

APPENDIX A

Mitigation, Monitoring and Reporting Plan

Mitigation, Monitoring and Reporting Plan for the Los Angeles to San Diego (LOSSAN) Proposed Rail Corridor Improvements EIR/EIS

The California Department of Transportation (Department) and the U.S. Department of Transportation, Federal Railroad Administration (FRA) jointly prepared a programmatic environmental impact report / environmental impact statement (EIR/EIS) to analyze the impacts of approving a rail improvements program on the Los Angeles-to-San Diego (LOSSAN) rail corridor. As a joint document, the EIR/EIS was prepared in compliance with both the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA). The Department is the State lead agency for purposes of compliance with CEQA and this mitigation, monitoring, and reporting plan fulfills the Department's responsibilities in recommending mitigation for the Final EIR/EIS for the purposes of CEQA.

This mitigation, monitoring, and reporting plan is designed to fulfill Section 21081.6 of CEQA, which requires public agencies to adopt a reporting or monitoring program whenever a project or program is approved that includes mitigation measures identified in an environmental document. The design practices and mitigation strategies described below are for a program-level decision and are to be used to avoid, minimize, or reduce any potentially significant environmental impacts. Project-level activities will undergo future environmental analysis tiered from this EIR/EIS and as required by CEQA and NEPA. As part of these second-tier environmental reviews, the lead agency for each of these projects would be expected use the design practices and mitigation strategies identified in the program document as a starting point to determine their applicability to a specific project and to develop additional mitigation measures for significant adverse impacts identified in the project-specific analysis. Because all the potential actions and impacts for tiered projects cannot be anticipated at a programmatic level, future lead agencies will select those strategies appropriate and applicable to the impacts associated with the project location and type of action. For purposes of CEQA, the mitigation strategies in the Final EIR/EIS also serve as mitigation measures at a programmatic level. The CEQA/NEPA monitoring process includes review, guidance, and reporting components. The lead agencies for second tier documents will note which applicable programmatic mitigation strategies are being adopted and used for mitigation measures and explain why others are not. The lead agencies will provide a schedule for implementing the adopted mitigation measures and for reviewing the implementation of those measures.

As a programmatic document, the Program EIR/EIS does not analyze site-specific impacts of potential alignments or stations; therefore, it cannot predict with certainty which impacts will occur and what site-specific mitigation measures are appropriate for second-tier projects or actions. Consequently, the Program EIR/EIS describes mitigation strategies that are approaches tailored to address the types of impacts anticipated as a result of LOSSAN rail corridor improvements. These strategies will provide the basis to structure more site-specific measures when more detailed data on the impacts is available at the second-tier. In addition, the Department has committed to design practices and policies that will be used to develop alignment alternatives at the project-level to avoid impacts and to help shape specific mitigation measures.

At this program level of planning, the Department is responsible for tracking the mitigation and incorporating it into future studies that it undertakes, but a monitoring plan cannot yet be developed. For the next phases of environmental analysis, a monitoring plan will be developed as part of each project that includes more specific timing for the mitigation measures, and additional parties may be identified with responsibility for implementing the measures.

Resource Area	Potential Impact / Issue	Design Practices and Mitigation Measures (Program EIR/EIS) (To Be Further Evaluated at Project Level)	Mitigation Timing ¹
Traffic and Circulation	Traffic and circulation	DESIGN PRACTICES: <input type="checkbox"/> Work with state, federal, regional, and local governments and affected transit agencies to develop specific project construction and operations mitigation measures.	D, C, O
		MITIGATION MEASURES: <input type="checkbox"/> Improve intercity travel on primary routes for access to stations by implementing some or all of the following approaches: <ul style="list-style-type: none"> • Transportation System Management (TSM) / Signal Optimization including retiming, rephrasing, and signal optimization; turn prohibitions, use of one-way streets, and traffic diversion to alternate routes; • Local spot widening of curves that allows for geometric improvements without significant right-of-way acquisition; and • Major intersection improvements (full lane widening), which require significant right-of-way acquisition to accommodate additional left-turn and/or through lanes. 	D, C
		<input type="checkbox"/> Consult and coordinate with public transit service providers to seek adequate bus feeder routes to serve proposed station areas which could mitigate potential transit impacts.	D
Air Quality	Long-term operational air quality impacts	DESIGN PRACTICES: <input type="checkbox"/> Expansion of parking at existing stations and efficient design of ingress and egress to new or expanded parking areas will minimize increases in air emissions in and around station areas. For new stations, use efficient design that minimizes train, bus, and automobile idling time and that will also minimize increases in emissions.	D
		MITIGATION MEASURES: <input type="checkbox"/> Install diesel particulate filters on locomotives.	O
		<input type="checkbox"/> Use liquefied natural gas for engines.	O

¹ Timing for implementing mitigation measures is noted here as D (design phase), C (construction phase), and/or O (operations phase). The design phase includes project-level environmental evaluations and permitting; the construction phase includes pre-construction activities through post-construction cleanup and restoration of project sites. The operations phase refers to long-term operating conditions along the rail corridor.

Resource Area	Potential Impact / Issue	Design Practices and Mitigation Measures (Program EIR/EIS) (To Be Further Evaluated at Project Level)	Mitigation Timing ¹
		<input type="checkbox"/> Reduce idling time to reduce diesel particulate matter and other emissions	O
		<input type="checkbox"/> Install anti-idling devices on locomotives, designed to automatically shut-off the main diesel internal combustion engine used for locomotive motive power after a specified time period when specified parameters (e.g., engine water temperature, ambient temperature, battery charge, railcar brake pressure, etc.) are at acceptable levels, then automatically restart the engine when parameters are no longer at acceptable levels.	O
		<input type="checkbox"/> Retrofit head-end power units (HEPs) in passenger locomotives with after-treatment technologies to reduce emissions.	O
		<input type="checkbox"/> Use a combination of lean-NO _x catalyst and diesel particulate filter.	O
		<input type="checkbox"/> Design stations and associated ingress/egress to provide efficient vehicle movements, to reduce idling time and congestion.	D
	Short-term construction air quality impacts	MITIGATION MEASURES:	C
		<input type="checkbox"/> Water all active construction areas at least twice daily.	C
		<input type="checkbox"/> Require that all trucks hauling soil, sand, and other loose materials be covered or maintain at least two feet of freeboard.	C
		<input type="checkbox"/> Pave, apply water three times daily, or apply non-toxic soil stabilizers on all unpaved access roads, parking areas and staging areas at active construction sites.	C
		<input type="checkbox"/> Sweep daily (with water sweepers) all paved access roads, parking areas and staging areas at active construction sites.	C
		<input type="checkbox"/> Sweep nearby streets daily (with water sweepers) if visible soil materials from LOSSAN construction are carried onto adjacent public streets.	C
		<input type="checkbox"/> Hydroseed or apply non-toxic soil stabilizers to inactive construction areas (previously graded areas inactive for ten days or more).	C
		<input type="checkbox"/> Enclose, cover, water twice daily or apply non-toxic soil binders to exposed stockpiles of dirt, sand, etc.	C
		<input type="checkbox"/> Limit traffic speeds on unpaved roads to 15 mph.	C
	<input type="checkbox"/> Install sand bags or other erosion control measures to prevent silt runoff to public roads.	C	
	<input type="checkbox"/> Replant vegetation in disturbed areas as quickly as possible.	C	

