Consequently, the required additional consultant support may entail amending the existing contract with AECOM or procuring a new consultant. If deemed necessary, Staff will return to Council and seek approval.

There is adequate funding available in FY24 Capital Improvement Projects for Grade Separations to perform this work.

STAKEHOLDER ENGAGEMENT

The evaluation criteria provide an approach to reviewing alternatives under consideration in a systematic way. The updates to the previously adopted evaluation criteria were discussed at the Rail Committee's regular meeting on March 29, 2023, and April 26, 2023, where public comment was taken.

ENVIRONMENTAL REVIEW

The proposed action is part of a planning study for a possible future action, which has not been approved, adopted, or funded and is therefore exempt from the California Environmental Quality Act (CEQA) in accordance with CEQA Guidelines Section 15262. The future decision to approve the construction of any one of the identified potential alternatives would be subject to CEQA and require the preparation of an environmental analysis. Environmental review and design for the grade separation project will be performed in the subsequent steps of the project development.

ATTACHMENTS

Attachment A: Existing Matrix Evaluation Criteria and Alternatives in Consideration May 2023







APPROVED BY: Philip Kamhi, Chief Transportation Official

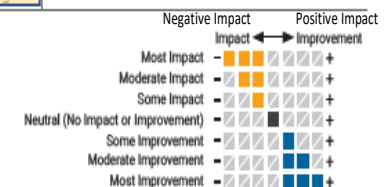
¹ Item 2, Action Items

<https://cityofpaloalto.primegov.com/Public/CompiledDocument?meetingTemplateId=11352&compileOutputType=1>

