

Ch 2 – Influencing Factors

This Chapter covers a variety of factors that influence any potential decisions related to grade separations; from general technical considerations, like freight operations, to relevant Caltrain and High Speed Rail policies and the changing need for and funding of grade separations. While not an exhaustive list, it attempts to draw attention to issues that should be considered.

City Council Criteria

In September 2017, the City Council adopted evaluation criteria they intended to use for grade separation evaluations. In 2018-2019 the Council had significant discussion about removing the tiered levels of the criteria. However, as the process evolved with the formation of the CAP and XCAP, the criteria never returned to Council for further discussion.

Adopted City Council Evaluation Criteria:

Tier 1 Criteria: Most Important

- Technical**
 - East-West connectivity: facilitate movement across the corridor for all modes of transportation
 - Traffic congestion: reduce delay and congestion for automobile traffic at rail crossings
 - Ped/Bike circulation: provide clear and safe routes for pedestrians and bicyclists seeking to cross the rail corridor, separate from automobile traffic
- Financial**
 - Rail operations: support continued rail operations and Caltrain service improvements
 - Cost: finance with feasible funding sources

Tier 2 Criteria: Also Important

- Property**
 - Environmental impacts: reduce rail noise and vibration along the corridor
 - Environmental impacts: minimize visual changes along the rail corridor
 - Local access: maintain or improve access to neighborhoods, parks, schools and other destinations along the corridor while reducing regional traffic on neighborhood streets
 - Cost: minimize right-of-way acquisition by eminent domain
- Construction**
 - Construction: minimize disruption and the duration of construction

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Source: <https://connectingpaloalto.com/wp-content/uploads/2019/11/Item-6-Final-Memo-Review-Council-Adopted-Criteria.pdf>

The City Council adopted criteria form the basis for a summary document created by the consultants known as the Matrix that compares and contrasts the various alternatives. The Matrix expands upon the Council's criteria by including other factors that could be used to make decisions.

Eminent Domain and Property Acquisition:

In the development of the Council Criteria and in subsequent discussions, the issue of eminent domain has been a key component. The Council has repeatedly indicated that they want to minimize the amount of eminent domain, but they very specifically did not prohibit the use of eminent domain outright and the issue of negotiated property acquisition was not fully pursued. The criteria specifically states "Cost: minimize right-of-way acquisition by eminent domain". y.

XCAP had land use attorney Norm Matteoni make a presentation to it so that the public, XCAP, Council and Staff could better understand the eminent domain process. A transcript¹ of that meeting was posted on the Connecting Palo Alto website, as well as the attachment² provided by Mr. Matteoni providing an overview of the eminent domain process and property owners' rights under the law.

Freight

Freight trains play a regional role in moving goods through the area and reducing the number of trucks needed, reducing pollution and traffic. On the Caltrain ROW, Union Pacific carries freight on diesel trains that travel through Palo Alto three times per night, six nights per week. Even after Caltrain is electrified, these diesel trains will continue. The majority of the customers using freight are in the Port of Redwood City, South San Francisco and the Port of San Francisco.

Caltrain owns the right-of-way in Palo Alto, but Union Pacific has several trackage rights agreements³ that allows them to travel on the corridor. As part of these agreements, throughout the Electrification project and any grade separation projects, Caltrain and Union Pacific must be able to maintain operations. In general, the agreements also provide that Caltrain will work with Union Pacific when making any changes to the infrastructure on the corridor.

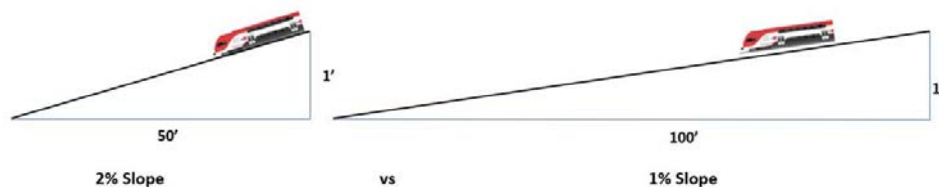
While freight represents less than 5% of all the train operations on the Caltrain corridor, the technical constraints of considering freight when designing grade separations have a significant impact on design flexibility. Electrified trains can climb and descend at steeper slopes than freight trains.. The majority of the Caltrain corridor has a maximum of 1% slope and that is the present Caltrain standard. When raising or lowering the train tracks to go over or under a road,