Resource Area	Potential Impact / Issue	Design Practices and Mitigation Measures (Program EIR/EIS) (To Be Further Evaluated at Project Level)	Mitigation Timing ¹
		<input type="checkbox"/> Use alternative fuels for construction equipment when feasible.	C
		<input type="checkbox"/> Minimize equipment idling time.	C
		<input type="checkbox"/> Maintain properly tuned equipment.	C
Noise and Vibration	Increased noise from train operations	DESIGN PRACTICES: <input type="checkbox"/> Many of the alignment options carried forward to project-level analysis are in tunnels or trenches. For these options, potential for substantial operational noise will be greatly reduced.	D
		<input type="checkbox"/> Where the existing rail corridor is proposed to be grade separated, noise would be reduced. Grade separation would eliminate existing horn sounding and warning bells at grade crossings resulting in noise benefits that would offset much of the noise impact attributable to increased rail service along the corridor.	D
		MITIGATION MEASURES: <input type="checkbox"/> Evaluate use of noise barriers, such as sound walls, where there are severe noise impacts, and incorporate appropriate measures..	D
		<input type="checkbox"/> Require noise reduction in rail equipment design and track structures design.	D
	Short-term construction noise impacts	<input type="checkbox"/> Where not already included in conceptual design, place alignment sections in tunnel or trenches or behind berms where feasible and where other measures are not available to reduce severe noise impacts.	D
		MITIGATION MEASURES: <input type="checkbox"/> Use enclosures or walls to surround noisy construction equipment, and install mufflers on engines; substitute quieter equipment or construction methods where feasible, minimizing time of operation and locating equipment farther from sensitive receptors.	C
		<input type="checkbox"/> Suspend construction between 7:00 pm and 7:00 am and/or on weekends or holidays in residential areas; avoid placing noisy equipment in quiet areas and areas that are currently at severe noise levels; restrict truck operations during nighttime hours.	C
<input type="checkbox"/> Require contractors to take into account local sound control and noise level rules, regulations and ordinances.		C	
	<input type="checkbox"/> Ensure that each internal combustion engine would be equipped with a muffler of a type recommended by the manufacturer.	C	

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		<input type="checkbox"/> Specify the use of the quietest available construction equipment where appropriate and feasible.	C
		<input type="checkbox"/> Turn off construction equipment during prolonged periods of non-use.	C
		<input type="checkbox"/> Require contractors to maintain all equipment and to train their equipment operators.	C
		<input type="checkbox"/> Locate noisy stationary construction equipment away from noise sensitive receptors.	C
	Exposure to ground-borne vibration	MITIGATION MEASURES: <input type="checkbox"/> Specify the use of train and track technologies that minimize ground vibration such as state of the art suspensions, resilient track pads, tie pads, ballast mats or floating slabs.	D,O
		<input type="checkbox"/> Phase construction activity, use low impact construction techniques, and avoid use of vibrating construction equipment where possible to avoid construction vibration impacts.	C
Energy	Energy use for construction and operation	MITIGATION MEASURES: <input type="checkbox"/> Minimize grade changes in steep terrain areas to reduce the use of diesel fuel.	D
		<input type="checkbox"/> Maximize intermodal transit connections to reduce automobile VMT related to the rail system.	D,O
		<input type="checkbox"/> Develop and implement a construction energy conservation plan.	C
		<input type="checkbox"/> Use newer, more energy efficient construction equipment.	C
		<input type="checkbox"/> Implement a program to encourage carpooling or use of public transportation by workers going to and from construction sites.	C
Land Use	Land use compatibility and property impacts	DESIGN PRACTICES: <input type="checkbox"/> Continue to apply design practices to minimize property needed for LOSSAN rail corridor improvements and to stay within or adjacent to existing transportation corridors to the extent feasible.	D

Resource Area	Potential Impact / Issue	Design Practices and Mitigation Measures (Program EIR/EIS) (To Be Further Evaluated at Project Level)	Mitigation Timing ¹
	Compatibility with land uses	MITIGATION MEASURES: <input type="checkbox"/> Coordinate with cities and counties along the corridor to develop project facilities that are consistent with land use planning processes and zoning ordinances to the extent feasible.	D
		<input type="checkbox"/> Establish requirements for station-area planning and opportunities for transit-oriented development where existing stations are expanded or new stations are developed.	D
	Community or neighborhood barriers	MITIGATION MEASURES: <input type="checkbox"/> Mitigation measures to reduce the effects of any existing or exacerbated barrier effects will be evaluated at the project-level environmental review and could include additional grade separation of rail lines and streets, new pedestrian crossings, new cross-connection points, improved visual quality of project facilities, and traffic management plans to maintain access during and after construction.	D, C
	Impacts to neighborhoods and disruption to communities during construction	MITIGATION MEASURES: <input type="checkbox"/> Provide opportunities for community involvement early in project-level studies.	D
		<input type="checkbox"/> Conduct design workshops within each affected neighborhood to develop an understanding of key linkages (automobile, bicycle, pedestrian) across the rail corridor so that those linkages can be preserved, including the use of grade-separated crossings.	D
		<input type="checkbox"/> Develop facility, landscape, and public art design standards for project facilities and corridors that reflect the character of adjacent affected neighborhoods.	D
		<input type="checkbox"/> Ensure that connectivity (pedestrian/bicycle and vehicular crossings) across the rail corridor is maintained where necessary to maintain neighborhood integrity.	D, C
		<input type="checkbox"/> Develop traffic management plans to reduce barrier effects during construction.	D,C
		<input type="checkbox"/> To the extent feasible, maintain connectivity during construction.	D, C
		<input type="checkbox"/> Maintain high level of visual quality of project facilities in neighborhood areas by implementing such measures as visual buffers, trees and other landscaping,	D, C

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		architectural design and public artwork.	
		<input type="checkbox"/> Develop procurement specifications and incentives for construction contractors for reducing the duration and disruption of infrastructure construction. Requirements may include restrictions on construction vehicle traffic and routes, haul routes, hours of construction activity, and advance public notification of all closures or expected travel delays.	D, C
	Impacts to property	MITIGATION MEASURES: <input type="checkbox"/> Potential land use displacement and property acquisition (temporary use and/or permanent, residential and non-residential property) are expected to be avoided to the extent feasible by considering further alignment adjustments and design changes in the future at the project level.	D
	<input type="checkbox"/> Design strategies would be developed for application at the project level to avoid or minimize the temporary or permanent acquisition of residential and non-residential property	D	
	<input type="checkbox"/> Access modifications, including over- or under-crossings, may be required to mitigate impacts arising from temporary or permanent property acquisitions where land uses are divided or otherwise disrupted.	D, C	
	Environmental Justice impacts	MITIGATION MEASURES: <input type="checkbox"/> EO 12898 requires federal agencies to ensure effective public participation and access to information. Consequently, a key component of compliance with EO 12898 is outreach to the potentially affected minority and/or low-income population to discover issues of importance that otherwise may not be apparent. Outreach to affected communities would be conducted as part of the decision-making process, and this outreach would be documented.	D
<input type="checkbox"/> DOT Order 5610.2 requires DOT agencies to develop procedures to provide meaningful opportunities for public involvement by members of minority populations during activities including identification of mitigation measures. Minority and low income populations would be provided access to information about health and environmental impacts, measures to avoid, minimize and/or to mitigate any disproportionately high and adverse effects and offsetting benefits and opportunities to enhance affected communities, neighborhoods, or individuals during an outreach	D		

