

APPENDIX 2-M: GILROY LMF OPTION CONSIDERATION AND ELIMINATION



HIGH-SPEED RAIL: CONNECTING AND TRANSFORMING CALIFORNIA

MEMORANDUM

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Subject: Gilroy LMF Option Consideration and Elimination

Introduction

This memorandum provides the history of planning for the Light Maintenance Facility (LMF), discusses the design objectives for high-speed rail in Northern California, presents the technical requirements for an LMF, and documents the reasons for eliminating a Gilroy LMF from consideration.

Summary

The proper location of the LMF in a railway system is one of the critical elements in providing a reliable and resilient train service to customers. The LMF must provide easy access for HSR trains onto and off of the network and be located near key service termination locations to support efficient startup of the service each morning and end of service each evening and allow for overnight maintenance of the trains and the infrastructure.

The California High-Speed Rail Authority (Authority) has been studying a potential LMF site in Brisbane (with options on the east and west side of the tracks) since 2010. In response to the Authority's Draft EIR/EIS for the San Francisco to San Jose project section (published in 2020), the City of Brisbane provided comments suggesting the LMF should be (among other options) located in Gilroy. This memo describes the challenges with that location for the Authority, Caltrain, and the other users of the rail corridor between San Francisco and Gilroy (such as freight operators).

Locating the LMF in Gilroy, further away from the terminal station, would increase the distance that non-revenue trains must travel on the system, increase the need for more frequent track maintenance, and impact the operating windows for freight operators. Overall, these extra trains would increase the risk of operating incidents and decrease the reliability of the system. Because every train would need to

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travel the length of the corridor from Gilroy to San Francisco for start of its service, the impacts would be felt across the entire rail corridor for all operators and passengers. In addition to these railroad impacts, additional train travel would impact the community through additional gate down times at all vehicular crossings, which would lead to additional traffic delays, and additional noise impacts during overnight noise-sensitive hours. These challenges would be further exacerbated as service ramps up in the corridor, including through Caltrain's 2040 service vision. Other environmental factors considered for the Gilroy location include impacts to the flood plain, wildlife corridors, and agricultural and cultural resources.

Background

The LMF² is a critical component of the HSR system and was conceptualized in the initial planning for the San Francisco to San Jose project section in 2010 and again when the environmental review process for the project section was reinitiated in 2016.

While a total of eleven locations for the LMF were initially considered³ (refer to Figure 1), since 2010 the only feasible options carried forward are the two locations in Brisbane. The Draft EIR/EIS for this project section, released for public review on July 10, 2020, evaluated the two LMF options in the City of Brisbane, with Alternative A on the east side of the tracks and Alternative B on the west side of the tracks (refer to Figure 2). The Alternative A and Alternative B sites in Brisbane satisfy the key engineering, financial, and operational considerations that guide the siting of an LMF. It is approximately eight miles from the terminal station in San Francisco, and the closest location that would not result in severe impacts to existing land uses. The layout was designed to minimize impacts on Caltrain and freight train operations in this heavily utilized rail corridor by providing a grade-separated junction at the entry to the facility. Among several advantages, the Brisbane sites were the only locations along the Caltrain corridor large enough to accommodate the facility needs without displacing existing neighborhoods or other land uses. Alternative A (East Brisbane LMF) was identified as the Preferred Alternative in part based on consideration of the City's plans⁴ to put mixed use (including housing) on the west side of the existing rail corridor and the property owner's plans to phase development starting with the west side.

² The 2010 Preliminary Alternatives Analysis and 2010 Supplemental Alternatives Analysis referred to the LMF as the Maintenance Facility. Technical Memorandums 5.1 and 5.3 refer to the LMF as the Terminal Storage and Maintenance Facility (TSMF).

³ The LMF Site Selection Memorandum evaluates 11 total LMF sites and is included in Appendix 2-K. The Preliminary Alternatives Analysis 2010 and Supplemental Alternatives Analysis 2010 evaluated and dismissed the Port Site and SFO.