Summary of Evaluation

Meadow-Charleston Evaluation of City Council-Adopted Criteria







Evaluation Criteria		 Trench	 Hybrid	 Viaduct	 South Palo Alto Tunnel Passenger and Freight	 South Palo Alto Tunnel with At-Grade Freight	 Underpass
A	Facilitate movement across the corridor for all modes of transportation	<p>■ ■ ■ ■ ■ ■ ■ ■ Meadow Drive and Charleston Road will be grade separated from the railroad for all modes and will remain open.</p>	<p>■ ■ ■ ■ ■ ■ ■ ■ Meadow Drive and Charleston Road will be grade separated from the railroad for all modes and will remain open.</p>	<p>■ ■ ■ ■ ■ ■ ■ ■ Meadow Drive and Charleston Road will be grade separated from the railroad for all modes and will remain open. Viaduct provides opportunities for additional crossings for all modes.</p>	<p>■ ■ ■ ■ ■ ■ ■ ■ Meadow Drive and Charleston Road will be grade separated from the railroad for all modes and will remain open.</p>	<p>■ ■ ■ ■ ■ ■ ■ ■ Meadow Drive and Charleston Road will be grade separated from the passenger train traffic only for all modes and will remain open. Meadow Drive and Charleston Road will not be grade separated from the freight train traffic. Alma Street will be limited to one lane in each direction within the trench sections leading up to the tunnel entrance.</p>	<p>■ ■ ■ ■ ■ ■ ■ ■ East/West (through) traffic on Meadow Drive and Charleston Road will be grade separated from the railroad and Alma Street for all modes.</p> <p>Some turning movements on Meadow Drive to/from Alma Street will be prohibited. All turning movements on Charleston Road to/from Alma Street will be permitted; however, some movements will be facilitated via a roundabout approximately 600 feet west of Alma Street, resulting in longer routes for all modes.</p>
		<p>■ ■ ■ ■ ■ ■ ■ ■ With construction of the grade separation, the railroad crossing gates and warning lights at Meadow Drive and Charleston Road will be removed. Thus, the traffic will not be interrupted by the railroad crossing gates.</p>	<p>■ ■ ■ ■ ■ ■ ■ ■ With construction of the grade separation, the railroad crossing gates and warning lights at Meadow Drive and Charleston Road will be removed. Thus, the traffic will not be interrupted by the railroad crossing gates.</p>	<p>■ ■ ■ ■ ■ ■ ■ ■ With construction of the grade separation, the railroad crossing gates and warning lights at Meadow Drive and Charleston Road will be removed. Thus, the traffic will not be interrupted by the railroad crossing gates.</p>	<p>■ ■ ■ ■ ■ ■ ■ ■ With construction of the grade separation, the railroad crossing gates and warning lights at Meadow Drive and Charleston Road will be removed. Thus, the traffic will not be interrupted by the railroad crossing gates.</p>	<p>■ ■ ■ ■ ■ ■ ■ ■ With construction of the grade separation, the railroad crossing gates and warning lights at Meadow Drive and Charleston Road will be removed. Thus, the traffic will not be interrupted by the railroad crossing gates. Freight train service is limited to just a few trains at night.</p>	<p>■ ■ ■ ■ ■ ■ ■ ■ With construction of the grade separation, the railroad crossing gates and warning lights at Meadow Drive and Charleston Road will be removed. Thus, the traffic will not be interrupted by the railroad crossing gates. Pedestrian and cyclist mode separation will also help reduce intersection congestion.</p>
B	Reduce delay and congestion for vehicular traffic at rail crossings	<p>■ ■ ■ ■ ■ ■ ■ ■ Pedestrians/cyclists will be separated from train traffic only. Bike lanes will be added to Meadow Drive and Charleston Road intersections. Additional pedestrian/cyclist separations routes can be explored on the next phase of design.</p>	<p>■ ■ ■ ■ ■ ■ ■ ■ Pedestrians/cyclists will be separated from train traffic only. Bike lanes will be added to Meadow Drive and Charleston Road intersections. Additional pedestrian/cyclist separations routes can be explored on the next phase of design.</p>	<p>■ ■ ■ ■ ■ ■ ■ ■ Pedestrians/cyclists will be separated from train traffic only. Bike lanes will be added to Meadow Drive and Charleston Road intersections. Additional pedestrian/cyclist separations routes can be explored on the next phase of design.