Resource Area	Potential Impact / Issue	Design Practices and Mitigation Measures (Program EIR/EIS) (To Be Further Evaluated at Project Level)	Mitigation Timing ¹
		<p>program conducted as part of the decision-making process.</p>	
		<p><input type="checkbox"/> In addition to examining all impacts, specific attention would be given to the permanent impact categories that are commonly of concern for this type of project and to those that previously have been identified as being of concern. These include:</p> <ul style="list-style-type: none"> • Air quality • Noise and vibration • Public health • Visual resource/aesthetics • Parklands • Relocation 	D
Aesthetics and visual resources	Visual impacts, light and glare, new visual contrasts	<p>DESIGN PRACTICES:</p> <p><input type="checkbox"/> Work with local agencies and communities at the project level to develop context-sensitive aesthetic designs and treatments for rail infrastructure, including bridges, tunnel portals and stations.</p>	D
		<p>MITIGATION MEASURES:</p> <p><input type="checkbox"/> At the project level, design proposed facilities that are attractive in their own right and that would integrate well into landscape contexts, so as to reduce potential view blockage, contrast with existing landscape settings, light and shadow effects, and other potential visual impacts.</p>	D
		<p><input type="checkbox"/> Design bridges and elevated track with graceful lines and minimal apparent bulk and shading effects. Consider contoured, rounded edges for columns and other structural elements.</p>	D
		<p><input type="checkbox"/> In lagoon areas of northern San Diego County, consider new bridge or causeway structures that would open up lagoon views as well as mitigate or enhance biological and hydrologic conditions.</p>	D
		<p><input type="checkbox"/> Where at-grade or depressed route segments pass through or along the edge of residential areas or heavily traveled roadways, install landscape treatments along the edge of the right-of-way to provide partial screening and to visually integrate the right-of-way into the residential context.</p>	C
		<p><input type="checkbox"/> Night lighting at stations will be the minimum required for operations and safety. Use</p>	O

Resource Area	Potential Impact / Issue	Design Practices and Mitigation Measures (Program EIR/EIS) (To Be Further Evaluated at Project Level)	Mitigation Timing ¹
		shielded and hooded outdoor lighting directed to the area where the lighting is required, and use sensors and timers for lights not required to be on all the time.	
		<input type="checkbox"/> Design new stations to minimize potential shadow impacts on adjacent pedestrian areas, parks, and residential areas.	D
		<input type="checkbox"/> Seed or plant areas outside the operating rail trackbed that are disturbed by cut, fill or grading to blend with surrounding vegetated areas, where the land will support plants. Use native vegetation in appropriate locations and densities.	C
		<input type="checkbox"/> Use strategic plantings of fast-growing trees to provide partial or full screening of elevated structures where they are close to residential areas, parks, and public open spaces.	C
Public Utilities	Conflicts with existing and planned utilities	DESIGN PRACTICES: <ul style="list-style-type: none"> <input type="checkbox"/> Avoid potential utility conflicts during design to the extent feasible. <input type="checkbox"/> Coordinate on-site with utility representatives during construction in the vicinity of critical infrastructure such as high-voltage overhead or underground transmission lines, high-pressure gas pipelines, or canals. 	D, C
		MITIGATION MEASURES: <ul style="list-style-type: none"> <input type="checkbox"/> Make adjustments during engineering design to the horizontal and vertical profiles of rail infrastructure to avoid crossing or interfering with major utility right-of-way or facilities. 	D
		<ul style="list-style-type: none"> <input type="checkbox"/> If avoidance is not feasible, perform relocation, reconstruction, and/or restoration of utility infrastructure in consultation and coordination with the utility owner. Options could include consolidating several underground utilities into one conduit, or protecting in place transmission lines, substations, and other affected facilities. 	D,C
Hazardous Materials and Wastes		DESIGN PRACTICES: <ul style="list-style-type: none"> <input type="checkbox"/> Avoid and minimize potential impacts related to hazardous materials and waste through design refinement and use of best practices during construction. 	D, C
		MITIGATION MEASURES: <ul style="list-style-type: none"> <input type="checkbox"/> Investigate soils and groundwater for contamination and prepare environmental site assessments when necessary. 	D

Resource Area	Potential Impact / Issue	Design Practices and Mitigation Measures (Program EIR/EIS) (To Be Further Evaluated at Project Level)	Mitigation Timing ¹
		<input type="checkbox"/> Realignment of rail improvement option, and/or relocate of proposed stations to avoid identified sites and remediation of identified hazardous material / waste contamination.	D
		<input type="checkbox"/> Prior to demolition of buildings or existing structures such as bridges for project construction, survey for lead-based paint and asbestos-containing materials.	C
		<input type="checkbox"/> Follow Best Management Practices for testing, treating, and disposing of water, and acquire necessary permits if ground dewatering is required.	D, C
		<input type="checkbox"/> When indicated by project level environmental site assessments, perform Phase II environmental site assessments in conformance with the ASTM Standards related to the Phase II Environmental Site Assessment Process to identify specific mitigation measures.	D
		<input type="checkbox"/> Prepare prior to construction and then implement a Site Management Program/Contingency Plan prior to construction to address known and potential hazardous material issues, including: <ul style="list-style-type: none"> a. Measures to address management of contaminated soil and groundwater; b. Site-specific Health and Safety Plan (HASP), including measures to protect construction workers and general public; and c. Procedures to protect workers and the general public in the event that unknown contamination or buried hazards are encountered. 	D, C
Cultural and Paleontological Resources		DESIGN PRACTICES: <ul style="list-style-type: none"> <input type="checkbox"/> Avoid to extent feasible and practical all cultural resources and impacts to Native American resources through careful alignment design and selection. <input type="checkbox"/> Develop procedures during project-level reviews for fieldwork, evaluation, and determination of potential impacts to cultural resources in consultation with SHPO and Native American tribes. 	D
	Impacts to archaeological resources and traditional cultural properties	MITIGATION MEASURES: <ul style="list-style-type: none"> <input type="checkbox"/> Avoid the impact, or when avoidance is not feasible, minimize the scale of the impact to the extent practical. <input type="checkbox"/> Incorporate the site into parks or open space. <input type="checkbox"/> Provide on-site monitoring if sites are suspected of containing human remains. <input type="checkbox"/> Cap or cover the cultural site before construction. 	D, C O C C

Resource Area	Potential Impact / Issue	Design Practices and Mitigation Measures (Program EIR/EIS) (To Be Further Evaluated at Project Level)	Mitigation Timing ¹
		<input type="checkbox"/> Provide data recovery for the archaeological resources, which may include excavation of an adequate sample of the site contents so that research questions applicable to the site can be addressed.	C
	Impacts to historic properties/ resources	MITIGATION MEASURES: <input type="checkbox"/> Avoid the impact through project design. Prepare and utilize a treatment plan for protection of historic properties/resources that would describe methods to preserve, stabilize, shore/underpin, and monitor buildings, structures, and objects.	D, C
<input type="checkbox"/> Avoid high vibration construction techniques in sensitive areas		C	
<input type="checkbox"/> Record and document cultural resources that would be adversely affected by the project to the standards of the Historic American Building Survey or Historic American Engineering Record.		D	
<input type="checkbox"/> Develop and implement design guidelines to ensure sympathetic, compatible, and appropriate designs for new construction.		D	
<input type="checkbox"/> Consult with architectural historians or historical architects to advise on appropriate architectural treatment of the structural design of proposed new structures. Prepare interpretive and/or educational materials and programs regarding the affected historic properties/resources. Materials may include a popular report, documentary videos, booklets, and interpretive signage.		D	
<input type="checkbox"/> Make interpretive information available to state and local agencies, such as salvage items, historic drawings, interpretive drawings, current and historic photographs, models, and oral histories. Also assist with archiving and digitizing the documentation of the cultural resources affected, and disseminating material to the appropriate repositories.		C, O	
<input type="checkbox"/> Relocate and rehabilitate historic properties/resources that would otherwise be demolished because of the project.		C	
<input type="checkbox"/> Monitor project construction to ensure it conforms to design guidelines and any other treatment procedures agreed to by the parties consulting pursuant to Section 106 of the National Historic Preservation Act. Repair inadvertent damage to historic properties/resources in accordance with the Secretary of the Interior's Standards for Treatment of Historic Properties.		C	
<input type="checkbox"/> Salvage selected decorative or architectural elements of the adversely affected historic		C	

