

ORANGE COUNTY TRANSPORTATION AUTHORITY

# OCTA RAIL DEFENSE AGAINST CLIMATE CHANGE PLAN

AGREEMENT NO. C-8-2072

**FINAL  
REPORT**

Prepared for:



Orange County Transportation Authority  
550 South Main Street  
Orange, CA 92863

**January 2021**

# CONTENTS

---

<b>1.0 EXECUTIVE SUMMARY</b> .....	<b>1</b>
1.1 Introduction .....	1
1.2 Community Engagement .....	1
1.3 Systemwide Exposure Scan .....	1
1.4 Detailed Facility Level Assessments .....	2
1.4.1 Coastal Alignment.....	3
1.4.2 Mission Viejo Trench and Extended Oso Creek Tributary/Oso Creek .....	5
1.4.3 Passenger Weather Exposure at Stations.....	5
1.5 Conclusion .....	6

---

<b>2.0 INTRODUCTION</b> .....	<b>7</b>
-------------------------------	----------

<b>3.0 COMMUNITY ENGAGEMENT</b> .....	<b>10</b>
3.1 Stakeholder engagement process .....	10
3.2 Public outreach process .....	10

---

<b>4.0 SYSTEMWIDE EXPOSURE SCAN</b> .....	<b>16</b>
4.1 Future climate projections in Orange County .....	16
4.2 Threats to the rail system .....	16
4.2.1 Coastal Flooding.....	16
4.2.2 Inland Flooding .....	17
4.2.3 Slope Failure and Erosion .....	18
4.2.4 High Heat.....	19
4.2.5 Wildfire .....	20
4.2.6 Drought .....	22
4.3 Areas Identified for Facility-Level Assessments.....	22

---

<b>5.0 FACILITY-LEVEL ASSESSMENTS</b> .....	<b>24</b>
5.1 Coastal Alignment: Erosion and Flood Risk (MP 200.2-207.4) .....	27
5.1.1 Context.....	27

5.1.2	<i>Key Findings</i> .....	34
5.1.3	<i>Recommendations</i> .....	60
5.1.4	<i>Incorporating Feedback from the California Coastal Commission and Establishing Adaptation Triggers</i> .....	63
<b>5.2</b>	<b>Mission Viejo Trench and Extended Oso Creek Tributary (O10)/Oso Creek: Flooding and Erosion/Sediment Control</b> .....	<b>68</b>
5.2.1	<i>Context</i> .....	68
5.2.2	<i>Key Findings</i> .....	72
5.2.3	<i>Recommendations</i> .....	83
<b>5.3</b>	<b>Passenger Weather Exposure at Stations and Green Infrastructure Solutions</b> .....	<b>85</b>
5.3.1	<i>Context</i> .....	85
5.3.2	<i>Key Findings</i> .....	90
5.3.3	<i>Recommendations</i> .....	98
<b>5.4</b>	<b>General Recommendations</b> .....	<b>105</b>
5.4.1	<i>Hydrology and Hydraulics</i> .....	105
5.4.2	<i>Temperature-Related Rail Stress</i> .....	106
5.4.3	<i>Power Shutoffs Resulting from Fires, Heatwaves, or Wind</i> .....	106
<b>5.5</b>	<b>Cost of Rail Service Disruption</b> .....	<b>108</b>
<hr/>		
<b>6.0</b>	<b>CONCLUSION</b> .....	<b>109</b>
<b>7.0</b>	<b>REFERENCES</b> .....	<b>110</b>
<b>8.0</b>	<b>APPENDIX A</b> .....	<b>113</b>
	Public Outreach Summary Report	

# TABLES

TABLE 1	Survey Key Findings .....	15
TABLE 2	OCTA Present Discounted Total Lifecycle Costs by Adaptation Option and Climate Scenario (includes Installation and Hazard Costs; 2% Discount Rate) .....	54
TABLE 3	OCTA Benefit Cost Ratios (2% Discount Rate; Benefits are avoided Hazard-related Costs from Baseline; Costs are Installation costs) .....	55
TABLE 4	Mission Viejo Trench Adaptation Measure Suitability .....	84
TABLE 5	Average Monthly High Temperatures (°F) at OCTA Rail Stations (Weather Spark, n.d.).....	85
TABLE 6	Station Investment Prioritization .....	92

