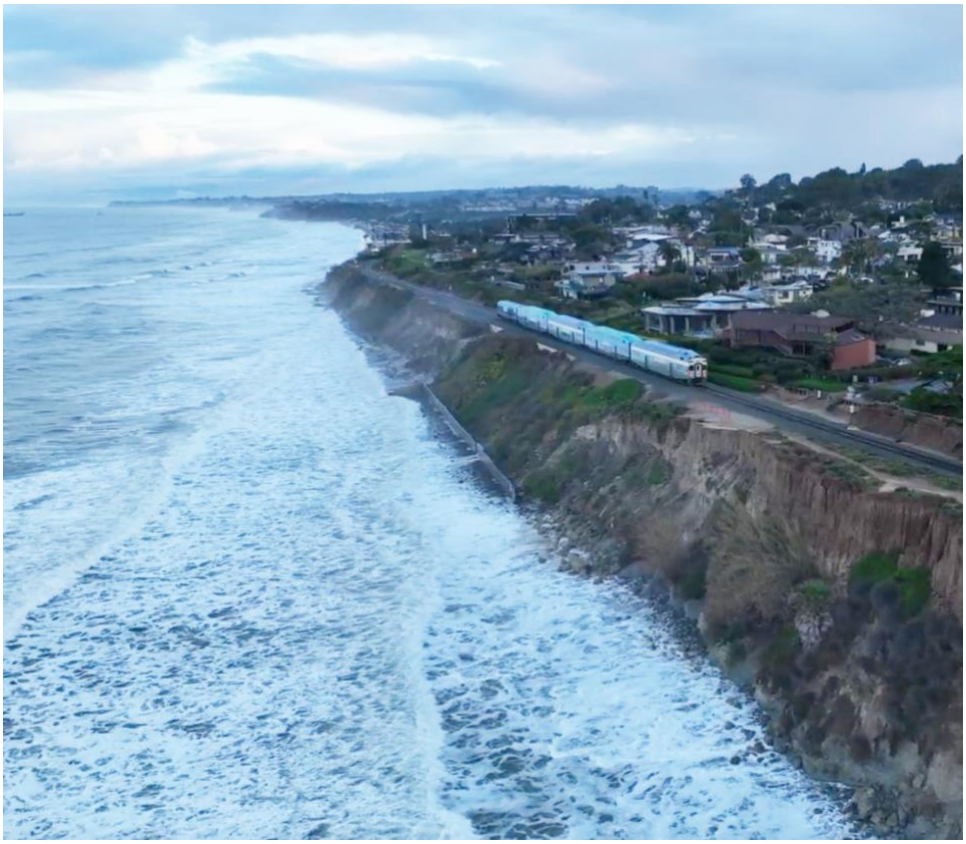
SANDAG | San Diego LOSSAN Rail Realignment Project

Alignments Screening Report

May 31, 2024



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Acronyms/Abbreviations

Acronym/ Abbreviation	Definition
Caltrans	California Department of Transportation
CEQA	California Environmental Quality Act
CP	control point
EIR	environmental impact report
GIS	Geographic Information Systems
LOSSAN	Los Angeles—San Diego—San Luis Obispo
MP	Mile Post
mph	miles per hour
SANDAG	San Diego Association of Governments
SDLRR	San Diego LOSSAN Rail Realignment
TBM	tunnel boring machine

Terms and Definitions

Term	Definition
Alignment	The horizontal and vertical location of a track or roadway defined primarily by a series of connected tangents and curves.
Berm	A segment of track that is on raised ground.
Bridge	Aerial structure carrying the rail tracks over roadways, canyons, or water.
Bored Tunnel	A circular-shaped tunnel that is constructed using a tunnel boring machine that digs or bores through the earth without removing the ground above.
Control Point	A location of train signals used to control the movement of trains.
Cut-and-Cover Tunnel	A rectangular-shaped tunnel that is constructed within a trench that is excavated from the surface and then covered after it is constructed.
Design Speed	A selected speed that is used to determine aspects of the railroad alignment during design, such as curves. The design speed may be higher than the operating speed.
Floodwalls	A freestanding structure built along a shore or bank to prevent encroachment of floodwaters.
Graded	Rail tracks constructed on flat ground, earthen berms, or cuts into hillsides.
Portal	Entrance to the tunnel.
Shoofly	Temporary track used to maintain service.
Soft Cost	Costs not directly tied to the physical construction of a project. These costs typically include, but are not limited to, expenditures related to project development, environmental reviews, engineering and design services, project management, permits, and legal services.
State CEQA Guidelines	California Code of Regulations Title 14 – Natural Resources: https://casetext.com/regulation/california-code-of-regulations/title-14-natural-resources
U-Structure	A rectangular-shaped structure with only three sides that is excavated from the surface and leaves an opening in the surface to allow the track to transition from a tunnel to the surface level.

The intent of this evaluation is to document, assess, and incorporate into the formal environmental review process for the San Diego LOSSAN Rail Realignment Project the alignments developed as a result of previous planning studies, additional design, and public engagement in advance of the commencement of the formal environmental review process.

The evaluation employs screening criteria that are informed by CEQA and planning practices to assess each alignment. This evaluation applies the same screening criteria to the publicly proposed alignments (referred to as “stakeholder and outreach alignments" in this report) and the conceptual alignments and, on the basis of this screening, identifies a focused subset of alignments that are recommended for inclusion in the Notice of Preparation of the San Diego LOSSAN Rail Realignment Project Draft EIR. The Notice of Preparation invites further input on the Draft EIR scope and the alignments identified in the Notice of Preparation.

This evaluation is not intended as, and does not include, an analysis of environmental impacts under CEQA. The environmental impacts of the San Diego LOSSAN Rail Realignment Project and the project alternatives proposed to reduce or avoid such impacts will be identified in the Project EIR in accordance with CEQA.

1 Executive Summary

1.1 Project Description

The San Diego Association of Governments (SANDAG) proposes to relocate the existing single-track alignment of the San Diego Subdivision of the Los Angeles—San Diego—San Luis Obispo (LOSSAN) Rail Corridor potentially within the Cities of Solana Beach, Del Mar, and San Diego, where the rail line runs along a terrace on the coastal bluffs, to a double-tracked alignment away from the coastal bluffs as part of the San Diego LOSSAN Rail Realignment (SDLRR) Project.

Previous planning and environmental studies have been undertaken to analyze the potential for realigning the San Diego Subdivision in the project study area. In August 2023, SANDAG released the *San Dieguito to Sorrento Valley Double Track Del Mar Tunnels Alternatives Analysis Report* (Alternatives Analysis Report), which refined five potential alignment alternatives based on previous conceptual engineering studies and evaluated them against a set of performance criteria. After completion of the Alternatives Analysis Report, SANDAG continued to evaluate alignments, including additional portal locations and tunnel configurations (i.e., single or twin bore). In total, 12 conceptual alignments were developed to demonstrate potential connections between the various portal locations and tunnel bore configurations. These alignments are referred to as "conceptual alignments" within this report and are summarized in Table 1-1.

Table 1-1. Conceptual Alignments

Conceptual Alignment No.	Conceptual Alignment		
	North Portal	South Portal	Bore
1	Under Jimmy Durante Boulevard	Portofino Drive	Twin Bore
2	Under Jimmy Durante Boulevard	Portofino Drive	Single Bore
3	Under Jimmy Durante Boulevard	Torrey Pines Road	Twin Bore
4	Under Jimmy Durante Boulevard	Torrey Pines Road	Single Bore
5	Under Jimmy Durante Boulevard	Knoll Near I-5	Twin Bore
6	Under Jimmy Durante Boulevard	Knoll Near I-5	Single Bore
7	Within Camino Del Mar	Portofino Drive	Twin Bore
8	Within Camino Del Mar	Portofino Drive	Single Bore
9	Within Camino Del Mar	Torrey Pines Road	Twin Bore
10	Within Camino Del Mar	Torrey Pines Road	Single Bore
11	Within Camino Del Mar	Knoll Near I-5	Twin Bore
12	Within Camino Del Mar	Knoll Near I-5	Single Bore

Between summer 2023 and winter 2024, SANDAG conducted public outreach events to inform, engage, and solicit public input to refine the Project and the range of potential alignments. Through these efforts, additional concepts were suggested by stakeholders and members of the public. Based upon the public input received, 14 distinct alignments were developed for analysis in this report from 30 individual concepts. These alignments are referred to as "stakeholder and outreach alignments" within this report and are summarized in Table 1-2. The conceptual alignments and stakeholder and outreach alignments considered in this report are illustrated in Figure 1-1. In total, 26 alignments were considered.

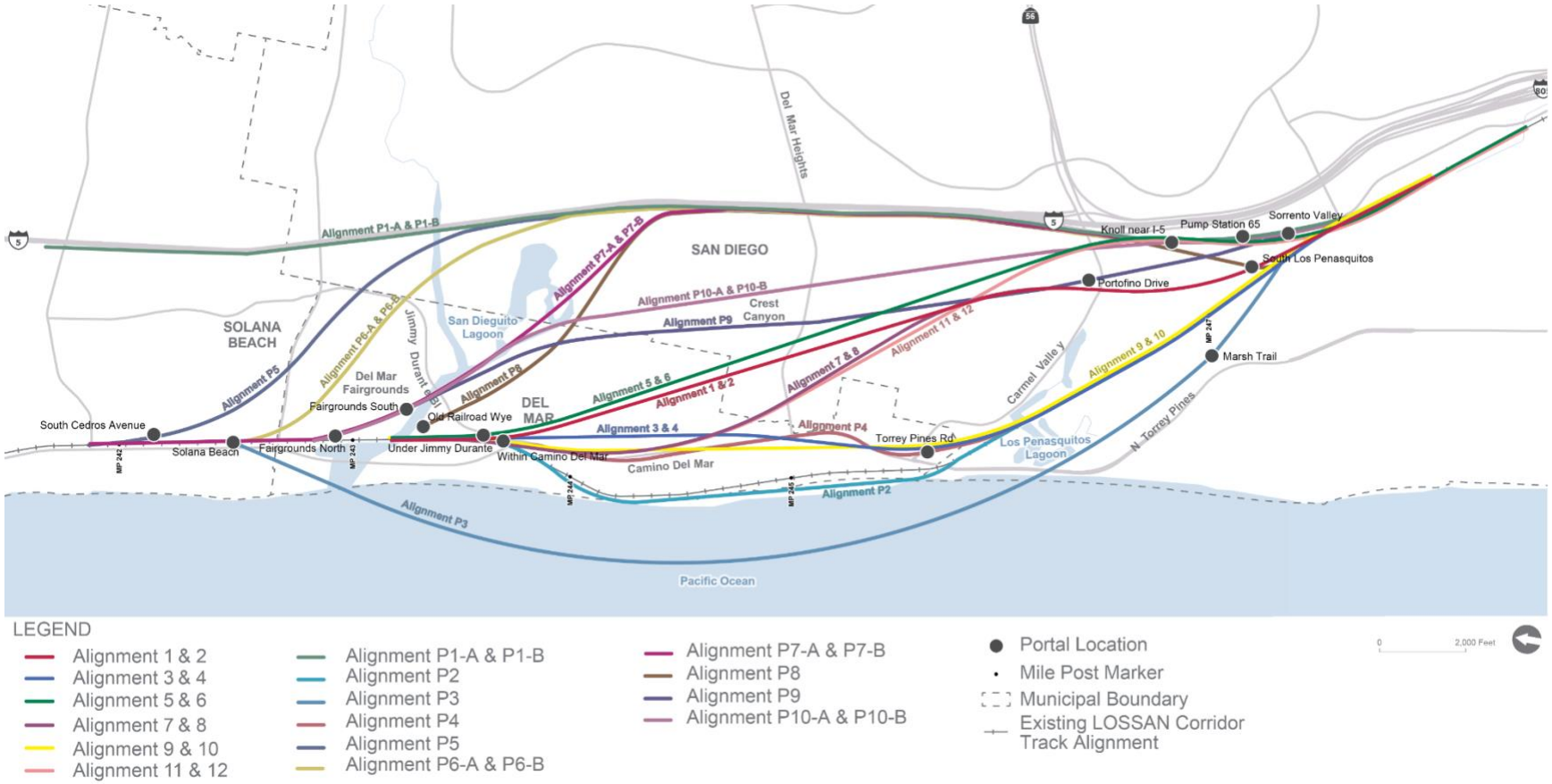
The alignments in this report consist primarily of tunneled sections with additional bridge, U-structure, and/or graded sections as needed. Table 2-1 in Chapter 2 provides a summary of alignment components and Figure 2-2 in Chapter 2 illustrates each component. Both single-bore and twin-bore configurations were considered for construction of the tunnels, although ultimately a single-bore configuration was eliminated from further consideration.

Table 1-2. Stakeholder and Outreach Alignments

Stakeholder and Outreach Alignment No.	North Portal	South Portal
P1-A	Not identified	Knoll Near I-5
P1-B	Not identified	Sorrento Valley
P2	N/A	N/A
P3	Solana Beach	Marsh Trail
P4	Camino Del Mar	Torrey Pines Road
P5	South Cedros Avenue	Pump Station 65
P6-A	Fairgrounds	Knoll Near I-5
P6-B	Fairgrounds	Sorrento Valley
P7-A	Fairgrounds	Knoll Near I-5
P7-B	Fairgrounds	Sorrento Valley
P8	Old Railroad Wye	South Los Peñasquitos Lagoon
P9	Fairgrounds	Portofino Drive
P10-A	Fairgrounds	Knoll Near I-5
P10-B	Fairgrounds	Sorrento Valley

Notes: A wye is a triangular-shaped junction of three rail lines that converge with each other. N/A = not applicable—the alignment was proposed as a bridge and does not include underground portions that would require portals. Not identified = a specific location for a northern portal was not noted.

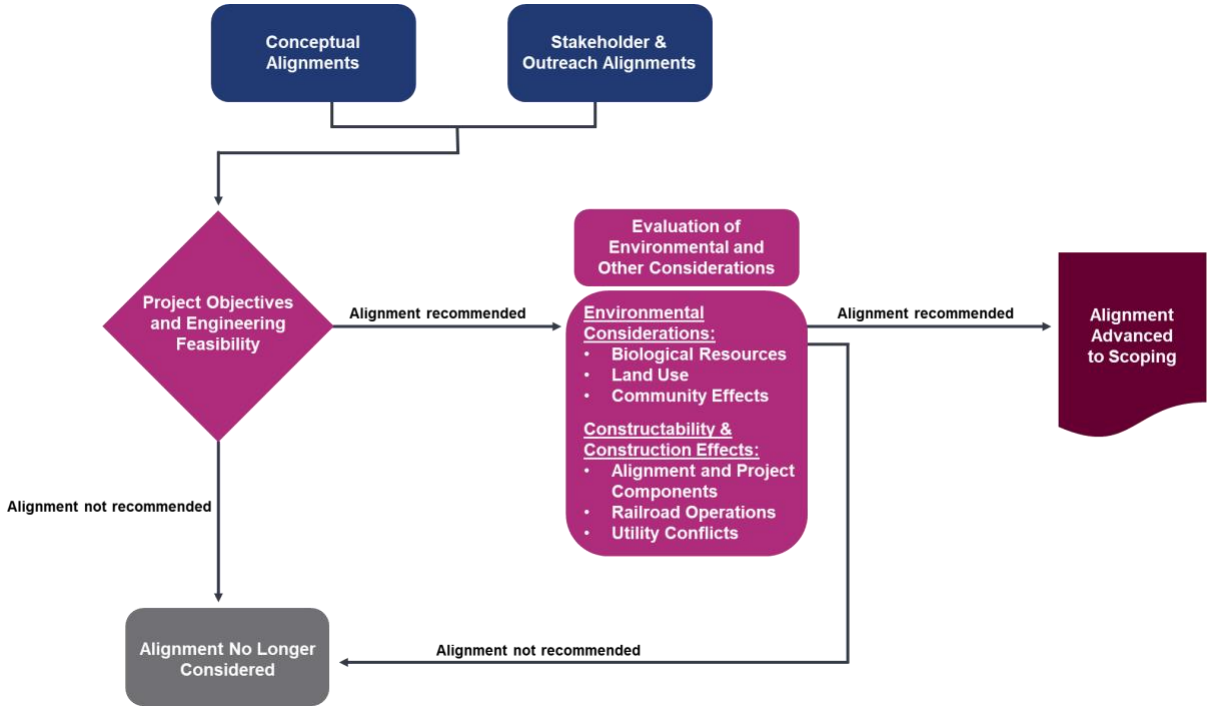
Figure 1-1. Conceptual Alignments and Stakeholder and Outreach Alignments



1.2 Screening Process

A screening process was developed to evaluate the 26 alignments in support of selecting the alignments that will advance to the formal California Environmental Quality Act (CEQA) scoping process. The screening process was informed by the criteria identified in Section 15126.6(c) of the State CEQA Guidelines. The screening process is summarized in Figure 1-2, and the screening criteria are described in more detail in Section 3.

Figure 1-2. Alignment Screening Process



1.3 Comparison of Alignments and Recommendations

1.3.1 Evaluation of Project Objectives and Engineering Feasibility

The conceptual alignments and stakeholder and outreach alignments were assessed based on their ability to meet the project objectives and engineering feasibility. Each of the conceptual alignments was prepared for an alternatives analysis and was designed specifically to meet the project objectives and engineering feasibility criteria. Although all conceptual alignments met project objectives and engineering feasibility, all single-bore alignments were removed from consideration prior to the evaluation of environmental and other considerations because of the increased complexity and community effects associated with the single-bore tunnel configuration. Therefore, Alignments 2, 4, 6, 8, 10, and 12 were removed from consideration in favor of the similar twin-bore alignments (Alignments 1, 3, 5, 7, 9, and 11). For the same reasons, a single-bore configuration was not considered for any of the stakeholder and outreach alignments.

Section 4.2 details the assessment of each stakeholder and outreach alignment's ability to meet the project objectives and engineering feasibility. Based on this evaluation, and as summarized in Table 1-3, Alignments P7-A, P7-B, P9, P10-A, and P10-B were advanced for further evaluation. The remaining stakeholder and outreach alignments were removed from consideration.

Table 1-3. Project Objectives and Engineering Feasibility Summary

Conceptual Alignments

Alignment No.	North Portal	South Portal	No. of the Six Project Objectives Met	Meets Engineering Feasibility	Advanced for Further Evaluation
1	Under Jimmy Durante Boulevard	Portofino Drive	6	Yes	Yes
2	Under Jimmy Durante Boulevard	Portofino Drive	6	Yes	No
3	Under Jimmy Durante Boulevard	Torrey Pines Road	6	Yes	Yes
4	Under Jimmy Durante Boulevard	Torrey Pines Road	6	Yes	No
5	Under Jimmy Durante Boulevard	Knoll Near I-5	6	Yes	Yes
6	Under Jimmy Durante Boulevard	Knoll Near I-5	6	Yes	No
7	Within Camino Del Mar	Portofino Drive	6	Yes	Yes
8	Within Camino Del Mar	Portofino Drive	6	Yes	No
9	Within Camino Del Mar	Torrey Pines Road	6	Yes	Yes
10	Within Camino Del Mar	Torrey Pines Road	6	Yes	No
11	Within Camino Del Mar	Knoll Near I-5	6	Yes	Yes
12	Within Camino Del Mar	Knoll Near I-5	6	Yes	No

Stakeholder and Outreach Alignments

Alignment No.	North Portal	South Portal	No. of the Six Project Objectives Met	Meets Engineering Feasibility	Advanced for Further Evaluation
P1-A	Not identified	Knoll Near I-5	1	Unknown	No
P1-B	Not identified	Sorrento Valley	1	Unknown	No
P2	N/A	N/A	1	Yes	No
P3	Solana Beach	Marsh Trail	3	No	No
P4	Camino Del Mar	Torrey Pines Road	5	Yes	No
P5	South Cedros Avenue	Pump Station 65	2	Yes	No
P6-A	Fairgrounds	Knoll Near I-5	3	Yes	No
P6-B	Fairgrounds	Sorrento Valley	3	Yes	No
P7-A	Fairgrounds	Knoll Near I-5	4	Yes	Yes
P7-B	Fairgrounds	Sorrento Valley	4	Yes	Yes
P8	Old Railroad Wye	South Los Peñasquitos Lagoon	4	No	No
P9	Fairgrounds	Portofino Drive	4	Yes	Yes
P10-A	Fairgrounds	Knoll Near I-5	4	Yes	Yes
P10-B	Fairgrounds	Sorrento Valley	4	Yes	Yes

Note: Based on a high-level assessment, the single-bore alignments (2, 4, 6, 8, 10, and 12) would result in greater impacts and more difficult construction than their twin-bored counterparts (1, 3, 5, 7, and 11), and therefore were removed from further evaluation prior to the assessment of environmental and other considerations. P1-A Unknown Eligibility Feasibility: As depicted by stakeholders and the public, insufficient information exists to evaluate the alignment against the project objective and/or engineering feasibility. Alignment No. P4: Despite meeting most of the project objectives and engineering feasibility, this alignment was removed from consideration because it is similar to conceptual Alignment 3, which would meet the remaining project objective. Alignment No. P8: A wye is a triangular-shaped junction of three rail lines that converge with each other. N/A = not applicable—the alignment was proposed as a bridge and does not include underground portions that would require portals. Not identified = a specific location for a northern portal was not noted.

1.3.2 Evaluation of Environmental and Other Considerations

Table 1-4 summarize the assessment of alignments in terms of environmental and other considerations. The detailed evaluation is included in Section 5.

Table 1-4. Environmental and Other Considerations Evaluation Criteria

Evaluation Criteria	Description
Potential Environmental Considerations	Biological Resources: Acreage of sensitive vegetation communities located within and adjacent to (within 10 feet of) the footprint of each alignment that could be permanently affected by implementation of the alignment. Land Use: Existing land uses within and adjacent to (within 10 feet of) the footprint of each alignment that could be permanently affected by implementation of the alignment. Community Effects: Potential disruption to the adjacent community during construction, including potential acquisitions, noise and dust, physical impacts to local roadways, and truck trips associated with construction material disposal.
Constructability and Construction Effects	Constructability of Alignment Components: Construction effects associated with each alignment, including the tunnel, portals, and other components required for the alignment, as applicable. Impacts to Existing Railroad Operations: Effects to existing railroad operation that would occur during construction of the alignment, such as temporary suspension of service, use of a shoofly (temporary track used to maintain service), or extended distance of single-track operation. Utility Conflicts: Potential conflicts with existing major wet utilities (i.e., sewer or water). Whether a utility can be protected in place or would require relocation would be determined in later stages of design.

Note: The evaluation of potential environmental considerations does not indicate whether an alignment would result in significant impacts under the California Environmental Quality Act or adverse effects under the National Environmental Policy Act. The determination of significance of impacts will occur during the formal environmental review phase of the Project.

1.3.3 Summary of Outcomes

Based on the evaluation provided in this report, the following recommendations have been developed in support of identifying the range of alternatives to advance to the formal CEQA scoping process:

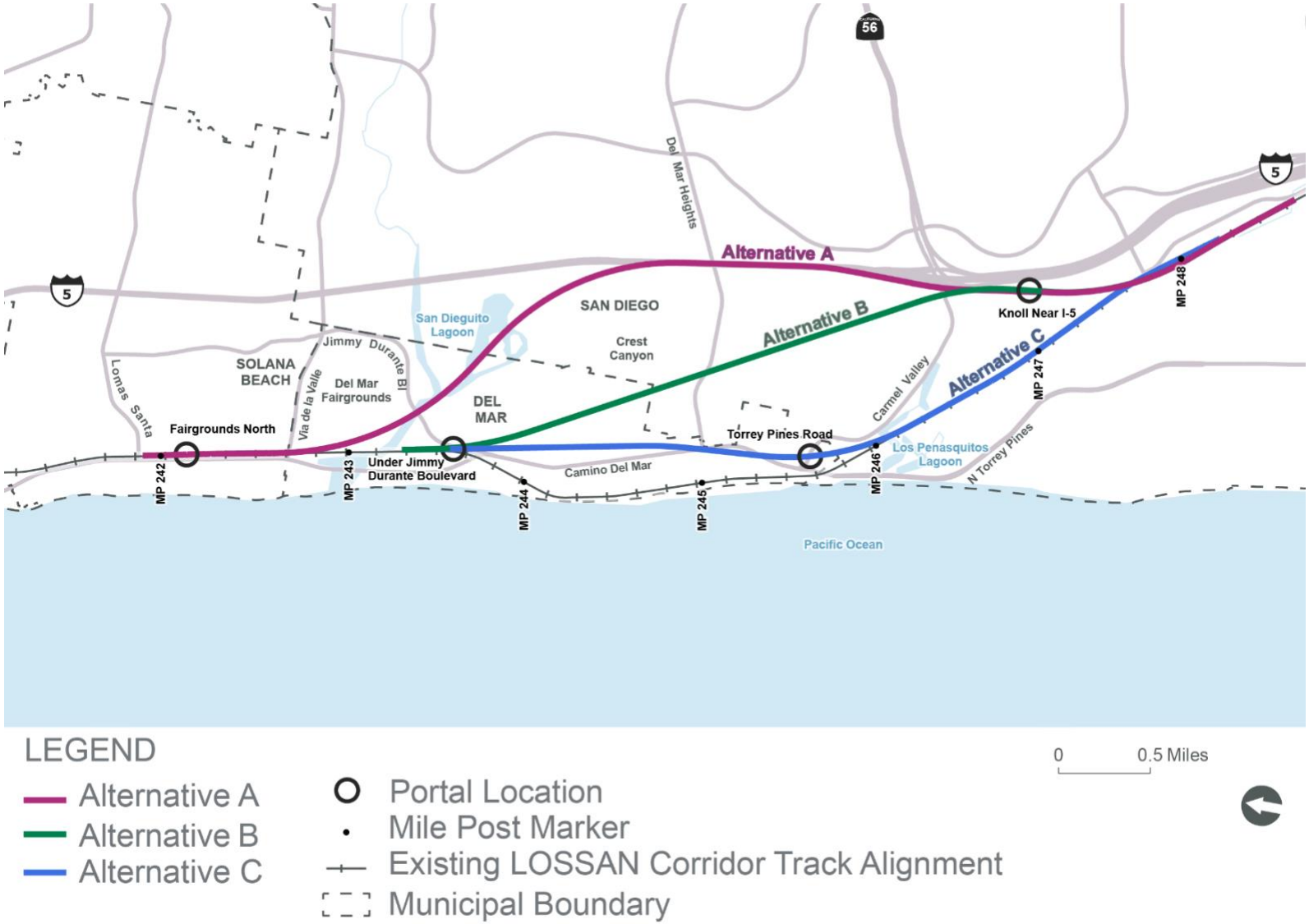
- **Alignment 3 is recommended** for further consideration in the CEQA scoping process. This alignment could result in fewer permanent impacts to sensitive vegetation communities, would require the second-fewest number of truck trips, and would generally be compatible with existing land uses. The north portal site associated with Alignment 3 (Under Jimmy Durante Boulevard) would result in fewer roadway impacts compared to the north portal site associated with Alignments 7, 9, and 11 (Within Camino Del Mar) and Alignments P7-A, P7-B, P9, P10-A, and P10-B (Fairgrounds North) portal locations. Alignment 3 would result in the lowest degree of construction complexity at the north portal and the alignment north of the portal compared to the other north portal locations.