Resource Area	Potential Impact / Issue	Design Practices and Mitigation Measures (Program EIR/EIS) (To Be Further Evaluated at Project Level)	Mitigation Timing ¹
		properties/resources, and retain and incorporate salvaged items into new construction where possible. If reuse is not possible, make salvaged items available for use in interpretive displays near the affected resources or in an appropriate museum.	
	Impacts to paleontological resources	MITIGATION MEASURES:	
		<input type="checkbox"/> Educate construction workers so that they can recognize and preserve/protect paleontological resources.	C
		<input type="checkbox"/> Recover fossils identified during the field reconnaissance.	C
		<input type="checkbox"/> Monitor construction to identify and protect paleontological resources from loss or damage.	C
		<input type="checkbox"/> Develop protocols for handling fossils discovered during construction, such as temporary suspension of construction so that the discovered fossils can will be recovered, identified, prepared for dating interpreting, and preservation at an established, permanent, accredited research facility.	C
Geology and Soils		DESIGN PRACTICES:	
		<input type="checkbox"/> Avoid major, active fault crossings, oil fields, and landslide problem area to the extent feasible. <input type="checkbox"/> Design and engineer all structures for earthquake activity using the Department's Seismic Design Criteria.	D
	Seismic hazards, surface rupture, and ground shaking from earthquakes	MITIGATION MEASURES:	
		<input type="checkbox"/> Design and build structures to withstand anticipated ground motion, using design options such as redundancy and ductility.	D
		<input type="checkbox"/> Mitigate liquefaction and resulting structural damage and traffic hazards using: (1) ground modification techniques such as soil densification; and (2) structural design, such as deep foundations.	D, C
		<input type="checkbox"/> Utilize motion sensing instruments to provide ground motion data and a control system to temporarily shut down rail operations during or after an earthquake to reduce risks.	O
		<input type="checkbox"/> Design and install foundations resistant to soil liquefaction and settlement.	D, C
		<input type="checkbox"/> Identify potential serpentinite bedrock disturbance areas and implement a safety plan.	D, C
		<input type="checkbox"/> Apply Section 19 requirements from the most current Department Standard	D, C

Resource Area	Potential Impact / Issue	Design Practices and Mitigation Measures (Program EIR/EIS) (To Be Further Evaluated at Project Level)	Mitigation Timing ¹	
		Specifications to ensure geotechnically stable slopes are planned and created.		
		<input type="checkbox"/> Install passive or active gas venting systems and gas collection systems in areas where subsurface gases are identified.	D, C, O	
		<input type="checkbox"/> Remove corrosive soil and use corrosion protected materials in infrastructure.	D, C	
		<input type="checkbox"/> Address erosive soils through soil removal and replacement, geosynthetics, vegetation, and or rip/rap, where warranted.	C	
		<input type="checkbox"/> Remove or moisture condition shrink/swell soils.	C	
		<input type="checkbox"/> Utilize stone columns, grouting, and deep dynamic compaction in areas of potential liquefaction.	D, C	
		<input type="checkbox"/> Utilize buttress berms, flattened slopes, drains, and/or tie-backs in areas of slope instability.	D, C	
		<input type="checkbox"/> Avoid settlement through preloading, use of stone columns, deep dynamic compaction, grouting, and/or special foundation designs.	D, C	
		<input type="checkbox"/> Install early warning systems triggered by strong ground motion associated with ground rupture, such as linear monitoring systems (e.g., time domain reflectometers) along major highways and rail lines within the zone of potential rupture to provide early warnings and allow for temporary control of rail and automobile traffic to avoid and reduce risks.	O	
		<input type="checkbox"/> Avoid active faults to the extent possible. Where avoidance is not possible, cross active faults at grade and perpendicular to the fault line.	D	
		<input type="checkbox"/> Continue to modify alignments to avoid crossing known or mapped active faults within tunnels.	D	
		Slope instability and landslides	MITIGATION MEASURES: <input type="checkbox"/> Install temporary and permanent slope reinforcement and protection, based on geotechnical investigations, and review of proposed earthwork and foundation excavation plans.	D, C
			<input type="checkbox"/> Conduct geotechnical inspections during construction to verify that no new, unanticipated conditions are encountered.	C
		<input type="checkbox"/> Incorporate slope monitoring in final design.	D, C	

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	Difficult excavation	MITIGATION MEASURES:	D
		<input type="checkbox"/> Identify areas of potentially difficult excavation to ensure safe practices.	
		<input type="checkbox"/> Focus future geotechnical engineering and geologic investigations in areas of potentially difficult excavation.	D
		<input type="checkbox"/> Monitor conditions during and after construction.	C
	Hazards related to oil and gas fields	<input type="checkbox"/> Employ tunnel excavation and lining techniques to ensure safety.	C
		MITIGATION MEASURES:	C
		<input type="checkbox"/> Follow federal and state Occupational Safety and Health Administration regulatory requirements for excavations.	
		<input type="checkbox"/> Consult with other agencies such as the Department of Conservation's Division of Oil and Gas, or the Department of Toxic Substances Control regarding known areas of concern.	C
		<input type="checkbox"/> Use safe and explosion-proof equipment during construction.	C
		<input type="checkbox"/> Test for gases regularly.	C
Hydrology and Water Resources	<input type="checkbox"/> Install monitoring systems and alarms in underground construction areas and facilities where subsurface gases are present.	C	
	<input type="checkbox"/> Install gas barrier systems.	C	
	DESIGN PRACTICES: <input type="checkbox"/> Utilize existing rail and other transportation corridors to extent practical for the proposed rail improvements to minimize potential impacts to hydrological resources bisecting sensitive areas and creating new crossings or encroachments on water resources. <input type="checkbox"/> Work with regulatory agencies to develop acceptable, specific design and construction standards for lagoon and stream crossings, including, but not limited to, maintaining open surface (bridged versus closed culvert) crossings, infrastructure setbacks, erosion control measures, sediment controlling excavation/fill practices, and other Best Management Practices. <input type="checkbox"/> Retain or reduce the existing in-water footprint of lagoon crossing structures. Project-level analyses and agency consultation, along with more detailed design work, will be used to evaluate the feasibility and potential impacts and benefits of replacing	D, C	

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		<p>structures and/or removing existing fill in the lagoons. Design of new structures would include features that minimize the amount of discharge into these waters, such as longer bridge spans to minimize the number of in-water structures, designs that minimize the need for rock-slope stabilization at bridge abutments, etc.</p> <p><input type="checkbox"/> For alignment options in tunnels, geologic exploration including groundwater sampling would be completed prior to construction. The geologic/soils/groundwater conditions would be evaluated prior to and monitored during construction to aid in the development of construction techniques and measures to minimize effects to ground- and surface-water resources. Design fully lined tunnels with impermeable material to prevent infiltration of ground- or surface waters.</p>	
	Impacts on floodplains	<p>MITIGATION MEASURES:</p> <p><input type="checkbox"/> Minimize the footprint of facilities within the floodplain where they cannot be avoided, through design changes or the use of aerial structures and tunnels.</p>	D
		<p><input type="checkbox"/> Avoid or minimize construction of facilities within floodplains where feasible. Assess all feasible facility redesign or modification to minimize flooding risk and potential harm to or within the floodplain.</p>	D
		<p><input type="checkbox"/> Where feasible, restored floodplains impacted by construction so they operate as before construction.</p>	C
	Impacts on surface waters	<p>MITIGATION MEASURES:</p> <p><input type="checkbox"/> Use construction methods and facility designs to minimize the potential encroachments onto surface water resources, particularly coastal lagoon areas.</p>	D, C
		<p><input type="checkbox"/> Coordinate lagoon crossing designs with resource agencies and local lagoon restoration and enhancement plans.</p>	D
		<p><input type="checkbox"/> Evaluate and where feasible provide for replacement of existing embankments within lagoons with bridge structures, in consultation with responsible agencies and entities, and in coordination with other projects such as the I-5 North Coast Project.</p>	D
		<p><input type="checkbox"/> Minimize sediment transport caused by construction by following best management practices (BMPs) as part of National Pollutant Discharge Elimination System (NPDES) and Storm Water Pollution Prevention Plan (SWPPP) requirements that will be included in construction permits. BMPs may include measures such as:</p> <p>a. Providing permeable surfaces where feasible;</p>	C