</p>	<p>■ ■ ■ ■ ■ ■ ■ ■ Pedestrians/cyclists will be separated from train traffic only. Bike lanes will be added to Meadow Drive and Charleston Road intersections. Additional pedestrian/cyclist separations routes can be explored on the next phase of design.</p>	<p>■ ■ ■ ■ ■ ■ ■ ■ Pedestrians/cyclists will be separated from train traffic only. Bike lanes will be added to Meadow Drive and Charleston Road intersections. Additional pedestrian/cyclist separations routes can be explored on the next phase of design.</p>	<p>■ ■ ■ ■ ■ ■ ■ ■ Pedestrians and cyclists traveling east/west will be completely separated from train and vehicular traffic on Alma Street. Full pedestrian and cyclist movement is maintained.</p> <p>Pedestrians and cyclists will have more circuitous routes traveling east/west across the corridor because the pedestrian/bike path is located on one side of the street only: on the south side of Meadow Drive and on the north side of Charleston Road. For example, cyclists traveling eastbound on Charleston Road near Ruthelma Street will have to cross Charleston Road to get onto the north side of the road, then cross Charleston Road again at the roundabout near Mumford Place to get back onto the right/south side of the road.</p>
		<p>■ ■ ■ ■ ■ ■ ■ ■ Pedestrians/cyclists will be separated from train traffic only. Bike lanes will be added to Meadow Drive and Charleston Road intersections. Additional pedestrian/cyclist separations routes can be explored on the next phase of design.</p>	<p>■ ■ ■ ■ ■ ■ ■ ■ Pedestrians/cyclists will be separated from train traffic only. Bike lanes will be added to Meadow Drive and Charleston Road intersections. Additional pedestrian/cyclist separations routes can be explored on the next phase of design.</p>	<p>■ ■ ■ ■ ■ ■ ■ ■ Pedestrians/cyclists will be separated from train traffic only. Bike lanes will be added to Meadow Drive and Charleston Road intersections. Additional pedestrian/cyclist separations routes can be explored on the next phase of design.</p>	<p>■ ■ ■ ■ ■ ■ ■ ■ Pedestrians/cyclists will be separated from train traffic only. Bike lanes will be added to Meadow Drive and Charleston Road intersections. Additional pedestrian/cyclist separations routes can be explored on the next phase of design.</p>	<p>■ ■ ■ ■ ■ ■ ■ ■ Pedestrians/cyclists will be separated from train traffic only. Bike lanes will be added to Meadow Drive and Charleston Road intersections. Additional pedestrian/cyclist separations routes can be explored on the next phase of design.</p>	<p>■ ■ ■ ■ ■ ■ ■ ■ Pedestrians and cyclists traveling east/west will be completely separated from train and vehicular traffic on Alma Street. Full pedestrian and cyclist movement is maintained.</p> <p>Pedestrians and cyclists will have more circuitous routes traveling east/west across the corridor because the pedestrian/bike path is located on one side of the street only: on the south side of Meadow Drive and on the north side of Charleston Road. For example, cyclists traveling eastbound on Charleston Road near Ruthelma Street will have to cross Charleston Road to get onto the north side of the road, then cross Charleston Road again at the roundabout near Mumford Place to get back onto the right/south side of the road.</p>
C	Provide clear, safe routes for pedestrians and cyclists crossing the rail corridor, separate from vehicles	<p>■ ■ ■ ■ ■ ■ ■ ■ Pedestrians/cyclists will be separated from train traffic only. Bike lanes will be added to Meadow Drive and Charleston Road intersections. Additional pedestrian/cyclist separations routes can be explored on the next phase of design.</p>	<p>■ ■ ■ ■ ■ ■ ■ ■ Pedestrians/cyclists will be separated from train traffic only. Bike lanes will be added to Meadow Drive and Charleston Road intersections. Additional pedestrian/cyclist separations routes can be explored on the next phase of design.