¹ https://connectingpaloalto.com/wp-content/uploads/2020/05/2020-02-05_XCAP-Meeting-Minutes-verbatim_Cybertary.pdf

² <https://connectingpaloalto.com/wp-content/uploads/2020/02/Item-3-All-Shared-at-Meeting-XCAP-Meeting-2.5.20.pdf>

³ <https://www.caltrain.com/about/JPB-Agreements.html>

the grade at which it can travel must be flatter, which in turns means it takes more distance. A rise of 1 foot in elevation in 100 feet of track is a 1% ascending grade. Similarly, a decrease of 1 foot in elevation in 100 feet of track is a descending grade of 1%. A change from a 1% grade to a 2% is a 50% decrease in the distance needed to achieve the change in grade. The following graphic illustrates this concept:



Freight trains can travel at steeper than 1% grade, and as can be seen above, a small change makes a big difference. In 2017, Union Pacific announced they were looking for a company to sublet their trackage rights to operate freight on the Peninsula. The mayors of San Francisco and San Jose wrote a letter to Union Pacific asking them to consider finding an operator that would be comfortable operating at 2% grade because. "In anticipation of Caltrain electrification, the Peninsula cities expect to work with Caltrain to amend the design criteria to provide for a two percent grade design standard."⁴ While this change hasn't happened yet, it indicates the importance of this technical requirement on the ability to build grade separations on the corridor. The needs of freight can also make grade separations designs more expensive because they require higher and wider clearances than Caltrain trains.

A September 2020 report recently revealed that Union Pacific is now considering selling its trackage rights to freight on the Peninsula and the JPB is in negotiations with Union Pacific to to acquire the short line rights for the tracks north of Santa Clara⁵ This developing situation could have implications for design. **Policymakers and staff should continue to advocate to Caltrain for a two percent grade design standards** , Five of the nine grade separation design alternatives considered by XCAP would require a design exception to the one percent standard.

High Speed Rail and Caltrain Operations

In addition to freight, Caltrain may have High Speed Rail operating on the corridor in the future. In 2008, voters approved Proposition 1A, which authorized funds for the construction of a high speed rail line between San Francisco and Los Angeles, as part of an eventual system that

⁴ <https://www.cityofpaloalto.org/civica/x/filebank/documents/61071>

⁵ Pg 16 of

<https://www.caltrain.com/Assets/Caltrain+Modernization+Program/Documents/PMOC+Reports/2020-09+September+PCEP+PMOC+Quarterly+Monitoring+Report.pdf>

would also extend to Sacramento in the north and San Diego in the south. HSR trains would run on the Caltrain line between San Jose and San Francisco. The estimated date for HSR on the Peninsula Corridor has recently been extended to 2031, and the project has had implementation and funding challenges. Many question whether it will ever arrive on the Peninsula. At minimum, its arrival date is likely to be later than 203, but its potential arrival has impacts on the corridor planning that have to be taken into account.

In 2012, Caltrain and High Speed Rail signed a Memorandum of Understanding⁶ committing to a Blended System on the Caltrain corridor which establishes primarily two shared tracks substantially within the existing Caltrain corridor. From Caltrain's website: *"Additional system improvements that need to be defined include HSR stations, passing tracks that can be used by HSR trains to bypass the Caltrain trains that need to stop more frequently, at-grade crossing improvements, and system upgrades to support higher train speeds. Grade separations, a storage/maintenance facility, and other system elements will also be considered in defining the blended system."*⁷ According to Caltrain's Business Plan, if HSR comes to the corridor, it will need passing tracks in several areas, including Palo Alto and Redwood City to overtake Caltrain.