# FIGURES

<b>FIGURE 1  </b>	<b>Project Area Map .....</b>	<b>9</b>
<b>FIGURE 2  </b>	<b>Age of Survey Respondents .....</b>	<b>12</b>
<b>FIGURE 3  </b>	<b>Race/Ethnicity of Survey Respondents .....</b>	<b>13</b>
<b>FIGURE 4  </b>	<b>Annual Household Income of Survey Respondents .....</b>	<b>13</b>
<b>FIGURE 5  </b>	<b>Geographic Distribution of Survey Respondents .....</b>	<b>14</b>
<b>FIGURE 6  </b>	<b>Climate Hazards in Orange County .....</b>	<b>16</b>
<b>FIGURE 7  </b>	<b>Coastal rail corridor in southern Orange County .....</b>	<b>17</b>
<b>FIGURE 8  </b>	<b>Slope along eastern side of rail in San Juan Capistrano.....</b>	<b>19</b>
<b>FIGURE 9  </b>	<b>CalFire Fire Hazard Severity Zones.....</b>	<b>21</b>
<b>FIGURE 10  </b>	<b>Selected Facility Level Assessments.....</b>	<b>23</b>
<b>FIGURE 11  </b>	<b>FHWA ADAP Process.....</b>	<b>26</b>
<b>FIGURE 12  </b>	<b>Coastal Alignment.....</b>	<b>27</b>
<b>FIGURE 13  </b>	<b>Photo of wave approaching the shoreline on the left and overtopping of tracks due to these waves near Transect 87 on October 27, 2015, (Metrolink, 2016) .....</b>	<b>29</b>
<b>FIGURE 14  </b>	<b>Revetment at MP 207.03.....</b>	<b>29</b>
<b>FIGURE 15  </b>	<b>Recent Landslide at MP 204.20 in contact with the Mariposa Walkway Bridge deck .....</b>	<b>31</b>
<b>FIGURE 16  </b>	<b>San Clemente State Beach area (MP 206.03 - 206.05).....</b>	<b>32</b>
<b>FIGURE 17  </b>	<b>Sediment block by K-rail at MP 206.04.....</b>	<b>33</b>

<b>FIGURE 18  </b>	<b>California Ocean Protection Council Sea Level Rise Projections Used in this Study .....</b>	<b>35</b>
<b>FIGURE 19  </b>	<b>Projected 100-Year, 24-Hour Precipitation Event, San Clemente Near Mariposa Promontory .....</b>	<b>37</b>
<b>FIGURE 20  </b>	<b>Components of Total Water Level (Vitousek, et al., 2017) .....</b>	<b>38</b>
<b>FIGURE 21  </b>	<b>Existing Rail and Existing FEMA Total Water Level Elevations .....</b>	<b>41</b>
<b>FIGURE 22  </b>	<b>Existing Rail and Future Total Water Level Elevations: 2100 Low Scenario .....</b>	<b>42</b>
<b>FIGURE 23  </b>	<b>Existing Rail and Future Total Water Level Elevations: 2100 Medium Scenario .....</b>	<b>43</b>
<b>FIGURE 24  </b>	<b>Existing Rail and Future Total Water Level Elevations: 2100 High Scenario .....</b>	<b>44</b>
<b>FIGURE 25  </b>	<b>Improved Revetment with Seawall Concept with Hypothetical Elevations .....</b>	<b>48</b>
<b>FIGURE 26  </b>	<b>Potential Coastal Alignment Relocation .....</b>	<b>49</b>
<b>FIGURE 27  </b>	<b>Segments Requiring Adaptation by SLR Increment .....</b>	<b>52</b>
<b>FIGURE 28  </b>	<b>Shoreline Position with and without Coastal Armoring, 6.6 feet SLR, Mariposa Promontory (USGS CoSMoS).....</b>	<b>58</b>
<b>FIGURE 29  </b>	<b>Shoreline Position with and without Coastal Armoring, 6.6 feet SLR, southern Orange County (USGS CoSMoS).....</b>	<b>59</b>
<b>FIGURE 30  </b>	<b>Alignment from Mission Viejo Trench to Oso Tributary/Oso Creek.....</b>	<b>68</b>
<b>FIGURE 31  </b>	<b>West Track Embankment MP 188.7 to 188.85.....</b>	<b>69</b>
<b>FIGURE 32  </b>	<b>Aerial View at Area 2: MP 189.27 - 189.35 .....</b>	<b>70</b>
<b>FIGURE 34  </b>	<b>FEMA Zone A 100-year Floodplain MP 189.34 to 189.90 .....</b>	<b>71</b>
<b>FIGURE 35  </b>	<b>Projected 100-Year, 24-Hour Precipitation Event in Watershed .....</b>	<b>74</b>
<b>FIGURE 36  </b>	<b>Map Series Depicting Numbered Adaptation Options in Mission Viejo Trench and Oso Creek Tributary/Oso Creek Area .....</b>	<b>80</b>

