OCTA

*October 6, 2025*

***To:*** Regional Transportation Planning Committee

***From:*** Darrell E. Johnson, Chief Executive Officer

***Subject:*** Coastal Rail Resiliency Study Update

## *Overview*

The Orange County Transportation Authority initiated the Coastal Rail Resiliency Study in fall 2023, focusing on both short- and mid-term solutions to protect the rail line and preserve rail operations. Through this study, staff has developed Alternative Concepts that would protect the rail line in place for up to 30 years. An update on the refined Alternative Concepts for the Coastal Rail Resiliency Study and a summary of the public meetings hosted in July 2025 is provided herein.

## *Recommendation*

Direct staff to advance the study with the refined range of Alternative Concepts, continue collaborating with key stakeholders for further analysis, and actively engage the public to solicit input.

## *Background*

The Orange County Transportation Authority (OCTA) owns and maintains approximately 47 miles of operating railroad right-of-way, with 42 miles along the Orange Subdivision and 5.5 miles along the Olive Subdivision. A map of both subdivisions is provided as Attachment A. This rail corridor is part of the Los Angeles – San Diego – San Luis Obispo Rail Corridor that serves intercity and commuter passenger and freight rail service.

Beginning in fall 2021, several bluff failures, landslides on the inland side, and diminishing beaches on the seaward side in the City of San Clemente have resulted in a series of rail service disruptions, totaling nearly one year of rail operating impacts.

In late 2023, OCTA initiated the South Coast Rail Infrastructure Feasibility Study and Alternative Concepts Analysis (also known as the Coastal Rail Resiliency

Study [Study]) which focuses on the seven-mile stretch of coastal rail line in south Orange County. The Study was undertaken to assess existing and future risks, challenges, and potential solutions to protect the rail line in place. During the first half of 2024, nearly three dozen meetings were held with stakeholders, regulatory agencies, and the public to gather feedback on the Study and early action items. These include four imminent high-risk areas that if not immediately addressed, may result in additional unforeseen emergencies that further impact rail operations. Input included requests to integrate natural solutions, consideration of the impacts of armoring actions, consulting with relevant experts, and maintaining reliable passenger rail service, etc.

The Study explores opportunities to protect the rail corridor for the short- to mid-term, defined as up to 30 years, between the City of Dana Point and the Orange County/San Diego County Line. It also identified four immediate early actions that are required to minimize further service disruptions. These early action areas are all located within the City of San Clemente, and continue to experience storm surges, bluff failures, erosion, and other factors. Early actions include riprap repairs at three sites, a catchment wall, demolition of the Mariposa Beach bridge and restoration of the trail, targeted sand nourishment, and other stabilization efforts to further buffer the rail line. OCTA has secured over $300 million in state and federal funding along with local funds to support these early action efforts to help ensure continued safe and reliable rail operations.

Draft Alternative Concepts for the short – to mid-term effort were presented to the OCTA Board of Directors (Board) in February 2025. They included eight beachside, nine bluffside, and three rail concepts to serve as a list of pre-screened options for application along seven typical segments of the seven-mile corridor, which have similar land-use characteristics (Attachment B). The primary objective of these concepts is to protect the rail operations against bluff erosion, coastline retreat, and rail vulnerabilities. Bluffside example concepts include various wall types, stabilization measures, and drainage improvements. Beachside example concepts include riprap placement, engineered rock revetment, and beach sand nourishment. Rail example concepts include elevating the track profile, alternative materials for critical railroad assets such as signal houses, masts, positive train control equipment, and track bed stabilization. As part of this item, the Board directed staff to proceed with refinement of the Alternative Concepts and continue collaboration with key stakeholders.

***Discussion***

In July 2025, OCTA hosted two public meetings to solicit additional public input on the draft Alternative Concepts. The first meeting was held in-person at the San Clemente City Hall on Tuesday, July 15, 2025. The second meeting was held virtually on Tuesday, July 29, 2025, with 63 and 87 participants, respectively. Attendees included residents, community-based organizations, key stakeholders, media, agencies, and participants from previous listening sessions. Spanish interpretation was provided for both meetings, and in-person attendees were able to review informational display boards and speak with the project team beforehand.

Following each of the stakeholder, regulatory, and public meetings, the technical team worked to refine the range of draft Alternative Concepts and developed evaluation criteria to assess a range of concepts with the primary goal of protecting the rail line in place over the next several decades. The evaluation process produced a list of highest scoring concepts from each category to be carried forward for further development as part of the Study.