HSR thinks otherwise. It claims that it does not need passing tracks in Palo Alto if Caltrain is willing to wait at stations or on sidings while High Speed Rail passes. Studies have shown, however, that this would significantly impact Caltrain's operational schedule and Caltrain would be unable to achieve their Business Plan goals. Caltrain recently sent a letter to High Speed Rail as part of HSR's Environmental Impact Report for its proposed San Francisco to San Jose route that made it clear it finds waiting at stations or sidings unacceptable and expects HSR to pay for passing tracks if they decide to run service on the Peninsula. [\(Source will be in appendix NEED SOURCE\)](#)

It should be noted that under the rules of the FRA, if there are four tracks built, a grade separation MUST be built, as it is unsafe and unacceptable for cars to drive over four tracks of trains at a level grade crossing.

Caltrain Rail Corridor Use Policy and Four-Tracks

The Caltrain Board of Directors, known as the Peninsula Joint Powers Board (JPB) is the owner and operator of the Caltrain corridor. **The JPB has to ultimately approve all designs for grade separations.** As part of its Long Term Service Vision, Caltrain Board's recently adopted the Rail Corridor Use Policy (RCUP)⁸ which in part states that Caltrain will not allow grade

⁶<https://www.caltrain.com/Assets/Caltrain+Modernization+Program/Documents/Executed+9+Party+MOU.pdf>

⁷ <https://www.caltrain.com/projectsplans/CaltrainModernization/BlendedSystem.html>

⁸ [https://www.caltrain.com/Assets/_Public+Affairs/pdf/Rail+Corridor+Use+Policy+\(RCUP\).pdf](https://www.caltrain.com/Assets/_Public+Affairs/pdf/Rail+Corridor+Use+Policy+(RCUP).pdf)

separations to be built that would preclude the ability to run a four track system. From Caltrain's email to Palo Alto City Staff:

"The exact location of a potential four track segment is yet to be defined, however. For the purposes of RCUP, which governs Caltrain's use of its own property, we took the most conservative approach and considered the potential for a 4-track segment between San Francisquito Creek Bridge in Palo Alto to just through the Mountain View Station (the area in which a 4-tracks segment is operationally viable for the intended purpose). The ultimate extent of the area preserved for 4-tracks does not need to encompass this full length. However, we would need to work with the City to advance thinking about the City's potential capital projects along the corridor to then make decisions that could constrain the extent of the area under consideration. Until that time, Caltrain will take a very conservative approach – as specified through the RCUP – when it comes to any potential long term encumbrance of our property."⁹

Caltrain has made it clear that any alternatives considered for grade crossings should not preclude the ability to deliver a four-track segment. While the City could initiate the RCUP review process to petition Caltrain staff review the compatibility, Caltrain says "in order to be considered for an exception to the RCUP and be considered compatible, **the onus would be on the City to show via conceptual designs that a potential future four track segment would not be precluded in this area...**" Caltrain goes further and explains "even if the City did this and the proposal was able to be considered 'potentially viable' by receiving a compatibility exception through the RCUP, it would still need to undergo substantial design, engineering, and regulatory review before it would be approved as a use for JPB property."

Caltrain Corridor Wide Grade Separation Study

In July 2020, Caltrain Representative Sebastian Petty described the Caltrain Corridor Wide Grade Separation Study that is planned. The study represents Caltrain's first attempt to develop a cohesive grade separation strategy for the corridor. A synopsis of the Caltrain presentation was made available in XCAP's update to City Council in Sept 2020¹⁰ and is excerpted below:

- Will begin Fall of 2020 (funding secured in this past year's capital budget). Budget authorized hiring a single point of contact to manage work broken up between multiple contractors and phases. Phase 1: expected to take 6 months; entire study about 2.5 years.
- Caltrain will not be involved in specific designs for each City. A corridor and community process, including all local jurisdictions on the corridor, regional and state partners will work to develop and determine the scope, timeframe, contracting method and how the study should be governed. Focus will be policy framework, not specific grade separation or crossing designs.