<b>FIGURE 37  </b>	<b>Heat Health Events, RCP 8.5, 2041-2060, General Populations.....</b>	<b>88</b>
<b>FIGURE 38  </b>	<b>Heat Health Events, RCP 8.5, 2041-2060, Vulnerable Populations.....</b>	<b>89</b>
<b>FIGURE 39  </b>	<b>Survey Results Summary .....</b>	<b>93</b>
<b>FIGURE 40  </b>	<b>Anaheim Canyon Recommended Near-Term Actions .....</b>	<b>99</b>
<b>FIGURE 41  </b>	<b>Buena Park Recommended Near-Term Actions.....</b>	<b>101</b>
<b>FIGURE 42  </b>	<b>Tustin Recommended Near-Term Actions.....</b>	<b>102</b>
<b>FIGURE 43  </b>	<b>Laguna Niguel/Mission Viejo Recommended Near-Term actions.....</b>	<b>104</b>
<b>FIGURE 44  </b>	<b>Metrolink PTC System Components .....</b>	<b>107</b>
<b>FIGURE 45  </b>	<b>How the PTC System Operates .....</b>	<b>107</b>

# 1.0 EXECUTIVE SUMMARY

## 1.1 INTRODUCTION

The Orange County Transportation Authority (OCTA), in partnership with the State of California Department of Transportation (Caltrans) District 12, has completed a study assessing how future climate change affects the Orange County rail corridor. The study focused on the approximately 25-mile section of railway from Jeffrey Road in Irvine to the Orange/San Diego county border and evaluated all twelve Metrolink Stations in Orange County (see Figure 1). This rail system in Orange County services millions of passenger boardings annually, along with freight traffic linking important commercial centers along the corridor.

The purpose of the study was both to characterize and understand future climate-related risk to the rail system and passengers and to identify strategies to help mitigate these risks and preserve the continuity of rail service into the future.

## 1.2 COMMUNITY ENGAGEMENT

The study engaged stakeholders and the general public for their input. A Project Working Group (PWG) convened key stakeholders from within the County. Members provided feedback regarding hazards, adaptation options, relevant policies and processes, and shared information about related work along the rail corridor.

The public outreach included a survey, available in both English and Spanish, to engage riders. 1,341 responses were received from a diverse group, with respondents providing input on station amenities that help protect passengers from heatwaves, heavy rain, and other weather conditions.

Of responding riders, 68% are committed to rail travel regardless of the weather conditions, with another 26% hesitant to travel and 6% unlikely to travel in bad weather. 66% of respondents expressed an interest in riding the train more if station improvements were made. The most popular potential station amenity improvements in the face of extreme weather were more shade, followed by more accurate information about train arrival times, followed by more seating. In the event of the rail service being disrupted, 51% of riders would switch their trips to car and 20% would not make their trips at all.