</p>	<p>■ ■ ■ ■ ■ ■ ■ ■ Pedestrians/cyclists will be separated from train traffic only. Bike lanes will be added to Meadow Drive and Charleston Road intersections. Additional pedestrian/cyclist separations routes can be explored on the next phase of design.</p>	<p>■ ■ ■ ■ ■ ■ ■ ■ Pedestrians/cyclists will be separated from train traffic only. Bike lanes will be added to Meadow Drive and Charleston Road intersections. Additional pedestrian/cyclist separations routes can be explored on the next phase of design.</p>	<p>■ ■ ■ ■ ■ ■ ■ ■ Pedestrians/cyclists will be separated from train traffic only. Bike lanes will be added to Meadow Drive and Charleston Road intersections. Additional pedestrian/cyclist separations routes can be explored on the next phase of design.</p>	<p>■ ■ ■ ■ ■ ■ ■ ■ Pedestrians and cyclists traveling east/west will be completely separated from train and vehicular traffic on Alma Street. Full pedestrian and cyclist movement is maintained.</p> <p>Pedestrians and cyclists will have more circuitous routes traveling east/west across the corridor because the pedestrian/bike path is located on one side of the street only: on the south side of Meadow Drive and on the north side of Charleston Road. For example, cyclists traveling eastbound on Charleston Road near Ruthelma Street will have to cross Charleston Road to get onto the north side of the road, then cross Charleston Road again at the roundabout near Mumford Place to get back onto the right/south side of the road.</p>
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D	Support continued rail operations and Caltrain service improvements	<p>■ ■ ■ ■ ■ ■ ■ ■ A temporary railroad track will be required, and a crossover track located north of the San Antonio Caltrain Station will be relocated. With the pump stations, there will be potential risks to train operations from flooding.</p>	<p>■ ■ ■ ■ ■ ■ ■ ■ A temporary railroad track will be required, and a crossover track located north of the San Antonio Caltrain Station will be relocated.</p>	<p>■ ■ ■ ■ ■ ■ ■ ■ New railroad tracks can be built without a temporary track, and a crossover track located north of the San Antonio Caltrain Station will be relocated.</p>	<p>■ ■ ■ ■ ■ ■ ■ ■ A temporary railroad track will be required at the boring pit areas to the north and south. A siding track will be relocated north of the California Avenue Caltrain Station. Due to the pump stations, there will be potential risks to train operations due to flooding.</p>	<p>■ ■ ■ ■ ■ ■ ■ ■ A temporary railroad track will be required at the boring pit areas to the north and south. A siding track will be relocated north of the California Avenue Caltrain Station. Due to the pump stations, there will be potential risks to train operations due to flooding.</p>	<p>■ ■ ■ ■ ■ ■ ■ ■ A temporary railroad track is likely to be required unless an alternate construction methodology and sequencing is acceptable to Caltrain.</p>
		<p>■ ■ ■ ■ ■ ■ ■ ■ A temporary railroad track will be required, and a crossover track located north of the San Antonio Caltrain Station will be relocated.</p>	<p>■ ■ ■ ■ ■ ■ ■ ■ A temporary railroad track will be required, and a crossover track located north of the San Antonio Caltrain Station will be relocated.</p>	<p>■ ■ ■ ■ ■ ■ ■ ■ New railroad tracks can be built without a temporary track, and a crossover track located north of the San Antonio Caltrain Station will be relocated.</p>	<p>■ ■ ■ ■ ■ ■ ■ ■ A temporary railroad track will be required at the boring pit areas to the north and south. A siding track will be relocated north of the California Avenue Caltrain Station. Due to the pump stations, there will be potential risks to train operations due to flooding.</p>	<p>■ ■ ■ ■ ■ ■ ■ ■ A temporary railroad track will be required at the boring pit areas to the north and south. A siding track will be relocated north of the California Avenue Caltrain Station. Due to the pump stations, there will be potential risks to train operations due to flooding.</p>	<p>■ ■ ■ ■ ■ ■ ■ ■ A temporary railroad track is likely to be required unless an alternate construction methodology and sequencing is acceptable to Caltrain.</p>