- **Alignment 5 is recommended** for further consideration in the CEQA scoping process. The south portal for this alignment (Knoll Near I-5) would be located away from residential properties and has received general support from the public. Potential permanent impacts to sensitive vegetation communities would be comparable to Alignment 3 and would be less than Alignments 1, 7, 9, P7-A, P9, and P10-A. The south portal site would also result in fewer roadway impacts compared to the various south portal locations. Alignment 5 would also result in less construction complexity at the north portal site (Under Jimmy Durante Boulevard) and the alignment north of the portal than Alignments 7, 9, and 11.
- **Alignment P7-A is recommended** for further consideration in the CEQA scoping process. This alignment would be the most similar to what the public supported in terms of a tunnel alignment that would be parallel to I-5 rather than under residential properties. This alignment would have a north portal within the existing railroad alignment trench located north of the state-owned fairgrounds property. This north portal site, which is common among the five stakeholder and outreach alignments, would have the greatest construction complexity of the various north portal locations. This alignment would also require construction of a new special events platform at the Del Mar Fairgrounds and would require demolition or reuse of the future San Dieguito Bridge. However, potential permanent impacts to sensitive vegetation communities for Alignment P7-A would be comparable to Alignments 3 and 5, which are also recommended for further consideration. Alignment P7-A would also result in fewer potential major utility conflicts than Alignments P7-B, P9, P10-A, and P10-B.

Alignments 3, 5, and P7-A are recommended to advance to CEQA scoping. The alignments are illustrated in Figure 1-3 and will be referred to as Alternative A: I-5 Alignment, Alternative B: Crest Canyon Alignment, and Alternative C: Camino Del Mar Alignment in the Notice of Preparation of the Draft Environmental Impact Report (EIR).

- Alternative A: I-5 Alignment will reflect Alignment P7-A in this report.
- Alternative B: Crest Canyon Alignment will reflect Alignment 5 in this report.
- Alternative C: Camino Del Mar Alignment will reflect Alignment 3 in this report.

Figure 1-3. CEQA Scoping Alternatives



2 Introduction and Description of Alignments

SANDAG proposes to relocate the existing single-track alignment of the LOSSAN Rail Corridor potentially within the Cities of Solana Beach, Del Mar, and San Diego, where the rail line runs along a terrace on the coastal bluffs, to a double-tracked alignment away from the bluffs, primarily located within tunnels. The San Diego LOSSAN Rail Realignment (SDLRR) Project is part of a larger program of improvements to be implemented on the LOSSAN Rail Corridor to enhance the safety and reliability of existing services between San Luis Obispo, Los Angeles, and San Diego. SANDAG, as the Lead Agency under CEQA, is initiating the preparation of a Draft EIR for the Project. Pursuant to CEQA Guidelines §15126.6, the SDLRR Draft EIR will consider a No Project Alternative and a reasonable range of alternatives. This report describes and evaluates the alignments considered for the project alternatives with the goal of identifying the alignments that advance into the CEQA scoping process.

Previous planning and environmental studies have been undertaken to analyze the potential for realigning the San Diego Subdivision in the SDLRR Project study area, as defined in Section 2.1. In August 2023, SANDAG released the *San Dieguito to Sorrento Valley Double Track Del Mar Tunnels Alternatives Analysis Report* (Alternatives Analysis Report) that refined five potential alignment alternatives based on previous conceptual engineering studies and evaluated them against a set of performance criteria. Two of these alternatives were advanced to 10% conceptual engineering and were further analyzed for engineering and environmental considerations. Based on feedback from stakeholders and community groups, four additional potential tunnel portal locations were also evaluated within the Alternatives Analysis Report with the goal of minimizing effects on the community and private properties. After completion of the Alternatives Analysis Report, SANDAG continued to evaluate alignments, including portal locations and tunnel configurations (i.e., single or twin bore). In total, 12 conceptual alignments were developed to demonstrate potential connections among the various portal locations and tunnel bore configurations. These alignments are referred to as “conceptual alignments” within this report and are summarized in Section 2.3.

Between summer 2023 and winter 2024, SANDAG conducted public outreach events to inform, engage, and solicit public input to refine the Project and the range of alternatives. Through these efforts, additional alignments were identified, and 14 distinct alignments were developed. These alignments are referred to as “stakeholder and outreach alignments” within this report and are summarized in Section 2.4. The evaluation in this report builds on that of the Alternatives Analysis Report to evaluate each conceptual alignment and stakeholder and outreach alignment using the screening criteria discussed in Section 3 and the process summarized in Figure 3-1.

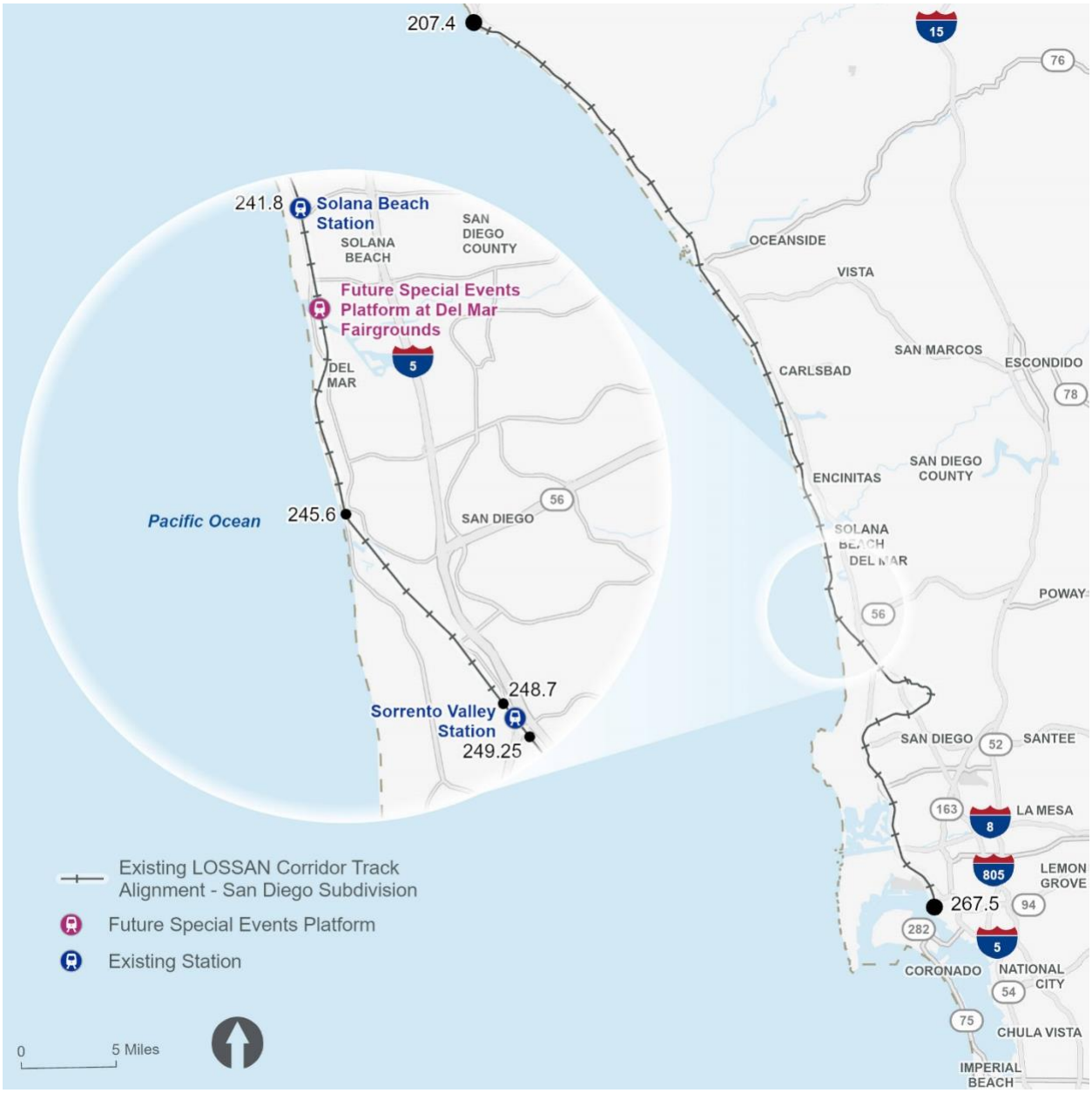
2.1 Project Description

SANDAG proposes to relocate the existing single-track alignment of the San Diego Subdivision of the LOSSAN Rail Corridor within the Cities of Solana Beach, Del Mar, and San Diego, where the rail line runs along a terrace on the coastal bluffs, to a double-tracked alignment away from the coastal bluffs. Building on the Alternatives Analysis Report, the objectives for the Project, described in Section 3.1, aim to improve rail service reliability; maintain passenger rail service; minimize impacts in the surrounding communities and on biological, cultural, and recreational resources; and improve coastal access and safety. Project objectives also include helping meet the goals of the 2021 Regional Plan and the 2018 California State Rail Plan. As described in the 2021 Regional Plan, the regional vision for the San Diego Subdivision would result in an increase in commuter rail service operating at higher speeds in order to reduce travel times and provide a competitive alternative to driving, as well as aiding in the continuation of goods movement through the region. The 2018 California State Rail Plan established a statewide vision describing a future integrated rail system that provides comprehensive and coordinated service to passengers through more frequent service, and convenient transfers between rail services and transit, recognizing the challenges of coastal erosion and sea-level rise.

The new alignment would primarily be located within tunnels. The new alignment may include bridges and berms through the Los Peñasquitos and San Dieguito Lagoons. The segment of track to be relocated could be between the Solana Beach Station and the Sorrento Valley Station, represented by Mile Posts (MP) 241.8 and 248.7 of the San Diego Subdivision, depending on the alignment selected. The Project would also require modifications to the signal system between MP 242.1 and MP 249.25. The relocation and double tracking of the alignment would eliminate operational risks caused by bluff erosion and provide greater track capacity and a higher operating speed for trains that use the corridor, enabling projected increases in service and minimizing conflicts with pedestrians.

The project study area is located in San Diego County in the Cities of Solana Beach, Del Mar, and San Diego. Ownership of the San Diego Subdivision is split between the North County Transit District (north of MP 245.6) and the San Diego Metropolitan Transit System (south of MP 245.6). Figure 2-1 shows the limits of the San Diego Subdivision and identifies the project study area.

Figure 2-1. Project Location



Note: Within the San Diego Subdivision, right-of-way north of MP 245.6 is owned by the North County Transit District and right-of-way south of MP 245.6 is owned by the Metropolitan Transit System. The Future Special Events Platform has been approved and fully funded but will be constructed as part of the San Dieguito Double Track Project.

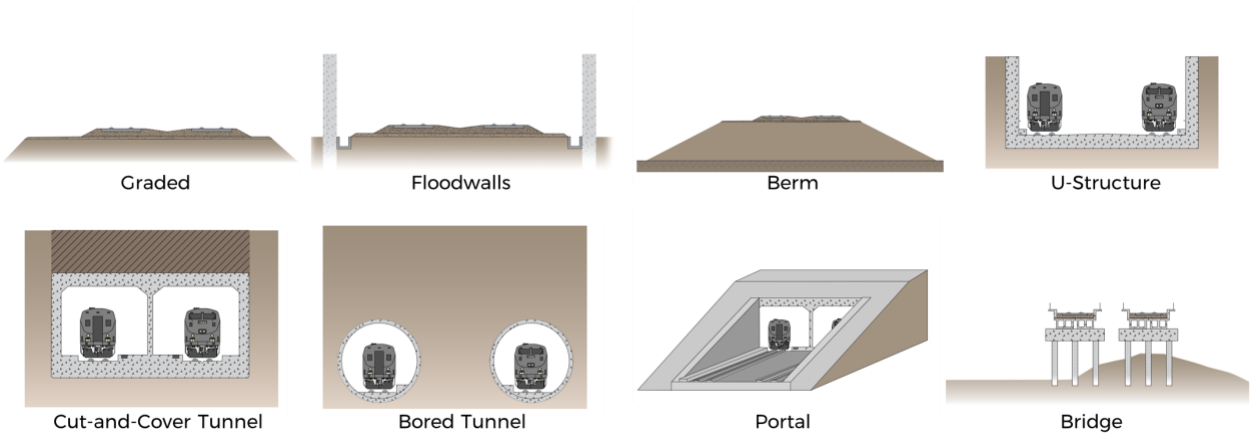
2.2 Alignment and Project Components

The alignments in this report consist primarily of tunnels with additional bridge, U-structure, and/or graded sections, as needed. Table 2-1 provides a summary of alignment components, and Figure 2-2 illustrates each component. For construction of the tunnels, both single-bore and twin-bore configurations were considered, although ultimately single bore was eliminated from further consideration during the evaluation of the conceptual alignments and the stakeholder and outreach alignments, as described in Section 4. The twin-bore alignments consist of two 28-foot internal-diameter bores separated by a distance equal to the tunnel diameter (28 feet). Construction of the tunnels would require locations for the launch and retrieval of the tunnel boring machine (TBM). The portals serve as the transition point from the tunnel to the ground surface level. It is assumed that the TBM would be launched at the south end of the tunnel and retrieved at the north end. Launching the TBM from the south has been assumed based on the greater construction activities at the launch site, access to the roadway network surrounding the south portal locations, and the proximity to the freeway, which would better accommodate the volume of truck trips associated with activities at the launch site.

Table 2-1. Summary of Alignment Components

Alignment Component	Description
Graded	Rail tracks constructed on flat ground, earthen berms, or cuts into hillsides.
Floodwalls	A freestanding structure built along a shore or bank to prevent encroachment of floodwaters.
Berm	A segment of track that is on raised ground.
U-Structure	A rectangular-shaped structure with only three sides that is excavated from the surface and leaves an opening in the surface to allow the track to transition from a tunnel to the surface level.
Cut-and-Cover Tunnel	A rectangular-shaped tunnel that is constructed within a trench that is excavated from the surface and then covered after it is constructed.
Portal	Entrance to the tunnel.
Bored Tunnel	A circular-shaped tunnel that is constructed using a tunnel boring machine that digs or bores through the earth without removing the ground above.
Bridge	Aerial structure carrying the rail tracks over roadways, canyons, or water.

Figure 2-2. Alignment Components



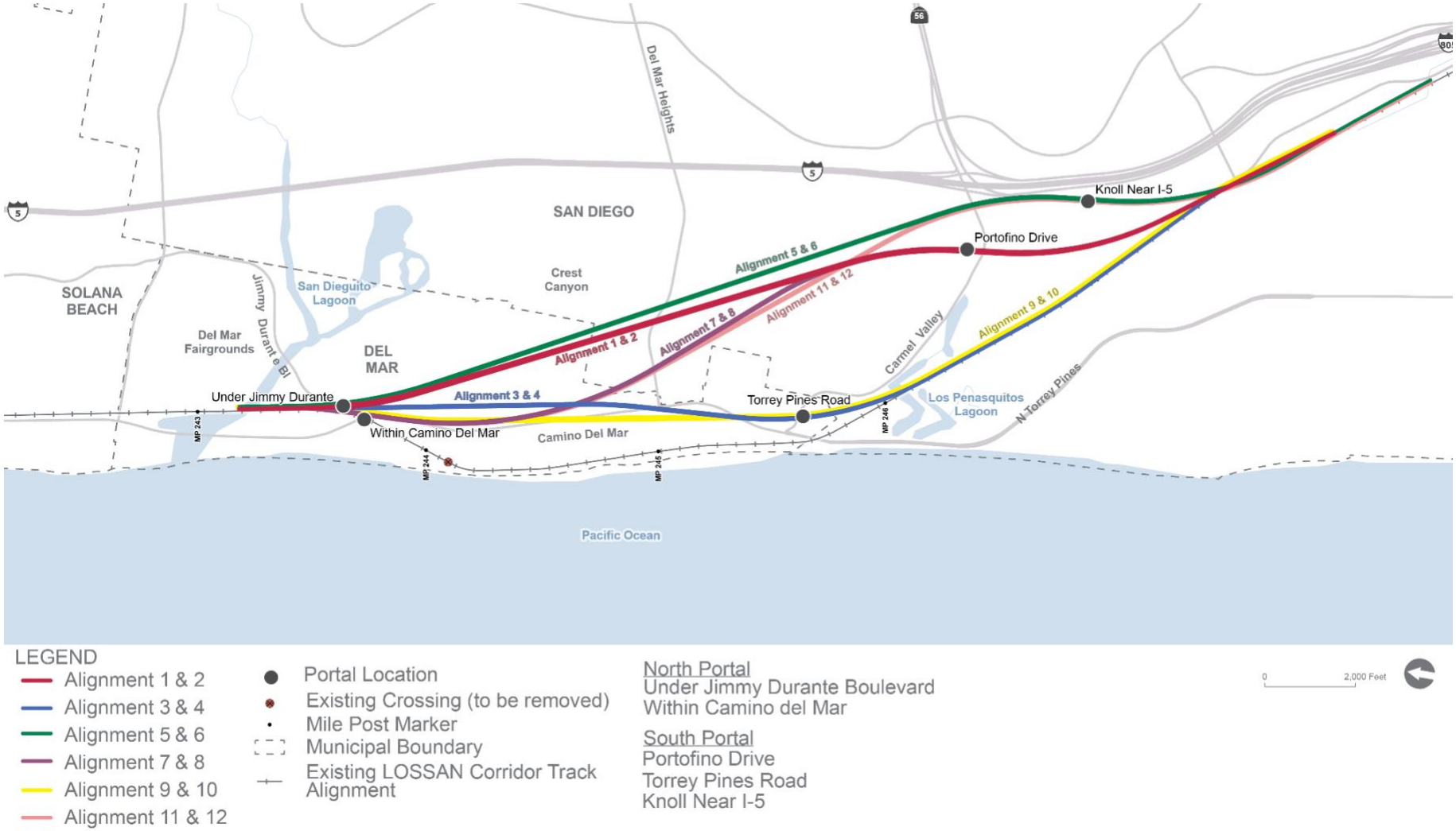
2.3 Conceptual Alignments

The conceptual alignments are based on alignments and portal locations identified in the Alternatives Analysis Report and are defined by their portal locations and tunnel bore configuration (i.e., single or twin bore). The alignments, illustrated in Figure 2-3, share two potential north portal locations and three potential south portal locations. The conceptual alignments are numbered 1 through 12 and are defined in Table 2-2.

Table 2-2. Conceptual Alignments

Conceptual Alignment No.	Conceptual Alignment		
	North Portal	South Portal	Bore
1	Under Jimmy Durante Boulevard	Portofino Drive	Twin Bore
2	Under Jimmy Durante Boulevard	Portofino Drive	Single Bore
3	Under Jimmy Durante Boulevard	Torrey Pines Road	Twin Bore
4	Under Jimmy Durante Boulevard	Torrey Pines Road	Single Bore
5	Under Jimmy Durante Boulevard	Knoll Near I-5	Twin Bore
6	Under Jimmy Durante Boulevard	Knoll Near I-5	Single Bore
7	Within Camino Del Mar	Portofino Drive	Twin Bore
8	Within Camino Del Mar	Portofino Drive	Single Bore
9	Within Camino Del Mar	Torrey Pines Road	Twin Bore
10	Within Camino Del Mar	Torrey Pines Road	Single Bore
11	Within Camino Del Mar	Knoll Near I-5	Twin Bore
12	Within Camino Del Mar	Knoll Near I-5	Single Bore

Figure 2-3. Conceptual Alignments



2.4 Stakeholder and Outreach Alignments

Leading up to the release of the Notice of Preparation, SANDAG conducted public outreach events to inform, engage, and solicit public input to refine the description of the Project and the alternatives to be identified in the Notice of Preparation of the Project Draft EIR. The following stakeholder and outreach events were held:

- July 24, 2023: SANDAG presentation to Del Mar City Council
- August 30, 2023: SD LOSSAN Rail Realignment Del Mar Community Open House
- October 4, 2023: LOSSAN Tunneling Workshop
- October 19, 2023: LOSSAN Virtual Information Session
- November 6, 2023: LOSSAN Alignments Workshop Del Mar
- November 7, 2023 – December 19, 2023: Weekly Community Field Office Hours
- November 15, 2023: LOSSAN Alignments Workshop Carmel Valley
- February 5, 2024: SANDAG presentation to Del Mar City Council
- March 19, 2024: SANDAG presentation to Torrey Pines Community Planning Board

These outreach events included workshops in November 2023 where participants had the opportunity to provide specific input on alignments and tunnel portal options to be considered. In total, stakeholders and the public identified more than 30 individual concepts for consideration, shown in Figure 2-4. Several of these concepts were similar to each other or to the conceptual alignments. The concepts identified by stakeholders and the public were grouped by similar characteristics and 14 distinct alignments were developed for consideration and numbered P1 through P10. Where applicable and known, each alignment is defined by its north and south portal locations, with variations noted by A or B designations. The evaluation for each alignment assumes a twin-bore configuration based on the high-level screening discussed in Section 4.1. Table 2-3 summarizes the alignments identified during this process, and the alignments are illustrated in Figure 2-5.

Table 2-3. Stakeholder and Outreach Alignments

Stakeholder and Outreach Alignment No.	North Portal	South Portal
P1-A	Not identified	Knoll Near I-5
P1-B	Not identified	Sorrento Valley
P2	N/A	N/A
P3	Solana Beach	Marsh Trail
P4	Camino Del Mar	Torrey Pines Road
P5	South Cedros Avenue	Pump Station 65
P6-A	Fairgrounds	Knoll Near I-5
P6-B	Fairgrounds	Sorrento Valley
P7-A	Fairgrounds	Knoll Near I-5
P7-B	Fairgrounds	Sorrento Valley
P8	Old Railroad Wye	South Los Peñasquitos Lagoon
P9	Fairgrounds	Portofino Drive
P10-A	Fairgrounds	Knoll Near I-5
P10-B	Fairgrounds	Sorrento Valley

Notes: A wye is a triangular-shaped junction of three rail lines that converge with each other. N/A = not applicable—the alignment was proposed as a bridge and does not include underground portions that would require portals. Not identified = a specific location for a northern portal was not noted.

Figure 2-4. Outreach Event Proposed Concepts

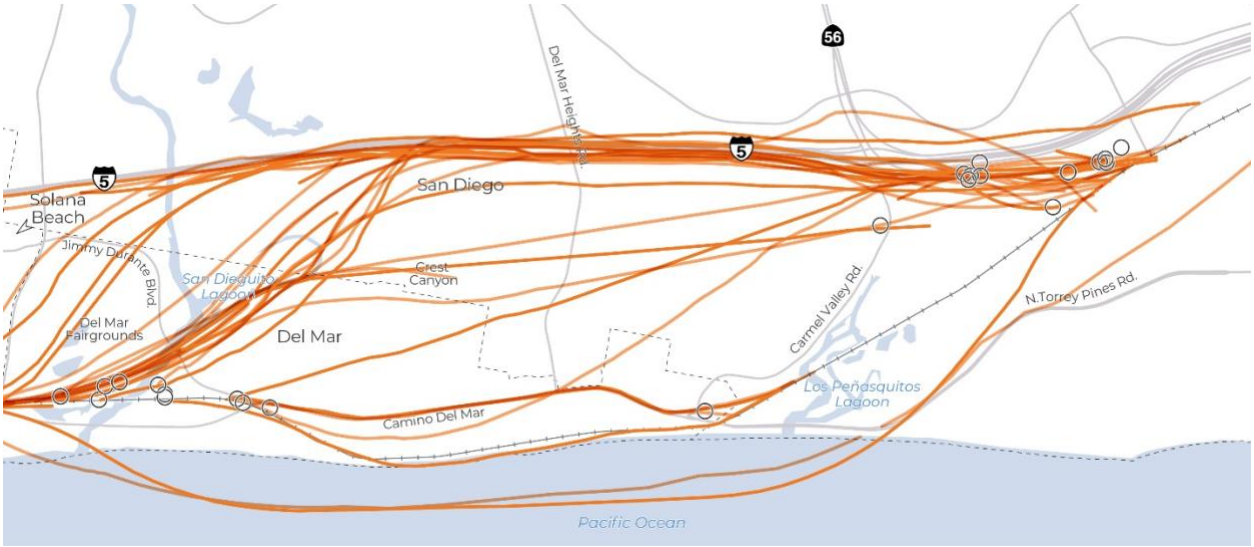
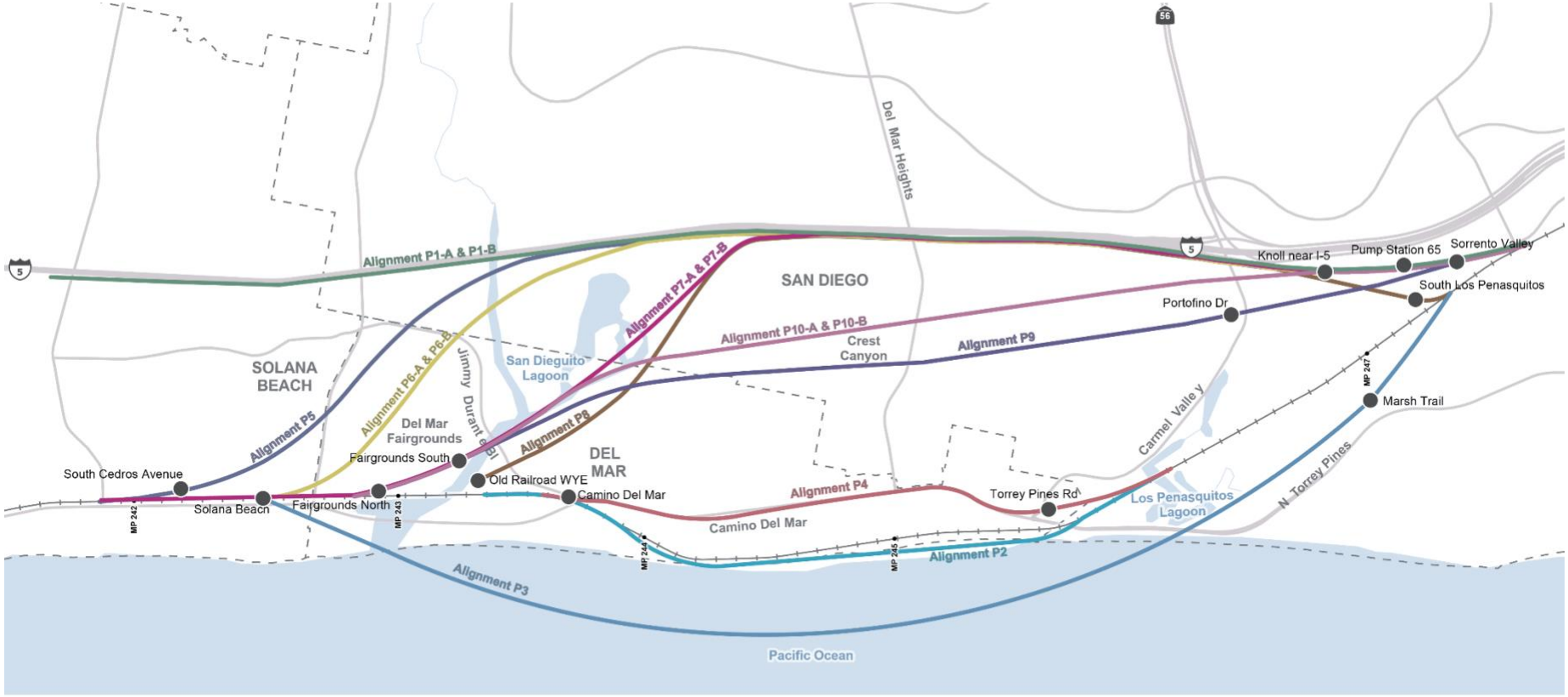


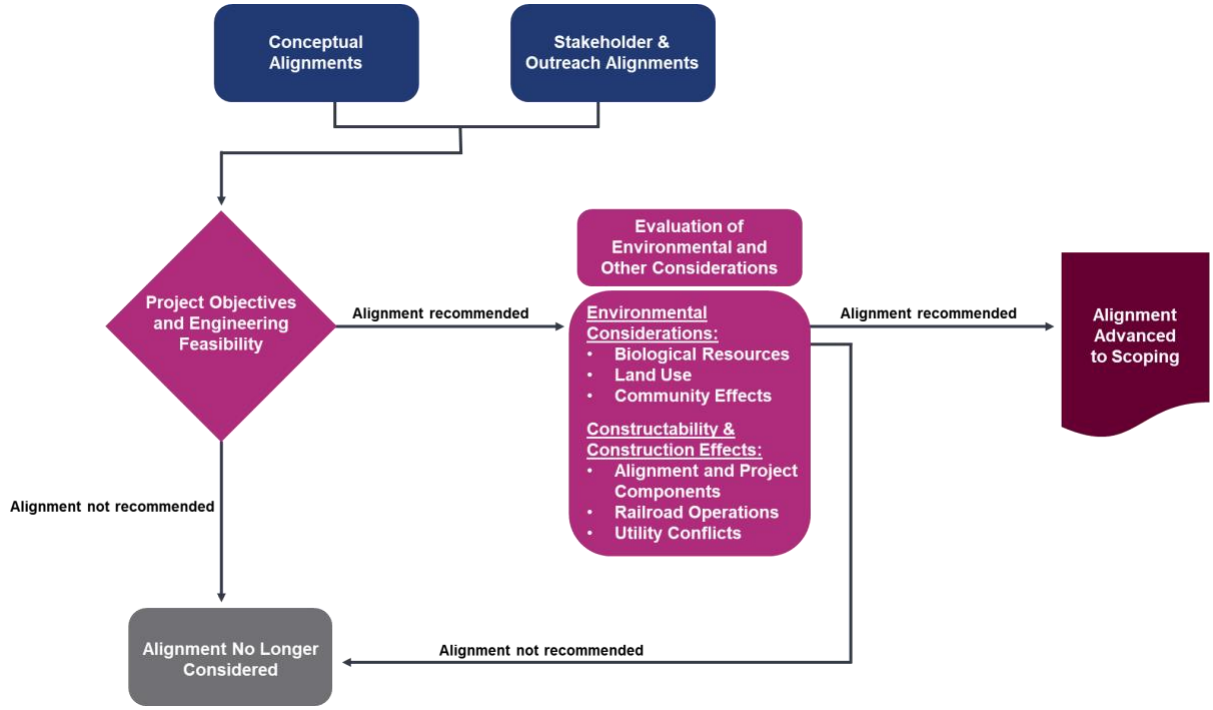
Figure 2-5. Stakeholder and Outreach Alignments



3 Screening Process

SANDAG staff developed a screening process to evaluate the 12 conceptual alignments and 14 stakeholder and outreach alignments in support of selecting the alignments that will advance to the CEQA scoping process, as shown in Figure 3-1. The screening process was informed by Section 15126.6(c) of the State CEQA Guidelines. Using this screening process, SANDAG staff first evaluated each alignment based on its ability to meet the project objectives and engineering feasibility described in Section 3.1. Alignments that would not meet the project objectives and/or were not feasible from an engineering standpoint were removed from consideration and were not evaluated further within this report. The evaluation of alignments in terms of meeting the project objectives and engineering feasibility is included in Section 4. If an alignment was found to meet project objectives and be feasible from an engineering standpoint, that alignment was carried forward for further evaluation with respect to environmental and other considerations, as described in Section 3.2 and evaluated in Section 5.