⁹https://connectingpal Alto.com/wp-content/uploads/2020/04/2020-04-22_Caltrain-Responses-Regarding-Encroachment.pdf

¹⁰https://connectingpal Alto.com/wp-content/uploads/2020/08/2020-09-02_XCAP-Update-to-City-Council-6.pdf

- Phase 2: Will echo what was heard and seek feedback from city representatives, especially on standards and construction methods and why they're needed to understand mutual implications of all decisions.
- Will consider economies of scale, construction standards and design standards comprehensively (so individual projects are not asked to go through onerous design exemption processes) and how construction contracting and sequencing approaches can be used to keep costs and impacts under control. And, will include organization analysis and governance around project delivery vs. operations and corridor management, structure for decision making on issues that span multiple jurisdictions and impact both cities and rail operations and structure for administering funding.

Grade Separations as part of the study:

- At a corridor level, standards like what is an acceptable grade will need to be evaluated rather than taking a case by case exception approach to ensure Union Pacific is comfortable.

The Corridor-wide grade separation study is also expected to consider grouping grade separation projects together to be able to receive more federal funding. [\(See Funding Grade Separations Section for more information\).](#)

Commented [1]: I think we should keep the Funding section

Caltrain Governance Reform

As part of its Business Plan, Caltrain is reviewing a possible reform of its governance structure which, if pursued, could also impact how grade separation projects are designed, managed and funded. In July 2019, Caltrain completed an Organizational Assessment Report¹¹ which explained that the California Legislature has provided enabling authority for two types of structures created for the purpose of building major capital projects. These are Special Construction Authorities and Grade Separation Districts. A Special Construction Authority is an independent agency created by the State legislature to plan and construct specific projects, which, if created, would require comprehensive agreements addressing funding mechanisms, planning and construction requirements, technical specification reviews, and operational agreements.¹² By contrast, a Grade Separation District could be created if a board of supervisors in any county could pass a resolution to create a grade separation district, upon a finding that the safety and welfare of the residents of contiguous areas within the county require the formation of a district to provide for a separation of grade. The Grade Separation District would need to be ratified by a majority of the voters within the proposed district in a general election. Under existing legislation, the district would have a 5-member governing board that confers broad powers to the agency, including the power to plan, design and build the project and to exercise the power of eminent domain. A grade separation district also has the power to issue bonds and to levy property taxes subject to obtaining approval from 2/3 of those who cast ballots in a duly called election.

¹¹ Report page 89 <https://www.caltrain2040.org/wp-content/uploads/Caltrain-Organizational-Assessment-Full-Report.pdf>

¹² Report page 90 ibid

From the report:

“Although implementation of grade separation projects to date within the Caltrain rail corridor have been designed and constructed by means other than a grade separation district (e.g., contractual arrangements between local funding agencies, the JPB and the cities or county in the jurisdiction of the project), there is precedent for the creation of such districts elsewhere in California. In 1954, the Kern County Board of Supervisors invoked the grade separation district enabling authority, resulting in the creation of the Greater Bakersfield Separation of Grade District whose duties were to separate dangerous at-grade intersections of roadways and railroads by means of underpasses or overpasses.”¹³

If Caltrain and/or Santa Clara County were to pursue either of these governance forms, the City of Palo Alto would need to consider their impact on Palo Alto’s grade separation strategies.

Funding for Grade Separations

The City Council directed XCAP not to consider the financing of grade separations and it has not. However, since two significant funding events--2016 Measure B and Caltrain Electrification Funding-- specific to grade separations were part of the rationale for the City’s decision to invest time and money on this issue XCAP believes it appropriate to comment on the present status of these potential funding sources.

Historic Funding Sources:

The grade separations have been constructed (and reconstructed) at various points during the corridor’s 150-year history. Planning for, funding, and constructing grade separations has been a decades-long challenge for the Caltrain corridor.

Between the 1935 - 1941, grade crossings were largely funded through two federal stimulus programs: Emergency Relief Appropriation Act (FERA) and later the Federal Aid Grade Crossings Appropriation Act which funded over 65 grade separations in California.¹⁴ While safety at grade crossings was an issue across the country, the federal government appropriated this funding mainly to stimulate employment during the Great Depression.