The color of the matrix is comparative between each alternative at this location.

Summary of Evaluation

Meadow-Charleston Evaluation of City Council-Adopted Criteria

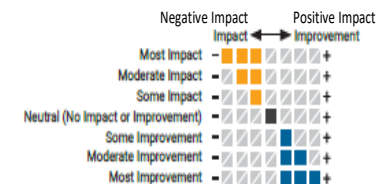
Evaluation Criteria		 Trench	 Hybrid	 Viaduct	 South Palo Alto Tunnel Passenger and Freight	 South Palo Alto Tunnel with At-Grade Freight	 Underpass
E	Finance with feasible funding sources (order of magnitude cost)	■ ■ ■ ■ ■ ■ ■ ■ The trench will require greater levels of local funding in the form of fees, taxes or special assessments, the feasibility of which are still being studied in the context of overall citywide infrastructure funding needs.	■ ■ ■ ■ ■ ■ ■ ■ The hybrid would require lower levels of local funding, with a substantial portion of capital costs covered by Regional, State and Federal sources.	■ ■ ■ ■ ■ ■ ■ ■ The viaduct would require substantial local funding resources more than the hybrid alternative, but less than the trench and tunnel alternatives.	■ ■ ■ ■ ■ ■ ■ ■ The tunnel will require the greatest levels of local funding in the form of fees, taxes or special assessments, the feasibility of which are still being studied in the context of overall citywide infrastructure funding needs.	■ ■ ■ ■ ■ ■ ■ ■ The tunnel will require the greatest levels of local funding in the form of fees, taxes or special assessments, the feasibility of which are still being studied in the context of overall citywide infrastructure funding needs. However, this alternative would not be eligible for grade separation funding as the at-grade crossing for freight would remain.	■ ■ ■ ■ ■ ■ ■ ■ The underpass will require substantial local funding resources more than the hybrid alternative, but less than the trench and tunnel alternatives.
F	Minimize right-of-way acquisition (Private property only)	■ ■ ■ ■ ■ ■ ■ ■ Subsurface acquisition will be required for the ground anchors for the trench retaining walls and private properties will be required for creek diversion pump station.	■ ■ ■ ■ ■ ■ ■ ■ No acquisition of private properties is required; however, driveway modifications will be required.	■ ■ ■ ■ ■ ■ ■ ■ No acquisition of private properties is required.	■ ■ ■ ■ ■ ■ ■ ■ Subsurface acquisition will be required for the ground anchors for the trench retaining walls and private properties will be required for creek diversion pump station.	■ ■ ■ ■ ■ ■ ■ ■ Subsurface acquisition will be required for the ground anchors for the trench retaining walls and private properties will be required for creek diversion pump station.	■ ■ ■ ■ ■ ■ ■ ■ Multiple private property acquisitions are required, and driveway modifications will be required. Some (silver) acquisition of residential properties immediately adjacent Alma Street, Meadow Drive and Charleston Road will be required.
G	Reduce rail noise and vibration	■ ■ ■ ■ ■ ■ ■ ■ Train horn noise and warning bells will be eliminated with the replacement of the at-grade crossings with grade separations. Utilizing EMU trains instead of diesel locomotives will also reduce noise. Trains operating in trench will reduce noise in neighborhoods. Acoustically treated trench walls will eliminate acoustical reflections. There would be a slight reduction to vibration levels at nearby receptors.	■ ■ ■ ■ ■ ■ ■ ■ Train horn noise and warning bells will be eliminated with the replacement of the at-grade crossings with grade separations. Utilizing EMU trains instead of diesel engines will also reduce noise. Six-foot high parapet sound barriers will help reduce propulsion and wheel/rail noise. There would be a slight reduction to vibration levels at nearby receptors.	■ ■ ■ ■ ■ ■ ■ ■ Train horn noise and warning bells will be eliminated with the replacement of the at-grade crossings with grade separations. Utilizing EMU trains instead of diesel engines will also reduce noise. Six-foot high parapet sound barriers will help reduce propulsion and wheel/rail noise. There would be a significant reduction to vibration levels at nearby receptors.	■ ■ ■ ■ ■ ■ ■ ■ Train horn noise and warning bells will be eliminated with the replacement of the at-grade crossings with grade separations. Utilizing EMU trains instead of diesel engines will also reduce noise. In the trench section, train noise would be partially reduced with acoustically absorptive materials. In the tunnel section, train noise would be contained. There would be a slight reduction to vibration levels at nearby receptors.	■ ■ ■ ■ ■ ■ ■ ■ Train horn noise and warning bells will be eliminated with the replacement of the at-grade crossings with grade separations. Utilizing EMU trains instead of diesel engines will also reduce noise. In the trench section, train noise would be partially reduced with acoustically absorptive materials. In the tunnel section, train noise would be contained. Reduced traffic noise on Alma would also reduce noise levels in the community. There would be a slight reduction to vibration levels at nearby receptors.	■ ■ ■ ■ ■ ■ ■ ■ Train horn noise and warning bells will be eliminated by the replacement of the at-grade crossings with grade separations. Utilizing EMU trains rather than diesel engines will also reduce noise. Modern rail bridge design will reduce excess structural noise. Sound barriers will also help to reduce propulsion and wheel/rail noise. There would be little to no change to vibration levels at nearby receptors. An optional 6-foot high noise barrier near the tracks and on the overpass structure could significantly reduce wheel/rail and propulsion noise.
H	Maintain access to neighborhoods, parks, and schools along the corridor, while reducing regional traffic on neighborhood streets	■ ■ ■ ■ ■ ■ ■ ■ No diversion of regional traffic with construction of grade separations.	■ ■ ■ ■ ■ ■ ■ ■ No diversion of regional traffic with construction of grade separations.	■ ■ ■ ■ ■ ■ ■ ■ No diversion of regional traffic with construction of grade separations.	■ ■ ■ ■ ■ ■ ■ ■ No diversion of regional traffic with construction of grade separations.	■ ■ ■ ■ ■ ■ ■ ■ Diversion of regional traffic with the permanent lane reduction on Alma Street will impact residential streets.	■ ■ ■ ■ ■ ■ ■ ■ Regional traffic will be diverted due to the restricted turning movements; however, travel in all directions will be possible, but may require a longer route and take more time. Turning movements at Ely Place will be limited to right turns on northbound Alma Street only. Pedestrian and cyclist access will improve due to mode separation.

Alternative Removed from Consideration 8/23/2021

Alternative Removed from Consideration 4/26/2021






































Alternative Removed from Consideration 4/26/2021

The color of the matrix is comparative between each alternative at this location.