Figure 3-1. Alignment Screening Process



3.1 Project Objectives and Engineering Feasibility

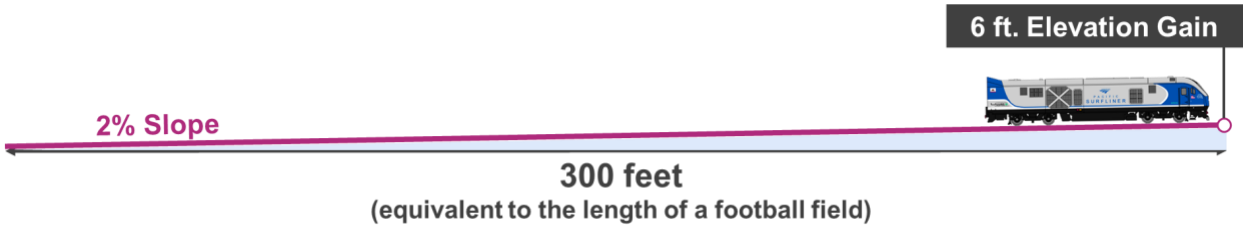
Each alignment was assessed based on its ability to meet the following project objectives:

- Improve rail service reliability by relocating the existing railroad tracks away from the eroding coastal bluffs in Del Mar.
- Maintain passenger rail service to the existing train stations serving Solana Beach and Sorrento Valley and accommodate direct rail access to the 22nd District Agricultural Association (Del Mar Fairgrounds).

- Minimize impacts on the surrounding communities during and after construction.
- Avoid and/or minimize impacts on biological, cultural, and recreational resources of national, state, or local significance, including publicly owned parks, beaches, wetlands, ecological reserves, wildlife or waterfowl refuges, and any publicly or privately owned historic site listed or eligible for listing on the National Register of Historic Places.
- Help meet the goals of the 2021 Regional Plan and the 2018 California State Rail Plan by increasing passenger and freight train capacity, further reducing travel times, improving reliability, and accommodating additional rail service.
- Improve coastal access and safety by eliminating at-grade railroad crossings and minimizing other pedestrian-rail points of interaction.

Additionally, the engineering feasibility of each alignment was considered based on the vertical profile design criteria. The design criteria accounts for the alignment grade, expressed as the rise in feet per 100 feet of length. The alignment grade must not exceed 2% to be deemed feasible from an engineering perspective, as a 2% grade is the operating requirement for freight trains that use the corridor. Figure 3-2 provides a visual representation of this grade. Because 2% slopes are very gradual, changing elevation takes a considerable distance.

Figure 3-2. Vertical Profile Design Criteria—Two Percent Slope



3.2 Environmental and Other Considerations

Table 3-1 provides a summary of the categories of evaluation criteria applied to all alignments that met the project objectives and engineering feasibility. The evaluation criteria for environmental and other considerations were used to equally compare the merits across alignments. Additional information on each criterion is provided in the sections that follow.

Table 3-1. Environmental and Other Considerations Evaluation Criteria

Evaluation Criteria	Description
Potential Environmental Considerations	Biological Resources: Acreage of sensitive vegetation communities located within and adjacent to (within 10 feet of) the footprint of each alignment that could be permanently affected by implementation of the alignment. Land Use: Existing land uses within and adjacent to (within 10 feet of) the footprint of each alignment that could be permanently affected by implementation of the alignment. Community Effects: Potential disruption to the adjacent community during construction, including potential acquisitions, noise and dust, physical impacts to local roadways, and truck trips associated with construction material disposal.
Constructability and Construction Effects	Constructability of Alignment Components: Construction effects associated with each alignment, including the tunnel, portals, and other components required for the alignment, as applicable. Impacts to Existing Railroad Operations: Effects to existing railroad operation that would occur during construction of the alignment, such as temporary suspension of service, use of a shoofly (temporary track used to maintain service), or extended distance of single-track operation. Utility Conflicts: Potential conflicts with existing major wet utilities (i.e., sewer or water). Whether a utility can be protected in place or would require relocation would be determined in later stages of design.

Note: The evaluation of potential environmental considerations does not indicate whether an alignment would result in significant impacts under the California Environmental Quality Act or adverse effects under the National Environmental Policy Act. The determination of significance of impacts will occur during the formal environmental review phase of the Project.

3.2.1 Potential Environmental Considerations

This evaluation considered potential permanent effects to existing biological resources and land uses, as well as potential disruption to adjacent communities during construction at launch and retrieval sites.

3.2.1.1 Biological Resources

The evaluation compared the area of sensitive vegetation communities within and adjacent to (within 10 feet from) the footprint of each alignment. Effects on sensitive vegetation communities and habitats typically require mitigation pursuant to the National Environmental Policy Act and CEQA, as well as to obtain federal permits or approvals from relevant agencies (e.g., U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers, and/or California Coastal Commission). Sensitive vegetation communities were identified during surveys conducted in 2023 consistent with CEQA Guidelines, the City of San Diego Land Development Code Biology Guidelines, and the City of San Diego Multiple Species Conservation Plan definitions[1], summarized as follows:

[1]Per the CEQA Guidelines, sensitive vegetation communities include those identified in a local or regional plan, policy, or regulation or by the California Department of Fish and Wildlife or the U.S. Fish and Wildlife Service. The Cities of Del Mar and Solana Beach do not have adopted guidelines to define sensitive vegetation communities.

- Section 15380 of the CEQA Guidelines defines sensitive vegetation communities and other habitat types as land supporting unique vegetation communities or the habitats of rare or endangered species or subspecies of animals or plants.
- Sensitive habitats are defined as environmentally sensitive lands within the City of San Diego's Land Development Code Biology Guidelines.
- Within the City of San Diego's Multiple Species Conservation Plan Subarea Plan, sensitive habitat types include those designated as wetlands and Tiers I through IIIB uplands.

Any vegetation community that met these definitions was considered sensitive. Sensitive vegetation communities within and adjacent to the footprint of each alignment include:

- Coastal and valley freshwater marsh – Wetland
- Diegan coastal sage scrub (including disturbed) – Tier II Upland
- Mule fat scrub – Wetland
- Open water/tidal
- Salt/brackish marsh – Wetland
- Southern coastal salt marsh – Wetland
- Southern willow scrub – Wetland

3.2.1.2 Land Use

The land use evaluation considered the existing land uses within and adjacent to (within 10 feet from) the footprint of each alignment. Alignments with a larger area of existing transportation land uses within or adjacent to the project footprint would be generally more compatible with the existing setting than those adjacent to non-transportation land uses such as recreation/open space. Existing land uses were identified based on 2022 SANDAG land use data. SANDAG performs an annual land use and housing unit inventory in the interest of maintaining a robust and accurate catalog of the existing conditions for any given year. Existing land uses within and adjacent to the footprint of each alignment include:

- **Recreation/Open Space:** Wildlife and nature preserves, lands set aside for open space, actively landscaped areas, parks, golf courses, and beaches
- **Residential:** Single-family and multifamily residential properties, and parcels of land that do not contain a dwelling unit but in which the land use is residential serving
- **Transportation:** Railroad and roadway right-of-way and parking lots
- **Public Institution:** Offices, public service facilities, and medical centers
- **Industrial:** Warehousing and certain mixed commercial and manufacturing uses
- **Hotel/Resort:** Hotels, motels, and resorts
- **Undeveloped/Vacant:** Unoccupied and undeveloped land
- **Commercial:** Commercial activities found along major streets and shopping areas

3.2.1.3 Community Effects

The evaluation of community effects considers the potential disruption to adjacent communities during construction, including potential acquisitions at and near the portals associated with the TBM launch and retrieval sites and physical impacts to local roadways. Additionally, construction activities may result in effects related to noise and dust. The analysis of construction-related noise, along with measures to minimize noise and dust, will occur during environmental review.

The evaluation also considers construction material disposal in terms of the relative number of one-way truck trips required to dispose of the material excavated from bored tunnels, cut-and-cover tunnel, and the U-structure during construction. Generally, the higher the volume of excavated material, the higher the number of truck trips. Truck trips would be required for other construction-related activities, and the number of these trips will be determined during environmental review as further information is developed for the construction schedule. The quantity of excavated material is based on the length of each alignment. Construction methods will be further evaluated during environmental review to determine ways to minimize the number of truck trips.

3.2.2 Constructability and Construction Effects

3.2.2.1 Constructability of Alignment Components

Construction activities at the south portal launch site would include:

- Clearing and grubbing of the site
- Excavation for the portal
- TBM assembly
- Tunnel launch and subsequent TBM support activities, including removal of materials from excavation and loading materials onto trucks
- Import and storage of materials for the tunnel, including the lining
- Construction of permanent portal structures and installation of track and supporting infrastructure

Construction activities at the north portal retrieval site[2] would include:

- Clearing and grubbing of the site
- Excavation for the portal
- Decommissioning and dismantling of the TBM
- Removal of material from excavation of the north portal and associated cut-and-cover and U-structure sections and loading material onto trucks
- Construction of permanent portal structures and installation of track and supporting infrastructure

[2] For all conceptual alignments, the north portal location is anticipated to serve as the TBM retrieval site. However, for Alignments P7-A, P7-B, P9, P10-A, and P10-B from the stakeholder and outreach alignments, it is anticipated that the TBM would be retrieved from the Del Mar Fairgrounds rather than from the north portal.

For planning purposes, 10 acres has been assumed as the minimum area needed for TBM launch and support of TBM operations during construction. Approximately 7 acres has been assumed to be the minimum area needed for TBM retrieval and portal construction. Conceptual construction laydown areas for the portals will be identified in future phases of design. These temporary staging areas could be restored to pre-construction conditions at the conclusion of the Project.

Additional alignment components would also be required outside of the tunnel and portal limits. Portions of the alignments that traverse Los Peñasquitos Lagoon would need to be on bridges to avoid impacts to the main water passages and to limit the permanent project footprint or otherwise be constructed on graded berms. The evaluation for constructability compares the requirements for construction of the various alignment components, including, but not limited to, tunnels, portals, and structures.

3.2.2.2 Railroad Operational Impacts during Construction

One of the challenges with building any of the alignments would be minimizing impacts on railroad operations during construction, particularly where the new alignment would tie in with the existing railroad tracks. Rail service must be maintained during construction to the extent feasible in order to continue to provide a travel option for those using the COASTER and Pacific Surfliner, as well as to maintain rail freight operations. Therefore, for each alignment, a scenario was developed that would support continued rail service while minimizing the temporary infrastructure required, effects to operation (e.g., speed, length of single-track operation), and cost and schedule implications. Construction phasing and methods to minimize impacts to rail service will be further developed during environmental review.

Generally, shooflies (temporary tracks), temporary turnouts, increased distance of single-track operations, and temporary control points would be required to minimize impacts to railroad operations during construction. The evaluation for railroad operational impacts during construction discusses measures that may be implemented during construction to maintain existing rail operations to the extent feasible.

3.2.2.3 Utility Conflicts

Each alignment was reviewed and evaluated for potential conflicts with existing major wet utilities. For purposes of this study, major wet utilities are defined as water facilities equal to or greater than 16 inches and sewer facilities equal to or greater than 18 inches. Using Geographic Information Systems (GIS) data from the SanGIS website, water and sewer utilities were identified.

4 Evaluation of Project Objectives and Engineering Feasibility

4.1 Conceptual Alignments

All conceptual alignments would meet the project objectives and engineering feasibility. Because each conceptual alignment was prepared for an alternatives analysis, the conceptual alignments were designed specifically to meet the project objectives and comply with the engineering feasibility criteria. However, for alignments with a north portal within Camino Del Mar, a single-bore tunnel (Alignments 8, 10, and 12) would require approximately 350 feet more of cut-and-cover construction within the roadway than a twin-bore tunnel, which would increase the complexity of managing roadway closures and detours. Through high-level screening as the conceptual alignments were further developed, it became apparent that all single-bore alignments would result in more complex construction and community effects than the similar twin-bore alignments. Therefore, the six single-bore alignments (Alignments 2, 4, 6, 8, 10 and 12) were removed from consideration prior to the evaluation of environmental and other considerations in Section 5.1. The twin-bore alignments (Alignment 1, 3, 5, 7, and 11) were advanced for further evaluation in Section 5.1.

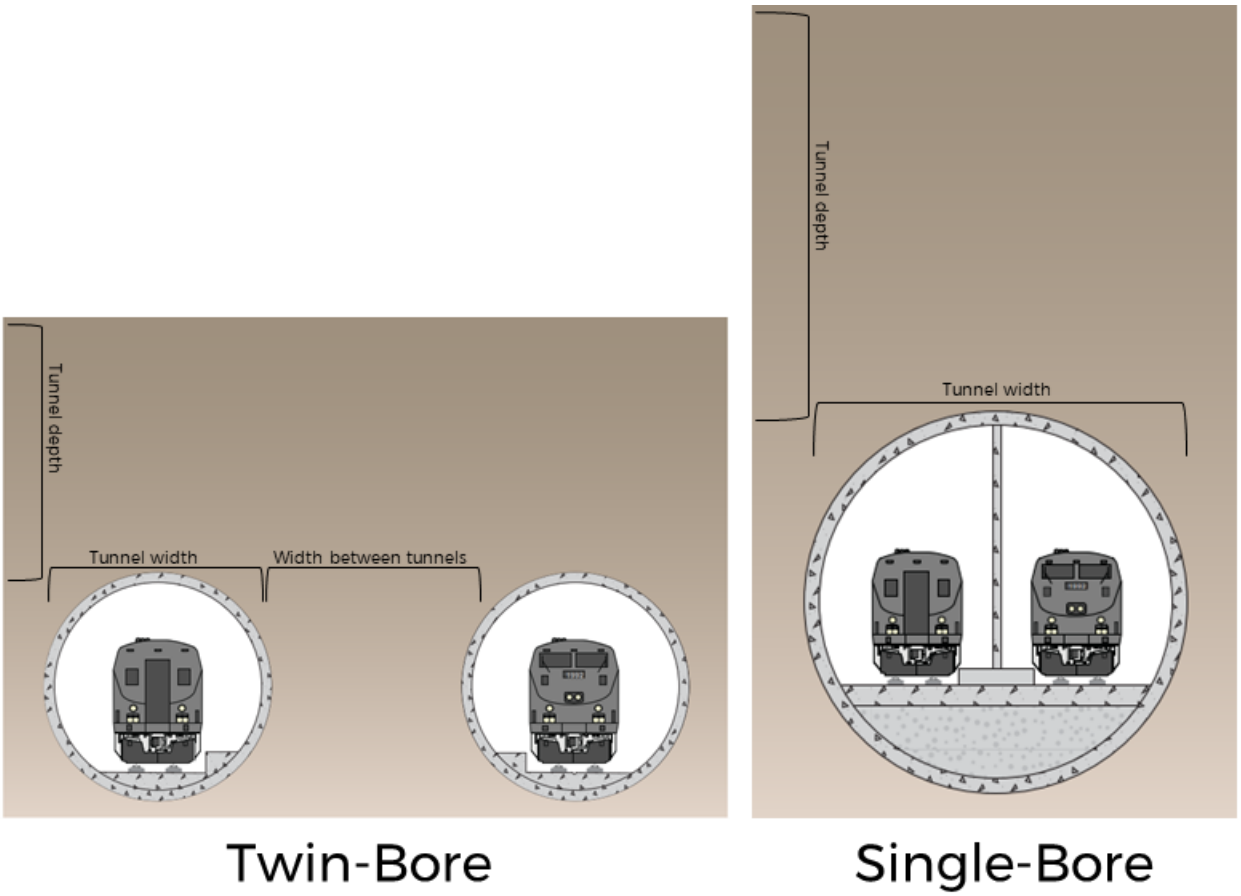
A key differentiator between single-bore and twin-bore tunnels (Figure 4-1) is the minimum depth required beneath the earth's surface to enter or exit the portal structure. The larger-diameter single-bore configuration would require a much longer transitional structure to provide a minimum of one-diameter of ground cover above the top of the tunnel, which is a best practice for conceptual design. Additionally, the footprint needed to construct the transition structures (U-structure and cut-and-cover tunnel) would be larger due to the increased depth of the portal to accommodate the larger tunnel diameter. This larger footprint would impact access to and through the community, including property effects to support temporary roadways during construction.

A single-bore tunnel configuration was also eliminated for the following reasons:

- The amount of material excavated for a single-bore tunnel is nearly 40% greater than the amount of material excavated for a twin-bore tunnel of the same length. Additionally, a single-bore tunnel requires more reinforced concrete lining. Therefore, single-bore tunnels require more truck trips to remove excavated material and deliver construction materials, which would result in greater construction-related traffic, effects on the community, and construction costs.
- The smaller TBM for a twin-bore tunnel would generally excavate the same length of tunnel faster than a larger TBM required for a single-bore tunnel.

In consideration of the increased complexity of construction and community effects, additional truck trips associated with removal of excavated material and delivery of construction materials, and greater cost, Alignments 2, 4, 6, 8, 10, and 12 were removed from consideration in favor of the similar twin-bore alignments. Additionally, for the reasons described, single-bore tunnels were not considered for any of the stakeholder and outreach alignments.

Figure 4-1. Twin-Bore and Single-Bore Tunnel Configuration



Note: Based on best practices for conceptual design, the minimum depth of ground cover above the top of the tunnel is equivalent to the width of the tunnel. The minimum distance between twin-bore tunnels is equivalent to the width of the tunnel.

4.2 Stakeholder and Outreach Alignments

Table 4-1 summarizes the assessment of each alignment's ability to meet the project objectives and engineering feasibility identified in Section 3.1.

4.2.1 Alignment P1-A

Alignment P1-A proposes a bored tunnel along the I-5 right-of-way, although the depiction of the alignment did not identify the point that it would connect to the existing railroad alignment at the north. Alignment P1-A would meet one of the six project objectives by relocating the existing railroad tracks away from the eroding bluffs. However, the alignment would not meet the objective to maintain passenger service to the existing Solana Beach Station and would not provide direct access to the Del Mar Fairgrounds. A north portal location was not identified, and, therefore, sufficient information is not available to evaluate this alignment against the remaining project objectives and engineering feasibility. Therefore, **Alignment P1-A was removed from further consideration.**

4.2.2 Alignment P1-B

Alignment P1-B proposes a bored tunnel along the I-5 right-of-way, although the depiction of the alignment did not identify the point that it would connect to the existing railroad alignment at the north. Alignment P1-B would meet one of the six project objectives by relocating the existing railroad tracks away from the eroding bluffs. However, the alignment would not meet the objective of maintaining passenger service to the existing Solana Beach Station and would not provide direct access to the Del Mar Fairgrounds. Additionally, the alignment would not meet the project objective to minimize impacts to the surrounding community as it would result in impacts to businesses in Sorrento Valley and at the intersection of Sorrento Valley Road and Carmel Mountain Road. As with Alignment P1-A, a north portal location was not identified, and, therefore, sufficient information is not available to evaluate this alignment against the remaining project objectives and engineering feasibility. Therefore, **Alignment P1-B was removed from further consideration.**

4.2.3 Alignment P2

Alignment P2 proposes a freestanding bridge built to the west of the existing tracks. Though feasible from an engineering standpoint, the alignment would only meet one of the six project objectives. The alignment would not relocate the existing railroad tracks away from the eroding coastal bluffs in Del Mar and would not meet long-term resiliency goals with continued storm events and sea-level rise. Alignment P2 would also result in significant effects to the beach and would require grading and support structures that would destroy the coastal bluffs and beach access, thereby affecting recreational and coastal resources. This alignment would also not reduce rail travel times or eliminate at-grade crossings. Therefore, **Alignment P2 was removed from further consideration.**

4.2.4 Alignment P3

Alignment P3 proposes an alignment that would locate the rail line in a tunnel under the ocean. This alignment would meet three of the six project objectives. This alignment would relocate the tracks, improve rail travel times, and support the objective to enhance coastal access and improve safety. However, Alignment P3 would not maintain rail access to the Del Mar Fairgrounds as the alignment would divert from the existing rail alignment before the fairgrounds. This alignment would also affect Solana Beach and impact biological and recreational resources, including Torrey Pines State Park, Dog Beach, the bluffs, and the Los Peñasquitos wetlands. Additionally, Alignment P3 would not be feasible from an engineering standpoint as the grades for tunneling underneath the ocean floor would exceed 2% and, therefore, would not meet the vertical profile design criteria required to maintain rail freight operation. As a result, **Alignment P3 was removed from further consideration.**

4.2.5 Alignment P4

Alignment P4 proposes a bored tunnel under the public right-of-way of Camino Del Mar. This alignment would meet all project objectives except for reducing rail travel times. Due to the curves required for the alignment to mirror the path of Camino Del Mar, the maximum speed of this alignment would be 50 miles per hour (mph), which could increase rail travel times compared to the existing alignment. Alignment P4 would be feasible from an engineering standpoint; however, it was removed from consideration because it is similar to conceptual Alignment 3 evaluated in Section 5.1, which would meet the objective of reducing travel times. Therefore, **Alignment P4 was removed from further consideration.**

4.2.6 Alignment P5

Alignment P5 proposes a bored tunnel along the I-5 right-of-way, under the San Dieguito Lagoon to South Cedros Avenue in Solana Beach. This alignment would meet two of the six project objectives. This alignment would relocate the tracks away from the eroding coastal bluffs and support the objective to enhance coastal access and improve safety. However, Alignment P5 would not be able to accommodate a direct connection to the Del Mar Fairgrounds and would result in impacts to the Cedros Avenue Design District in Solana Beach, businesses in Sorrento Valley, and businesses at the intersection of Sorrento Valley Road and Carmel Mountain Road. As depicted by stakeholders and the public, the alignment would not reduce rail travel times. Therefore, **Alignment P5 was removed from further consideration.**

4.2.7 Alignment P6-A

Alignment P6-A proposes a bored tunnel along the I-5 right-of-way under the San Dieguito Lagoon and Del Mar Fairgrounds to Solana Beach. This alignment would meet three of the six objectives and engineering feasibility. The alignment would not reduce travel times and would result in impacts to the Coastal Rail Trail, a multi-use path along the rail corridor, and Solana Beach. The alignment would also result in impacts to Stevens Creek and the Del Mar Fairgrounds. Therefore, the alignment would not meet the project objectives to minimize impacts to the surrounding community; preserve biological, cultural (e.g., historic property), and recreational resources; and reduce rail travel times. In addition to not meeting three of the project objectives, Alignment P6-A is similar to Alignment P7-A, which would meet the objective of reducing travel times and was advanced for further consideration. Therefore, **Alignment P6-A was removed from further consideration.**

4.2.8 Alignment P6-B

Alignment P6-B is similar to Alignment P6-A, except the southern portal is located farther south in Sorrento Valley. This alignment would meet three of the six objectives and engineering feasibility. Similar to Alignment P6-A, the alignment would not reduce travel times and would result in impacts to the Coastal Rail Trail (a multi-use path along the rail corridor) and Solana Beach. The alignment would also result in impacts to Stevens Creek and the Del Mar Fairgrounds. Therefore, the alignment would not meet the project objectives to minimize impacts to the surrounding community; preserve biological, cultural, and recreational resources; and reduce rail travel times. Alignment P6-B would also result in additional impacts to businesses in Sorrento Valley and at the intersection of Sorrento Valley Road and Carmel Mountain Road. Alignment P6-B is similar to P7-B, which would meet the objective of reducing travel times and was advanced for further evaluation. Therefore, **Alignment P6-B was removed from further consideration.**

4.2.9 Alignment P7-A

Alignment P7-A proposes a bored tunnel along the I-5 right-of-way under the San Dieguito Lagoon and Del Mar Fairgrounds to Solana Beach. Alignment P7-A would meet four of the six project objectives. Similar to Alignment P6-A, Alignment P7-A would result in impacts to the Coastal Rail Trail, Solana Beach, Stevens Creek, and the Del Mar Fairgrounds. Therefore, the alignment would not meet the project objectives to minimize impacts to the surrounding community and preserve biological, cultural, and recreational resources. However, Alignment P7-A would meet all other project objectives and is feasible from an engineering standpoint. Therefore, **Alignment P7-A was advanced for further evaluation in Section 5.2.**

4.2.10 Alignment P7-B

Alignment P7-B proposes a bored tunnel along the I-5 right-of-way under the San Dieguito Lagoon and Del Mar Fairgrounds to Solana Beach. Similar to Alignment P7-A, Alignment P7-B would meet four of the six project objectives. Alignment P7-B would also result in impacts to the Coastal Rail Trail, Solana Beach, Stevens Creek, and the Del Mar Fairgrounds. Therefore, the alignment would not meet the project objectives to minimize impacts to the surrounding community and preserve biological, cultural, and recreational resources. The alignment would also result in additional impacts to businesses in Sorrento Valley. However, Alignment P7-B would meet all other project objectives and is feasible from an engineering standpoint. Therefore, **Alignment P7-B was advanced for further evaluation in Section 5.2.**

4.2.11 Alignment P8

Alignment P8 proposes a bored tunnel under the Los Peñasquitos Lagoon, along the I-5 right-of-way and under private property to Del Mar. Alignment P8 would meet four of the six project objectives. However, this alignment would not reduce travel times and would result in significant impacts to Los Peñasquitos Lagoon, not meeting the project objective to preserve biological, cultural, and recreational resources. Additionally, the inclusion of a tunnel portal immediately following a bridge on flat terrain would not be feasible from an engineering perspective. There is insufficient distance to achieve the necessary 2% grade required between the bridge and where the portal location was proposed for this alignment concept, therefore making the alignment infeasible. As a result, **Alignment P8 was removed from further consideration**.