⁴ In November 2018, voters in Brisbane approved Measure JJ which amended the City's General Plan to allow 1,800-2,200 residential units and 7 million square feet of commercial development on the Baylands site. As of the date of this paper, the Specific Plan for the area is still under development.

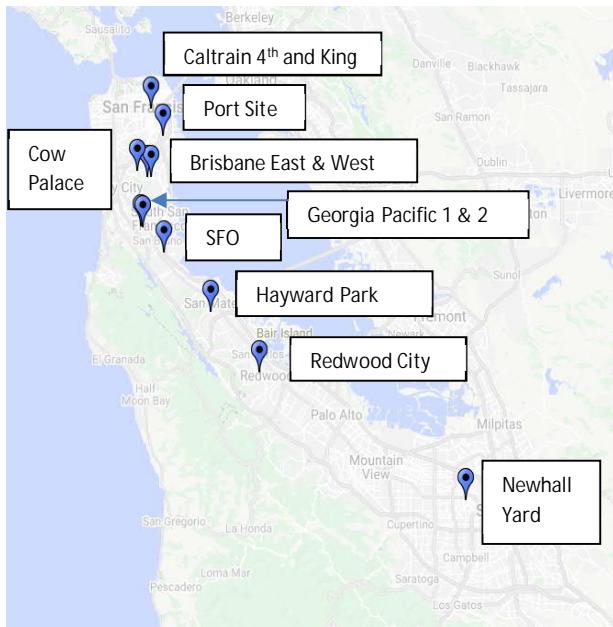


Figure 1: LMF Sites Considered



Alternative A
M East



Alternative B
M West

Figure 2: Alternatives in Draft EIR/EIS

LMF Function and Design Criteria

The LMF analyzed in the Draft EIR/EIS for the San Francisco to San Jose project section is one of only three such facilities⁵ that would support the 520-mile Phase 1 high-speed rail system. It would serve as the day-to-day location for overnight storage, maintenance, inspection, and ongoing routine servicing of trainsets. Trains and crews would be dispatched from the LMF to the Salesforce Transit Center (STC), or the interim 4th and King Street Station, to begin revenue service throughout the day. The LMF would house standby trainsets to protect reliable operation and would function as a service point for any trains in need of emergency attention.

The LMF would also support maintenance of trainsets, which occur on a daily, monthly, and quarterly basis to meet federal safety and maintenance standards. Maintenance activities include train washing, interior cleaning, wheel truing, testing, and inspections. These activities may occur between runs or as a pre-departure service at the start of the revenue day.

The Authority's design criteria⁶ for storage and maintenance facilities are based on best practices and experience gained by other high-speed rail system operators throughout the world. There are three primary criteria that govern the siting and location of the LMF (that would be relevant for consideration of the location between Brisbane and Gilroy): Distance from terminal station, size, and proximity to mainline tracks.

⁵ As described in TM 5.3, the three maintenance facilities include: one near the northern terminus in San Francisco, one near the southern terminus in Los Angeles, and one Heavy Maintenance Facility in the centrally located between Merced and Bakersfield.

⁶ For more information on LMFs, please consult published Authority technical memoranda (TM). TMs 5.1 and 5.3 related to HSR operation facilities may be found online:

<https://hsr.ca.gov/programs/environmental-planning/project-level-environmental-engineering-guidelines-studies-reports/>

- Distance from terminal station – To support the functions described above, the optimal location for the LMF would be within 1.5–3 miles of the San Francisco terminal station. The system must be designed to minimize the number and duration of non-revenue generating or “deadhead” movements to avoid increased operations and maintenance costs. Deadhead movements also reduce track capacity and revenue train service, and increase community impacts. Close proximity to the terminal station also allows operators to respond more efficiently in emergencies, including midday incidents. While the Brisbane LMF is more than 3 miles from the terminal station, it was the closest feasible location identified.
- Site Size – The LMF sizing criterion is based on ridership projections and fleet size estimates and is intended to be sufficient to handle projected system growth to the year 2040, as identified in the Authority's business plans. Because the LMF is one of three primary maintenance facilities on the high-speed rail system, the capacity of the yard needs to be of sufficient size to accommodate approximately one third of the total fleet size. An area of approximately 100 acres is required to accommodate all necessary components of storage and maintenance at the facility.
- Proximity to mainline tracks – Minimizing the distance between the LMF and the mainline or service tracks is important to reducing costs associated with track infrastructure, minimizing travel time between the mainline track and the LMF, and avoiding or reducing potential effects on existing land uses and environmental resources. The longer the lead track required to access the mainline (> 0.25 mile), the greater the operational and maintenance inefficiencies.