Summary of Evaluation

Meadow-Charleston Evaluation of City Council-Adopted Criteria

Evaluation Criteria		 Trench	 Hybrid	 Viaduct	 South Palo Alto Tunnel Passenger and Freight	 South Palo Alto Tunnel with At-Grade Freight	 Underpass
I	Minimize visual changes along the corridor	<ul style="list-style-type: none">       Railroad tracks will be below grade with high fencing at grade. Landscaping options will be limited to plants with shallow roots in areas where ground anchors are required for the trench retaining walls. 	<ul style="list-style-type: none">       Railroad tracks will be approximately 15 feet above grade. Landscaping with trees will be incorporated for screening where feasible. 	<div>Alternative Removed from Consideration 8/23/2021</div> <ul style="list-style-type: none">       Railroad tracks will be approximately 20 feet above grade. Landscaping with trees will be incorporated for screening where feasible. 	<div>Alternative Removed from Consideration 4/26/2021</div> <ul style="list-style-type: none">       Railroad tracks will be below grade with high fencing at grade in the trench section. Landscaping options will be limited to plants with shallow roots in areas where ground anchors are required for the trench retaining walls. 	<div>Alternative Removed from Consideration 4/26/2021</div> <ul style="list-style-type: none">       Passenger tracks will be below grade and freight tracks will be at-grade with high fencing. Landscaping options will be limited to plants with shallow roots in areas where ground anchors are required for the trench retaining walls. 	<ul style="list-style-type: none">       Railroad tracks will remain at-grade. On Charleston Road, removal of the planting strip on both sides of the road will be required along with the planting strip on the east side of Alma Street between Charleston Road and Ely Place.
J	Minimize disruption and duration of construction	<ul style="list-style-type: none">       Extended road closures at Meadow Drive and Charleston Road are required. Construction would last for approximately 6 years. 	<ul style="list-style-type: none">       Extended lane reductions at Alma Street, Meadow Drive, and Charleston Road will be required. Construction would last for approximately 4 years. 	<div>Alternative Removed from Consideration 8/23/2021</div> <ul style="list-style-type: none">       The viaduct will have minimal road closures (nights/weekends only). Construction would last for approximately 2 years. 	<div>Alternative Removed from Consideration 4/26/2021</div> <ul style="list-style-type: none">       Extended lane reductions on Alma Street are required. Construction would last for approximately 2 years. 	<div>Alternative Removed from Consideration 4/26/2021</div> <ul style="list-style-type: none">       Extended Lane reductions on Alma Street are required. Construction would last for approximately 6 years. 	<ul style="list-style-type: none">       Lane reductions and temporary closures (nights/weekends only) on Alma Street, a closure of Meadow Drive between Emerson Street and Park Boulevard, and a closure of Charleston Road between Alma Street and Park Boulevard will be required for the majority of construction. The total duration of construction will be approximately 3.5 to 4 years; however the durations are subject to change depending on the construction methodologies used.
Order of magnitude cost		\$800M to 950M*	\$190M to \$230M*	\$400M to \$600M*	\$1,210M to \$1,827M*	\$1,190M to \$1,759M*	\$340M to \$420M*