4.2.12 Alignment P9

Alignment P9 proposes a bored tunnel under the Los Peñasquitos Lagoon, Crest Canyon, and the San Dieguito Lagoon to Del Mar. Alignment P9 would meet four of the six project objectives. Alignment P9 would result in impacts to the Coastal Rail Trail, Solana Beach, Stevens Creek, and the Del Mar Fairgrounds. Therefore, the alignment would not meet the project objectives to minimize impacts to the surrounding community and preserve biological, cultural, and recreational resources. However, Alignment P9 would meet all other project objectives and is feasible from an engineering standpoint. Therefore, **Alignment P9 was advanced for further evaluation in Section 5.2.**

4.2.13 Alignment P10-A

Alignment P10-A proposes a bored tunnel under the Los Peñasquitos Lagoon and the San Dieguito Lagoon to Del Mar. Alignment P10-A would meet four of the six project objectives but would result in impacts to the Coastal Rail Trail, Solana Beach, Stevens Creek, and the Del Mar Fairgrounds. Therefore, the alignment would not meet the project objectives to minimize impacts to the surrounding community and preserve biological, cultural, and recreational resources. However, Alignment P10-A would meet all other project objectives and is feasible from an engineering standpoint. Therefore, **Alignment P10-A was advanced for further evaluation in Section 5.2.**

4.2.14 Alignment P10-B

Alignment P10-B proposes a bored tunnel under the Los Peñasquitos Lagoon and the San Dieguito Lagoon to Del Mar. Similar to Alignment P10-A, Alignment P10-B would meet four of the six project objectives. Alignment P10-B would result in impacts to the Coastal Rail Trail, Solana Beach, Stevens Creek, and the Del Mar Fairgrounds. Therefore, the alignment would not meet the project objectives to minimize impacts to the surrounding community and preserve biological, cultural, and recreational resources. The alignment would also result in additional impacts to businesses in Sorrento Valley. However, Alignment P10-B would meet all other project objectives and is feasible from an engineering standpoint. Therefore, **Alignment P10-B was advanced for further evaluation in Section 5.2.**

4.2.15 Summary

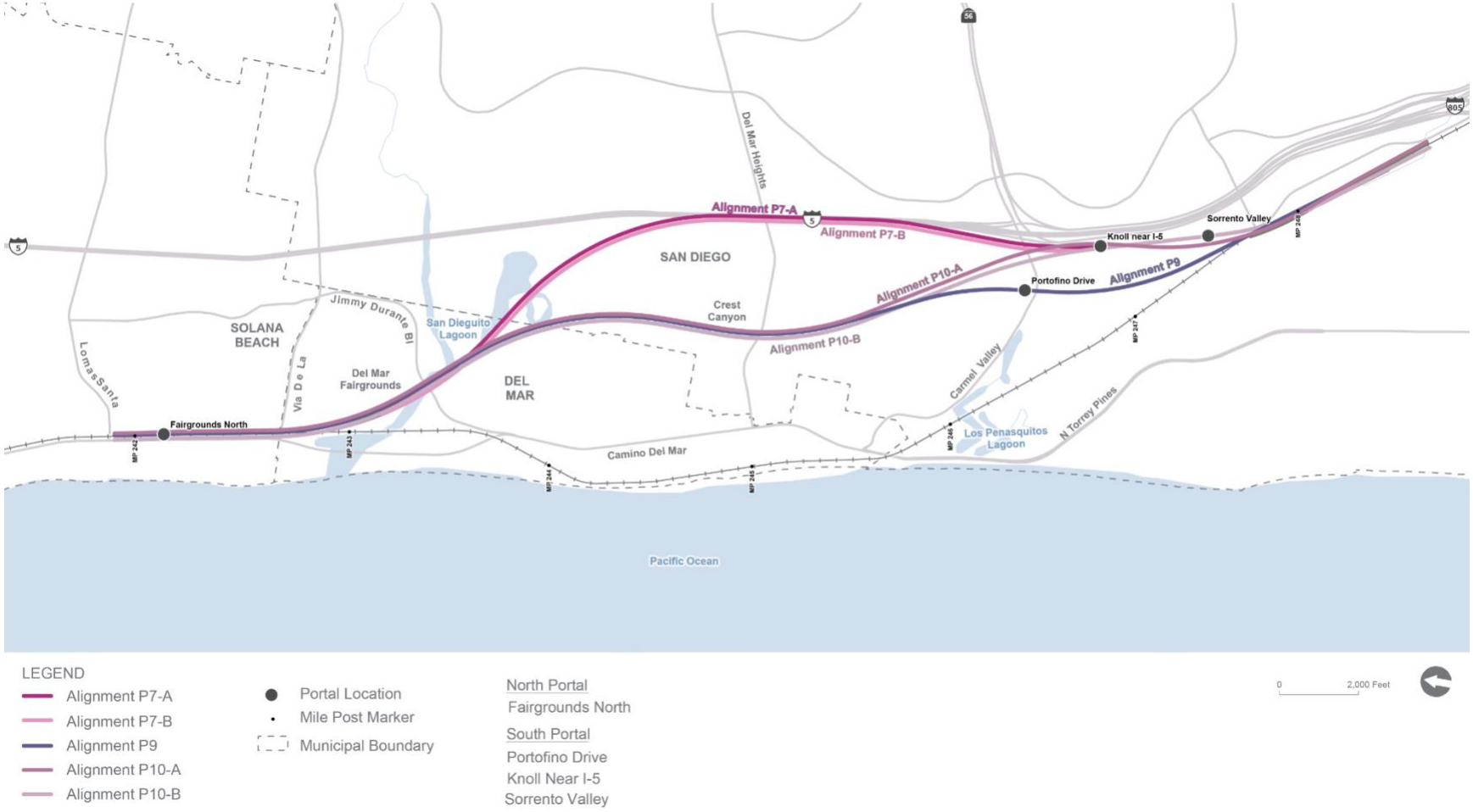
Based on the evaluation of project objectives and engineering feasibility, as summarized in Table 4-1, **Alignments P7-A, P7-B, P9, P10-A, and P10-B were advanced for further evaluation** in Section 5.2. The remaining stakeholder and outreach alignments were removed from consideration. Alignments P7-A, P7-B, P9, P10-A, and P10-B as depicted by stakeholders and the public were modified as each alignment was further developed, as illustrated in Figure 4-2.

Table 4-1. Project Objectives and Engineering Feasibility — Stakeholder and Outreach Alignments

Stakeholder and Outreach Alignment No.	North Portal	South Portal	Meets Project Objectives						Meets Engineering Feasibility	Advanced for Further Evaluation
			Improve rail service reliability by relocating the existing railroad tracks away from the eroding coastal bluffs in Del Mar	Maintain passenger rail service to the existing train stations serving Solana Beach and Sorrento Valley and accommodate direct rail access to 22nd District Agricultural Association (Del Mar Fairgrounds)	Minimize impacts in the surrounding communities during and after construction	Avoid and/or minimize impacts on biological, cultural, and recreational resources	Help meet the goals of the 2021 Regional Plan and the 2018 California State Rail Plan by increasing passenger and freight train capacity, further reducing travel times, improving reliability, and accommodating additional rail service	Improve coastal access and safety by eliminating at-grade railroad crossings and minimizing other pedestrian-rail points of interaction		
P1-A	Not identified	Knoll Near I-5	Yes	No	Unknown[1]	Unknown	Unknown	Unknown	Unknown	No
P1-B	Not identified	Sorrento Valley	Yes	No	No	Unknown	Unknown	Unknown	Unknown	No
P2	N/A	N/A	No	Yes	No	No	No	No	Yes	No
P3	Solana Beach	Marsh Trail	Yes	No	No	No	Yes	Yes	No	No
P4	Camino Del Mar	Torrey Pines Road	Yes	Yes	Yes	Yes	No	Yes	Yes	No
P5	South Cedros Avenue	Pump Station 65	Yes	No	No	No	No	Yes	Yes	No
P6-A	Fairgrounds	Knoll Near I-5	Yes	Yes	No	No	No	Yes	Yes	No
P6-B	Fairgrounds	Sorrento Valley	Yes	Yes	No	No	No	Yes	Yes	No
P7-A	Fairgrounds	Knoll Near I-5	Yes	Yes	No	No	Yes	Yes	Yes	Yes
P7-B	Fairgrounds	Sorrento Valley	Yes	Yes	No	No	Yes	Yes	Yes	Yes
P8	Old Railroad Wye	South Los Peñasquitos Lagoon	Yes	Yes	Yes	No	No	Yes	No	No
P9	Fairgrounds	Portofino Drive	Yes	Yes	No	No	Yes	Yes	Yes	Yes
P10-A	Fairgrounds	Knoll Near I-5	Yes	Yes	No	No	Yes	Yes	Yes	Yes
P10-B	Fairgrounds	Sorrento Valley	Yes	Yes	No	No	Yes	Yes	Yes	Yes

Notes: Stakeholder and Outreach Alignment No. P1- A: As depicted by stakeholders and the public, there is insufficient information to evaluate the alignment against the project objective and/or engineering feasibility.
A wye is a triangular-shaped junction of three rail lines that converge with each other.
N/A = not applicable—the alignment was proposed as a bridge and does not include underground portions that would require portals.
Not identified = a specific location for a northern portal was not noted.

Figure 4-2. Stakeholder and Outreach Alignments Advanced



5 Evaluation of Environmental and Other Considerations

5.1 Conceptual Alignments

This section summarizes the evaluation of Alignments 1, 3, 5, 7, 9, and 11. Table 5-1 provides a comparison of the type and approximate length of the various alignment components for each of these alignments, including the length of the tunnel under public right-of-way or property and private property. The alignment components are considered throughout the evaluation of environmental and other considerations in the sections that follow.

Table 5-1. Conceptual Alignments — Summary of Alignments and Components

Conceptual Alignment No.	Bored Tunnel (feet)	U-Structure (feet)	Cut-and-Cover Tunnel (feet)	Bridge (feet)	Floodwall (feet)	Graded (feet)	Total Alignment Length (feet)	% of Tunnel under Public ROW (%)	% of Tunnel under Private ROW (%)
1	13,800	900	700	1,500	800	7,600	25,300	41	59
3	9,800	900	600	6,100	800	7,800	25,900	6	94
5	16,600	2,400	900	100	1,900	6,200	28,000	44	56
7	13,900	1,100	900	1,500	800	7,200	25,300	49	51
9	9,500	1,200	500	6,100	800	7,800	26,000	27	73
11	16,600	2,200	1,200	100	1,900	6,300	28,300	46	54

Notes: The graded length includes the berm. ROW = right-of-way

5.1.1 Potential Environmental Considerations

This section compares the area of sensitive vegetation communities and the existing land uses within and adjacent to (within 10 feet from) the footprint of each conceptual alignment. The section also provides an evaluation of the potential disruption to adjacent communities during construction at TBM launch and retrieval sites, including potential acquisitions and noise and dust. The section also considers physical impacts to roadways and the number of truck trips associated with construction material disposal from excavation of the bored tunnels, cut-and-cover tunnel, and the U-structure. Table 5-2 summarizes the acreages of the sensitive vegetation communities and the existing land use designations within and adjacent to the project footprint for each alignment. Table 5-3 presents an estimate of truck trips required for construction material disposal. The sections that follow present the evaluation of these considerations by conceptual alignment.

Table 5-2. Sensitive Vegetation Communities and Existing Land Uses (Permanent)

Conceptual Alignment No.	Biological Resources Sensitive Vegetation Communities (acres)		Land Use (acres)							
	Wetlands	Uplands	Residential	Recreation/ Open Space	Transpor-tation	Public Institution	Industrial	Hotel	Undeveloped	Commercial
1	20	2	<1	20	13	1	<1	0	0	0
3	13	3	1	3	27	1	<1	0	0	0
5	15	0	<1	12	12	1	<1	0	0	0
7	17	2	<1	17	22	1	<1	<1	0	0
9	13	3	1	3	37	1	<1	<1	0	0
11	15	0	<1	<1	22	1	<1	<1	0	0

Source: SanGIS 2022, AECOM 2023 biological resource surveys

Table 5-3. Approximate Volume of Excavated Material and Truck Trips for Disposal of Construction Material

Conceptual Alignment No.	Total Excavation Volumes (Cubic Yards)	Estimated Truck Trips for Construction Material Disposal
1	1,716,000	171,600
3	1,273,000	127,300
5	2,294,000	229,400
7	1,819,000	181,900
9	1,220,000	122,000
11	2,351,000	235,100

Note: Estimated Truck Trips for Construction Material Disposal: Only accounts for one-way traffic for disposal of construction materials associated with the bored tunnels, cut-and-cover tunnel, and the U-structure.

5.1.1.1 Alignment 1 (Portals: Under Jimmy Durante Boulevard and Portofino Drive)

Biological Resources and Land Use: The Alignment 1 footprint could affect 22 acres of sensitive vegetation communities, which would be more than any other conceptual alignment. This alignment could also have the second smallest area of existing transportation land uses (13 acres) and the largest area of recreation/open space land uses (20 acres). As a result of the larger area of non-transportation land uses, the alignment would be generally less compatible with existing land uses compared to the other conceptual alignments.

Community Effects: Construction at the north portal (Under Jimmy Durante Boulevard) would require the acquisition of private property for the cut-and-cover and U-structure portion of the alignment. This portal location would also be adjacent to residential properties, and noise and dust abatement measures would be implemented during construction. The existing roadway profile for Jimmy Durante Boulevard would be raised to pass over the cut-and-cover tunnel where the proposed track alignment would intersect with the existing roadway alignment. The proposed roadway design would maintain the existing width of the roadway and access to residential properties. Temporary access to residential properties during construction would be provided to support construction phasing, if necessary.

The Alignment 1 south portal at Portofino Drive would be located on privately owned land but is not expected to displace buildings. Residential properties are located to the west and on the eastern edge of the proposed launch site. Noise and dust abatement measures would be implemented during construction. The existing roadway alignment and profile of Carmel Valley Road would not be permanently affected by the bridge for the proposed rail alignment and would remain intact. Vertical clearance from the track overcrossing would be sufficient. However, bridge construction would result in temporary closures and detours on Carmel Valley Road and Portofino Drive. This portal location would result in more roadway impacts than Alignments 5 and 11 but fewer than Alignments 3 and 9. The majority of construction-related traffic is anticipated to use Carmel Valley Road and Portofino Drive, as these roads would provide the most direct access to the project site. However, Alignment 1 would result in less excavated material and fewer truck trips for material disposal than Alignment 5, 7, and 11.

5.1.1.2 Alignment 3 (Portals: Under Jimmy Durante Boulevard and Torrey Pines Road)

Biological Resources and Land Use: The Alignment 3 footprint could affect 16 acres of sensitive vegetation communities. Alignment 3 could also affect 1 acre of residential land use within and adjacent to the footprint, which could require conversion to a transportation land use. The area of existing recreation/open space land uses could be among the smallest (3 acres) compared to the other conceptual alignments and there could be approximately 27 acres of existing transportation land uses within and adjacent to the footprint, larger than Alignments 1, 5, 7 and 11, thus indicating this alignment could be more compatible with existing land uses.

Community Effects: Construction of the north portal (Under Jimmy Durante Boulevard) would require the acquisition of private property for the cut-and-cover tunnel and U-structure portion of the alignment. This portal location would also be adjacent to residential properties, and noise and dust abatement measures would be implemented during construction. The existing roadway profile for Jimmy Durante Boulevard would be raised to pass over the cut-and-cover tunnel where the proposed track alignment would intersect with the existing roadway alignment. The proposed roadway design would maintain the existing width of the roadway and permanent access to residential properties. Temporary access to residential properties during construction would be provided to support construction phasing, if necessary.

Private property acquisition would also be required to facilitate construction of the south portal site at Torrey Pines Road for Alignment 3, and noise and dust abatement measures would be implemented during construction. The cut-and-cover tunnel of the alignment near the south portal would intersect with Carmel Valley Road, which would need to be decked over, with this decking maintained during portal and tunneling construction. The existing roadway alignment and profile would be maintained. After construction of the cut-and-cover tunnel, the roadway would be restored as a grade-separated crossing over the cut-and-cover tunnel. Temporary access to residential properties during construction would be provided to support construction phasing. Construction of this south portal would be the most impactful to the local road network compared to the Portofino Drive (Alignments 1 and 7) and Knoll Near I-5 (Alignments 5 and 9) south portals. The majority of construction-related traffic is anticipated to use Carmel Valley Road and North Torrey Pines Road, as these roads would provide the most direct access to the project site. Compared to Alignment 3, only Alignment 9 would result in less excavated material and fewer truck trips.

5.1.1.3 Alignment 5 (Portals: Under Jimmy Durante Boulevard and Knoll Near I-5)

Biological Resources and Land Use: The Alignment 5 footprint could affect 15 acres of sensitive vegetation communities, which would be less than any other conceptual alignment. There could be approximately 12 acres of existing transportation land uses within and adjacent to the footprint, smaller than all conceptual alignments except for Alignment 1. In addition, Alignment 5 could have less than 1 acre of residential land use requiring conversion to a transportation land use, and the area of existing recreation/open space land uses is also smaller (12 acres) than that of Alignments 1 and 7. As a result, the alignment would be generally more compatible with existing land uses compared to the other conceptual alignments.

Community Effects: Construction of the north portal (Under Jimmy Durante Boulevard) would require the acquisition of private property for the cut-and-cover tunnel and U-structure portion of the alignment. This portal location would also be adjacent to residential properties, and noise and dust abatement measures would be implemented during construction. The existing roadway profile for Jimmy Durante Boulevard would be raised to pass over the cut-and-cover tunnel where the proposed track alignment would intersect with the existing roadway alignment. The proposed roadway design would maintain the existing width of the roadway and permanent access to residential properties. Temporary access to residential properties during construction would be provided to support construction phasing, if necessary.

The Alignment 5 south portal (Knoll Near I-5) would be located on privately owned land within and adjacent to the Los Peñasquitos Lagoon but is not expected to displace buildings. The portal site does not have residential properties in the immediate vicinity; however, noise and dust abatement measures may be required during construction to protect resources within the lagoon. Old Sorrento Valley Road and the associated bike trail facilities would be affected by the cut-and-cover tunnel for the proposed alignment and would require temporary relocation. Access to residential properties would not be affected during construction. Access to the pump station would be temporarily limited from the south. This south portal would be the least impactful to local roads during construction compared to the other conceptual alignments. The majority of construction-related traffic is anticipated to use Carmel Mountain Road and Sorrento Valley Road, with limited traffic using Carmel Valley Road, as these roads would provide the most direct access to the project site. Compared to the other conceptual alignments, Alignment 5 would result in the second-highest amount of excavated material and truck trips for material disposal, with only Alignment 11 requiring higher volumes and trips.

5.1.1.4 Alignment 7 (Portals: Within Camino Del Mar and Portofino Drive)

Biological Resources and Land Use: The Alignment 7 footprint could affect 19 acres of sensitive vegetation communities, which is the second-largest area compared to all conceptual alignments. There could be approximately 22 acres of existing transportation land uses within and adjacent to the footprint, which could be smaller than Alignments 3 and 9 but larger than Alignments 1 and 5. Alignment 7 could have less than 1 acre of residential land uses; however, the alignment could have the second-largest area of recreation/open space land uses within and adjacent to the footprint. For these reasons, Alignment 7 would generally be less compatible with existing land uses.

Community Effects: Construction at the north portal site (Within Camino Del Mar) would require acquisition of commercial property. Residential land uses would be located to the east, and noise and dust abatement measures would be implemented during construction. Alignment 7 would require reconstruction of the existing Camino Del Mar Bridge and construction of a temporary bridge to divert traffic across the railroad and to accommodate portal and track shoofly construction. Access to private properties along Grand Avenue would be affected by construction activities. Additionally, Jimmy Durante Boulevard and Camino Del Mar would be reconstructed. Compared to the north portal (Under Jimmy Durante Boulevard), this north portal location would be the most impactful to the local roadway network.

The Alignment 7 south portal (Portofino Drive) would be located on privately owned land but is not expected to displace buildings. Residential properties are located to the west and on the eastern edge of the proposed launch site. Noise and dust abatement measures would be implemented during construction. The existing roadway alignment and profile of Carmel Valley Road would not be permanently affected by the bridge for the proposed rail alignment and would remain intact. Vertical clearance from the track overcrossing would be sufficient. However, bridge construction would result in temporary closures and detours on Carmel Valley Road and Portofino Drive. The majority of construction traffic is anticipated to use Carmel Valley Road and Portofino Drive, as these roads would provide the most direct access to the project site. This portal location would result in more roadway impacts than Alignments 5 and 11 but fewer than Alignments 3 and 9. Alignment 7 would result in a smaller amount of excavated material and require fewer truck trips for material disposal than Alignments 5 and 11 but would result in a larger amount of excavated material and truck trips compared to Alignments 1, 3, and 9.

5.1.1.5 Alignment 9 (Portals: Within Camino Del Mar and Torrey Pines Road)

Biological Resources and Land Use: The Alignment 9 footprint could include 16 acres of sensitive vegetation communities, similar to Alignment 3. This alignment would also have the largest area of existing transportation land uses within and adjacent to the footprint, at 37 acres. Alignment 9 could affect approximately 1 acre of residential land use within and adjacent to the footprint, and the area of existing recreation/open space land uses (3 acres) would be among the smallest compared to the other alignments. As a result, the alignment would be generally more compatible with existing land uses compared to the other conceptual alignments.

Community Effects: Construction at the north portal site (Within Camino Del Mar) would require acquisition of commercial property. Residential land uses would be located to the east, and noise and dust abatement measures would be implemented during construction. Alignment 9 would require reconstruction of the existing Camino Del Mar Bridge and construction of a temporary bridge to divert traffic across the railroad and to accommodate portal and track shoofly construction. Access to private properties along Grand Avenue would be affected by construction activities. Additionally, Jimmy Durante Boulevard and Camino Del Mar would be reconstructed. Compared to the north portal (Under Jimmy Durante Boulevard), this north portal location would be the most impactful to the local roadway network.

Private property acquisition would also be required to facilitate construction of the south portal site at Torrey Pines Road for Alignment 9, and noise and dust abatement measures would be implemented during construction. The cut-and-cover section of the alignment near the south portal would intersect with Carmel Valley Road, which would need to be decked over, with this decking maintained during portal and tunneling construction. The existing roadway alignment and profile would be maintained. After construction of the cut-and-cover tunnel, the roadway would be restored as a grade-separated crossing over the cut-and-cover tunnel. Temporary access to residential properties during construction would be provided to support construction phasing. Construction of this south portal would be the most impactful to the local road network compared to the Portofino Drive (Alignments 1 and 7) and Knoll Near I-5 (Alignments 5 and 9) south portals. The majority of construction-related traffic is anticipated to use Carmel Valley Road and North Torrey Pines Road, as these roads would provide the most direct access to the project site. Compared to the other conceptual alignments, Alignment 9 would result in the least amount of excavated material and require the fewest number of truck trips for material disposal.

5.1.1.6 Alignment 11 (Portals: Within Camino Del Mar and Knoll Near I-5)

Biological Resources and Land Use: The Alignment 11 footprint could include 15 acres of sensitive vegetation communities, similar to Alignment 5. There could be approximately 22 acres of existing transportation land uses within and adjacent to the footprint, which could be smaller than Alignments 3 and 9. However, Alignment 11 could have less than 1 acre of residential land uses requiring conversion to a transportation land use and the area of recreation/open space is smaller than that of Alignments 3 and 9. For these reasons, Alignment 11 would generally be compatible with existing land uses.

Community Effects: Construction at the north portal site (Within Camino Del Mar) would require acquisition of commercial property. Residential land uses would be located to the east, and noise and dust abatement measures would be implemented during construction. Alignment 11 would require reconstruction of the existing Camino Del Mar Bridge and construction of a temporary bridge to divert traffic across the railroad and to accommodate portal and track shoofly construction. Access to private properties along Grand Avenue would be affected by construction activities. Additionally, Jimmy Durante and Camino Del Mar would be reconstructed. Compared to the north portal (Under Jimmy Durante Boulevard), this north portal location would be the most impactful to the local roadway network.

The Alignment 11 south portal (Knoll Near I-5) would be located on privately owned land within and adjacent to the Los Peñasquitos Lagoon but is not expected to displace buildings. The portal site does not have residential properties in the immediate vicinity; however, noise and dust abatement measures may be required during construction to protect resources within the lagoon. Old Sorrento Valley Road and the associated bike trail facilities would be affected by the cut-and-cover tunnel for the proposed alignment and would require temporary relocation. Access to residential properties would not be affected during construction. Access to the pump station would be temporarily limited from the south. This south portal would be the least impactful to local roads during construction compared to the other conceptual alignments. The majority of construction-related traffic is anticipated to use Carmel Mountain Road and Sorrento Valley Road, with limited traffic using Carmel Valley Road, as these roads would provide the most direct access to the project site. Alignment 11 would result in the highest amount of excavated material and require the greatest number of truck trips for material disposal compared to the other conceptual alignments.

5.1.2 Constructability and Construction Effects

5.1.2.1 Constructability of Alignment Components

The evaluation in this section considered construction effects associated with the conceptual alignments, including the tunnel, portals, and other infrastructure and structures required to support the alignment, as applicable.

Three potential south portals have been identified. It is assumed that the TBM would be launched from the south portal; therefore, the identification of potential portal locations also considered the footprint and access to and from the site. The portals are as follows:

- **Portofino Drive**: Near the intersection of Carmel Valley Road and Portofino Drive
- **Torrey Pines Road**: Near the intersection of Carmel Valley Road and Camino Del Mar/ N Torrey Pines Road
- **Knoll Near I-5:** At the knoll adjacent to I-5

Two potential north portals have been identified. It is assumed that the TBM would be retrieved from the north portal. The portals are as follows:

- **Under Jimmy Durante Boulevard**: Partially within the hillside just north of the intersection of Jimmy Durante Boulevard and Camino Del Mar
- **Within Camino Del Mar**: Within Camino Del Mar just north of the intersection of Jimmy Durante Boulevard and Camino Del Mar

Alignment 1 (Portals: Under Jimmy Durante Boulevard and Portofino Drive)

Alignment 1 would include a total bored tunnel length of approximately 13,800 feet. Although the bored tunnel length for Alignment 1 is longer than Alignments 3 and 9, Alignment 1 may require fewer subsurface easements from private properties than Alignment 3 as a larger percentage of the tunnel (approximately 41%) is located under public right-of-way or property.