## 1.3 SYSTEMWIDE EXPOSURE SCAN

The study used a two-tiered approach, with an initial scan of exposure to climate change-related hazards followed by several more detailed assessments of potentially high-risk areas. The exposure scan findings included:

- Coastal flooding: Sea level rise (SLR) and relevant coastal hazards, including storm surge and shoreline erosion, pose a threat to almost all the approximately 7-mile coastal rail corridor in Orange County. This area clearly warranted more analysis, so was the focus of one of the three detailed assessments.
- Inland flooding: Changes in precipitation patterns can impact the frequency and magnitude of flooding affecting the rail system. Areas in or near current floodplains were flagged as part of the systemwide analysis. The two largest areas were:

- » A 5-mile segment between the rail trench in Mission Viejo and northern San Juan Capistrano. It parallels Oso Creek Tributary and Oso Creek and was carried forward for detailed analysis.
- » A segment from southern San Juan Capistrano where the rail parallels San Juan Creek, out to its mouth. The Orange County Flood Control District's San Juan Creek Flood Risk Management Feasibility Study will address flood risk in this area, so it was not carried forward for further analysis.
- Slope failure and erosion: Changing precipitation patterns as well as SLR and changing coastal storm patterns can affect erosion and increase the likelihood of slope failure. Several potential risk areas were flagged, including:
  - » Erosion issues in the Mission Viejo trench (carried forward to detailed analysis)
  - » Oso Creek erosion in San Juan Capistrano downstream of where the creek flows in a concrete channel (not carried forward, as erosion near the rail has been stabilized)
  - » Steep slope to the east of the rail in southern San Juan Capistrano (not carried forward, as slope failure risk appears to be relatively low)
  - » On coastal rail corridor, there are various bluff failure and erosion threats on landward side and shoreline erosion threats on the coastal side (carried forward to detailed analysis)
- High heat: Rising temperatures and high heat events present a potential threat to passenger comfort and health at stations along the corridor. In Orange County, heat-related health events are expected to increase into the future, particularly for more vulnerable populations and particularly in inland rather than coastal areas. One of the detailed analyses reviews this and provides recommended amenity improvements for the most affected stations. Heatwaves can also affect the frequency and duration of power outages and will represent an increasing challenge for the rail system in the future. Furthermore, hotter conditions are also projected to increase the stress on the rail itself, potentially leading to expansion and track buckling. General recommendations regarding both issues are provided later in this report.
- Wildfire: Climate projections show an increasing wildfire risk in southern Orange County. While direct wildfire exposure of the roughly 25-mile rail corridor from Irvine to San Clemente does not appear to be a major threat, wildfire can have consequential indirect impacts on the system, including possible power outages and air quality issues.
- Drought: In Orange County, vegetation is expected to experience increasing climate-related stress, in part due to changing drought patterns. The detailed analysis on station amenities made recommendations for vegetation management under future climate conditions.

---

## 1.4 DETAILED FACILITY LEVEL ASSESSMENTS

The second tier of analysis involved more detailed facility-level assessments aimed at better understanding climate risks and potential adaptation options to respond to these risks. The three detailed assessments were:

- Coastal alignment: erosion and flood risk (Milepost (MP) 200.2 – 207.4)
- Mission Viejo Trench and Extended Oso Creek Tributary/Oso Creek: Flooding and Erosion/Sediment Control (MP 189.0 – 194.6)

- Passenger weather exposure at stations and green infrastructure solutions.

### 1.4.1 COASTAL ALIGNMENT

The coastal rail corridor in southern Orange County is threaded between the Pacific Ocean and high coastal bluffs, finger canyons, and other human developments. The coast along the rail line consists of beach of varying width with some sections of rock revetment. In some areas, there are features such as houses between ocean and the rail; in others, the rail is exposed directly. The rail corridor is a backbone of the regional transportation system, and service disruption can cause massive impacts.

Four SLR scenarios were assessed along the corridor. These scenarios project roughly 1.2-2.8 feet of SLR in 2050 and 2.5-10.2 feet of SLR in 2100. Future heavy precipitation projections were also assessed. There was relatively limited change between the historical and future heavy rainfall events under different scenarios.

The combination of SLR, erosion, and flooding could threaten not only the rail and embankment, but also associated infrastructure, such as bridges, culverts, and stations. According to the analysis, the most exposed sections of rail are the very southernmost portion of Orange County (MP 207.3-207.4) and the Mariposa Promontory (MP 203.9-204.5). Furthermore, if wave runups are not prevented from overtopping the rail, they could exacerbate erosion issues in locations such as Mariposa Promontory, where the bluffs are close to the rail.