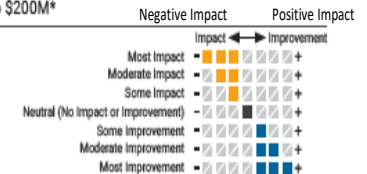
Summary of Evaluation

Churchill Evaluation of City Council-Adopted Criteria

Evaluation Criteria		Backup Alternative 11/29/2021  Closure with Mitigations	 Viaduct	 Partial Underpass Preferred Alternative 11/29/2021
A	Facilitate movement across the corridor for all modes of transportation	■ ■ ■ ■ ■ ■ ■ ■ ■ ■ Churchill Avenue will be closed to vehicles at the railroad tracks. Pedestrians and cyclists will be grade separated from the railroad in Option 1. For Option 2, pedestrians and cyclists will be grade separated from the railroad and vehicle traffic on Alma Street.	■ ■ ■ ■ ■ ■ ■ ■ ■ ■ Churchill Avenue will be grade separated from the railroad for all modes and will remain open. Viaduct provides opportunities for additional crossings for all modes.	■ ■ ■ ■ ■ ■ ■ ■ ■ ■ Churchill Avenue will be grade separated from the railroad for all modes and will remain open. Through traffic on Churchill Avenue is no longer possible, and some traffic will have to take alternate routes. Pedestrian/bike (only) traffic will be grade separated from the railroad and vehicle traffic on Alma Street via an undercrossing at Kellogg Avenue.
B	Reduce delay and congestion for vehicular traffic at rail crossings	■ ■ ■ ■ ■ ■ ■ ■ ■ ■ With closure of Churchill Avenue, the traffic at nearby intersections will be impacted; however, this can be mitigated.	■ ■ ■ ■ ■ ■ ■ ■ ■ ■ With construction of the grade separation, the railroad crossing gates and warning lights at Churchill Avenue will be removed. Thus, the traffic will not be interrupted by railroad crossing gates.	■ ■ ■ ■ ■ ■ ■ ■ ■ ■ With construction of the grade separation, the railroad crossing gates and warning lights at Churchill Avenue will be removed. Thus, the traffic will not be interrupted by the railroad crossing gates. Pedestrian undercrossing at Kellogg Avenue will also help reduce intersection congestion.
C	Provide clear, safe routes for pedestrians and cyclists crossing the rail corridor, separate from vehicles	■ ■ ■ ■ ■ ■ ■ ■ ■ ■ Pedestrians/cyclists will be separated from train traffic and vehicles.	■ ■ ■ ■ ■ ■ ■ ■ ■ ■ Pedestrians/cyclists will be separated from train traffic only. Bicycles will be added to Churchill intersections. Additional pedestrian/cyclist separations routes can be explored on the north side of design.	■ ■ ■ ■ ■ ■ ■ ■ ■ ■ Pedestrians and cyclists will be completely separated from train and vehicular traffic. Full pedestrian and cyclist movement is maintained with a new undercrossing at Kellogg Avenue.
D	Support continued rail operations and Caltrain service improvements	■ ■ ■ ■ ■ ■ ■ ■ ■ ■ A temporary railroad track will not be required.	■ ■ ■ ■ ■ ■ ■ ■ ■ ■ A temporary railroad track will be required. Stanford game day station will be eliminated due to grade issues.	■ ■ ■ ■ ■ ■ ■ ■ ■ ■ A temporary railroad track is likely to be required unless an alternate construction methodology and sequencing is acceptable to Caltrain.
E	Finance with feasible funding sources (Order of magnitude cost)	■ ■ ■ ■ ■ ■ ■ ■ ■ ■ The closure would require the lowest levels of local funding, with a substantial portion of capital costs covered by Regional, State and Federal sources.	■ ■ ■ ■ ■ ■ ■ ■ ■ ■ The viaduct would require substantial local funding resources significantly above the closure alternative.	■ ■ ■ ■ ■ ■ ■ ■ ■ ■ The underpasses would require lower levels of local funding, with a substantial portion of capital costs covered by Regional, State, and Federal sources.
F	Minimize right-of-way acquisition (Private property only)	■ ■ ■ ■ ■ ■ ■ ■ ■ ■ No acquisition of private properties is required; however, there will be impacts to Palo Alto High School property. There also may be some parking loss on the east side of Churchill Avenue for the pedestrian/bike undercrossing (Option 2 only).	■ ■ ■ ■ ■ ■ ■ ■ ■ ■ No acquisition of private properties will be required.	■ ■ ■ ■ ■ ■ ■ ■ ■ ■ Driveway modifications are likely to be required due to the removal of planter strips along Alma Street. Some (sliver) acquisition of the high school and/or residential property fronting Churchill Avenue on the west side of the tracks will be required. Street parking on both sides of Kellogg Avenue will be eliminated along the pedestrian/bike ramp (for approximately 250-300 feet from Alma Street).