The Alignment 1 north portal (Under Jimmy Durante Boulevard) would be located just north of Jimmy Durante Boulevard and Camino Del Mar. This portal would be partially buried within the hillside, and the cut-and-cover tunnel would extend across Jimmy Durante Boulevard. The site is partially below the 100-year floodplain, and an assessment of weather trends would be required to determine the risk of flooding and whether measures would be required to minimize that risk on construction activities. Abatement measures to minimize the risk of flooding during construction could include the following:

- Installing temporary floodwalls or barriers to prevent flooding from affecting the construction area
- Locating the construction staging site above anticipated flood levels
- Storing vital construction materials at higher elevations, above the identified flood level
- Developing a contingency plan in the event of flooding so that work can be resumed quickly

Additionally, the alignment near the north portal would require abatement measures to protect the alignment during future operation. These measures could include the use of flood gates and/or flood walls.

The south portal for Alignment 1 (Portofino Drive) would be located at the intersection of Portofino Drive and Carmel Valley Road. Two sites have been identified to support the TBM launch: the main site would be 9 acres and located north of Carmel Valley Road, and a satellite site of 2 acres would be located south of Carmel Valley Road. The main site would need significant excavation and regrading to create a usable space for the construction laydown area, and multiple retaining structures would be required to allow for TBM operation. The main site is largely above the 100-year floodplain and is not expected to require abatement measures to prevent flooding. Additionally, due to the elevated structures associated with the alignment near the south portal, there is no significant infrastructure that would need to be protected from flooding and/or sea-level rise during future operation.

Alignment 1 would also require approximately 1,500 feet of bridge within the limits of Los Peñasquitos Lagoon, which is substantially less than the bridge required for Alignments 3 and 9, as summarized in Table 5-1. Alignment 1 would require approximately 7,000 feet of new berm within the lagoon to support the alignment. This length is slightly less than that required for Alignments 3 and 9; however, these alignments only require raising and widening the existing berm. Additionally, under Alignment 1, the existing track embankment in Los Peñasquitos Lagoon would no longer be required for rail operations creating the possibility that approximately 10,000 feet of track embankment within the lagoon could be removed or repurposed for wetland restoration and/or expanded recreational use.

Alignment 3 (Portals: Under Jimmy Durante Boulevard and Torrey Pines Road)

Alignment 3 would include a total bored tunnel length of approximately 9,800 feet. Although the bored tunnel length for Alignment 3 is shorter than all conceptual alignments other than Alignment 9, Alignment 3 may require more subsurface easements from private properties as approximately 94% of the alignment is located under private property.

The Alignment 3 north portal (Under Jimmy Durante Boulevard) would be located just north of Jimmy Durante Boulevard and Camino Del Mar. This portal would be partially buried within the hillside, and the cut-and-cover tunnel would extend across Jimmy Durante Boulevard. The site is partially below the 100-year floodplain, and an assessment of weather trends would be required to determine the risk of flooding and whether measures would be required to minimize that risk on construction activities. Abatement measures to minimize the risk of flooding during construction could include the following:

- Installing temporary floodwalls or barriers to prevent flooding from affecting the construction area
- Locating the construction staging site above anticipated flood levels
- Storing vital construction materials at higher elevations, above the identified flood level
- Developing a contingency plan in the event of flooding so that work can be resumed quickly

Additionally, the alignment near the north portal would require abatement measures to protect the alignment during future operation. These measures could include the use of flood gates and/or flood walls.

The south portal for Alignment 3 (Torrey Pines Road) would be located at the knoll near the intersection of Carmel Valley Road and South Camino Del Mar. Similar to Alignment 1, the site would require significant excavation and regrading to create a usable space. Additionally, a retaining wall approximately 60 feet high would be required to allow the site to be used as a construction laydown area and support construction of the cut-and-cover tunnel. The site, although at less risk to flooding than the Knoll Near I-5 portal, would also be partially below the 100-year floodplain and would require an assessment of weather trends and potentially the implementation of abatement measures during construction, depending on the outcome of the assessment. Abatement measures to minimize the risk of flooding during construction could include the following:

- Installing temporary floodwalls or barriers to prevent flooding from affecting the construction area
- Storing vital construction materials at higher elevations, above the identified flood level

- Developing a contingency plan in the event of flooding so that work can be resumed quickly

Alignment 3, along with Alignment 9, would require the longest length of bridge within the limits of the Los Peñasquitos Lagoon, at 6,100 feet. The bridge would be constructed adjacent to the existing railroad track. The berm segments for Alignment 3, along with Alignment 9, within Los Peñasquitos Lagoon would be approximately 7,200 feet and would be placed adjacent to the existing track alignment and would require a raised elevation to stay above flood levels. This would require a phased approach to maintain rail operations during construction. As such, Alignment 3, along with Alignment 9, would have more complex construction phasing, a potentially larger footprint within the lagoon, and more bridge to be maintained during operation than the other conceptual alignments.

Alignment 5 (Portals: Under Jimmy Durante Boulevard and Knoll Near I-5)

Alignment 5, along with Alignment 11, would include the longest total bored tunnel length, at approximately 16,600 feet. Although 44% of the tunnel would be located under public right-of-way or property, which is greater than the length of Alignments 1, 3, and 9, given the length of the tunnel, Alignment 5 may require more subsurface easements from private properties than the other conceptual alignments.

The Alignment 5 north portal (Under Jimmy Durante Boulevard) would be located just north of Jimmy Durante Boulevard and Camino Del Mar. This portal would be partially buried within the hillside, and the cut-and-cover tunnel would extend across Jimmy Durante Boulevard. The site is partially below the 100-year floodplain, and an assessment of weather trends would be required to determine the risk of flooding and whether measures would be required to minimize the risk on construction activities. Abatement measures to minimize the risk of flooding during construction could include the following:

- Installing temporary flood walls or barriers to prevent flooding from affecting the construction area
- Locating the construction staging site above anticipated flood levels
- Storing vital construction materials at higher elevations, above the identified flood level
- Developing a contingency plan in the event of flooding so that work can be resumed quickly

Additionally, the alignment near the north portal would require abatement measures to protect the alignment during future operation. These measures could include the use of flood gates and/or flood walls.

The south portal for Alignment 5 (Knoll Near I-5) would be located approximately 2,000 feet south of the California Department of Transportation (Caltrans) park-and-ride lot on Carmel Valley Road. Construction at the south portal site would require coordination with Caltrans. Although it is not expected that construction of the cut-and-cover and bored tunnels would have a significant effect on the performance of the I-5 structures, an assessment of the Caltrans structures would be required during later phases of the design.

The site would require excavation and regrading to create a usable space for the construction laydown area to allow for TBM operation. The majority of the construction site would be below the 100-year floodplain and would require an assessment of weather trends to determine the risk of flooding and whether measures would be required to minimize the risk on construction activities. Abatement measures to minimize the risk of flooding during construction could include the following:

- Installing temporary floodwalls or barriers to prevent flooding from affecting the construction area
- Storing vital construction materials at higher elevations, above the identified flood level
- Developing a contingency plan in the event of flooding so that work can be resumed quickly

Additionally, the alignment near the south portal would require abatement measures to protect the alignment during future operation. These measures could include the use of flood gates and/or flood walls.

Alignment 5, along with Alignment 11, would require the shortest length of bridge within the limits of the Los Peñasquitos Lagoon, with a total length of 100 feet and approximately 5,500 feet of berm to support the alignment within the lagoon, shorter than Alignments 1, 3, 7, and 9. As such, Alignment 5, along with Alignment 11, would have less complex construction phasing and substantially less bridge to be maintained during operation than all other conceptual alignments. Additionally, under Alignment 5, the existing track embankment in Los Peñasquitos Lagoon would no longer be required for rail operations. Therefore, approximately 10,000 feet of track embankment within the lagoon could be removed or repurposed for recreational use, which would reduce impacts within the lagoon under Alignment 5 compared to Alignments 3 and 9.

Alignment 7 (Portals: Within Camino Del Mar and Portofino Drive)

Alignment 7 would include a total bored tunnel length of approximately 13,900 feet. Although the bored tunnel length for Alignment 7 is longer compared to other conceptual alignments, Alignment 7 may require fewer subsurface easements from private properties as a larger percentage of the tunnel (approximately 49%) would be located under public right-of-way or property.

The north portal for Alignment 7 (Within Camino Del Mar) would be located just north of Jimmy Durante Boulevard and would be fully within Camino Del Mar. The site would be partially below the 100-year floodplain, and an assessment of weather trends would be required to determine the risk of flooding and whether measures would be required to minimize that risk on construction activities. Abatement measures to minimize the risk of flooding during construction could include the following:

- Installing temporary flood walls or barriers to prevent flooding from affecting the construction area
- Storing vital construction materials at higher elevations, above the identified flood level
- Developing a contingency plan in the event of flooding so that work can be resumed quickly

Additionally, the alignment near the north portal would require abatement measures to protect the alignment during future operation. These measures could include the use of flood gates and/or flood walls. The temporary shoofly would also require construction of a new track bed, which would affect existing parallel drainage features.

The Alignment 7 south portal (Portofino Drive) would be located at the intersection of Portofino Drive and Carmel Valley Road. Two sites have been identified to support the TBM launch: the main site would be 9 acres and located north of Carmel Valley Road, and a satellite site of 2 acres would be located south of Carmel Valley Road. The main site would need significant excavation and regrading to create a usable space for the construction laydown area, and multiple retaining structures would be required to allow for TBM operation. The main site is largely above the 100-year floodplain and is not expected to require abatement measures to prevent against flooding. Additionally, due to the elevated structures associated with the alignment near the north portal, there is no significant infrastructure that would need to be protected from flooding and/or sea-level rise during future operation.

As with Alignment 1, Alignment 7 would also require approximately 1,500 feet of bridge within the limits of Los Peñasquitos Lagoon. Alignment 7 would also require approximately 7,000 feet of berm to support the alignment within the lagoon, which is slightly less than that required for Alignments 3 and 9; however, these alignments only require raising and widening the existing berm. Additionally, under Alignment 7, the existing track embankment in Los Peñasquitos Lagoon would no longer be required for rail operations. Therefore, approximately 10,000 feet of track embankment within the lagoon could be removed or repurposed for recreational use, which would reduce impacts within the lagoon under Alignment 7 compared to Alignments 3 and 9.

Alignment 9 (Portals: Within Camino Del Mar and Torrey Pines Road)

Alignment 9 would include the shortest total bored tunnel length, at approximately 9,500 feet, and may require fewer subsurface easements from private properties than the other conceptual alignments. The north portal for Alignment 9 (Within Camino Del Mar) would be located just north of Jimmy Durante Boulevard and would be fully within Camino Del Mar. The site would be partially below the 100-year floodplain, and an assessment of weather trends would be required to determine the risk of flooding and whether measures would be required to minimize that risk on construction activities. Abatement measures to minimize the risk of flooding during construction could include the following:

- Installing temporary flood walls or barriers to prevent flooding from affecting the construction area
- Storing vital construction materials at higher elevations, above the identified flood level
- Developing a contingency plan in the event of flooding so that work can be resumed quickly

Additionally, the alignment near the north portal would require abatement measures to protect the alignment during future operation. These measures could include the use of flood gates and/or flood walls. The temporary shoofly would also require construction of a new track bed, which would affect existing parallel drainage features.

The south portal for Alignment 9 (Torrey Pines Road) would be located at the knoll near the intersection of Carmel Valley Road and South Camino Del Mar. Similar to Alignment 1, the site would require significant excavation and regrading to create a usable space. Additionally, a retaining wall approximately 60 feet high would be required to allow the site to be used as a construction laydown area and support construction of the cut-and-cover tunnel. The site, although at less risk to flooding than the Knoll Near I-5 portal, would also be partially below the 100-year floodplain and would require an assessment of weather trends and potentially the implementation of abatement measures during construction, depending on the outcome of the assessment. Abatement measures to minimize the risk of flooding during construction could include the following:

- Installing temporary floodwalls or barriers to prevent flooding from affecting the construction area
- Storing vital construction materials at higher elevations, above the identified flood level
- Developing a contingency plan in the event of flooding so that work can be resumed quickly

Alignment 9, along with Alignment 3, would require the longest length of bridge within the limits of the Los Peñasquitos Lagoon, at 6,100 feet. The bridge would be constructed adjacent to the existing railroad track. The berm segments for Alignment 9, similar to Alignment 3, within Los Peñasquitos Lagoon would be approximately 7,200 feet and would be placed adjacent to the existing track alignment and would require a raised elevation to stay above flood levels. This would require a phased approach to maintain rail operations during construction. As such, Alignment 9, along with Alignment 3, would have more complex construction phasing, a potentially larger footprint within the lagoon, and would have more bridge to be maintained during operation than the other conceptual alignments.

Alignment 11 (Portals: Within Camino Del Mar and Knoll Near I-5)

Alignment 11, along with Alignment 5, would include the longest total bored tunnel length of the conceptual alignments, at approximately 16,600 feet. Approximately 46% of the tunnel length would be located under public right-of-way or property, more than all alignments other than Alignment 7, which could decrease the number of subsurface easements required from private properties.

The Alignment 11 north portal (Within Camino Del Mar) would be located just north of Jimmy Durante Boulevard and would be fully within Camino Del Mar. The site would be partially below the 100-year floodplain, and an assessment of weather trends would be required to determine the risk of flooding and whether measures would be required to minimize that risk on construction activities. Abatement measures to minimize the risk of flooding during construction could include the following:

- Installing temporary flood walls or barriers to prevent flooding from affecting the construction area
- Storing vital construction materials at higher elevations, above the identified flood level
- Developing a contingency plan in the event of flooding so that work can be resumed quickly

Additionally, the alignment near the north portal would require abatement measures to protect the alignment during future operation. These measures could include the use of flood gates and/or flood walls. The temporary shoofly would also require construction of a new track bed, which would affect existing parallel drainage features.

The Alignment 11 south portal (Knoll Near I-5) would be located approximately 2,000 feet south of the Caltrans park-and-ride lot on Carmel Valley Road. Construction at the south portal site would require coordination with Caltrans. Although it is not expected that construction of the cut-and-cover and bored tunnels would have a significant effect on the performance of the I-5 structures, an assessment of the Caltrans structures would be required during later phases of the design.

The site would require excavation and regrading to create a usable space for the construction laydown area to allow for TBM operation. The majority of the construction site would be below the 100-year floodplain and would also require an assessment of weather trends to determine the risk of flooding and whether measures would be required to minimize the risk on construction activities. Abatement measures to minimize the risk of flooding during construction could include the following:

- Installing temporary floodwalls or barriers to prevent flooding from affecting the construction area
- Storing vital construction materials at higher elevations, above the identified flood level
- Developing a contingency plan in the event of flooding so that work can be resumed quickly

Additionally, the alignment near the south portal would require abatement measures to protect the alignment during future operation. These measures could include the use of flood gates and/or flood walls.

Alignment 11, along with Alignment 5, would require the shortest length of bridge within the limits of the Los Peñasquitos Lagoon, with a total length of 100 feet and approximately 5,500 feet of berm to support the alignment within the lagoon. As such, Alignment 11, along with Alignment 5, would have less complex construction phasing and substantially less bridge to be maintained during operation than all other conceptual alignments. Additionally, under Alignment 11, the existing track embankment in Los Peñasquitos Lagoon would no longer be required for rail operations. Therefore, approximately 10,000 feet of track embankment within the lagoon could be removed or repurposed for recreational use, which would reduce impacts within the lagoon under Alignment 11 compared to Alignments 3 and 9.

5.1.2.2 Railroad Operational Impacts During Construction

This section provides an overview of the construction activities required to maintain railroad operations during construction to the extent feasible. The summary for each alignment focuses on where the new alignment would tie in with the existing railroad tracks and the measures that may be required to minimize impacts. It is assumed that any shutdown of existing rail service would occur during scheduled “absolute work windows.” An absolute work window is a period of 48 hours during which passenger and rail freight do not operate. The period usually begins after the last scheduled passenger train passes through the construction limits during late Friday evening/early Saturday morning and continues until Sunday evening/early Monday morning.

Alignment 1 (Portals: Under Jimmy Durante Boulevard and Portofino Drive)

North Portal Under Jimmy Durante Boulevard

The following would be required to maintain existing rail operation to the extent feasible during construction of the north portal:

- A temporary single-track shoofly of approximately 3,000 feet would be constructed within the existing railroad right-of-way to support construction of the new alignment, which would temporarily remove double-track operation for a length equivalent to that of the shoofly during construction.
- Temporary control points would be installed to support train operation on the shoofly.
- Design speeds[3] along the shoofly would be approximately 50 mph for passenger trains and 45 mph for freight, similar to current design speeds at this location.
- It is assumed that the future double-track San Dieguito Bridge would be constructed and in operation by the time construction begins on the SDLRR Project. As such, the new alignment would connect to existing service at the end of the future bridge.

South Portal Portofino Drive

The following would be required to maintain existing rail operation to the extent feasible during construction of the south portal:

- A temporary shoofly of approximately 4,000 feet would be constructed to support construction of the new alignment while maintaining single-track operations.
- Temporary control points would be installed to support train operation on the shoofly.
- Design speeds along the shoofly would be approximately 55 mph for passenger trains and 45 mph for freight (compared to design speeds of 60 mph and 50 mph for existing passenger and freight trains, respectively).
- Bridge 247.7 would require phased reconstruction to maintain rail service.

Alignment 3 (Portals: Under Jimmy Durante Boulevard and Torrey Pines Road)

North Portal Under Jimmy Durante Boulevard

The following would be required to maintain existing rail operation to the extent feasible during construction of the north portal:

- A temporary single-track shoofly of approximately 3,000 feet would be constructed within the existing railroad right-of-way to support construction of the new alignment, which would temporarily remove double-track operation for a length equivalent to that of the shoofly during construction.
- Temporary control points would be installed to support train operation on the shoofly.
- Design speeds along the shoofly would be approximately 50 mph for passenger trains and 45 mph for freight, similar to current design speeds at this location.

[3] An operating speed reflects the speed at which a train travels along a segment of track. In comparison, the design speed is used to determine aspects of a segment of an alignment, such as curves, while design of the alignment is underway. The design speed may be higher than the operating speed. Design speeds are compared for purposes of this evaluation, as operating speeds may vary depending on circumstances.

- It is assumed that the future double-track San Dieguito Bridge would be constructed and in operation by the time construction begins on the SDLRR Project. As such, the new alignment would connect to existing service at the end of the future bridge.

South Portal Torrey Pines Road

The following would be required to maintain existing rail operation to the extent feasible during construction of the south portal:

- It is assumed that each track for the new alignment would be constructed in separate phases. The existing rail service would use the first new track when construction of that track is completed while construction continues on the second new track.
- A temporary control point would be required near the Sorrento Valley Station.
- Construction would be phased to limit impacts to Phase 1 of the Los Peñasquitos Lagoon restoration, which would occur west of the existing rail alignment. As such, impacts during construction would be limited to the east side of the existing track alignment.
- Alternatively, a long shoofly track with new embankment could be constructed within the restored lagoon footprint for the length of the alignment within Los Peñasquitos Lagoon.
- Phased construction would be required for two bridges, with a total length of approximately 6,100 feet within Los Peñasquitos Lagoon.
- Bridge 247.7 would require phased reconstruction to maintain rail service.

If construction proceeds as described, the alignment near the south portal would not require a shoofly to maintain existing rail service. However, if construction is not phased as described, a shoofly would be required.

Alignment 5 (Portals: Under Jimmy Durante Boulevard and Knoll Near I-5)

North Portal Under Jimmy Durante Boulevard

The following would be required to maintain existing rail operation to the extent feasible during construction of the north portal:

- A temporary single-track shoofly of approximately 3,000 feet would be constructed within the existing railroad right-of-way to support construction of the new alignment, which would temporarily remove double-track operation for a length equivalent to that of the shoofly during construction.
- Temporary control points would be installed to support train operation on the shoofly.
- Design speeds along the shoofly would be approximately 50 mph for passenger trains and 45 mph for freight, similar to the current design speeds at this location.
- It is assumed that the future double-track San Dieguito Bridge would be constructed and in operation by the time construction begins on the SDLRR Project. As such, the new alignment would connect to existing service at the end of the future bridge.

South Portal Knoll Near I-5

The following would be required to maintain existing rail operation to the extent feasible during construction of the south portal:

- A temporary shoofly of approximately 4,000 feet would be constructed to support construction of the new alignment while maintaining single-track operations.
- Variations of temporary shooflies may be required during construction to support phased construction.
- Alternatively, the temporary shoofly could be located farther west in Los Peñasquitos Lagoon to provide an adequate construction footprint.
- Temporary control points would be installed to support train operation on the shoofly.
- Design speeds along the shoofly would be approximately 55 mph for passenger trains and 45 mph for freight (compared to design speeds of 60 mph and 50 mph for existing passenger and freight trains, respectively), although accommodating these design speeds may require a more restrictive shoofly.
- A temporary shoofly would also be required to support construction of the proposed floodwalls, which would impact the existing track.
- Bridge 247.7 may require phased reconstruction to maintain rail service.

As currently designed, the southern portion of Alignment 5 would cross over the existing tracks. If this alignment advances into the environmental process, other designs should be explored that would eliminate this crossing in order to minimize impacts to existing railroad operation during construction.

Alignment 7 (Portals: Within Camino Del Mar and Portofino Drive)

North Portal Within Camino Del Mar

The following would be required to maintain existing rail operation to the extent feasible during construction of the north portal:

- A temporary single-track shoofly of approximately 3,000 feet would be constructed to support construction of the new alignment, which would temporarily remove double-track operation for a length equivalent to that of the shoofly during construction.
- Temporary control points would be installed to support shoofly operations.
- Design speeds along the shoofly would be approximately 30 mph for passenger trains and 25 mph for freight (compared to design speeds of 55 mph and 45 mph for existing passenger and freight trains, respectively).
- It is assumed that the future double-track San Dieguito Bridge would be constructed and in operation by the time construction begins on the SDLRR Project. As such, the new alignment would connect to existing service at the end of the future bridge.

South Portal Portofino Drive

The following would be required to maintain existing rail operation to the extent feasible during construction of the south portal:

- A temporary shoofly of approximately 4,000 feet would be constructed to support construction of the new alignment while maintaining single-track operations.

- Temporary control points would be installed to support train operation on the shoofly.
- Design speeds along the shoofly would be approximately 55 mph for passenger trains and 45 mph for freight (compared to design speeds of 60 mph and 50 mph for existing passenger and freight trains, respectively).
- Bridge 247.7 would require phased reconstruction to maintain rail service.

Alignment 9 (Portals: Within Camino Del Mar and Torrey Pines Road)

North Portal Within Camino Del Mar

The following would be required to maintain existing rail operation to the extent feasible during construction of the north portal:

- A temporary single-track shoofly of approximately 3,000 feet would be constructed to support construction of the new alignment, which would temporarily remove double-track operation for a length equivalent to that of the shoofly during construction.
- Temporary control points would be installed to support shoofly operations.
- Design speeds along the shoofly would be approximately 30 mph for passenger trains and 25 mph for freight (compared to design speeds of 55 mph and 45 mph for existing passenger and freight trains, respectively).
- It is assumed that the future double-track San Dieguito Bridge would be constructed and in operation by the time construction begins on the SDLRR Project. As such, the new alignment would connect to existing service at the end of the future bridge.

South Portal Torrey Pines Road

The following would be required to maintain existing rail operation to the extent feasible during construction of the south portal:

- It is assumed that each track for the new alignment would be constructed in separate phases. The existing rail service would use the first new track when construction of that track is completed while construction continues on the second new track.
- A temporary control point would be required near the Sorrento Valley Station.
- Construction would be phased to limit impacts to Phase 1 of the Los Peñasquitos Lagoon restoration, which would occur west of the existing rail alignment. As such, impacts during construction would be limited to the east side of the existing track alignment.
- Alternatively, a long shoofly track with new embankment could be constructed within the restored lagoon footprint for the length of the alignment within Los Peñasquitos Lagoon.
- Phased construction would be required for two bridges, with a total length of approximately 6,100 feet, within Los Peñasquitos Lagoon.
- Bridge 247.7 would require phased reconstruction to maintain rail service.

If construction proceeds as described, the alignment near the south portal would not require a shoofly to maintain existing rail service. However, if construction is not phased as described, a shoofly would be required.

Alignment 11 (Portals: Within Camino Del Mar and Knoll Near I-5)

North Portal Within Camino Del Mar

The following would be required to maintain existing rail operation to the extent feasible during construction of the north portal:

- A temporary single-track shoofly of approximately 3,000 feet would be constructed to support construction of the new alignment, which would temporarily remove double-track operation for a length equivalent to that of the shoofly during construction.
- Temporary control points would be installed to support shoofly operations.
- Design speeds along the shoofly would be approximately 30 mph for passenger trains and 25 mph for freight (compared to design speeds of 55 mph and 45 mph for existing passenger and freight trains, respectively).
- It is assumed that the future double-track San Dieguito Bridge would be constructed and in operation by the time construction begins on the SDLRR Project. As such, the new alignment would connect to the existing service at the end of the future bridge.

South Portal Knoll Near I-5

The following would be required to maintain existing rail operation to the extent feasible during construction of the south portal:

- A temporary shoofly of approximately 4,000 feet would be constructed to support construction of the new alignment while maintaining single-track operations.
- Variations of temporary shooflies may be required during construction to support phased construction.
- Alternatively, the temporary shoofly could be located farther west in Los Peñasquitos Lagoon to provide an adequate construction footprint.
- Temporary control points would be installed to support train operation on the shoofly.
- Design speeds along the shoofly would be approximately 55 mph for passenger trains and 45 mph for freight (compared to design speeds of 60 mph and 50 mph for existing passenger and freight trains, respectively), although accommodating these design speeds may require a more restrictive shoofly.
- A temporary shoofly would also be required to support construction of the proposed floodwalls, which would impact the existing track.
- Bridge 247.7 may require phased reconstruction to maintain rail service.

As currently designed, the southern portion of Alignment 11 would cross over the existing tracks. If this alignment advances into the environmental process, other designs should be explored that would eliminate this crossing in order to minimize impacts to existing railroad operation during construction.

5.1.2.3 Utility Conflicts

Each conceptual alignment was reviewed and evaluated for potential conflicts with existing major wet utilities (i.e., water and sewer facilities). Table 5-4 provides a summary of the potential major utility conflicts identified for each alignment. The ability to protect the utility in place or relocate would be determined during later stages of design. However, the information that follows provides context for the activities that could be required during construction.

Table 5-4. Potential Utility Conflicts

Conceptual Alignment No.	Water Facilities	Sewer Facilities	Total
1	3	1	4
3	3	0	3
5	4	1	5
7	3	1	4
9	3	0	3
11	4	1	5

Source: SanGIS 2022

Alignment 1 (Portals: Under Jimmy Durante Boulevard and Portofino Drive)

Alignment 1 could result in potential conflicts with three major water facilities and one major sewer facility. It is expected that potential conflicts with the utilities could be addressed via relocation or protect-in-place construction methods. Therefore, the potential utility conflicts would not result in major impacts to Alignment 1.

Alignment 3 (Portals: Under Jimmy Durante Boulevard and Torrey Pines Road)

Alignment 3 could result in potential conflicts with three major water facilities but no major sewer facilities. It is expected that potential conflicts with the utilities could be addressed via relocation or protect-in-place construction methods. Therefore, the potential utility conflicts would not result in major impacts to Alignment 3.