MP 207.3-207.4 (southern end of Orange County) may require adaptation under current conditions. In 2040 under all scenarios, adaptation at 203.9-204.5 (Mariposa Promontory) is needed. Adaptation would be needed at all locations by 2100 under the higher scenarios.

The study assessed several options to protect the rail, with four carried forward to a lifecycle cost assessment: a baseline revetment option, improving the revetment, improving and adding a seawall on top of the revetment, and relocating the rail farther inland. Identifying and selecting options in this corridor is complex given that performance of different options varies by location along the coast, future timeframe, and climate scenario. The environmental setting, regulatory setting, and multitude of stakeholders, even in current conditions, add to this complexity.

OCTA faces significant costs along the coastal corridor, regardless of climate scenario and adaptation option chosen. An order-of-magnitude, planning-level lifecycle cost analysis was performed to assess capital, maintenance, damage repair, and service disruption costs of the options. Across scenarios, the improved revetment and improved revetment with seawall performed relatively similarly and had the lowest lifecycle costs among the four options. The baseline revetment had the second highest costs within each scenario, with permanent disruption by the end of the century under higher scenarios. Relocation had by far the highest costs under all the scenarios. In addition, each adaptation option has several key benefits and drawbacks, which are summarized in this report.

Recommendations for the coastal alignment include:

- Continued vigilance in monitoring the existing shoreline revetment performance and regular maintenance.
- Prevent high-volume overtopping of the rail and destruction of the revetment, as it is crucial not only to the rail itself but also the stability of the bluffs behind the rail. Inadequate coastal protection would likely lead to accelerated shoreline erosion and cliff retreat on the landward side of the rail, including both the damage/destruction of public property, such as trails, and infrastructure and private property, such as blufftop homes.
- Formalize design/performance criteria for coastal hazards, and monitor them in a forward-looking manner. 'Adaptation triggers' should be set based upon the best available projections and on the amount of time it takes to implement a solution. The report includes recommendations for how these can be set.
- Where and when the rail is not expected to meet performance criteria, enhanced coastal protection is strongly recommended. The improved revetment (larger rock armor size, more gradual slope, higher crest) option or the improved revetment with seawall option is recommended. While both have some drawbacks, based on the current understanding of possible conditions out to 2100, they appear to be the most reasonable options in areas where the performance criteria are not met. Optimal design concept and parameters should be evaluated further during the conceptual engineering phase. Because the improved revetment with seawall option would likely take up somewhat less beach space than the improved revetment, it is likely more feasible from a permitting standpoint.
- The addition of a new revetment or armor layer onto an existing revetment should only be done where necessary to ensure the performance criteria are met and rail service is not disrupted. Permitting is likely only feasible for additional coastal armoring where and when it is critical to protect the rail infrastructure and service.
- Per the California Coastal Commission, coastal armoring projects (e.g., installation of new revetment or enhancement of an existing one) should be designed to eliminate or mitigate adverse impacts on beach access and sediment supply.
- Given the extent of the OCTA Right of Way (ROW) and existing conditions, major intervention on the bluffs at Mariposa Promontory is not recommended. Instead, monitoring and periodic debris removal coupled with improved protection on the coastal side of the rail are suggested.
- Coordinate with regional beach nourishment efforts. Beach nourishment would be performed by other agencies and occur outside of the rail ROW, but OCTA may be able to assist with access and permit needs for these efforts.
- Revisit the analysis and options over time, including the relocation option. In some cases where large increases in wave runups are expected, continuing to build the revetment upward and outward could become infeasible at some point.

## 1.4.2 MISSION VIEJO TRENCH AND EXTENDED OSO CREEK TRIBUTARY/OSO CREEK

This area of concern extends from the rail trench in Mission Viejo at the northern end and then south out of the trench, parallel to Oso Creek Tributary and Oso Creek at the southern end. This segment, MP 189.0 to 194.6, traverses portions of Mission Viejo, Laguna Niguel, and, at its very southern end, San Juan Capistrano.

There have been various erosion issues along the segment in Mission Viejo where and near where the rail sits in the trench. As it emerges from the trench, the rail closely parallels and sometimes crosses over the Oso Creek Tributary and then Oso Creek. Oso Creek and Tributary are mapped in Federal Emergency Management Agency (FEMA) 100-year floodplain with some areas of mapped in the 500-year floodplain. Based on field observations, there was evidence of scour along several creek locations.