Resource Area	Potential Impact / Issue	Design Practices and Mitigation Measures (Program EIR/EIS) (To Be Further Evaluated at Project Level)	Mitigation Timing ¹
		<ul style="list-style-type: none"> b. Retaining and treating stormwater onsite using catch basins and filtering wet basins; c. Minimizing the contact of construction materials, equipment, and maintenance supplies with stormwater; d. Reducing erosion through soil stabilization, watering for dust control, installing perimeter silt fences, placing rice straw bales, and installing sediment basins; e. Maintaining water quality by using infiltration systems, detention systems, retention systems, constructed wetland systems, filtration systems, biofiltration/bioretention systems, grass buffer strips, ponding areas, organic mulch layers, planting soil beds, sand beds, and vegetated systems such as swales and grass filter strips designed to convey and treat fallow flow (swales) or sheetflow (filter strips) runoff. 	
		<input type="checkbox"/> Use methods such as habitat restoration, reconstruction of habitat on-site, and providing offsite habitat replacement to minimize surface water quality impacts.	C
		<input type="checkbox"/> Comply with mitigation measures included in permits issued under sections 404 and 401 of the federal Clean Water Act.	C
		<input type="checkbox"/> Comply with requirements in the Storm Water Pollution Prevention Plan to reduce pollutants in storm water discharges and the potential for erosion and sedimentation	C
		<input type="checkbox"/> Comply with requirements of Section 10 of the federal Rivers and Harbors Act for work required around a water body designated as navigable and applicable permit requirements.	C
		<input type="checkbox"/> Comply with the requirements of state Streambed Alteration Agreements for work along the banks of various surface water bodies.	C
		<input type="checkbox"/> Implement a spill prevention and emergency response plan to handle potential fuel or other spills.	C
		<input type="checkbox"/> Where feasible, avoid significant development of facilities in areas that may have substantial erosion risk, including areas with erosive soils or steep slopes.	D, C
	Impacts to ground-water	MITIGATION MEASURES: <input type="checkbox"/> Minimize development of facilities in areas that may have substantial groundwater discharge or affect recharge.	D, C
		<input type="checkbox"/> Apply for, obtain, and comply with conditions of applicable waste discharge permits as part of project-level review	D

Resource Area	Potential Impact / Issue	Design Practices and Mitigation Measures (Program EIR/EIS) (To Be Further Evaluated at Project Level)	Mitigation Timing ¹
		<input type="checkbox"/> Develop and implement facility designs that are elevated, or at a minimum are permeable, and would not affect recharge potential where construction is required in areas of potentially substantial groundwater discharge or recharge.	D
		<input type="checkbox"/> Develop and implement a Storm Water Pollution Prevention Plan for grading, with Best Management Practices that would control release of contaminants nears areas of surface water or groundwater recharge. Best Management Practices may include constraining fueling and other sensitive activities to alternative locations, providing drip pans under some equipment, and providing daily checks of vehicle condition.	D
		<input type="checkbox"/> Use and retain native materials with high infiltration potential at the ground surface in areas that are critical to infiltration for groundwater recharge.	C
Biological Resources and Wetlands		DESIGN PRACTICES: <input type="checkbox"/> Utilize existing transportation corridors and rail lines to minimize potential impacts to biological resources in sensitive areas.	D
		<input type="checkbox"/> Underpasses, overpasses, or other appropriate structures would be designed at reasonable intervals to avoid, minimize and/or mitigate any potential impacts to wildlife movement.	D
		<input type="checkbox"/> Use in-line construction access (using existing or new rail infrastructure for access and materials movement) in sensitive areas to avoid access impacts to biological resources. Use helicopter access for geologic exploration in lagoon areas to avoid need for access roads in undisturbed areas.	D, C
		<input type="checkbox"/> Use or reuse excavated materials within the confines of the project, and avoid or minimize impacts in sensitive areas of placement of excess material.	C
		<input type="checkbox"/> Retain or reduce the existing in-water footprint of lagoon crossing structures. Project-level analyses and agency consultation, along with more detailed design work, will be used to evaluate the feasibility and potential impacts and benefits of replacing structures and/or removing existing fill in the lagoons. Design of new structures would include features that minimize the amount of discharge into these waters, such as longer bridge spans to minimize the number of in-water structures, designs that minimize the need for rock-slope stabilization at bridge abutments, etc.	D
		MITIGATION MEASURES: <input type="checkbox"/> Biological Resources Management Plans (BRMPs) would be prepared to specify the	D

Resource Area	Potential Impact / Issue	Design Practices and Mitigation Measures (Program EIR/EIS) (To Be Further Evaluated at Project Level)	Mitigation Timing ¹
		<p>design and implementation of biological resources mitigation measures, including habitat replacement and revegetation, protection during construction, performance (growth) standards, maintenance criteria, and monitoring requirements. The USFWS, CDFG, and USACE would review Draft BRMPs. The primary goal of a BRMP is to ensure the long-term perpetuation of the existing diversity of habitats in the project area and adjacent urban interface zones. BRMPs will contain the following:</p> <ol style="list-style-type: none"> a. Specific measures for the protection of sensitive amphibian, mammal, bird, and plant species during construction. b. Identification and quantification of habitats to be removed, along with the locations where these habitats are to be restored or relocated. c. Procedures for vegetation analyses of adjacent protected habitats to estimate their relative composition; site preparation (clearing, grading, weed eradication, soil amendment, topsoil storage); irrigation, planting (container plantings, seeding); and maintenance (weed control, irrigation system checks, replanting). This information would be used to determine the requirements for revegetation areas. d. Sources of plant materials and methods of propagation. e. Specific parameters for the determination of the amount of replacement habitat for temporary disturbance areas. f. Specification of parameters for maintenance and monitoring of re-established habitats, including weed control measures, frequency of field checks, and monitoring reports for temporary disturbance areas. g. Specification of performance standards for growth of re-established plant communities and cut-and-fill slopes. h. Remedial measures to be taken if performance standards are not met. i. Methodologies and requirements for monitoring of the restoration/replacement efforts. j. Measures to preserve topsoil and control erosion control. k. Design of protective fencing around Environmentally Sensitive Areas (ESAs) and construction staging areas. l. Specification of location and quantities of gallinaceous guzzlers (catch basin/artificial watering structures, if needed); specification of monitoring of water levels in guzzlers. m. Location of trees to be protected as wildlife habitat (roosting sites) and locations for planting of replacement trees. n. Specification of the purpose, type, frequency, and extent of chemical use for insect 	