Examples:

For these reasons, railroad systems around the world, including in the US and California, locate storage and maintenance facilities as close as practicable to their terminal stations. For example, in the United Kingdom, the primary depots for almost every high-speed rail service serving London includes a storage and maintenance facility in the inner city suburbs and within ten miles of the main terminal. Two examples are the Great Western at Old Oak Common near Paddington station and the West Coast mainline at Wembley near Euston station. Examples can also be found much closer to home here in California. In California, rail operators, including Metrolink, Amtrak, ACE, and Caltrain, have maintenance facilities within close proximity to their stations. See Table 1, for a example list of California train operators' maintenance facility distances.

Table 1: California Examples of Maintenance Facility to Station Distances

Operator	Maintenance Facility Location/Name	Nearest Station	Distance
Metrolink	Central Maintenance Facility	LA Union Station	2 miles
	Eastern Maintenance Facility	San Bernardino	< 1 mile
	Oceanside (OSD)	Oceanside	2 miles
	Lancaster	Lancaster	< 1 mile
	Ventura	Ventura	< 1 mile
	Perris	Perris	< 1 mile

	Riverside	Riverside	< 1 mile
Amtrak Pacific Surfliner	8 th Street Yard Los Angeles	LA Union Station	< 1 mile
	San Diego (SDG)	San Diego	< 1 mile
North County Transit District	Oceanside (OSD)	Oceanside	2 miles
	San Diego (SDG)	San Diego	< 1 mile
Amtrak San Joaquin	West Oakland	Oakland	< 1 mile
	Fresno	Fresno	< 1 mile
	Bakersfield	Bakersfield	< 1 mile
ACE	Stockton	Stockton	< 1 mile
	Tamien	San Jose	2 miles
Caltrain	San Jose Centralized Equipment Maintenance and Operations Facility	San Jose	< 1 mile
	SF 4 th and King	SF 4 th and King	< 1 mile
Capital Corridor	Sacramento	Sacramento	< 1 mile
	West Oakland	Oakland	< 1 mile
	Oakland Coliseum	Oakland Coliseum	< 1 miles
	San Jose	San Jose	< 1 mile

For California high-speed rail service, the key terminating points will be San Francisco and Los Angeles, at STC and LAUS, respectively. In Los Angeles, the Authority is proposing a storage and maintenance facility in the West Yard area, which is within one mile of LAUS. Even at less frequently used terminating locations, such as Merced and Anaheim, the Authority has designed the system in line with international best practices by ensuring that storage and maintenance facilities are in close proximity the terminal stations.

For its northern terminus in San Francisco, the Authority undertook an extensive search to identify an appropriate location for the northern-most maintenance facility. This assessment determined that the sites at Brisbane are the most consistent with operating requirements and avoid intensive existing land uses on the Peninsula.

Operational Consequences of an LMF Located in Gilroy

The LMF is a heavily utilized facility, and Gilroy is not a functionally appropriate location because it is located approximately 80 miles south of the terminal facility. As described below, a Gilroy LMF would add additional risk to the reliability of operations, increase the risk at each of the 70 grade crossings located between San Francisco and Gilroy, increase gate down time, and increase the cost of operations.