Alignment 5 (Portals: Under Jimmy Durante Boulevard and Knoll Near I-5)

Alignment 5 could result in potential conflicts with four major water facilities and one major sewer facility. Overall, it is expected that the majority of the potential conflicts could be addressed via relocation or protect-in-place construction methods, with the exception of potential conflicts with a trunk sewer and water main at the south portal location at the Knoll Near I-5. Specifically, the 54-inch Carmel Valley Trunk Sewer and 36-inch Sorrento Valley Water Main, both owned by the City of San Diego, are located south of Carmel Valley Road, west of Sorrento Valley Road in Los Peñasquitos Lagoon, and could conflict with the south portal location. The cut-and-cover tunnel of Alignment 5 would result in potential horizontal and vertical effects on these facilities. Extensive coordination with the City of San Diego Public Utilities Department would be required to address these potential conflicts and identify a solution to address the conflict. Relocation of the trunk sewer and/or water main would be a major undertaking and would add cost and risk to the overall project.

Alignment 7 (Portals: Within Camino Del Mar and Portofino Drive)

Alignment 7 could result in potential conflicts with three major water facilities and one major sewer facility. It is expected that potential conflicts with the utilities could be addressed via relocation or protect-in-place construction methods. Therefore, the potential utility conflicts would not result in major impacts to Alignment 7.

Alignment 9 (Portals: Within Camino Del Mar and Torrey Pines Road)

Alignment 9 could result in potential conflicts with three major water facilities but no major sewer facilities. It is expected that potential conflicts with the utilities identified could be addressed via relocation or protect-in-place construction methods. Therefore, the potential utility conflicts would not result in major impacts to Alignment 9.

Alignment 11 (Portals: Within Camino Del Mar and Knoll Near I-5)

Alignment 11 could result in potential conflicts with four major water facilities and one major sewer facility. As with Alignment 5, it is expected that the majority of the potential conflicts could be addressed via relocation or protect-in-place construction methods, with the exception of potential conflicts with a trunk sewer and water main at the south portal location at the Knoll Near I-5. Specifically, the 54-inch Carmel Valley Trunk Sewer and 36-inch Sorrento Valley Water Main, both owned by the City of San Diego, are located south of Carmel Valley Road, west of Sorrento Valley Road in Los Peñasquitos Lagoon, and could conflict with the south portal location. The cut-and-cover tunnel of Alignment 11 would result in potential horizontal and vertical effects on these facilities. Extensive coordination with the City of San Diego Public Utilities Department would be required to address these potential conflicts and identify a solution to address the conflict. Relocation of the trunk sewer and/or water main would be a major undertaking and would add cost and risk to the overall project.

5.2 Stakeholder and Outreach Alignments

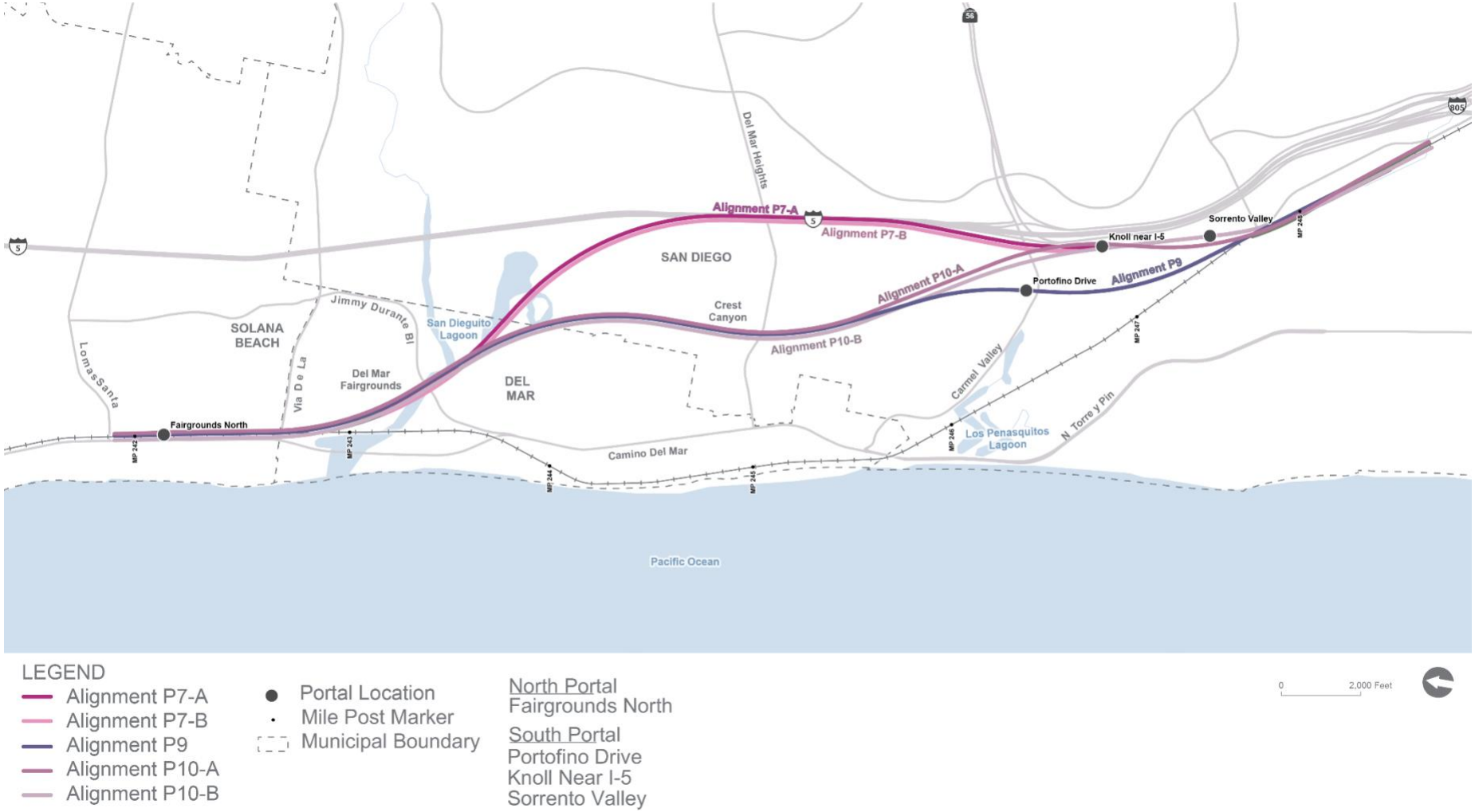
Following the evaluation in Section 4.2, Alignments P7-A, P7-B, P-9, P10-A, and P10-B were advanced for continued evaluation in this report. The alignments as depicted by stakeholders and the public were modified as each alignment was further developed, as illustrated in Figure 5-1. This section summarizes the evaluation of each of these stakeholder and outreach alignments in terms of environmental and other considerations. Table 5-5 provides a comparison of the type and length of the various components for each alignment and the percentage of the tunnel under public right-of-way or property or private property. The alignment components are considered throughout the evaluation of environmental and other considerations in the sections that follow.

Table 5-5. Stakeholder and Outreach Alignments — Summary of Alignments and Components

Stakeholder and Outreach Alignment No.	Bored Tunnel (feet)	U-Structure (feet)	Cut-and-Cover Tunnel (feet)	Bridge (feet)	Floodwall (feet)	Graded (feet)	Total Alignment Length (feet)	% of Tunnel under Public ROW or Property	% of Tunnel under Private Property
P7-A	20,000	2,700	6500	100	900	6,400	35,900	95	5
P7-B	23,400	2,700	6,600	0	200	2,200	35,000	90	10
P-9	16,700	1,300	6,000	1,500	0	7,300	32,800	91	9
P10-A	19,400	3,100	5,900	100	1,100	6,300	35,900	84	16
P10-B	22,600	3,000	6,900	0	400	3,000	35,900	80	20

Notes: The graded length includes the berm. ROW = right-of-way

Figure 5-1. Stakeholder and Outreach Alignments Advanced



5.2.1 Potential Environmental Considerations

This section compares the area of sensitive vegetation communities and the existing land uses within and adjacent to (within 10 feet from) the footprint of each stakeholder and outreach alignment. The section also provides an evaluation of the potential disruption to adjacent communities during construction at launch and retrieval sites, including effects to local roadways, potential acquisitions, noise and dust, and the number of truck trips associated with construction material disposal from excavation of the bored tunnels, cut-and-cover tunnels, and the U-structure. Table 5-6 summarizes the acreages of the sensitive vegetation communities and the existing land use designations within and adjacent to the project footprint for each alignment. Table 5-7 shows an estimate of truck trips required for construction material disposal. The sections that follow present the evaluation of these considerations by stakeholder and outreach alignment.

Table 5-6. Sensitive Vegetation Communities and Existing Land Uses (Permanent)

Conceptual Alignment No.	Biological Resources Sensitive Vegetation Communities (acres)		Land Use (acres)							
	Wetlands	Uplands	Residential	Recreation/ Open Space	Transpor-tation	Public Institution	Industrial	Hotel	Undeveloped	Commercial
P7-A	15	1	<1	17	16	<1	<1	0	0	0
P7-B	1	1	<1	5	19	0	2	0	0	<1
P9	16	3	<1	19	17	0	<1	0	0	0
P10-A	15	1	<1	17	16	<1	<1	0	0	0
P10-B	1	1	<1	5	19	0	2	0	0	<1

Source: SanGIS 2022, AECOM 2023 biological resource surveys

Table 5-7. Approximate Volume of Excavated Material and Truck Trips for Disposal of Construction Material

Stakeholder and Outreach Alignment No.	Total Excavation Volumes (Cubic Yard)	Estimated Truck Trips for Construction Material Disposal
P7-A	5,472,000	547,200
P7-B	5,946,000	594,600
P9	5,342,000	534,200
P10-A	6,190,000	619,000
P10-B	5,360,000	536,000

Note: Estimated Truck Trips only accounts for one-way traffic for disposal of construction material associated with the bored tunnels, cut-and-cover tunnel, and the U-structure.

Alignment P7-A (Portals: Fairgrounds North and Knoll Near I-5)

Biological Resources and Land Use: The Alignment P7-A footprint could affect 16 acres of sensitive vegetation communities, similar to Alignment P10-A. This area is smaller than that of Alignment P9 but larger than the area for Alignments P7-B and P10-B. There could be approximately 16 acres of existing transportation land uses within and adjacent to the footprint, similar to the other stakeholder and outreach alignments. However, the area of existing recreation/open space land uses is larger (17 acres) than that of Alignments P7-B and P10-B. As a result, the alignment could be generally less compatible with existing land uses compared to Alignments P7-B and P10-B.

Community Effects: The alignment would not connect to the planned special events platform at the Del Mar Fairgrounds and would require construction of a new platform. Given the configuration of the alignment, an underground special events platform would be required to maintain passenger rail service to the fairgrounds. The proposed underground platform and adjacent cut-and-cover tunnel would pass through the southwestern corner of the fairgrounds property and affect the fairgrounds during construction. The platform's aboveground plaza features and vertical circulation would have a permanent impact on the fairgrounds property.

Residential properties are not located adjacent to the location where the TBM would be retrieved in the north but are located adjacent to the cut-and-cover tunnel near the north portal. Noise and dust abatement measures may be required during construction. The trench associated with the existing railroad alignment would require widening to accommodate the proposed alignment, which could affect adjacent properties, including the multi-use trail above the trench. Additional access to the trench for construction equipment may be necessary, extending roadway impacts into the Solana Beach community. This construction access is anticipated to affect Via De La Valle, Lomas Santa Fe Drive, and the adjoining South Highway 101 and South Cedros Avenue. A significant detour of Via De La Valle would also be required to replace the current bridge over the trench as it is inadequate to support the proposed tunnel construction. Additionally, significant portions of the fairgrounds' southwest parking lot and access to the surrounding area would have restricted use and would require ongoing coordination with the fairgrounds during construction. Event access to the fairgrounds may also be affected at Jimmy Durante Boulevard and Via De La Valle, as those roadways would be used to provide construction access to the fairgrounds platform site.

The south portal for Alignment P7-A would be located at the Knoll Near I-5, on privately owned land within and adjacent to the Los Peñasquitos Lagoon but is not expected to displace buildings. Residential properties are not located in the immediate vicinity; however, noise and dust abatement measures may be required during construction to protect resources within the lagoon. Old Sorrento Valley Road and associated bike trail facilities would require temporary relocation due to the cut-and-cover tunnel of the alignment. Access to residential properties would not be affected during construction. Access to the pump station would be temporarily limited from the south. Roadway impacts at this location would be minimal compared to the south portal for the other stakeholder and outreach alignments (i.e., Sorrento Valley and Portofino Drive). The majority of construction-related traffic is anticipated to use Carmel Mountain Road and Sorrento Valley Road, with limited traffic using Carmel Valley Road, as these roads would provide the most direct access to the project site. Alignment P7-A would result in a smaller volume of excavated materials and fewer truck trips for disposal than Alignments P7-B and P10-A, but a larger volume and greater number of truck trips compared to Alignments P9 and P10-B.

Alignment P7-B (Portals: Fairgrounds North and Sorrento Valley)

Biological Resources and Land Use: The Alignment P7-B footprint could affect 2 acres of sensitive vegetation communities. Similar to Alignment P10-B, this area is smaller than that of all other stakeholder and outreach alignments. There could be approximately 19 acres of existing transportation land uses within and adjacent to the footprint, similar to the other stakeholder and outreach alignments. The area of existing recreation/open space land uses is smaller (5 acres) than that of Alignments P7-A, P9, and P10-A. As a result, the alignment could be generally more compatible with existing land uses compared to the stakeholder and outreach alignments.

Community Effects: The alignment would not connect to the planned special events platform at the Del Mar Fairgrounds and would require construction of a new platform. Given the configuration of the alignment, an underground special events platform would be required to maintain passenger rail service to the fairgrounds. The proposed underground platform and adjacent cut-and-cover tunnel would pass through the southwestern corner of the fairgrounds property and affect the fairgrounds during construction. The platform's aboveground plaza features and vertical circulation would have a permanent impact on the fairgrounds property.

Residential properties are not located adjacent to the location where the TBM would be retrieved in the north but are located adjacent to the cut-and-cover tunnel near the north portal. Noise and dust abatement measures may be required during construction. The trench associated with the existing railroad alignment would require widening to accommodate the proposed alignment, which could affect adjacent properties, including the multi-use trail above the trench. Additional access to the trench for construction equipment may be necessary, extending roadway impacts into the Solana Beach community. This construction access is anticipated to effect Via De La Valle, Lomas Santa Fe Drive, and the adjoining South Highway 101 and South Cedros Avenue. A significant detour of Via De La Valle would also be required to replace the current bridge over the trench as it is inadequate to support the proposed tunnel construction. Additionally, significant portions of the fairgrounds' southwest parking lot and access to the surrounding area would have restricted use and would require ongoing coordination with the fairgrounds during construction. Event access to the fairgrounds may also be affected at Jimmy Durante Boulevard and Via De La Valle.

The south portal for Alignment P7-B (Sorrento Valley) would be located on privately owned land and public right-of-way within a commercial district. However, the launch site would not be located near residential properties, and it is expected that tunnel and portal construction would be able to continue without substantial noise and dust abatement measures. Tunneling from this site would involve the acquisition of private properties.

The existing roadway alignment and profile of both Sorrento Vally Road and Carmel Mountain Road would be affected by the portal and would require temporary and permanent realignment, both of which would require private property acquisitions. Access to Sorrento Valley Road to the north would also be temporarily removed. As a result, access to the pump station would be from the north only during construction. This south portal location would result in the greatest impact to the local roadway network. The majority of construction-related traffic is anticipated to use Carmel Mountain Road and Sorrento Valley Road, as these roads would provide the most direct access to the project site. Compared to the other stakeholder and outreach alignments, Alignment P7-B would result in the second-largest quantity of excavated materials and number of truck trips for disposal, with only Alignment P10-A requiring a larger quantity of excavated material and number of truck trips.

Alignment P9 (Portals: Fairgrounds North and Portofino Drive)

Biological Resources and Land Use: The Alignment 9 footprint could include 19 acres of sensitive vegetation communities, the largest area compared to the other stakeholder and outreach alignments. This alignment would have a slightly larger area of transportation land uses (17 acres) compared to Alignments P7-A and P1-A but would also have the largest area of recreation/open space land uses (19 acres). As a result, the alignment would generally be less compatible with existing land uses.

Community Effects: The alignment would not connect to the planned special events platform at the Del Mar Fairgrounds and would require construction of a new platform. Given the configuration of the alignment, an underground special events platform would be required to maintain passenger rail service to the fairgrounds. The proposed underground platform and adjacent cut-and-cover tunnel would pass through the southwestern corner of the fairgrounds property and affect the fairgrounds during construction. The platform's aboveground plaza features and vertical circulation would have a permanent impact on the fairgrounds property.

Residential properties are not located adjacent to the location where the TBM would be retrieved in the north but are located adjacent to the cut-and-cover tunnel near the north portal. Noise and dust abatement measures may be required during construction. The trench associated with the existing railroad alignment would require widening to accommodate the proposed alignment, which could impact adjacent properties, including the multi-use trail above the trench. Additional access to the trench for construction equipment may be necessary, extending roadway impacts into the Solana Beach community. This construction access is anticipated to affect Via De La Valle, Lomas Santa Fe Drive, and the adjoining South Highway 101 and South Cedros Avenue. A significant detour of Via De La Valle would also be required to replace the current bridge over the trench as it is inadequate to support the proposed tunnel construction. Additionally, significant portions of the fairgrounds' southwest parking lot and access to the surrounding area would have restricted use and would require ongoing coordination with the fairgrounds during construction. Event access to the fairgrounds may also be affected at Jimmy Durante Boulevard and Via De La Valle.

The Alignment P9 south portal (Portofino Drive) would be located on privately owned land but is not expected to displace buildings. Residential properties are located to the west and on the eastern edge of the proposed launch site. Noise and dust abatement measures would be implemented during construction. The existing roadway alignment and profile for Carmel Valley Road would not be permanently affected by the bridge for the proposed rail alignment and would remain intact. Vertical clearance from the track overcrossing would be sufficient. However, bridge construction would result in temporary closures and detours on Carmel Valley Road and Portofino Drive. The majority of construction traffic is anticipated to use Carmel Valley Road and Portofino Drive, as these roads would provide the most direct access to the project site. This south portal would be more impactful to the roadway network than the south portal proposed for Alignments P7-A and P10-A, but less impactful than the south portal for Alignments P7-B and P10-B. Compared to the other stakeholder and outreach alignments, Alignment P9 would result in the smallest amount of excavated material and would require the fewest number of truck trips for material disposal.

Alignment P10-A (Portals: Fairgrounds North and Knoll Near I-5)

Biological Resources and Land Use: The Alignment P10-A footprint could affect 16 acres of sensitive vegetation communities. This area is smaller than that of Alignment 9 but larger than the area for Alignments P7-B and P10-B. There could be approximately 16 acres of existing transportation land uses within and adjacent to the footprint, similar to the other stakeholder and outreach alignments. However, the area of existing recreation/open space land uses is larger (17 acres) than that of Alignments P7-B and P10-B. As a result, the alignment could be generally less compatible with existing land uses compared to Alignments P7-B and P10-B.

Community Effects: The alignment would not connect to the planned special events platform at the Del Mar Fairgrounds and would require construction of a new platform. Given the configuration of the alignment, an underground special events platform would be required to maintain passenger rail service to the fairgrounds. The proposed underground platform and adjacent cut-and-cover tunnel would pass through the southwestern corner of the fairgrounds property and affect the fairgrounds during construction. The platform's aboveground plaza features and vertical circulation would have a permanent impact on the fairgrounds property.

Residential properties are not located adjacent to the location where the TBM would be retrieved in the north but are located adjacent to the cut-and-cover tunnel near the north portal. Noise and dust abatement measures may be required during construction. The trench associated with the existing railroad alignment would require widening to accommodate the proposed alignment, which could impact adjacent properties, including the multi-use trail above the trench. Additional access to the trench for construction equipment may be necessary, extending roadway impacts into the Solana Beach community. This construction access is anticipated to affect Via De La Valle, Lomas Santa Fe Drive, and the adjoining South Highway 101 and South Cedros Avenue. A significant detour of Via De La Valle would also be required to replace the current bridge over the trench as it is inadequate to support the proposed tunnel construction. Additionally, significant portions of the fairgrounds' southwest parking lot and access to the surrounding area would have restricted use and would require ongoing coordination with the fairgrounds during construction. Event access to the fairgrounds may also be affected at Jimmy Durante Boulevard and Via De La Valle.

The south portal for Alignment P10-A (Knoll Near I-5) would be on land within and adjacent to the Los Peñasquitos Lagoon. Construction at this site would not require acquisition of private property. Residential properties are not located in the immediate vicinity; however, noise and dust abatement measures may be required during construction to protect resources within the lagoon. Similar to Alignment P7-A, Old Sorrento Valley Road and associated bike trail facilities would require temporary relocation due to the cut-and-cover section of the alignment. Access to residential properties would not be affected during construction. Access to the pump station would be temporarily limited from the south. Roadway impacts at this location would be minimal compared to the south portal for the other stakeholder and outreach alignments (i.e., Sorrento Valley and Portofino Drive). The majority of construction-related traffic is anticipated to use Carmel Mountain Road and Sorrento Valley Road, with limited traffic using Carmel Valley Road, as these roads would provide the most direct access to the project site. Compared to the other stakeholder and outreach alignments, Alignment P10-A would result in the largest amount of excavated material and would require the most truck trips for material disposal.

Alignment P10-B (Portals: Fairgrounds North and Sorrento Valley)

Biological Resources and Land Use: The Alignment P10-B footprint could affect 2 acres of sensitive vegetation communities. Similar to Alignment P7-B, this area is smaller than that of all other stakeholder and outreach alignments. There could be approximately 19 acres of existing transportation land uses within and adjacent to the footprint, similar to the other stakeholder and outreach alignments. However, the area of existing recreation/open space land uses is smaller (5 acres) than that of Alignments P7-A, P9, and P10-A. As a result, the alignment could be generally more compatible with existing land uses compared to the other stakeholder and outreach alignments.

Community Effects: The alignment would not connect to the planned special events platform at the Del Mar Fairgrounds and would require construction of a new platform. Given the configuration of the alignment, an underground special events platform would be required to maintain passenger rail service to the fairgrounds. The proposed underground special events platform and adjacent cut-and-cover tunnel would pass through the southwestern corner of the fairgrounds property and affect the fairgrounds during construction. The platform's aboveground plaza features and vertical circulation would have a permanent impact on the fairgrounds property.

Residential properties are not located adjacent to the location where the TBM would be retrieved in the north but are located adjacent to the cut-and-cover tunnel near the north portal. Noise and dust abatement measures may be required during construction. The trench associated with the existing railroad alignment would require widening to accommodate the proposed alignment, which could impact adjacent properties, including the multi-use trail above the trench. Additional access to the trench for construction equipment may be necessary, extending roadway impacts into the Solana Beach community. This construction access is anticipated to affect Via De La Valle, Lomas Santa Fe Drive, and the adjoining South Highway 101 and South Cedros Avenue. A significant detour of Via De La Valle would also be required to replace the current bridge over the trench as it is inadequate to support the proposed tunnel construction. Additionally, significant portions of the fairgrounds' southwest parking lot and access to the surrounding area would have restricted use and would require ongoing coordination with the fairgrounds during construction. Event access to the fairgrounds may also be affected at Jimmy Durante Boulevard and Via De La Valle.

The south portal for Alignment P10-B (Sorrento Valley) would be located on privately owned land and public right-of-way within a commercial district. However, the launch site would not be located near residential properties, and it is expected that tunnel and portal construction would be able to continue without substantial noise and dust abatement measures. Tunneling from this site would involve the acquisition of private properties.

The existing roadway alignment and profile of both Sorrento Valley Road and Carmel Mountain Road would be affected by the portal structures of the proposed alignment and would require temporary and permanent realignment, both of which would require private property acquisitions. Access to Sorrento Valley Road to the north would also be temporarily removed. As a result, access to the pump station would be from the north only during construction. This south portal location would result in the greatest impact to the local roadway network. The majority of construction-related traffic is anticipated to use Carmel Mountain Road and Sorrento Valley Road, as these roads would provide the most direct access to the project site. Alignment P10-B would result in fewer excavated materials and truck trips for disposal than Alignments P7-A, P7-B, and P10-A but more than Alignment P9.

5.2.2 Constructability and Construction Effects

5.2.2.1 Constructability of Alignment Components

Three south portals have been identified for the stakeholder and outreach alignments, with the assumption that the TBM would be launched from the south portal:

- **Portofino Drive**: Near the intersection of Carmel Valley Road and Portofino Drive
- **Knoll Near I-5**: At the knoll adjacent to I-5
- **Sorrento Valley**: Near the intersection of Sorrento Valley Road and Carmel Mountain Road

One potential north portal location has been identified for the stakeholder and outreach alignments; however, it is assumed the TBM would be retrieved from the Del Mar Fairgrounds rather than at the portal:

- **Fairgrounds North**: Within the trench for the existing railroad alignment, north of the state-owned fairgrounds property

Alignment P7-A (Portals: Fairgrounds North and Knoll Near I-5)

Alignment P7-A would include a total bored tunnel length of approximately 20,000 feet. Although the bored tunnel length is longer than Alignments P9 and P10-A, Alignment P7-A may require fewer subsurface easements from private properties as 95% of the alignment would be located under public right-of-way or property.

The Alignment P7-A north portal would be located within the existing railroad alignment trench north of the state-owned fairgrounds property. The alignment would include a new underground special events platform to maintain passenger rail service to the fairgrounds. The platform would be constructed with an open cut from the surface and include permanent aboveground plaza features and vertical circulation providing access to the platform. These features would need to be coordinated with current and future uses of the fairgrounds property. The alignment would also require reconstruction of the Via De La Valle overcrossing, which would need to span over the width of the railroad right-of-way to accommodate construction. The Jimmy Durante Bridge over the San Dieguito River may also require reconstruction due to the bored tunnel alignment.

The platform site would be below the 100-year floodplain and would require an assessment of weather trends to determine the risk of flooding and whether measures would be required to minimize that risk on construction activities. Abatement measures to minimize the risk of flooding during construction could include the following:

- Installing temporary flood walls or barriers to prevent flooding from affecting the construction area
- Storing vital construction materials at higher elevations, above the identified flood level
- Developing a contingency plan in the event of flooding so that work can be resumed quickly

Additionally, the plaza features and vertical circulation associated with the special events platform would require abatement measures to protect the alignment during future operation. These measures could include the use of flood gates and/or flood walls. Stevens Creek would be located within the limits of the cut-and-cover tunnel along the northern portion of the alignment, and additional drainage considerations would be required during later stages of design if this alignment advances for further consideration.

The south portal for Alignment P7-A (Knoll Near I-5) would be located approximately 2,000 feet south of the Caltrans park-and-ride lot on Carmel Valley Road. Construction at the south portal site would require coordination with Caltrans. Although it is not expected that construction of the cut-and-cover and bored tunnels would have a significant effect on the performance of the I-5 structures, an assessment of the Caltrans structures would be required during later phases of the design.

The site would require excavation and regrading to create a usable space for the construction laydown area to allow TBM operation. The majority of the construction site would be below the 100-year floodplain and would also require an assessment of weather trends to determine the risk of flooding and whether measures would be required to minimize the risk on construction activities. Abatement measures to minimize the risk of flooding during construction could include the following:

- Installing temporary floodwalls or barriers to prevent flooding from affecting the construction area
- Storing vital construction materials at higher elevations, above the identified flood level
- Developing a contingency plan in the event of flooding so that work can be resumed quickly

Additionally, the alignment near the south portal would require abatement measures to protect the alignment during future operation. These measures could include the use of flood gates and/or flood walls. The length of flood walls anticipated is approximately 200 feet, which is comparable to Alignments P7-B and P10-B, but less than Alignment P10-A.