The evaluation criteria consisted of five categories, each with their own respective percentage weights based on design life (up to 30 years), ability to protect the rail line, and how well the concepts meet the goals and objectives of the Study. In addition, it should be noted that while a concept may score well in one category, it may score poorly in another. The overall scoring of each topic reflects a concept's average across all scoring criteria.

The evaluation criteria is summarized below. A more detailed description is provided in Attachment C.

| Evaluation Topic/Description | Weight |
|---|---|
| Coastal Resilience and Rail Reliability: service disruptions during maintenance, sensitivity to storm surge, sea level rise, beach erosion, longevity of concept (30-year design life), as well as track resilience provided from bluff erosion | 25 percent |
| Implementability and constructability: ROW requirements, schedule and speed of implementation, minimize construction impacts, complexity of constructability, and the ability to meet design criteria | 25 percent |
| Costs: construction, maintenance, and lifecycle costs for consideration | 20 percent |

| Evaluation Topic/Description | Weight |
|---|---|
| Public Assets and Environmental Impacts: local resources, public facilities, utilities, grade crossings, surfing and swimming, multi-use paths and pedestrian access, beach/coastal access, permitting, sensitive habitats, as well as Section 4(f) resources | 20 percent |
| Related/Planned Projects: alignment with local, state, federal planning efforts. Determine whether concepts support and/or supplement initiatives by other agencies to address coastal erosion challenges | 10 percent |

*Scoring Results - Rail*

Of the three rail alternative concepts, two are recommended for further consideration. Alternative materials for critical railroad infrastructure to improve the resiliency of the rail line, as well as reducing lifecycle costs, are the least challenging, can be phased, and limits impacts to surrounding communities and environmental assets. Ground improvement (track-bed stabilization) has the best influence on railroad resiliency and can be combined with bluffside ground improvements to further stabilize area, although it may impact railroad operations during construction. Elevation of the tracks comes at a high cost with construction outweighing benefits comparatively.

*Bluffside*

Of the nine Bluffside Alternative Concepts, two are recommended for further consideration: catchment walls and tieback/soil nail/pin-pile walls, which are cost-effective, low-maintenance, and fit within existing ROW. Stabilization grading and hydraugers are not recommended due to construction challenges and community impacts. Drainage measures (cut-off drains, basins, outlets, matting, vegetation) are generally not recommended because of limited applicability and lack of corridor-wide benefit, and ground improvements (track stabilization) are only recommended in combination with rail-related ground improvements. Deflection walls in tributaries may support the goals of this Study; however, natural beach replenishment can take years with several influencing factors, such as the frequency and strength of storms and waves, which would require regional collaboration and possible implementation by other agencies.

*Beachside*

Of the five Beachside Alternative Concepts, three are recommended for further consideration, and generally consist of beach nourishment with either a combination of seawall and rock shoreline protection structure, seawall, and/or riprap. These concepts are recommended due to construction limitations within the existing ROW and the proven nature of such structures to protect the railroad while also improving beach access when combined with sand placement. Sand

retention measures are not recommended due to impacts on recreational users (surfing/swimming) and a challenging environmental approval process. Beach nourishment only (not combined with any other solution) and watershed modifications are not recommended due to lead time, funding, sourcing, and monumental coordination and permitting efforts, requiring implementation by other agencies. Beach nourishment as a stand-alone solution would require repeated large-scale sand placements and extensive sourcing/testing, as shown by other initiatives.

Key Project Risk and Challenges

Any improvements that are being planned would be subject to the immediate risk of additional bluff failures during the project development process which could lead to immediate rail service closure and require rescoping of planned improvements underway. As the proposed improvements progress through the project development process, some of the key challenges will include:

- Identification and permitting of a sufficient sand replenishment source location
- Developing and securing a timely sand transport and delivery method
- Coordination, approvals, and permitting required for additional revetment

Next Steps

With direction from the Board, the Study team will continue public and stakeholder engagement on the short-listed concepts through in-person and virtual meetings. The short-listed Alternative Concepts will be further developed for future project implementation. Staff will return to the Board in summer 2026 with the Draft Feasibility Study Report. Following the conclusion of this short- and mid-term planning Study, OCTA will begin the alternatives analysis, preliminary engineering, and environmental clearance phase for the various concepts identified through this effort. This Study will also help to determine the priority of the identified improvements. Staff will continue to identify funding and project streamlining opportunities as well as work with regulatory agencies to expedite the permitting processes.

***Attachments***

A. Orange and Olive Subdivisions Map
B. Typical Sections Map
C. Scoring Weights, Considerations, and Rankings

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