Transportation from a Gilroy LMF to the terminal station in San Francisco for the start of daily services and back to the facility at the end of daily service would require an additional 27 deadhead trains per

day to be added to the 124 revenue trains per day to be scheduled on the Caltrain corridor. This represents nearly a 25% increase in the number of high-speed train movements on the entire Caltrain corridor. The additional deadhead movements are summarized and discussed below:

Table 2: Deadhead Movement Assessment

Deadhead miles to Brisbane	240 miles per day
Deadhead miles to Gilroy	2,111 miles per day
Additional deadhead miles for Gilroy LMF	683,000 miles per year
First deadhead move departs Brisbane	5:20am to make 6:00am start of service
First deadhead move departs Gilroy	4:25am to make 6:00am start of service
Last deadhead move arrives Brisbane	Leave STC at 12:09am and arrival at 12:40am
Last deadhead move arrives Gilroy	Leave STC at 12:45am and arrival at 1:55am
Additional time of operations	130 minutes per day
Additional energy cost per day (@43kWh/mile and \$0.074 per kWh)	\$7,828
Additional trainset maintenance cost per day (@ \$1.077 per mile)	\$2,649
Additional traincrew costs per day (@ \$75 per hour)	\$2,250
Total additional costs	\$12,727 per day (\$4.7million per year)

The additional deadhead miles add a certain amount of risk to the operational objective of providing safe and reliable train operations in several ways. The additional trains would extend the operating period by an additional 130 minutes, thereby reducing the amount of time for track/train maintenance from 6 hours to just under 4 hours. The extra train movements would degrade the system faster but allow less time to provide maintenance. This inverse relationship significantly increases the risk for providing reliable train operations.

For rail corridors, the greatest risk occurs at interfaces with other modes of transportation. There are 70 grade crossings between San Francisco to Gilroy and only 2 grade crossings between San Francisco to Brisbane. By placing the LMF in Gilroy, the number of trains passing through grade crossings increases, thereby increasing the risk of incidents.

Furthermore, when there is an incident or during emergency train servicing scenarios, the train would, to the best of its ability, complete the trip to the terminal station in San Francisco before heading to the LMF. A LMF located in Gilroy would make this journey significantly more challenging and riskier for a train in need of servicing.

The train slots required by these movements would also absorb the limited capacity on the two-track railway corridor between Gilroy and San Francisco. Since the deadhead moves would occur after midnight and before 6am, they would have less effect on passenger revenue service. However, Caltrain conducts non-revenue moves of their trains overnight so capacity for those moves would be affected. The reduced capacity would also affect the window of operation for freight operators, which primarily

operate in the evening and overnight hours in the Caltrain corridor. These operators are also looking to increase future operations.

Finally, the additional distance that high-speed trains would need to travel (estimated at around 683,000 miles per year) would increase wear and tear, resulting in increased track and system maintenance costs for Caltrain as the infrastructure owner, and increased trainset maintenance costs for the Authority as the trainset owner. The Authority would also incur additional costs associated with additional traincrew and traction power requirements. The Authority estimates that total annual operating costs increase for full-service operations would be approximately \$4.7 million. These additional costs would need to be recovered through the fare box for the Authority to meet its Proposition 1A requirement to operate without subsidy. Therefore, locating the LMF facility in Gilroy, rather than Brisbane, would directly impact ticket prices for customers.

[Environmental Impacts of a Gilroy LMF](#)

Several environmental considerations were factored into the study of LMF locations, including the Gilroy location. Below is a description of Gilroy location specific impacts followed by corridor wide (from San Francisco to Gilroy) impacts.

Location Specific Impacts

The Gilroy LMF was removed from the San Jose to Merced project with the change in program delivery direction and definition of the “Valley to Valley” section in the 2018 Business Plan. When the Valley to Valley Section changed the temporary terminal station in San Jose to a terminal station San Francisco, there no longer was an operational need to have an LMF in Gilroy. By removing the LMF from the San Jose to Merced environmental analysis, the project section’s overall impacts to the following resources was minimized:

Flood Plain Impact:

Given the space requirements, a Gilroy LMF would need to be located in the Soap Lake Flood Plain, just as the Maintenance of Way Facility for each of the alternatives. During a 100-year flood event, flooding in the Soap Lake area has the potential to submerge approximately 9,000 acres. The additional encroachment of an LMF into the floodplain and additional impervious surfaces added in the floodplain would increase project effects on hydrology and water quality.