Alignment P7-A would require approximately 100 feet of bridge within the limits of Los Peñasquitos Lagoon, less than that required for Alignment P9. Alignment P7-A would also require approximately 5,200 feet of berm to support the alignment within the lagoon. Additionally, the existing track embankment in Los Peñasquitos Lagoon would no longer be required to facilitate rail operations. Therefore, approximately 10,000 feet of track embankment within the lagoon could be removed or repurposed for recreational use, which would reduce the lagoon impact for Alignment P7-A compared to Alignment P9.

This alignment would require demolition or reuse of the future San Dieguito Bridge as the new alignment would not connect to the future bridge. The alignment would require demolition of the planned special events platform at the fairgrounds.

Alignment P7-B (Portals: Fairgrounds North and Sorrento Valley)

Alignment P7-B would include a total bored tunnel length of approximately 23,400 feet. Although the required tunnel length is longer than the other stakeholder and outreach alignments, it may require fewer subsurface easements from private properties as 90% of the alignment would be located under public right-of-way or property.

The Alignment P7-B north portal at the fairgrounds would include a new underground special events platform to maintain passenger rail service to the fairgrounds. The platform would be constructed with an open cut from the surface and include permanent aboveground plaza features and vertical circulation providing access to the platform. These features would need to be coordinated with current and future uses of the fairgrounds property. The alignment would also require reconstruction of the Via De La Valle overcrossing, which would need to span over the width of the railroad right-of-way to accommodate construction. The Jimmy Durante Bridge over the San Dieguito River may also require reconstruction due to the bored tunnel alignment.

The platform site would be below the 100-year floodplain and would require an assessment of weather trends to determine the risk of flooding and whether measures would be required to minimize that risk on construction activities. Abatement measures to minimize the risk of flooding during construction could include the following:

- Installing temporary flood walls or barriers to prevent flooding from affecting the construction area
- Storing vital construction materials at higher elevations, above the identified flood level
- Developing a contingency plan in the event of flooding so that work can be resumed quickly

Additionally, the plaza features and vertical circulation associated with the special events platform would require abatement measures to protect the alignment during future operation. These measures could include the use of flood gates and/or flood walls. Stevens Creek would be located within the limits of the cut-and-cover tunnel along the northern portion of the alignment, and additional drainage considerations would be required during later stages of design if this alignment advances for further consideration.

The south portal for Alignment P7-B (Sorrento Valley) would be located at the intersection of Sorrento Valley Road and Carmel Mountain Road. The site would need excavation and regrading to create a usable space for the construction laydown area to allow for TBM operation. The portal location would impact existing drainage in an area with known flooding issues and would require consideration of options to convey drainage under or around the proposed alignment. Additionally, the alignment would travel through the existing intersection of Sorrento Valley Road and Carmel Mountain Road, both of which would require reconstruction. The site is largely above the 100-year floodplain; however, flood-abatement measures may be required when reconstructing the roadway. Additionally, the alignment near the south portal would require abatement measures to protect the alignment during future operation. These measures could include the use of flood gates and/or flood walls. The length of flood walls is anticipated to be approximately 200 feet, which is comparable to Alignments P7-A and P10-B, but less than Alignment P10-A.

Alignment P7-B would not require any bridge in Los Peñasquitos Lagoon. The alignment would also include approximately 1,400 feet of berm to support the alignment within the lagoon. These impacts are comparable to Alignment P10-B and less than Alignments P7-A, P9, and P10-A. Additionally, the existing track embankment in Los Peñasquitos Lagoon would no longer be required to facilitate rail operations. Therefore, approximately 10,000 feet of track embankment within the lagoon could be removed or repurposed for recreational use.

Alignment P9 (Portals: Fairgrounds North and Portofino Drive)

Alignment P9 would include a total bored tunnel length of approximately 16,700 feet. The tunnel length for Alignment P9 would be shorter than all other stakeholder and outreach alignments. The alignment may also require fewer subsurface easements from private properties as 91% of the alignment would be located under public right-of-way or property.

The Alignment P9 north portal at the fairgrounds would include a new underground special events platform to maintain passenger rail service to the fairgrounds. The platform would be constructed with an open cut from the surface and include permanent aboveground plaza features and vertical circulation providing access to the platform. These features would need to be coordinated with current and future uses of the fairgrounds property. The alignment would also require reconstruction of the Via De La Valle overcrossing, which would need to span over the width of the railroad right-of-way to accommodate construction. The Jimmy Durante Bridge over the San Dieguito River may also require reconstruction due to the bored tunnel alignment.

The platform site would be below the 100-year floodplain and would require an assessment of weather trends to determine the risk of flooding and whether measures would be required to minimize that risk on construction activities. Abatement measures to minimize the risk of flooding during construction could include the following:

- Installing temporary flood walls or barriers to prevent flooding from affecting the construction area
- Storing vital construction materials at higher elevations, above the identified flood level
- Developing a contingency plan in the event of flooding so that work can be resumed quickly

Additionally, the plaza features and vertical circulation associated with the special events platform would require abatement measures to protect the alignment during future operation. These measures could include the use of flood gates and/or flood walls. Stevens Creek would be located within the limits of the cut-and-cover tunnel along the northern portion of the alignment, and additional drainage considerations would be required during later stages of design if this alignment advances for further consideration.

The Alignment P9 south portal (Portofino Drive) would be located at the intersection of Portofino Drive and Carmel Valley Road. Two sites have been identified to support the TBM launch: the main site would be 9 acres and located north of Carmel Valley Road, and a satellite site of 2 acres would be located south of Carmel Valley Road. The main site would need significant excavation and regrading to create a usable space for the construction laydown area, and multiple retaining structures would be required to allow for TBM operation. The main site is largely above the 100-year floodplain and is not expected to require abatement measures to prevent against flooding. Additionally, due to the elevated structures associated with the alignment near the north portal, there is no significant infrastructure that would need to be protected from flooding and/or sea-level rise during future operation.

Alignment P9 would also require approximately 1,500 feet of bridge within the limits of Los Peñasquitos Lagoon. This bridge length would be greater than all other stakeholder and outreach alignments. Additionally, the alignment would include approximately 6,600 feet of berm to support the alignment within the lagoon. As such, Alignment P9 would require more complex construction phasing and a larger footprint within the lagoon compared to Alignments P7-A, P7-B, P10-A, and P10-B.

Alignment P10-A (Portals: Fairgrounds North and Knoll Near I-5)

Alignment P10-A would include a total bored tunnel length of approximately 19,400 feet. This tunnel length is shorter than all stakeholder and outreach alignments other than Alignment P9; however, the alignment would have a smaller percentage of alignment under public right-of-way or property (84%) than all stakeholder and outreach alignments.

The Alignment P10-A north portal at the fairgrounds would include a new underground special events platform to maintain passenger rail service to the fairgrounds. The platform would be constructed with an open cut from the surface and include permanent aboveground plaza features and vertical circulation providing access to the platform. These features would need to be coordinated with current and future uses of the fairgrounds property. The alignment would also require reconstruction of the Via De La Valle overcrossing, which would need to span over the width of the railroad right-of-way to accommodate construction. The Jimmy Durante Bridge over the San Dieguito River may also require reconstruction due to the bored tunnel alignment.

The platform site would be below the 100-year floodplain and would require an assessment of weather trends to determine the risk of flooding and whether measures would be required to minimize that risk on construction activities. Abatement measures to minimize the risk of flooding during construction could include the following:

- Installing temporary flood walls or barriers to prevent flooding from affecting the construction area
- Storing vital construction materials at higher elevations, above the identified flood level
- Developing a contingency plan in the event of flooding so that work can be resumed quickly

Additionally, the plaza features and vertical circulation associated with the special events platform would require abatement measures to protect the alignment during future operation. These measures could include the use of flood gates and/or flood walls. Stevens Creek would be located within the limits of the cut-and-cover tunnel along the northern portion of the alignment, and additional drainage considerations would be required during later stages of design if this alignment advances for further consideration.

The south portal for Alignment P10-A (Knoll Near I-5) would be located approximately 2,000 feet south of the Caltrans park-and-ride lot on Carmel Valley Road. Construction at the south portal site would require coordination with Caltrans. Although it is not expected that construction of the cut-and-cover and bored tunnels would have a significant effect on the performance of the I-5 structures, an assessment of the Caltrans structures would be required during later phases of the design.

The site would require excavation and regrading to create a usable space for the construction laydown area to allow for TBM operation.

The majority of the construction site would be below the 100-year floodplain and would also require an assessment of weather trends to determine the risk of flooding and whether measures would be required to minimize the risk on construction activities. Abatement measures to minimize the risk of flooding during construction could include the following:

- Installing temporary floodwalls or barriers to prevent flooding from affecting the construction area
- Storing vital construction materials at higher elevations, above the identified flood level
- Developing a contingency plan in the event of flooding so that work can be resumed quickly

Additionally, the alignment near the south portal would require abatement measures to protect the alignment during future operation. These measures could include the use of flood gates and/or flood walls. The length of flood walls is anticipated to be approximately 1,000 feet, which is longer than all other stakeholder and outreach alignments.

Alignment P10-A would require approximately 100 feet of bridge within the limits of Los Peñasquitos Lagoon. This alignment would also include approximately 5,500 feet of berm to support the alignment within the lagoon. Similar to Alignment P7-A, the length of bridge would be less than that required for Alignment P9. Additionally, the existing track embankment in Los Peñasquitos Lagoon would no longer be required to facilitate rail operations. Therefore, approximately 10,000 feet of track embankment within the lagoon could be removed or repurposed for recreational use, which would reduce the lagoon impact for Alignment P10-A compared to Alignment P9.

Alignment P10-B (Portals: Fairgrounds North and Sorrento Valley)

Alignment P10-B would include a total bored tunnel length of approximately 22,600 feet. Compared to the stakeholder and outreach alignments, this tunnel length is the second longest, and has the smallest percentage of the tunnel located under public right-of-way or property (80%). As such, Alignment P10-B may require more subsurface easements from private properties.

The Alignment P10-B north portal at the fairgrounds would include a new underground special events platform to maintain passenger rail service to the fairgrounds. The platform would be constructed with an open cut from the surface and include permanent aboveground plaza features and vertical circulation providing access to the platform. These features would need to be coordinated with current and future uses of the fairgrounds property. The alignment would also require reconstruction of the Via De La Valle overcrossing, which would need to span over the width of the railroad right-of-way to accommodate construction. The Jimmy Durante Bridge over the San Dieguito River may also require reconstruction due to the bored tunnel alignment.

The platform site would be below the 100-year floodplain and would require an assessment of weather trends to determine the risk of flooding and whether measures would be required to minimize that risk on construction activities. Abatement measures to minimize the risk of flooding during construction could include the following:

- Installing temporary flood walls or barriers to prevent flooding from affecting the construction area
- Storing vital construction materials at higher elevations, above the identified flood level
- Developing a contingency plan in the event of flooding so that work can be resumed quickly

Additionally, the plaza features and vertical circulation associated with the special events platform would require abatement measures to protect the alignment during future operation. These measures could include the use of flood gates and/or flood walls. Stevens Creek would be located within the limits of the cut-and-cover tunnel along the northern portion of the alignment, and additional drainage considerations would be required during later stages of design if this alignment advances for further consideration.

The south portal for Alignment P10-B (Sorrento Valley) would be located at the intersection of Sorrento Valley Road and Carmel Mountain Road. The site would need excavation and regrading to create a usable space for the construction laydown area to allow for TBM operation. The portal location would impact an existing drainage in an area with known flooding issues and would require consideration of options to convey drainage under or around the proposed alignment. Additionally, the alignment would travel through the existing intersection of Sorrento Valley Road and Carmel Mountain Road, both of which would require reconstruction. The site is largely above the 100-year floodplain; however, flood-abatement measures may be required when reconstructing the roadway. Additionally, the alignment near the south portal would require abatement measures to protect the alignment during future operation. These measures could include the use of flood gates and/or flood walls. The length of flood walls is anticipated to be approximately 400 feet, which is comparable to Alignments P7-A and P7-B, but less than Alignment P10-A.

Alignment P10-B would not require any bridge in Los Peñasquitos Lagoon. The alignment would also have limited impacts within the lagoon that would include approximately 2,200 feet of berm to support the alignment. These impacts are comparable to Alignment P7-B and less than Alignments P7-A, P9, and P10-A. Additionally, the existing track embankment in Los Peñasquitos Lagoon would no longer be required to facilitate rail operations. Therefore, approximately 10,000 feet of track embankment within the lagoon could be removed or repurposed for recreational use.

5.2.2.2 Railroad Operational Impacts during Construction

Alignment P7-A (Portals: Fairgrounds North and Knoll Near I-5)

North Portal Fairgrounds North

The following would be required to maintain existing rail operation to the extent feasible during construction of the north portal:

- A temporary single-track shoofly of approximately 6,000 feet would be constructed to support construction of the new alignment, which would temporarily remove double-track operation for a length equivalent to that of the shoofly during construction. The shoofly would be located within the widened trench with a new retaining wall to support its location.
- A temporary control point would be constructed within the existing trench for the railroad alignment.

- Design speeds[4] along the shoofly would be approximately 60 mph for passenger trains and 40 mph for freight (compared to planned design speeds of 90 mph and 60 mph for passenger and freight trains, respectively).
- Construction of the cut-and-cover tunnel within the existing railroad trench would require working adjacent to an operating rail line, with minimal clearances, until the tunnel alignment transitions into the fairgrounds. This would constrain construction activities and lengthen the construction duration. Passenger and freight trains operating on the shoofly in this location may be required to operate at slower speeds to maintain safety.

The double-track segment from Solana Beach Station to Control Point (CP) Del Mar that will be constructed with the San Dieguito Double Track Project would be reduced to single-track operations to provide the construction footprint needed. The limits of single-track operations to support this alignment are assumed to start at the new control point noted above and terminate at the proposed temporary control point just north of the Sorrento Valley Station. The frequency of railroad operations that may occur during the construction phase is currently unknown; therefore, a further evaluation would be necessary in future phases of project development to address potential issues with the length of single-track operations anticipated under this alignment if it advances for further consideration.

South Portal Knoll Near I-5

The following would be required to maintain existing rail operation to the extent feasible during construction of the south portal:

- A temporary shoofly of approximately 4,000 feet would be constructed to support construction of the new alignment while maintaining single-track operations.
- Variations of temporary shooflies may be required during construction to support phased construction.
- Alternatively, the temporary shoofly could be located farther west in Los Peñasquitos Lagoon to provide an adequate construction footprint.
- Temporary control points would be installed to support train operation on the shoofly.
- Design speeds along the shoofly would be approximately 55 mph for passenger trains and 45 mph for freight (compared to design speeds of 60 mph and 50 mph for existing passenger and freight trains, respectively), although accommodating these design speeds may require a more restrictive shoofly.
- A temporary shoofly would be required to support construction of the proposed floodwalls, which would impact the existing track.
- Bridge 247.7 may require phased reconstruction to maintain rail service.

[4] An operating speed reflects the speed at which a train travels along a segment of track. In comparison, the design speed is used to determine aspects of a segment of an alignment, such as curves, while design of the alignment is underway. The design speed may be higher than the operating speed. Design speeds are compared for purposes of this evaluation as operating speeds may vary depending on circumstances.

Alignment P7-B (Portals: Fairgrounds North and Sorrento Valley)

North Portal Fairgrounds North

The following would be required to maintain existing rail operation to the extent feasible during construction of the north portal:

- A temporary single-track shoofly of approximately 6,000 feet would be constructed to support construction of the new alignment, which would temporarily remove double-track operation for a length equivalent to that of the shoofly during construction. The shoofly would be located within the widened trench with a new retaining wall to support its location.
- A temporary control point would be constructed within the existing trench for the railroad alignment.
- Design speeds along the shoofly would be approximately 60 mph for passenger trains and 40 mph for freight (compared to planned design speeds of 90 mph and 60 mph for passenger and freight trains, respectively).
- Construction of the cut-and-cover tunnel within the existing railroad trench would require working adjacent to an operating rail line, with minimal clearances, until the tunnel alignment transitions into the fairgrounds. This would constrain construction activities and lengthen the construction duration. Passenger and freight trains operating on the shoofly in this location may also be required to operate at slower speeds to maintain safety.

The double-track segment from Solana Beach Station to CP Del Mar that will be constructed with the San Dieguito Double Track Project would be reduced to single-track operations to provide the construction footprint needed. The limits of single-track operations to support this alignment are assumed to start at the new control point noted above and terminate at the proposed temporary control point just north of the Sorrento Valley Station. The frequency of railroad operations that may occur during the construction phase is currently unknown; therefore, a further evaluation would be necessary in future phases of project development to address potential issues with the length of single-track operations anticipated under this alignment if it advances for further consideration.

South Portal Sorrento Valley

The following would be required to maintain existing rail operation to the extent feasible during construction of the south portal:

- A temporary shoofly of approximately 3,000 feet would be constructed to support construction of the new alignment while maintaining single-track operations.
- A temporary control point would be constructed.
- Design speeds along the shoofly would be approximately 55 mph for passenger trains and 45 mph for freight (compared to design speeds of 60 mph and 50 mph for existing passenger and freight trains, respectively).

Alignment P9 (Portals: Fairgrounds North and Portofino Drive)

North Portal Fairgrounds North

The following would be required to maintain existing rail operation to the extent feasible during construction of the north portal:

- A temporary single-track shoofly of approximately 6,000 feet would be constructed to support construction of the new alignment, which would temporarily remove double-track operation for a length equivalent to that of the shoofly during construction. The shoofly would be located within the widened trench with a new retaining wall to support its location.
- A temporary control point would be constructed within the existing trench for the railroad alignment.
- Design speeds along the shoofly would be approximately 60 mph for passenger trains and 40 mph for freight (compared to planned design speeds of 90 mph and 60 mph for passenger and freight trains, respectively).
- Construction of the cut-and-cover tunnel within the existing railroad trench would require working adjacent to an operating rail line, with minimal clearances, until the tunnel alignment transitions into the fairgrounds. This would constrain construction activities and lengthen the construction duration. Passenger and freight trains operating on the shoofly in this location may also be required to operate at slower speeds to maintain safety.

The double-track segment from Solana Beach Station to CP Del Mar that will be constructed with the San Dieguito Double Track Project would be reduced to single-track operations to provide the construction footprint needed. The limits of single-track operations to support this alignment are assumed to start at the new control point noted above and terminate at the proposed temporary control point just north of the Sorrento Valley Station. The frequency of railroad operations that may occur during the construction phase is currently unknown; therefore, a further evaluation would be necessary in future phases of project development to address potential issues with the length of single-track operations anticipated under this alignment if it advances for further consideration.

South Portal Portofino

The following would be required to maintain existing rail operation to the extent feasible during construction of the south portal:

- A temporary shoofly of approximately 4,000 feet would be constructed to support construction of the new alignment while maintaining single-track operations.
- Temporary control points would be installed to support train operation on the shoofly.
- Design speeds along the shoofly would be approximately 55 mph for passenger trains and 45 mph for freight (compared to design speeds of 60 mph and 50 mph for existing passenger and freight trains, respectively).
- Bridge 247.7 would require phased reconstruction to maintain rail service.

Alignment P10-A (Portals: Fairgrounds North and Knoll Near I-5)

North Portal Fairgrounds North

The following would be required to maintain existing rail operation to the extent feasible during construction of the north portal:

- A temporary single-track shoofly of approximately 6,000 feet would be constructed to support construction of the new alignment, which would temporarily remove double-track operation for a length equivalent to that of the shoofly during construction. The shoofly would be located within the widened trench with a new retaining wall to support its location.
- A temporary control point would be constructed within the existing trench for the railroad alignment.
- Design speeds along the shoofly would be approximately 60 mph for passenger trains and 40 mph for freight (compared to planned design speeds of 90 mph and 60 mph for passenger and freight trains, respectively).
- Construction of the cut-and-cover tunnel within the existing railroad trench would require working adjacent to an operating rail line, with minimal clearances, until the tunnel alignment transitions into the fairgrounds. This would constrain construction activities and lengthen the construction duration. Passenger and freight trains operating on the shoofly in this location may also be required to operate at slower speeds to maintain safety.

The double-track segment from Solana Beach Station to CP Del Mar that will be constructed with the San Dieguito Double Track Project would be reduced to single-track operations to provide the construction footprint needed. The limits of single-track operations to support this alignment are assumed to start at the new control point noted above and terminate at the proposed temporary control point just north of the Sorrento Valley Station. The frequency of railroad operations that may occur during the construction phase is currently unknown; therefore, a further evaluation would be necessary in future phases of project development to address potential issues with the length of single-track operations anticipated under this alignment if it advances for further consideration.

South Portal Knoll Near I-5

The following would be required to maintain existing rail operation to the extent feasible during construction of the south portal:

- A temporary shoofly of approximately 4,000 feet would be constructed to support construction of the new alignment while maintaining single-track operations.
- Variations of temporary shooflies may be required during construction to support phased construction.
- Alternatively, the temporary shoofly could be located farther west in Los Peñasquitos Lagoon to provide an adequate construction footprint.
- Temporary control points would be installed to support train operation on the shoofly.
- Design speeds along the shoofly would be approximately 55 mph for passenger trains and 45 mph for freight (compared to design speeds of 60 mph and 50 mph for existing passenger and freight trains, respectively), although accommodating these design speeds may require a more restrictive shoofly.

- A temporary shoofly would also be required to support construction of the proposed floodwalls, which would impact the existing track.
- Bridge 247.7 may require phased reconstruction to maintain rail service.

Alignment P10-B (Portals: Fairgrounds North and Sorrento Valley)

North Portal Fairgrounds North

The following would be required to maintain existing rail operation to the extent feasible during construction of the north portal:

- A temporary single-track shoofly of approximately 6,000 feet would be constructed to support construction of the new alignment, which would temporarily remove double-track operation for a length equivalent to that of the shoofly during construction. The shoofly would be located within the widened trench with a new retaining wall to support its location.
- A temporary control point would be constructed within the existing trench for the railroad alignment.
- Design speeds along the shoofly would be approximately 60 mph for passenger trains and 40 mph for freight (compared to planned design speeds of 90 mph and 60 mph for existing passenger and freight trains, respectively).
- Construction of the cut-and-cover tunnel within the existing railroad trench would require working adjacent to an operating rail line, with minimal clearances, until the tunnel alignment transitions into the fairgrounds. This would constrain construction activities and lengthen the construction duration. Passenger and freight trains operating on the shoofly in this location may also be required to operate at slower speeds to maintain safety.

The double-track segment from Solana Beach Station to CP Del Mar that will be constructed with the San Dieguito Double Track Project would be reduced to single-track operations to provide the construction footprint needed. The limits of single-track operations to support this alignment are assumed to start at the new control point noted above and terminate at the proposed temporary control point just north of the Sorrento Valley Station. The frequency of railroad operations that may occur during the construction phase is currently unknown; therefore, a further evaluation would be necessary in future phases of project development to address potential issues with the length of single-track operations anticipated under this alignment if it advances for further consideration.

South Portal Sorrento Valley

The following would be required to maintain existing rail operation to the extent feasible during construction of the south portal:

- A temporary shoofly of approximately 3,000 feet would be constructed to support construction of the new alignment while maintaining single-track operations.
- A temporary control point would be constructed.
- Design speeds along the shoofly would be approximately 55 mph for passenger trains and 45 mph for freight (compared to design speeds of 60 mph and 50 mph for existing passenger and freight trains, respectively).

5.2.2.3 Utility Conflicts

Each stakeholder and outreach alignment was reviewed and evaluated for potential conflicts with existing major wet utilities. Table 5-8 provides a summary of potential major utility conflicts identified for each alignment. The ability to protect the utility in place or relocate would be determined during later stages of design. However, the information that follows provides context for the activities that could be required during construction.

Table 5-8. Potential Utility Conflicts

Stakeholder and Outreach Alignment No.	Water Facilities	Sewer Facilities	Total
P7-A	3	2	5
P7-B	5	3	8
P9	3	2	5
P10-A	3	2	5
P10-B	5	3	8

Source: SanGIS 2022

Alignment P7-A (Portals: Fairgrounds North and Knoll Near I-5)

Alignment P7-A could result in potential conflicts with three major water facilities and two major sewer facilities. Overall, it is expected that the majority of the potential conflicts could be addressed via relocation or protect-in-place construction methods, with the exception of potential conflicts with a trunk sewer and water main at the south portal location at the Knoll Near I-5. Specifically, the 54-inch Carmel Valley Trunk Sewer and 36-inch Sorrento Valley Water Main, both owned by the City of San Diego, are located south of Carmel Valley Road, west of Sorrento Valley Road in Los Peñasquitos Lagoon, and could conflict with the south portal location. The cut-and-cover tunnel of Alignment P7-A would result in potential horizontal and vertical effects on these facilities. Extensive coordination with the City of San Diego Public Utilities Department would be required to address these potential conflicts and identify a solution to address the conflict. Relocation of the trunk sewer and/or water main would be a major undertaking and would add cost and risk to the overall project.

Alignment P7-B (Portals: Fairgrounds North and Sorrento Valley)

Alignment P7-B could result in potential conflicts with five major water facilities and three major sewer facilities. It is expected that potential conflicts with the utilities identified could be addressed via relocation or protect-in-place construction methods. Therefore, the potential utility conflicts would not result in major impacts to Alignment P7-B.

Alignment P9 (Portals: Fairgrounds North and Portofino Drive)

Alignment P9 could result in potential conflicts with three major water facilities and two major sewer facilities. It is expected that potential conflicts with the utilities identified could be addressed via relocation or protect-in-place construction methods. Therefore, the potential utility conflicts would not result in major impacts to Alignment P9.

Alignment P10-A (Portals: Fairgrounds North and Knoll Near I-5)

Alignment P10-A could result in potential conflicts with three major water facilities and two major sewer facilities. As with Alignment P7-A, it is expected that the majority of the potential conflicts identified could be addressed via relocation or protect-in-place construction methods, with the exception of potential conflicts with a trunk sewer and water main at the south portal location at the Knoll Near I-5. Specifically, the 54-inch Carmel Valley Trunk Sewer and 36-inch Sorrento Valley Water Main, both owned by the City of San Diego, are located south of Carmel Valley Road, west of Sorrento Valley Road in Los Peñasquitos Lagoon, and could conflict with the south portal location. The cut-and-cover tunnel of Alignment P10-A would result in potential horizontal and vertical effects on these facilities. Extensive coordination with the City of San Diego Public Utilities Department would be required to address these potential conflicts and identify a solution to address the conflict. Relocation of the trunk sewer and/or water main would be a major undertaking and would add cost and risk to the overall project.

Alignment P10-B (Portals: Fairgrounds North and Sorrento Valley)

Alignment P10-B could result in potential conflicts with five major water facilities and three major sewer facilities. It is expected that potential conflicts with the utilities identified could be addressed via relocation or protect-in-place construction methods. Therefore, the potential utility conflicts would not result in major impacts to Alignment P10-B.

6 Comparison of Alignments and Recommendations

Pursuant to CEQA Guidelines §15126.6, the SDLRR Draft EIR will consider a No Project Alternative and a reasonable range of project alternatives. This section summarizes the analysis of the 12 conceptual alignments and 14 stakeholder and outreach alignments considered for the identification of the project alternatives in the Draft EIR. Each conceptual alignment and stakeholder and outreach alignment was evaluated using the screening criteria discussed in Section 3 and the evaluations presented in Sections 4 and 5. This section provides an overview of the outcomes of the evaluation.