Resource Area	Potential Impact / Issue	Design Practices and Mitigation Measures (Program EIR/EIS) (To Be Further Evaluated at Project Level)	Mitigation Timing ¹
		<p>and disease control operations as part of vegetative maintenance within sensitive habitat areas.</p> <ul style="list-style-type: none"> o. Specific construction monitoring programs for sensitive species. p. Specific measures for the protection of sensitive habitats to be preserved. These measures may include, but are not limited to, erosion and siltation control measures, protective fencing guidelines, dust control measures, grading techniques, construction area limits, and biological monitoring requirements. q. Provisions for biological monitoring during construction activities to ensure compliance and success of protective measures. The monitoring procedures would (1) identify specific locations of wildlife habitat and sensitive species to be monitored; (2) identify the frequency of monitoring, monitoring methodology (for each habitat and sensitive species to be monitored); (3) list required qualifications of biological monitor(s); and (4) identify reporting requirements. 	
	Impacts to plant communities and sensitive plant species	<p>MITIGATION MEASURES:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Reduce impacts to plant communities by use of construction monitoring, on- and/or off-site revegetation/restoration, and purchase of existing mitigation bank credit. On-site mitigation is preferred. Off-site mitigation should be located within the same watershed or in close proximity to the impact area. 	C
		<ul style="list-style-type: none"> <input type="checkbox"/> Consult with regulatory agencies to determine and establish appropriate mitigation ratios. 	D
		<ul style="list-style-type: none"> <input type="checkbox"/> Measures to mitigate potential impacts to sensitive plant species may include pre-construction focused surveys, construction monitoring, restoration of suitable breeding and foraging habitat, relocation of plants, seed collection, plant propagation, out-planting to a suitable mitigation site, purchase of credits from an existing mitigation bank, and participation in an existing Habitat Conservation Plan (HCP). 	D
		<ul style="list-style-type: none"> <input type="checkbox"/> Prevent the spread of weeds during construction and operation by identifying areas with existing weed problems and measures to control traffic moving out of those areas such as cleaning construction vehicles or limiting the movement of fill. 	C
	Impacts to sensitive wildlife species and wildlife movement / migration corridors	<p>MITIGATION MEASURES:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Measures to mitigate potential impacts to sensitive wildlife species may include pre-construction focused surveys, construction monitoring, restoration of suitable breeding and foraging habitat, and participation in an existing HCP. 	D, C
		<ul style="list-style-type: none"> <input type="checkbox"/> Record locations of observed species on construction drawings and phase 	C

Resource Area	Potential Impact / Issue	Design Practices and Mitigation Measures (Program EIR/EIS) (To Be Further Evaluated at Project Level)	Mitigation Timing ¹	
		construction to avoid the breeding season.		
		<input type="checkbox"/> Construct wildlife underpasses, bridges, and/or large culverts, to facilitate known wildlife movement corridors.	C	
		<input type="checkbox"/> Ensure that wildlife crossings are of a design, shape, and size to be sufficiently attractive to encourage wildlife use.	D, C	
		<input type="checkbox"/> Provide appropriate vegetation to wildlife overcrossings and undercrossings to afford cover and other species requirements.	C	
		<input type="checkbox"/> Design functional corridors to provide connectivity to protected land zoned for uses that provide wildlife permeability. The following measures would be used in the design of wildlife movement corridors: a. Identify the habitat areas the corridor is designed to connect b. Select several species of interest from the species present in the area c. Evaluate the relevant needs of each selected species d. For each potential corridor, evaluate how the area will accommodate movement by each species of interest e. Draw the corridors on a map f. Design and implement a monitoring program	D	
		<input type="checkbox"/> Use aerial structures or tunnels to allow for unhindered crossing by wildlife.	D	
	Impacts to jurisdictional waters and wetlands; impacts to lagoon areas	MITIGATION MEASURES:		C
		<input type="checkbox"/> Return degraded habitat to pre-existing conditions		C
		<input type="checkbox"/> Create new habitat by converting non-wetland habitats into wetland or other aquatic habitat.		C
		<input type="checkbox"/> Enhance existing wetlands by increasing one or more functions through activities such as plantings or non-native vegetation eradication.		C
		<input type="checkbox"/> Provide for passive revegetation by allowing a disturbed area to revegetate naturally.		C
		<input type="checkbox"/> Purchase credits in an existing wetlands or aquatic habitat mitigation bank.		C
	<input type="checkbox"/> Provide in-lieu fee payments to an agency or other entity that will provide aquatic habitat conservation or restoration.		C	

Resource Area	Potential Impact / Issue	Design Practices and Mitigation Measures (Program EIR/EIS) (To Be Further Evaluated at Project Level)	Mitigation Timing ¹
		<input type="checkbox"/> Develop and implement measures to address the “no net loss” policy for wetlands.	D, C
		<input type="checkbox"/> Emphasize on-site mitigation over off-site mitigation, and for off-site mitigation prefer location within the same watershed or as close in proximity to the area of impact as possible.	C
		<input type="checkbox"/> Work with resource agencies and lagoon organizations to develop and implement a mitigation planning and monitoring program to determine impacts and mitigation effectiveness for sensitive species and habitats in lagoon areas. Elements may include documenting baseline conditions, monitoring mitigation to determine effectiveness and compatibility with lagoon restoration programs, and coordinating to the extent feasible the rail improvements construction with other projects in lagoon areas.	D, C
Section 4(f) and 6(f) Resources (Public Parks and Recreation)	Impacts to parks and recreational resources	DESIGN PRACTICES: <ul style="list-style-type: none"> <input type="checkbox"/> Utilize existing rail and other transportation corridors to avoid and/or minimize impacts to adjacent parks and recreational lands. <input type="checkbox"/> Continue to refine alignment designs to avoid or minimize impacts to park resources and recreational resources. 	D
		MITIGATION MEASURES: <ul style="list-style-type: none"> <input type="checkbox"/> Apply measures at the project level to reduce and minimize indirect/proximity impacts as appropriate for the particular sites affected, while avoiding other adverse impacts (e.g., visual), such as noise barriers, visual buffers and landscaping. 	D, C
		<input type="checkbox"/> Apply measures to modify access to/egress from the recreational resource to reduce impacts to these resources.	D, C
		<input type="checkbox"/> Design and construct cuts, fill, and aerial structures to avoid and minimize visual impacts to units of the state park system.	D, C
		<input type="checkbox"/> Inventory and record affected historic structures, and provide appropriate mitigation for adverse effects to historic structures.	D, C
		<input type="checkbox"/> Incorporate wildlife under or over crossings at appropriate intervals as necessary.	D, C
		<input type="checkbox"/> Restore affected park lands to natural state and replace or restore affected park facilities.	C
		<input type="checkbox"/> Require appropriate vehicle cleaning for all construction equipment used near units of	C

Resource Area	Potential Impact / Issue	Design Practices and Mitigation Measures (Program EIR/EIS) (To Be Further Evaluated at Project Level)	Mitigation Timing ¹
		the California State Park System to protect against spreading of exotic plants or disease.	
		<input type="checkbox"/> If park facilities must be relocated, provide planning studies as well as appropriate design and replacement with minimal impact on park use.	D
		<input type="checkbox"/> Use local native plants for revegetation.	C
		<input type="checkbox"/> Develop and implement construction practices, including scheduling, to limit impacts to wildlife, wildlife corridors and visitor use areas within public parks.	C
		<input type="checkbox"/> Use best management practices during construction and maintenance to protect wetland resources.	C, O
		<input type="checkbox"/> For temporary loss of park and recreation uses consider providing compensation.	D
		<input type="checkbox"/> Where public parklands acquired with public funds would be acquired for non-park use as part of the LOSSAN rail corridor improvements, commit as required by law to providing funds for the acquisition of substantially equivalent substitute parkland or to acquiring/providing substitute parkland of comparable characteristics for construction impacts.	D
Growth Inducement	Localized growth impacts around station sites	MITIGATION MEASURES: <input type="checkbox"/> For any localized growth impacts around expanded or new stations, coordinated early in project-level reviews with local jurisdictions on land use plans and any necessary controls to minimize impacts.	D
		<input type="checkbox"/> Develop station designs compatible with local land use plans, and that maximize intermodal traffic and transfers and reduce congestion around stations.	D
Cumulative Impacts	Traffic circulation and travel conditions	MITIGATION MEASURES: <input type="checkbox"/> Strategies can be developed, in consultation with state, federal, regional, and local governments and affected transit agencies, to improve the flow of intercity travel on the primary routes and access to the proposed stations or airports and to reduce traffic impacts including: 1. Regional strategies would include coordination with Regional Transportation planning and Intelligent Transportation System Strategies. 2. Local improvements could employ TSM/Signal Optimization; local spot widening of curves; and major intersection improvements.	D, C