G	Reduce rail noise and vibration	■ ■ ■ ■ ■ ■ ■ ■ ■ ■ Train horn noise and warning bells will be eliminated with the removal of the at-grade crossings with roadway closure. Utilizing EMU trains instead of diesel engines will also reduce noise. There would be no change to vibration levels at nearby receptors. An optional 6-foot high noise barrier near the tracks could significantly reduce wheel/rail and propulsion noise.	■ ■ ■ ■ ■ ■ ■ ■ ■ ■ Train horn noise and warning bells will be eliminated with the replacement of the at-grade crossings with grade separations. Utilizing EMU trains instead of diesel engines will also reduce noise. There would be significant reduction in vibration levels at nearby receptors.	■ ■ ■ ■ ■ ■ ■ ■ ■ ■ Train horn noise and warning bells will be eliminated by the replacement of the at-grade crossings with grade separations. Utilizing EMU trains rather than diesel engines will also reduce noise and some road noise would be reduced. Modern rail bridge design will reduce excess structural noise. There would be little to no change to vibration levels at nearby receptors. An optional 6-foot high noise barrier near the tracks and on the overpass structure could significantly reduce wheel/rail and propulsion noise.
H	Maintain access to neighborhoods, parks, and schools along the corridor, while reducing regional traffic on neighborhood streets	■ ■ ■ ■ ■ ■ ■ ■ ■ ■ Vehicle access will be diverted and resultant regional traffic will be mitigated. Pedestrian and cyclist access will improve to mode separation.	■ ■ ■ ■ ■ ■ ■ ■ ■ ■ No diversion of regional traffic with construction of a grade separations.	■ ■ ■ ■ ■ ■ ■ ■ ■ ■ Regional traffic will be diverted due to the restricted turning movements. Pedestrian and cyclist access will improve due to mode separation.
I	Minimize visual changes along the corridor	■ ■ ■ ■ ■ ■ ■ ■ ■ ■ Railroad tracks remain at existing grade. Residual roadway areas from closure provide opportunities for landscaping.	■ ■ ■ ■ ■ ■ ■ ■ ■ ■ Railroad tracks will be approximately 20 feet above grade. Landscaping with trees will be incorporated for screening where feasible.	■ ■ ■ ■ ■ ■ ■ ■ ■ ■ The railroad tracks and the northbound lanes of Alma Street will remain at-grade, and the east side of Churchill Avenue will remain unchanged. Mature trees and overhead power poles within the Alma Street planting strip, from just north of Kellogg Avenue to just south of Coleridge Avenue, will be removed. Landscaping restoration is limited due to space constraints.
J	Minimize disruption and duration of construction	■ ■ ■ ■ ■ ■ ■ ■ ■ ■ The closure will have minimal road closures (nights/weekends only). Construction would last for approximately 2 years.	■ ■ ■ ■ ■ ■ ■ ■ ■ ■ Extended lane reductions at Alma Street (one lane in each direction) will be required. Construction would last for approximately 2 years.	■ ■ ■ ■ ■ ■ ■ ■ ■ ■ Closure of Churchill Avenue between Alma Street and Mariposa Avenue will be required for the majority of construction. Alma Street will be one-way northbound for approximately 6+ months. Total duration of construction will be approximately 2.5 to 3 years; however the durations are subject to change depending on the construction methodologies used.
Order of magnitude cost		\$50M to \$65M*	\$300M to \$400M*	\$160M to \$200M*

* Total Preliminary Construction Cost for infrastructure of both railroad crossings includes escalation to 2025 (Subject to Change).

The color of the matrix is comparative between each alternative at this location.



From: [herb](#)
To: [Council, City](#); [Clerk, City](#)
Subject: June 12, 2023 Council Meeting, Item #6: Grade Separation Evaluation Criteria
Date: Sunday, June 11, 2023 5:14:29 PM

CAUTION: This email originated from outside of the organization. Be cautious of opening attachments and clicking on links.

JUNE 12, 2023 CITY COUNCIL MEETING, AGENDA ITEM #6
GRADE SEPARATION ALTERNATIVES

The June 20, 2023 Rail Committee meeting will be considering adding viaduct and trench options to the evaluation criteria.

Maybe you should combine your consideration of the Rail Committee's recommendation on those alternatives with the recommendation on this item #6 on the June 12 Council meeting by continuing discussion of item #6 until you receive the recommendation of the June 20 Rail Committee meeting.

Herb Borock