6.1 Project Objectives and Engineering Feasibility

The conceptual alignments and stakeholder and outreach alignments were assessed based on their ability to meet the project objectives and engineering feasibility described in Section 3.1. Each of the conceptual alignments was prepared for an alternatives analysis and was designed specifically to meet the project objectives and design feasibility criteria. Although all conceptual alignments met project objectives and engineering feasibility, **all single-bore alignments were removed from consideration**, as described in the introduction to Section 4. Specifically, in consideration of the increased complexity and community effects associated with the single-bore tunnel, Alignments 2, 4, 6, 8, 10, and 12 were removed from consideration in favor of the similar twin-bore alignments (Alignments 1, 3, 5, 7, 9, and 11). Similarly, single bore was not considered for any of the stakeholder and outreach alignments. Section 4.2 details the assessment of each stakeholder and outreach alignment's ability to meet the project objectives and engineering feasibility. Based on this evaluation, and as summarized in Table 6-1, Alignments P7-A, P7-B, P9, P10-A, and P10-B were advanced for further evaluation. The remaining stakeholder and outreach alignments did not meet the majority of the project objectives or engineering feasibility and were removed from consideration.

Table 6-1. Project Objectives and Engineering Feasibility Summary

Alignment No.	Description of Ability to Meet Project Objectives and Engineering Feasibility	Advanced for Further Evaluation
Conceptual Alignments 1-12	All alignments would meet project objectives and engineering feasibility. The single-bore alignments (2, 4, 6, 8, 10, and 12) result in greater impacts and more difficult construction than their dual-bore counterparts and therefore were dropped from further consideration.	Yes Alignments (1, 3, 5, 7, 9, 11)
P1-A	The alignment would meet the project objective to relocate the tracks away from the bluffs but would not meet the objective to maintain passenger service to the Solana Beach Station and would not provide direct access to the Del Mar Fairgrounds. A north portal location was not identified, and sufficient information is not available to evaluate this alignment against the remaining project objectives and engineering feasibility.	No

Alignment No.	Description of Ability to Meet Project Objectives and Engineering Feasibility	Advanced for Further Evaluation
P1-B	The alignment would meet the project objective to relocate the tracks away from the bluffs but would not meet the project objectives to maintain passenger service or to minimize impacts to the surrounding community. A north portal location was not identified, and sufficient information is not available to evaluate this alignment against the remaining project objectives and engineering feasibility.	No
P2	The alignment would be feasible from an engineering standpoint but would only meet one of the six project objectives.	No
P3	The alignment would meet three of the six project objectives and would not meet the required engineering feasibility.	No
P4	The alignment would meet five of the six project objectives and would meet engineering feasibility. The project objective to reduce rail travel times would not be met. Despite meeting the majority of the project objectives and engineering feasibility, this alignment was removed from consideration because it is similar to conceptual Alignment 3, which would meet all of the project objectives and is evaluated in this report.	No
P5	The alignment would be feasible from an engineering standpoint but would only meet two of the six project objectives.	No
P6-A	The alignment would meet three of the six objectives and engineering feasibility. Alignment P6-A would not meet the project objectives to minimize impacts to the surrounding community and preserve biological, cultural, and recreational resources. As depicted by stakeholders and the public, the alignment would not reduce rail travel times. Alignment P6-A is similar to Alignment P7-A, which would meet the objective of reducing travel times and is evaluated in this report.	No
P6-B	The alignment would meet three of the six objectives and engineering feasibility. This alignment would not meet the project objectives to minimize impacts to the surrounding community; preserve biological, cultural, and recreational resources; and reduce rail travel times. Alignment P6-B is similar to Alignment P7-B, which would meet the objective of reducing travel times and is evaluated in this report.	No
P7-A	The alignment would meet four of the six project objectives and would be feasible from an engineering standpoint.	Yes
P7-B	The alignment would meet four of the six project objectives and would be feasible from an engineering standpoint.	Yes
P8	The alignment would meet four of the six project objectives but would not be feasible from an engineering standpoint.	No
P9	The alignment would meet four of the six project objectives and would be feasible from an engineering standpoint.	Yes
P10-A	The alignment would meet four of the six project objectives and would be feasible from an engineering standpoint.	Yes
P10-B	The alignment would meet four of the six project objectives and would be feasible from an engineering standpoint.	Yes

6.2 Environmental and Other Considerations

This section summarizes the evaluation of the following alignments that were advanced for further consideration based on the evaluation of project objectives and engineering feasibility:

- Alignment 1 (Portals: Under Jimmy Durante Boulevard and Portofino Drive)
- Alignment 3 (Portals: Under Jimmy Durante Boulevard and Torrey Pines Road)
- Alignment 5 (Portals: Under Jimmy Durante Boulevard and Knoll Near I-5)
- Alignment 7 (Portals: Within Camino Del Mar and Portofino Drive)
- Alignment 9 (Portals: Within Camino Del Mar and Torrey Pines Road)
- Alignment 11 (Portals: Within Camino Del Mar and Knoll Near I-5)
- Alignment P7-A (Portals: Fairgrounds North and Knoll Near I-5)
- Alignment P7-B (Portals: Fairgrounds North and Sorrento Valley)
- Alignment P9 (Portals: Fairgrounds North and Portofino Drive)
- Alignment P10-A (Portals: Fairgrounds North and Knoll Near I-5)
- Alignment P10-B (Portals: Fairgrounds North and Sorrento Valley)

6.2.1 Potential Environmental Considerations

Biological Resources and Land Use: Potential permanent effects to biological resources and existing land uses are summarized in Table 6-2.

- Sensitive Vegetation Communities: Alignments 1, 7, and P9 with a south portal at Portofino Drive could affect the largest area of sensitive vegetation communities (19 acres for Alignments 7 and P9 and 22 acres for Alignment 1) compared to the other alignments. Alignments P7-B and P10-B could affect the smallest area of sensitive vegetation communities (2 acres).
- Non-Transportation Land Uses: Alignment 11 could affect the smallest area of existing non-transportation land uses (2 acres), followed by Alignments 3 and 9 (5 acres) with south portals at Torrey Pines Road. Alignment 1 could affect the largest area of existing non-transportation land uses (22 acres) and would be generally less compatible with existing land uses compared to the other alignments.
- Transportation Land Uses: The Alignment 9 footprint could affect the largest area of existing transportation land uses (37 acres) compared to the other alignments.
- Conclusion: As a result, Alignments 3, 9, and 11 with south portals at Torrey Pines Road or the Knoll Near I-5 would be generally more compatible with existing land uses compared to alignments with a south portal at Portofino Drive.

Table 6-2. Summary of Biological Resources and Existing Land Uses (Permanent)

Alignment No.	Sensitive Vegetation Communities (acres)	Transportation Land Uses (acres)	Non-Transportation Land uses (acres)
1	22	13	22
3	16	27	5
5	15	12	14
7	19	22	18
9	16	37	5
11	15	22	2
P7-A	16	16	17
P7-B	2	19	7
P9	19	17	19
P10-A	16	16	17
P10-B	2	19	7

Source: SanGIS 2022, AECOM 2023 biological resource surveys
Note: Non-transportation land uses include residential, recreation/open space, transportation, public institution, industrial, hotel, undeveloped, and commercial land uses.

Community Effects

- Acquisitions and Noise and Dust Abatement: All alignments would require the acquisition of private property for construction of the alignment structures. Residential properties would be located adjacent to one or both portals associated with Alignments 1, 3, 5, 7, 9, 11, and P9; therefore, noise and dust abatement measures would be implemented during construction. While construction near the south portal for Alignments 5 and 9 would not occur near residential properties, noise and dust abatement measures may be implemented to protect resources within Los Peñasquitos Lagoon. Residential properties are not located adjacent to the south portal or the location where the TBM would be retrieved in the north for Alignments P7-A, P7-B, P10-A, and P10-B. Dust and noise abatement measures may be required during construction to protect resources within Los Peñasquitos Lagoon at the south portal and along the cut-and-cover tunnel near the north portal given proximity to residential properties. The trench associated with the existing railroad alignment would require widening to accommodate all stakeholder and outreach alignments, which could affect adjacent properties and the multi-use trail above the trench.
- Physical Roadway Impacts: The south portal site at the Knoll Near I-5 (Alignments 5, 11, and P7-A) would result in the smallest impacts to the local roadway network compared to the other south portals. The south portal site located in Sorrento Valley (Alignments P7-B and P-10-B) would result in the greatest impacts to the local roadway network. Compared to the other north portal sites, the north portal Within Camino Del Mar (Alignments 7, 9, and 11) would be the most impactful to the local roadway network. The north portal Under Jimmy Durante Boulevard (Alignments 1, 3, 5, and 7) would be the least impactful north portal site to the local roadway network. The Fairgrounds North portal common to all stakeholder and outreach alignments would be less impactful to the local roadway network than the north portal Within Camino Del Mar and more impactful than the Under Jimmy Durante Boulevard north portal.

- Truck Trips for Disposal of Construction Material: As shown in Table 6-3, the number of truck trips required to dispose of construction materials associated with the bored tunnel, cut-and-cover tunnel, U-structure, and portals would range from 122,000 (Alignment 9) to 619,000 (Alignment P10-A) one-way trips. The stakeholder and outreach alignments are longer than the conceptual alignments and would result in more than twice the number of truck trips to dispose of construction materials.
- Conclusion: The Fairgrounds North portal would be most disruptive to the surrounding community. This portal would require construction of a new underground special events platform to maintain passenger rail service to the fairgrounds. Significant portions of the fairgrounds' southwest parking lot and access to the surrounding area would have restricted use. Event access to the fairgrounds may also be affected at Jimmy Durante Boulevard and Via De La Valle. Additionally, properties and the multi-use trail adjacent to the existing railroad trench could be affected during construction, and construction access would affect Via De La Valle, Lomas Santa Fe Drive, and the adjoining South Highway 101 and South Cedros Avenue.

Table 6-3. Approximate Number of Truck Trips for Disposal of Construction Material

Alignment No.	Truck Trips
1	171,600
3	127,300
5	229,400
7	181,900
9	122,000
11	235,100
P7-A	547,200
P7-B	594,600
P9	534,200
P10-A	619,000
P10-B	536,000

Note: Only accounts for one-way traffic for disposal of construction material associated with the bored tunnels, cut-and-cover tunnel, and the U-structure.

6.2.2 Constructability and Construction Effects

The following is a summary of the constructability considerations.

6.2.2.1 Considerations Regarding Alignment Components

Table 6-4 summarizes information on the components of each alignment.

- Alignments 1 and 7 would require the shortest total alignment length at 25,300 feet, and Alignments P7-A, P10-A, and P10-B would require the longest total alignment length, at 35,900 feet.
- Alignment 9 would require the shortest bored tunnel length at 9,500 feet, and Alignment P7-B would require the longest bored tunnel length, at 23,400 feet.

- The percentage of the tunnel under public right-of-way or property would be the smallest for Alignment 3 at 6% and largest for Alignment P7-A at 95%. All five stakeholder and outreach alignments would have the greatest percentage of the tunnel portion of the alignment under public-right-of-way or property.
- Alignments P7-B and P10-B with a south portal at Sorrento Valley would not require bridges. Of the remaining alignments, Alignments 5, 11, P7-A, and P10-A with a south portal at the Knoll Near I-5 would require the shortest length of bridge at 100 feet, and Alignments 3 and 9 would require the longest length of bridge at 6,100 feet.
- Alignments 3 and 9 with a south portal at Torrey Pines Road would require the longest length of berm to support the alignment within Los Peñasquitos Lagoon at 7,200 feet, and Alignment P7-B would require the shortest length of berm at 1,400 feet.
- Alignments P7-A, P7-B, P9, P10-A, and P10-B would require demolition or reuse of the future San Dieguito Bridge as the new alignment would not connect to the future bridge.

Table 6-4. Summary of Alignment Components

Alignment No.	Bored Tunnel (feet)	U-Structure (feet)	Cut-and-Cover Tunnel (feet)	Bridge (feet)	Floodwall (feet)	Graded (feet)	Total Alignment Length (feet)	% of Tunnel under Public ROW or Property	% of Tunnel under Private Property
1	13,800	900	700	1,500	800	7,600	25,300	41	59
3	9,800	900	600	6,100	800	7,800	25,900	6	94
5	16,600	2,400	900	100	1,900	6,200	28,000	44	56
7	13,900	1,100	900	1,500	800	7,200	25,300	49	51
9	9,500	1,200	500	6,100	800	7,800	26,000	27	73
11	16,600	2,200	1,200	100	1,900	6,300	28,300	46	54
P7-A	20,000	2,700	6500	100	900	6,400	35,900	95	5
P7-B	23,400	2,700	6,600	0	200	2,200	35,000	90	10
P-9	16,700	1,300	6,000	1,500	0	7,300	32,800	91	9
P10-A	19,400	3,100	5,900	100	1,100	6,300	35,900	84	16
P10-B	22,600	3,000	6,900	0	400	3,000	35,900	80	20

Notes: The graded length includes the berm. ROW = right-of-way

6.2.2.2 North Portal and Alignment Considerations

- Under Jimmy Durante Boulevard Portal (Alignments 1, 3, and 5) would result in the lowest degree of construction complexity at the north portal and the portion of the alignment north of the portal compared to other north portal sites. No significant existing infrastructure would need to be protected or reconstructed at this north portal site.
- Within Camino Del Mar Portal (Alignments 7, 9, and 11) would result in a larger degree of construction complexity at the north portal and alignment north of the portal than Alignments 1, 3, and 5 (north portal Under Jimmy Durante Boulevard). This north portal location would require reconstruction of the existing Camino Del Mar bridge to initiate the portal construction.

- Fairgrounds North Portal (Alignments P7-A, P7-B, P9, P10-A, P10-B) would have the greatest construction complexity of the north portal locations given the need to work within and widen the existing railroad alignment trench, the need to construct a new underground special events platform, coordination with current and future use at the fairgrounds, reconstruction of the Via De La Valle overcrossing, potential reconstruction of the Jimmy Durante Bridge, and drainage considerations at Stevens Creek.

6.2.2.3 South Portal and Alignment Considerations

- Portofino Drive Portal (Alignments 1, 7, and P9) would result in the lowest degree of construction complexity at the south portal and alignment south of the portal compared to the other south portal locations. The main portal site is largely above the 100-year floodplain and is not expected to require abatement measures to prevent flooding. There is no significant infrastructure that would need to be protected.
- Torrey Pines Road Portal (Alignments 3 and 9) would result in the highest degree of construction complexity at the south portal and alignment south of the portal compared to the other south portal locations. The bridge and berm segments within the Los Peñasquitos Lagoon would require a raised elevation to stay above flood levels and would require a phased approach to maintain rail operations during construction.
- Sorrento Valley Portal (Alignments P7-B and P10-B) would result in a higher degree of construction complexity at the south portal and alignment south of the portal than Alignments 5, 11, P7-A, and P7-B (Knoll Near I-5 south portal). The TBM launch site for this portal would impact existing drainage in an area with known flooding issues and would require implementing a means to convey drainage under or around the alignment. Reconstruction of Sorrento Valley Road and Carmel Mountain Road would also be required.

6.2.2.4 Utility Conflicts

Table 6-5 summarizes potential major utility conflicts for each alignment.

- Alignments 3 and 9 would result in the fewest potential conflicts with existing utilities, having potential conflicts with three major water facilities and no conflicts with major sewer facilities.
- Alignments P7-B and P10-B would result in the greatest number of potential utility conflicts, with five potential conflicts with major water facilities and three potential conflicts with major sewer facilities.
- Overall, it is expected that the majority of the potential conflicts could be addressed via relocation or protect-in-place construction methods, with the exception of potential conflicts with a 54-inch trunk sewer and a 36-inch water main at the south portal location at the Knoll Near I-5 (Alignments 5, P7-A, and P10-A). Coordination with the City of San Diego Public Utilities Department would be required to address these potential conflicts and identify a solution to address the conflict.

Table 6-5. Summary of Potential Utility Conflicts

Alignment No.	Total	Discussion
1	4	Addressed via relocation or protect-in-place construction methods.
3	3	Addressed via relocation or protect-in-place construction methods.
5	5	Potential conflicts with the 54-inch Carmel Valley Trunk Sewer and 36-inch Sorrento Valley Water Main would require extensive coordination with the City of San Diego Public Utilities Department.
7	4	Addressed via relocation or protect-in-place construction methods.
9	3	Addressed via relocation or protect-in-place construction methods.
11	5	Addressed via relocation or protect-in-place construction methods.
P7-A	5	Potential conflicts with the 54-inch Carmel Valley Trunk Sewer and 36-inch Sorrento Valley Water Main would require extensive coordination with the City of San Diego Public Utilities Department.
P7-B	8	Addressed via relocation or protect-in-place construction methods.
P9	5	Addressed via relocation or protect-in-place construction methods.
P10-A	5	Potential conflicts with the 54-inch Carmel Valley Trunk Sewer and 36-inch Sorrento Valley Water Main would require extensive coordination with the City of San Diego Public Utilities Department.
P10-B	8	Addressed via relocation or protect-in-place construction methods.

Source: SanGIS 2022

6.2.2.5 Railroad Operational Impacts during Construction

Table 6-6 summarizes the railroad operational impacts during construction for each alignment.

North Portal

- The alignments at all of the north portals would require a shoofly to maintain existing rail service.
    - Alignments 1, 3, 5, 7, 9, and 11 (Under Jimmy Durante Boulevard and Within Camino Del Mar portals) would require a temporary single-track shoofly of approximately 3,000 feet.
    - Alignments P7-A, P7-B, P9, P10-A, and P10-B (Fairgrounds North portal) would require a temporary single-track shoofly of approximately 6,000 feet. These alignments would require the longest shoofly and single-track operation to support construction when compared to the other alignments near the north portal sites.
    - For all alignments, the temporary shoofly would temporarily remove double-track operation for a length equivalent to that of the shoofly during construction.

- Design speeds[5] for passenger and freight trains operating along the shoofly would differ from current or planned design speeds.
    - Design speeds along the shoofly for Alignments P7-A, P7-B, P9, P10-A, and P10-B (Fairgrounds North portal) would be approximately 60 mph for passenger trains and 40 mph for freight, which is slower than planned design speeds of 90 mph and 60 mph for existing passenger and freight trains, respectively. This shoofly would result in the greatest reduction in design speeds for passenger and freight trains compared to design speeds along the shoofly at the other north portal locations.
    - Design speeds along the shoofly for Alignments 1, 3, and 5 (Under Jimmy Durante Boulevard portal) would be approximately 50 mph for passenger trains and 45 mph for freight, similar to current design speeds at this location.
    - Design speeds along the shoofly for Alignments 7, 9, and 11 (Within Camino Del Mar portal) would be the slowest compared to the other north portal locations, at 30 mph for passenger trains and 25 mph for freight, compared to current design speeds of 55 mph and 45 mph for existing passenger and freight trains, respectively.

South Portal

- Shoofly:
    - If construction proceeds as described in Section 5.2.2, Alignments 3 and 9 (south portal at Torrey Pines Road) would not require a shoofly to maintain existing rail service.
    - Alignments P7-B and P10-B (Sorrento Valley portal) would require a temporary shoofly of approximately 3,000 feet.
    - Alignments 1, 5, 7, 11, P7-A, P9, and P10-A (Knoll Near I-5 or Portofino Drive portal) would require a temporary shoofly of approximately 4,000 feet.
- Design speed along the shoofly:
    - For those alignments that require the shoofly, design speeds would be approximately 55 mph for passenger trains and 45 mph for freight, compared to design speeds of 60 mph and 50 mph for existing passenger and freight trains, respectively.

[5] An operating speed reflects the speed at which a train travels along a segment of track. In comparison, the design speed is used to determine aspects of a segment of an alignment, such as curves, while design of the alignment is underway. The design speed may be higher than the operating speed. Design speeds are compared for purposes of evaluation as operating speeds may vary depending on circumstances.

Table 6-6. Summary of Railroad Operational Impacts during Construction

Alignment No.	North Portal Shoofly Length (ft)	Restrictive Speed During Construction (mph) (Passenger/Freight)	Southern Portal Shoofly Length (ft)	Restrictive Speed During Construction (mph) (Passenger/Freight)
1	3,000	50/45	4,000	55/45
3	3,000	50/45	N/A	N/A
5	3,000	50/45	4,000	55/45
7	3,000	30/25	4,000	55/45
9	3,000	30/45	N/A	N/A
11	3,000	30/45	4,000	55/45
P7-A	6,000	60/40	4,000	55/45
P7-B	6,000	60/40	3,000	55/45
P9	6,000	60/40	4,000	55/45
P10-A	6,000	60/40	4,000	55/45
P10-B	6,000	60/40	3,000	55/45

6.2.3 Construction Cost Estimates

Rough order of magnitude construction cost estimates were developed for each alignment and are provided for context, but were not used as part of the screening process. The rough order of magnitude cost estimates consider the alignment component (e.g., tunnel, bridge, graded), track and signal infrastructure, temporary and permanent roadway modifications, environmental remediation, and temporary supporting infrastructure. The unit costs developed in the Alternatives Analysis Report are used to make it easier to compare current and previous estimates using 2022 dollars. These rough order of magnitude construction cost estimates do not include right-of-way costs, soft costs, or other costs not noted, nor do the costs consider inflation to reflect the year of expenditure during the construction period. Detailed capital cost estimates will be developed during environmental review.

Table 6-7 summarizes the rough order of magnitude construction cost estimates for each alignment. Construction cost estimates range from $1.79 billion (Alignment 1) to $4.39 billion (Alignment P10-B).

Table 6-7. Construction Rough Order of Magnitude Cost Estimate

Alignment No.	Construction Rough Order of Magnitude Cost Estimate (2022 $billion)
1	$1.79
3	$1.85
5	$2.28
7	$1.86
9	$1.85
11	$2.29
P7-A	$4.14
P7-B	$4.29
P9	$3.76
P10-A	$4.06
P10-B	$4.39

Note: Rough order of magnitude construction cost estimates are based on 2022 dollars. Changes from previously published estimates are due to project refinements and implementation of standard cost categories.

6.3 Summary of Outcomes

Based on the evaluation provided in this report, the following recommendations have been developed in support of identifying the range of alternatives to advance to CEQA scoping:

- **Alignment 1 is not recommended** for further consideration. While this alignment would have the third-fewest number of truck trips and the lowest construction complexities, this alignment with the south portal at Portofino Drive could permanently affect the largest area of sensitive vegetation communities and non-transportation land uses of the alignments. Additionally, significant opposition to the south portal site at Portofino Drive has been expressed by the public during outreach conducted to date, and an alternative southern portal location with less opposition has been identified to advance to CEQA scoping.
- **Alignment 3 is recommended** for further consideration. This alignment could result in fewer permanent impacts to sensitive vegetation communities, require the second-fewest number of truck trips, and would generally be compatible with existing land uses. The north portal site associated with Alignment 3 (Under Jimmy Durante Boulevard) would result in fewer roadway impacts compared to the north portal site associated with Alignments 7, 9, and 11 (Within Camino Del Mar) and Alignments P7-A, P7-B, P9, P10-A, and P10-B (Fairgrounds North) portal locations. Alignment 3 would result in the lowest degree of construction complexity at the north portal and alignment north of the portal compared to the other north portal locations.

- **Alignment 5 is recommended** for further consideration. The south portal for this alignment (Knoll Near I-5) would be located away from residential properties and has received general support from the public. Potential permanent impacts to sensitive vegetation communities would be comparable to Alignment 3, and less than Alignments 1, 7, 9, P7-A, P9, and P10-A. The south portal site would also result in fewer roadway impacts compared to the various south portal locations. Alignment 5 would also result in less construction complexity at the north portal site (Under Jimmy Durante Boulevard) and alignment north of the portal than Alignments 7, 9, and 11.
- **Alignment 7 is not recommended** for further consideration. The alignment, with a south portal at Portofino Drive, could result in one of the largest impacts on sensitive vegetation communities and non-transportation land uses. Compared to the other north portal sites, the north portal site associated with this alignment (Within Camino Del Mar) would be the most impactful to the local roadway network. This alignment would also have higher complexity at the north portal site and alignment north of the portal than Alignments 1, 3, and 5 (north portal site Under Jimmy Durante Boulevard). Additionally, strong opposition for the south portal site at Portofino Drive has been expressed by the public during outreach conducted to date.
- **Alignment 9 is not recommended** for further consideration. This alignment is similar to Alignment 3 with a north portal Within Camino Del Mar and a slight difference in the location of the bored tunnel alignment. Compared to the other north portal sites, the north portal site associated with this alignment would be the most impactful to the local roadway network. This alignment would also result in the highest degree of construction complexity at the south portal site (Torrey Pines Road) and alignment south of the portal, and a higher degree of construction complexity at the north portal site and alignment north of the portal than Alignments 1, 3, and 5 (north portal Under Jimmy Durante Boulevard).
- **Alignment 11 is not recommended** for further consideration. Compared to the other north portal sites, the north portal site associated with this alignment (Within Camino Del Mar) would be the most impactful to the local roadway network. This alignment would also have higher degree of construction complexity at the north portal site and alignment north of the portal than Alignments 1, 3, and 5 (north portal Under Jimmy Durante Boulevard). Alignment 11 would result in a higher degree of construction complexity at the south portal (Knoll Near I-5) and alignment south of the portal than Alignments 7 and P9 (Portofino Drive portal). Alignment 11 would also result in more potential major utility conflicts than Alignments 1, 3, 7, and 9.
- **Alignment P7-A is recommended** for further consideration. This alignment would be the most similar to what the public supported in terms of a tunnel alignment that would be parallel to I-5 rather than under residential properties. This alignment would have a north portal within the existing railroad alignment trench located north of the state-owned fairgrounds property. This north portal site, which is common among the five stakeholder and outreach alignments, would have the greatest construction complexity of the various north portal locations. This alignment would also require construction of a new special events platform at the Del Mar Fairgrounds and would require demolition or reuse of the future San Dieguito Bridge. However, potential permanent impacts to sensitive vegetation communities for Alignment P7-A would be comparable to Alignments 3 and 5, which are also recommended for further consideration. Alignment P7-A would also result in fewer potential major utility conflicts than Alignments P7-B, P9, P10-A, and P10-B.

- **Alignment P7-B is not recommended** for further consideration. This alignment would result in greater community effects compared to other alignments. The Sorrento Valley south portal site would result in the largest impact to the surrounding local roadway network of the various south portal locations.
- **Alignment P9 is not recommended** for further consideration. The area within and adjacent to the alignment footprint, with a south portal at Portofino Drive, contains the second-largest area of sensitive vegetation communities and non-transportation land uses. Additionally, significant opposition to the south portal site at Portofino Drive has been expressed by the public during outreach conducted to date, and an alternative southern portal location with less opposition has been identified.
- **Alignment P10-A is not recommended** for further consideration. This alignment would be similar to Alignment P7-A; however, Alignment P7-A is more responsive to comments received from the public during the outreach and engagement processes to date.
- **Alignment P10-B is not recommended** for further consideration. The alignment would result in more community effects compared to the other alignments. The alignment would result in the largest quantity of excavated materials and truck trips for disposal. The Sorrento Valley south portal site would result in the largest impact to the surrounding local roadway network of the various south portal locations.

Alignments 3, 5, and 7A are recommended to advance to CEQA scoping. The alternatives are illustrated in Figure 6-1 and will be referred to as Alternative A: I-5 Alignment, Alternative B: Crest Canyon Alignment, and Alternative C: Camino Del Mar Alignment in the Notice of Preparation.

- Alternative A: I-5 Alignment will reflect Alignment P7-A in this report.
- Alternative B: Crest Canyon Alignment will reflect Alignment 5 in this report.
- Alternative C: Camino Del Mar Alignment will reflect Alignment 3 in this report.

Figure 6-1. CEQA Scoping Alternatives