Resource Area	Potential Impact / Issue	Design Practices and Mitigation Measures (Program EIR/EIS) (To Be Further Evaluated at Project Level)	Mitigation Timing ¹
		<ol style="list-style-type: none"> 3. Traffic Management Plans would be prepared prior to construction, in coordination with local jurisdictions and agencies. 4. Promote transit-oriented development around existing stations to provide coordinated planning of travel ways, parking and ingress/egress to new or expanded station locations. 5. Federal, state, and local transportation entities should conduct coordinated and concurrent reviews of construction activities and schedules to streamline the number and duration of traffic delays resulting from multiple project development. 6. Federal, state, and local transportation entities involved with rail improvements and the I-5 North Coast Corridor project should coordinate planning, construction and implementation efforts to reduce traffic impacts in the northern San Diego County area. 	
	Air quality impacts	<p>MITIGATION MEASURES:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Mitigation strategies to address localized air quality impacts include the following measures to reduce this impact: <ol style="list-style-type: none"> 1. Grade separate highway-rail crossings to reduce vehicular delays and idling. 2. Utilize energy efficient, cleaner locomotive technologies to reduce potential pollution. 3. Promote the installation of diesel particulate filters, fleet turnover to newer technologies, and reduction of idling through infrastructure improvements and automatic anti-idling devices installed on locomotives. 4. Minimize construction air emissions through timely revegetation of disturbed areas, watering of construction sites, street sweeping, soil stabilization, and restrictions on equipment idling times. 5. Promote joint construction planning with other federal, state, regional, and local transportation and transit agencies to streamline construction activities and reduce cumulative fugitive dust emissions. 6. Promote increased use of public transit, alternative fueled vehicles, and parking for carpools, bicycles, and other alternative transportation methods. 	D, C, O
	Impacts on noise and vibration	<p>MITIGATION MEASURES:</p> <ul style="list-style-type: none"> <input type="checkbox"/> The following mitigation strategies would be adopted to reduce cumulative noise impacts: 	D, C, O

Resource Area	Potential Impact / Issue	Design Practices and Mitigation Measures (Program EIR/EIS) (To Be Further Evaluated at Project Level)	Mitigation Timing ¹
		<ol style="list-style-type: none"> 1. Joint planning with federal, state, regional, and local transportation and transit agencies to reduce construction related noise 2. Construction associated with in-water work in the lagoons should be coordinated with restoration projects to minimize impacts to sensitive and biological resources. 3. Use full grade separations at major roadways to avoid need for warning horns. 4. Investigate the use of noise reduction infrastructure such as noise walls and earth berms. 5. Utilize grade separation to reduce noise to nearby sensitive receptors. 6. Implement construction mitigation such as construction schedules during daytime hours only, limiting haul truck hours, and choosing routes that avoid neighborhoods and recreational or open space. 	
	Energy	<p>MITIGATION MEASURES:</p> <ul style="list-style-type: none"> □ The mitigation strategies related to cumulative energy consumption include: <ol style="list-style-type: none"> 1. Utilize grade separations to reduce vehicle and train idling and congestion. 2. Maximize intermodal transit connections to reduce automobile travel related to the passenger rail service. 3. Reduce construction impacts with a construction energy conservation plan, using new, more energy-efficient construction equipment, and implementing work programs for carpooling or public transportation. 4. Implement joint construction planning to streamline construction activities. 	D, C, O
	Impacts on land use and planning, communities and neighborhoods, property, and environmental justice	<p>MITIGATION MEASURES:</p> <ul style="list-style-type: none"> □ The mitigation strategies for LOSSAN contributions to cumulative land use impacts include: <ol style="list-style-type: none"> 1. Design refinements around stations or other populated areas that would reduce or avoid barrier effects or neighborhood impacts. 2. Design practices to maximize use of existing rights-of-way, and incorporating strategies for stations to incorporate transit oriented design. 3. Coordination with cities and counties in each region to ensure that project facilities would be consistent with land use planning processes and zoning ordinances. 4. Joint planning, rail and highway work, to reduce construction duration and disturbances in and around coastal cities. 	D, C

Resource Area	Potential Impact / Issue	Design Practices and Mitigation Measures (Program EIR/EIS) (To Be Further Evaluated at Project Level)	Mitigation Timing ¹
	Impacts on aesthetics and visual resources	<p>MITIGATION MEASURES:</p> <ul style="list-style-type: none"> □ The following mitigation strategies would reduce cumulative visual impacts: <ol style="list-style-type: none"> 1. Promote design practices that place existing and new rail infrastructure in a tunnel or covered trench, or remove existing rail infrastructure from areas of high scenic value and relocate it in tunnels. 2. Promote design practices that avoid or minimize impact to coastal views of residences, beaches, and commercial establishments. 3. Utilize design practices that will incorporate local agency and community input during subsequent project level environmental review in order to develop context sensitive aesthetic designs and treatments for infrastructure. 4. Implement design practices that integrate into landscape contexts, reducing potential view blockage, contrast with existing landscape settings, and light and shadow effects. 	D
	Impacts on public utilities	<p>MITIGATION MEASURES:</p> <ul style="list-style-type: none"> □ The mitigation strategies include the following to reduce cumulative impacts to utilities: <ol style="list-style-type: none"> 1. Design measures that will avoid potential conflicts to the extent feasible and practical, including methods to avoid crossing or using utility rights-of-way, and modifying both the horizontal and vertical profiles of proposed rail improvements. Emphasis would be placed on detailed alignment design to avoid potential contribution to cumulative impacts from linear facilities on land use opportunities and to minimize conflicts with existing major fixed public utilities and supporting infrastructure facilities. 2. Participate in joint construction planning with other projects along the corridor where feasible to help reduce potential conflicts with utilities, as well as potentially provide opportunities for one-time relocation and/or protection of major utilities. 3. Coordinate with utility representatives during construction in the vicinity of critical infrastructure. 	D, C
	Impacts on cultural and paleontological resources	<p>MITIGATION MEASURES:</p> <ul style="list-style-type: none"> □ The mitigation strategies include the following to reduce potential cumulative impacts to cultural and paleontological resources: <ol style="list-style-type: none"> 1. Joint implementation planning with other major projects along the corridor to 	D, C

Resource Area	Potential Impact / Issue	Design Practices and Mitigation Measures (Program EIR/EIS) (To Be Further Evaluated at Project Level)	Mitigation Timing ¹
		<p>confirm presence of any sensitive areas and resources, and allow for coordinated protection of those resources during construction. Also, jointly participate in data recovery and curation efforts if required by SHPO prior to construction.</p> <ol style="list-style-type: none"> 2. Continued consultation with SHPO would occur to define and describe general procedures to be applied in the future for fieldwork, method of analysis, and the development of specific mitigation measures to address effects and impacts to cultural resources, potentially resulting in a programmatic agreement between the future lead agencies and SHPO. 3. Consultation with Native American tribes would be conducted. 4. Avoid impacts through project-level identification of sensitive resources and project design refinements and alignment variations. 5. Subsequent project level field studies to verify the location of cultural resources would offer opportunities to avoid or minimize direct impacts on resources, based on the type of project, type of property, and impacts to the resource. 	
	Impacts on geology and soils	<p>MITIGATION MEASURES:</p> <ul style="list-style-type: none"> <input type="checkbox"/> The mitigation strategies include the following to reduce cumulative impacts: <ol style="list-style-type: none"> 1. Design practices will be used while preparing extensive alignment studies to ensure that potential effects related to major geologic hazards such as major fault crossings, oil fields, and landslide areas, will be avoided. 2. Mitigation for potential impacts will be developed on a site-specific basis, based on detailed geotechnical studies to address ground shaking, fault crossings, slope stability/landslides, areas of difficult excavation, hazards related to oil and gas fields, and mineral resources. 3. Encourage the removal of existing rail line from unstable coastal bluffs. This would reduce the need for drainage and slope stabilization structures in these areas. 4. Promote joint implementation planning with other projects along the corridor to provide opportunities for streamlined efforts regarding slope and soil stabilization, revegetation, site-specific seismic studies and design refinements, and dewatering during construction. 	D, C, O
	Impacts on hydrology and water resources	<p>MITIGATION MEASURES:</p>	D, C, O