¹³ Report page 91 ibid

¹⁴ Pdf pg 68 of <https://dot.ca.gov/-/media/dot-media/programs/environmental-analysis/documents/env/roadway-bridges-ca-2003-a11y.pdf>

Since the JPB assumed ownership of the Caltrain Service in 1992, the majority of the grade separations built were in San Mateo County¹⁵ using “Measure A” sales tax (1998, 2004) which paid (in part) for the following:

- Millbrae: Millbrae Ave (1990s)
- North Fair Oaks: 5th Ave (1990s)
- Redwood City: Jefferson Ave (1990s)
- Belmont: Ralston, Harbor (1990s)
- San Carlos: Holly, Britain Howard (1990s)
- San Bruno: San Bruno, San Mateo, Angus (2014)

These projects were primarily city-led initiatives to reduce vehicle congestion and cities applied to the county for funds, with projects competing for limited funds. Today, 63% of the crossings along the Caltrain corridor (71 of 113) have been completed and there are 42 remaining separations from San Francisco to San Jose.¹⁶ There is one grade separation project currently under construction: San Mateo: 25th Avenue (estimated 2021 completion). Remaining at-grade crossings are: 2 in San Francisco County, 30 in San Mateo County and 10 in Santa Clara County (with 28 additional crossings on the Union Pacific owned part of the corridor south of Tamien).

Grade separation projects have also received funding from local transportation impact fees and value capture approaches, the State (CPUC Section 190) and the Federal government. As an example, here’s the breakdown of San Bruno’s grade separation was funded in 2014:

Comparable Grade Separation Projects in Nearby Cities

San Bruno funding sources obtained

Project Summary:

- Elevate Caltrain tracks above three crossings; three pedestrian underpasses; new elevated Caltrain station
- Project cost of \$155 million
- Completed in 2014

Funding Summary:

- Regional funds - \$92.4 million
 - San Mateo County Transportation Authority (Measure A)
- State funds - \$55.9 million
 - High Speed Rail / Proposition 1B / Statewide Transportation Improvement Program / Caltrans+CPUC Section 190
- Federal funds - \$6.6 million
 - Federal Transit Administration

Source: https://connectingpaloalto.com/wp-content/uploads/2019/03/20190313-PaloAlto_CAP_mtg_v4_Optimized.pdf

¹⁵ Pdf pg 17

<https://www.caltrain.com/Assets/Caltrain+Modernization+Program/Meetings/LPMG/April+2019+Caltrain+Business+Plan+LPMG+Presentation.pdf>

¹⁶<https://www.caltrain.com/Assets/Caltrain+Modernization+Program/Meetings/LPMG/April+2019+Caltrain+Business+Plan+LPMG+Presentation.pdf>

Dedicated funding had not previously been available in San Francisco or Santa Clara Counties until the passage of Santa Clara County's Measure B (2016).

Commented [2]: I believe this section is important. Policymakers often wonder how grade separations were paid for. This gives important context that a) initially, it was all federal money, b) as the need became driven by City's CAR needs (not trains), then county tax measures like SMC Measure A was used and c) 2016 Measure B provides a partial funding strategy, but more money will be needed and given that the need now stems from the train (and not for cars) the funding strategy will likely change - meaning cities shouldn't just be focused on local fights for tax measure funding like Measure B.

Santa Clara County Measure B (2016):

Santa Clara County's Measure B (2016), a 30-year, half-cent countywide sales tax to enhance transit, highways, expressways and active transportation (bicycles, pedestrians and complete streets) is considered a substantive "down payment" for grade separations. The measure earmarked \$700 million for eight grade separations including four in Palo Alto (Palo Alto Ave, Churchill, East Meadow and Charleston), two in Mountain View (Rengstorff and Castro St) and two in Sunnyvale (Mary Ave and Sunnyvale Ave). The total cost of the eight grade separations will vastly exceed this amount. In order for cities to access Measure B funding, projects must include a minimum of 10% contribution of non-2016 Measure B funding.