Biological Resources:

A Gilroy LMF would be located in a natural wildlife corridor associated with the lands to the south and east of Gilroy in the Soap Lake Floodplain, including the Pajaro River. This area is a valley, allowing wildlife to migrate between the Diablo Range to the east and the Santa Cruz Mountains to the west. The importance of this wildlife movement corridor to the populations of rare and common species have been documented through the work of the Santa Clara Valley Habitat Conservancy, the Nature Conservancy, and other organizations. The placement of a Gilroy LMF in this wildlife corridor would increase the project’s effects on wildlife movement and require increased and more ambitious mitigation efforts. In contrast, the existing conditions of the proposed LMF location for the Preferred Alternative in Brisbane is an area of a former landfill and has much lower habitat value than the land to the south and east of Gilroy.

Agricultural Resources:

A Gilroy LMF would be located in an area of primarily agricultural resources. A Gilroy LMF would require more ambitious mitigation for such effects. In contrast, the existing conditions of the proposed LMF location for the Preferred Alternative in Brisbane is in an area of a former landfill.

Cultural Resources:

A Gilroy LMF would be located in the Soap Lake Flood Plain. This is an area that has been documented as a tribal cultural resource, a sacred place with cultural value to a California Native American tribe and is an archeologically sensitive area. Section 106 requires that this be taken into consideration with any federal project. A Gilroy LMF would require more encroachment into this sensitive area, more construction and disturbance in this archaeologically sensitive area, and potentially more impacts to tribal and archaeological resources. In contrast, the proposed LMF location for the Preferred Alternative in Brisbane is in an area of a former landfill and is not a sensitive area for tribal or archaeological resources.

Corridor Wide Impacts

The corridor wide impacts affect all the communities between San Francisco to Gilroy. As described above, this spans approximately 80 miles and 70 grade crossings.

Transportation and Traffic Impacts:

An LMF facility located in Gilroy would result in substantial deadhead train travel to and from San Francisco, the northern terminus. These increased train movements would increase the potential for incidents at 70 grade crossings between San Francisco and Gilroy, thereby increasing the risk of delay for all rail services on the Caltrain corridor. This could lead to a decline in on-time performance of all services on the Peninsula. If an incident occurs, operational protocol requires the damaged train to go to the terminal station in San Francisco to drop off passengers and then go to the LMF for servicing. Locating the LMF in Gilroy would exacerbate this issue. Not only does this location for the LMF increase the risk of incidents, it makes it harder to recover from them if they occur.

Furthermore, increasing the number of trains at the crossings directly increases gate down time. A gate is down for approximately 1 minute every time a train passes through. 27 extra trains would increase gate down time by approximately 27 minutes per day at all 70 grade crossing between San Francisco to Gilroy. In contrast, an the 27 extra trains would only affect 2 grade crossings with the LMF in Brisbane.

Safety and Security

The Authority received feedback from first response organizations regarding the potential impact on response times in this area from the increased service levels currently proposed for the San Jose to Merced project section. Locating the LMF in Gilroy would exacerbate this issue for all 70 grade crossings between San Francisco to Gilroy. Each gate crossing takes approximately a minute to open and close, depending various site-specific issues such as the speed of the train at that location, potential trains on the adjacent track, and proximity to station platforms. 27 additional trains per day per direction would increase gate down time by 27 minutes per day at each of the 70 grade crossings.

Noise:

The increase in deadhead train movements would increase overnight and early morning train noise along the rail corridor due both to train movements and the sounding of horns. Trains are mandated by FRA rules to sound their horn at every grade crossing, resulting in more frequent horn noise. This noise

would occur during the more noise-sensitive overnight and early morning hours with the deadhead train movements to a Gilroy LMF. These additional noise effects are avoided with an LMF in Brisbane, because the LMF would be located close to the northern California terminus for the HSR system in San Francisco, which reduces the areas affected by deadhead moves compared to an LMF in Gilroy.