Resource Area	Potential Impact / Issue	Design Practices and Mitigation Measures (Program EIR/EIS) (To Be Further Evaluated at Project Level)	Mitigation Timing ¹
		<p><input type="checkbox"/> The mitigation strategies include the following to reduce cumulative impacts:</p> <ol style="list-style-type: none"> 1. Design practices to reduce the amount of impermeable surfaces because at-grade alignments would consist of permeable track-fill 2. Design practices to maximize use of existing rights-of-way and tunnels to minimize potential impacts on water resources. 3. Design practices in lagoon areas of northern San Diego County to remove existing embankments or fill with the construction of replacement causeway or open-cell bridge structures. This would increase tidal flow in lagoon areas. 4. Joint planning with I-5 North Coast Corridor Project and lagoon restoration projects for coordinated bridge design, removal of fill, and demolition activities. Plan for all major construction to occur during one time frame if project planning and funding makes this feasible, to reduce the number of disturbances within and around lagoon environments and to limit potential cumulative impacts of sedimentation and turbidity. 5. Joint mitigation planning and monitoring, water sampling studies before and after construction, and other such technical studies that may contribute to the overall health of lagoon hydrology. 6. Coordinated planning and design of drainage facilities, catch basins, swales, or other features associated with the rail project to potentially improve water quality despite additional vehicular and rail traffic in the future. 7. Avoidance and minimization measures would be incorporated into the development, design, and implementation phases. 8. Close coordination with the regulatory agencies to develop specific design and construction standards for stream crossings, infrastructure setbacks, erosion control measures, sediment controlling excavation/fill practices, and other best management practices. 9. Mitigation strategies specific to reconstruction, restoration, or replacement of the resource will occur, in close coordination with state and federal resource agencies, related to flood plains; surface waters, runoff, and erosion; and groundwater. 	
	Impacts on biological resources and wetlands	<p>MITIGATION MEASURES:</p> <p><input type="checkbox"/> The mitigation strategies include the following to reduce cumulative impacts to biological resources and wetlands:</p>	D, C, O

Resource Area	Potential Impact / Issue	Design Practices and Mitigation Measures (Program EIR/EIS) (To Be Further Evaluated at Project Level)	Mitigation Timing ¹
		<ol style="list-style-type: none"> 1. Design practices to maximize use of existing rights-of-way to minimize potential impacts on biological resources and wetlands. 2. Joint planning and implementation efforts would reduce impacts to lagoons and other areas of important habitat and wildlife movement corridors. 3. Joint planning would provide opportunity for streamlining permits and regulatory requirements. Determine components of each phase and what tasks can be completed together as one project or multiple projects on the basis or programmatic permitting. 4. Joint planning of maintenance activities after construction in sensitive areas to avoid duplication of maintenance equipment, coordinate schedules, reduce equipment disturbance, and potential of overlapping or excessive application of herbicides and other chemicals in sensitive environments. 5. Avoidance and minimization measures would be incorporated into the development, design, and implementation phases. 6. Close coordination will occur with the regulatory agencies to develop specific design and construction standards for stream crossings, infrastructure setbacks, monitoring during construction, and other best management practices. 7. Mitigation strategies specific to reconstruction, restoration, or replacement of the resource will occur, in close coordination with state and federal resource agencies, related to wetlands. 8. Field studies would be conducted to verify the location, in relation to the LOSSAN alignments, of sensitive habitat, wildlife movement corridors, and wetlands. These studies would provide further opportunities to minimize and avoid potential impacts on biological resources through changes to the alignment plan and profile in sensitive areas. For example, the inclusion of design features such as elevated track structures over drainages and wetland areas and wildlife movement corridors would minimize potential impacts to wildlife and sensitive species. 	
	<p>Impacts on Section 4(f) and 6(f) resources (public parks and recreational resources)</p>	<p><input type="checkbox"/> The mitigation strategies include the following and would reduce cumulative impacts to Section 4(f) and 6(f) resources:</p> <ol style="list-style-type: none"> 1. Design practices to include use of existing right-of-way and rail corridors or tunnels to avoid or minimize impacts to parks and recreational resources. 2. Joint planning implementation with other project proponents and state and local parks and recreation agencies and foundation to reduce construction-related 	<p>D, C, O</p>

Resource Area	Potential Impact / Issue	Design Practices and Mitigation Measures (Program EIR/EIS) (To Be Further Evaluated at Project Level)	Mitigation Timing ¹
		<p>impacts, as well as to develop measures to minimize harm if required.</p> <ol style="list-style-type: none"> 3. Joint planning to coordinate enhancement efforts such as funding, interpretive materials along trails, or other public benefits. 4. Incorporation of sound barriers (e.g., walls, berms or trenches), visual buffers/landscaping, and modification of transportation access to/egress from the public lands and recreational resource. 5. Incorporation of design modifications or controls on construction schedules, phasing, and activities 6. Beautification measures. 7. Replacement of land or structures or their equivalents on or near their existing site(s). 8. Tunneling, cut and cover, cut and fill of right-of-ways. 9. Treatment of embankments. 10. Planting, screening, creating wildlife corridors, acquisition of land for preservation, installation of noise barriers. 11. Establishment of pedestrian or bicycle paths. 12. Other potential mitigation strategies could be identified during the public input process. 	
		<p><input type="checkbox"/> In the event that LOSSAN corridor alignments or facilities are located within or in close proximity to public parks, the following mitigation strategies for natural, cultural, aesthetic and recreational impacts may be considered to offset the contribution to the cumulative impact:</p> <ol style="list-style-type: none"> 1. Compensation for temporary and loss of park and recreation use. 2. Recordation of any historic features removed. 3. If necessary, provide alternative shuttle access service to park visitors. 4. Restore directly impacted park lands to a natural state. 5. If any facilities must be relocated, provide planning studies as well as design and appropriate replacement with minimal impact on park use. 6. Inventory and record affected historic structures. Provide appropriate mitigation for adverse effects to historic structures. 	D, C

Resource Area	Potential Impact / Issue	Design Practices and Mitigation Measures (Program EIR/EIS) (To Be Further Evaluated at Project Level)	Mitigation Timing ¹
		<ul style="list-style-type: none"> 7. Require appropriate vehicle cleaning for all construction equipment used near units of the California State Park System to protect against spreading exotic plants or disease. 8. Use local native plants for revegetation. 9. Design and construct cuts, fills, and aerial structures to avoid and minimize visual impact to units of the State Park System. 10. In addressing impacts to wildlife movement corridors and habitat directly related to California State Park System units, consult with the California Department of Parks and Recreation. 11. Incorporate wildlife under- or over-crossings as necessary. 12. Adopt construction practices to protect critical wildlife corridors and visitor use areas within public parks. 	