Palo Alto, Mountain View and Sunnyvale have yet to negotiate with VTA how the money will be divided and distributed, but some monies have been distributed to Mountain View to begin planning and design. Mountain View recently signed the Castro Street Grade Separation Project Cooperative Agreement¹⁷ to access Measure B funding and work is currently underway for 35% engineering of the Rengstorff project.¹⁸

In 2000 and 2008, Santa Clara County passed tax measures aimed at making a variety of improvements, including for Caltrain, however cost overruns on BART have meant the promised funds have been raided by VTA. Policymakers must remain focused to ensure that the 2016 Measure B dollars are not raided to cover the cost overruns of the BART extension to San Jose.

Additional Funding Sources:

Palo Alto Funding Options:

There are a variety of possibilities for Palo Alto to raise additional local money to fund grade separations. These could include options such as transportation impact fees, value capture, property tax, business tax, bond measure, special districts (Mello Roos), etc. Any type of funding would require a vote of the Palo Alto electorate.

¹⁷ http://santaclaravta.icm2.com/Citizens/Detail_LegiFile.aspx?MeetingID=3128&ID=7378

¹⁸ https://www.caltrain.com/projectsplans/Projects/Caltrain_Capital_Program/Rengstorff_Avenue_Grade_Separation_Project.html

Federal Infrastructure Spending:

For years, Democrats and the Republicans have discussed the possibility of a Federal Infrastructure Investment Plan that could provide significant funding for large infrastructure projects. If such investments materialize, they could provide an opportunity for more financing.

According to analysis from AECOM's economic expert, historically, federal funds have been limited for projects completed or under construction.¹⁹ High Speed rail funds are now considered to be an unreliable source of future funding due to their own financial woes.²⁰ Local funding sources such as transportation impact fees have yet to be a large contributor comparative to total project costs.²¹

Corridor-wide Funding:

As discussed in the previous section, Caltrain is undertaking a Corridor-wide Grade Separation Study which will look at the potential need to change historic funding strategies along the corridor in order to achieve their Long-term Service Vision Goal.

Policymakers should note that ~~since as~~ the need for grade separations is now focused on public transit as a ~~becomes a~~ regional priority to meet transportation and climate goals, the manner in which these projects are managed and funded could dramatically shift away from the previously city/county driven model that focused on grade separations for vehicle traffic.

Measure RR

Despite being the seventh largest and most efficient commuter rail service in the nation, unlike most transit agencies, Caltrain has not had a dedicated source of funding. Since its inception, Caltrain has relied on revenue from passenger fares (70% of operating budget) and on contributions from its Member Agencies: San Mateo County Transit District (SMCTD), Santa Clara Valley Transportation Authority (VTA) and City & County of San Francisco (CCSF).²²

Each of the Member Agencies (a) contributes an equal amount of capital funding each year and (b) supplements operating funding based on the percentage of system ridership originating in each County. The levels of both capital and operating funding are determined by the funding capacity of the Member Agency with the least ability to provide its share of funding in any given year. The amount that Member Agency can make available then becomes the standard against which the contributions of the other Member Agencies are calculated.

¹⁹https://connectingpaloalto.com/wp-content/uploads/2019/03/20190313PaloAlto_CAP_mtg_v4_Optimized.pdf

²⁰ ibid

²¹ ibid

²² <https://www.caltrain.com/about/dedicatedfunding.html>

Commented [3]: This information comes from the early work done by the AECOM economists at the beginning of XCAP's process (carried over from CAP) and I believe they should be kept so future council members understand the alternatives that were highlighted by that work. It is in the presentation of our very first meeting and it is presented in a agnostic way . https://connectingpaloalto.com/wp-content/uploads/2019/09/20190619-PaloAlto_XCAP_Mtg_1_FINALcorrected.pdf

In the November 2020 election, voters approved Measure RR (2020) establishing a dedicated source of funding for Caltrain as a 30 year one-eighth cent sales tax in San Francisco, San Mateo and Santa Clara County which will provide approximately \$100 million annually.

The impacts of this dedicated funding and the changes that might come from member agencies and their previous funding commitments remains to be seen. The amount of money available from Measure RR seems likely to be dedicated almost exclusively to operations and would likely not have any excess funds for grade separations.