The primary climate stressor that may adversely impact the trench and associated railway infrastructure is heavy precipitation and associated stormwater runoff. Heavy precipitation, potentially enhanced by climate change, could exacerbate the erosion and sedimentation issues.

Future heavy precipitation projections were assessed, and there was relatively limited change between the historical and future heavy rainfall events under different scenarios. The study analyzed how heavy precipitation would affect streamflow and water elevations under several future scenarios. 100-year water levels were below the rail ballast for each scenario analyzed.

To mitigate existing and potential future erosion and sedimentation issues, adaptation options were developed. Generally, these were organized as a suite of measures rather than a set of alternatives to one another. Of these, higher priority recommendations include erosion control measures from MP 188.9 to 189.25 and concrete slope paving of the slope above the gravel entrance road from Alicia Parkway (MP 189.25 to 189.35). The report also provides general recommendations regarding (1) accounting for climate change in future hydrology studies and (2) guidance on different adaptation measures based on soil conditions and slope inclination.

## 1.4.3 PASSENGER WEATHER EXPOSURE AT STATIONS

Orange County is projected to experience increases in the magnitude, frequency, and duration of heatwaves, posing a potential threat to passenger comfort and health at stations along the corridor. The OCTA rail stations are located in a variety of climate settings, from a more temperate coastal climate to a hotter and more variable temperatures experienced inland.

Stations were assigned priority levels for amenity improvements based on existing station amenities, future climate projections, ridership numbers, and demographics. According to this analysis, Buena Park, Anaheim Canyon, Tustin, and Laguna Niguel/Mission Viejo were flagged as having near-term amenity improvement needs.

Recommendations for amenity improvements at these stations were developed from information on existing amenities, research on effective adaptation strategies, and rider preferences indicated in the public survey results. High priority strategies for all four near-term stations include additional shade structures, additional seating under these shade structures, and hydration stations. For some of the stations, high priority strategies also include drought-resistant vegetation and tree boxes. The study also developed general vegetation guidance for the region, given changing climate conditions.

---

## 1.5 CONCLUSION

This report establishes a plan for OCTA to respond to and prepare for future climate-related risk. Its recommendations indicate which strategies should be prioritized in the near-term to mitigate climate risks at these locations and which can be implemented in the long-term to further bolster the resilience of the system.

Additional steps will need to be taken to transform these recommendations into action, including identifying funding and financing sources to cover the costs of these strategies, continued engagement with relevant state and local agencies to coordinate these efforts, and in some cases conducting environmental reviews to secure needed permits. The report's recommendations also identify topics in need of further research and study. As the regional, state, national, and international understanding of these risks evolves over time, OCTA should revisit this topic to continue to ensure and enhance the resiliency of the system.

## 2.0 INTRODUCTION

The Orange County Transportation Authority (OCTA), in partnership with the State of California Department of Transportation (Caltrans) District 12, has completed a study assessing how future climate change affects the Orange County rail corridor. The study focused on the approximately 25-mile section of railway from Jeffrey Road in Irvine to the Orange/San Diego county border and evaluated all twelve Metrolink Stations in Orange County (see Figure 1). This rail system in Orange County services 3.9 million passenger boardings annually and freight traffic linking important commercial centers along the corridor (OCTA, 2019).

The purpose of the study was both to characterize and understand future climate-related risk to the rail system and passengers and to identify strategies to help mitigate these risks and preserve the continuity of rail service into the future. Through the study, OCTA:

- Utilized climate data to assess potential risks to OCTA infrastructure into the future;
- Identified strategies to reduce the risk to rail infrastructure from mudslides, flooding, severe storm/weather events, coastal surge, and sea level rise;
- Developed enhanced vegetation management and sustainable vegetation strategy for periods of drought and high precipitation,
- Identified improvements to amenities at rail stations for passengers against weather, such as shelters, natural shading and drinking fountains; and
- Established a preliminary understanding of additional risks to the rail system, such as power shutoffs due to fires and fire-inducing weather.

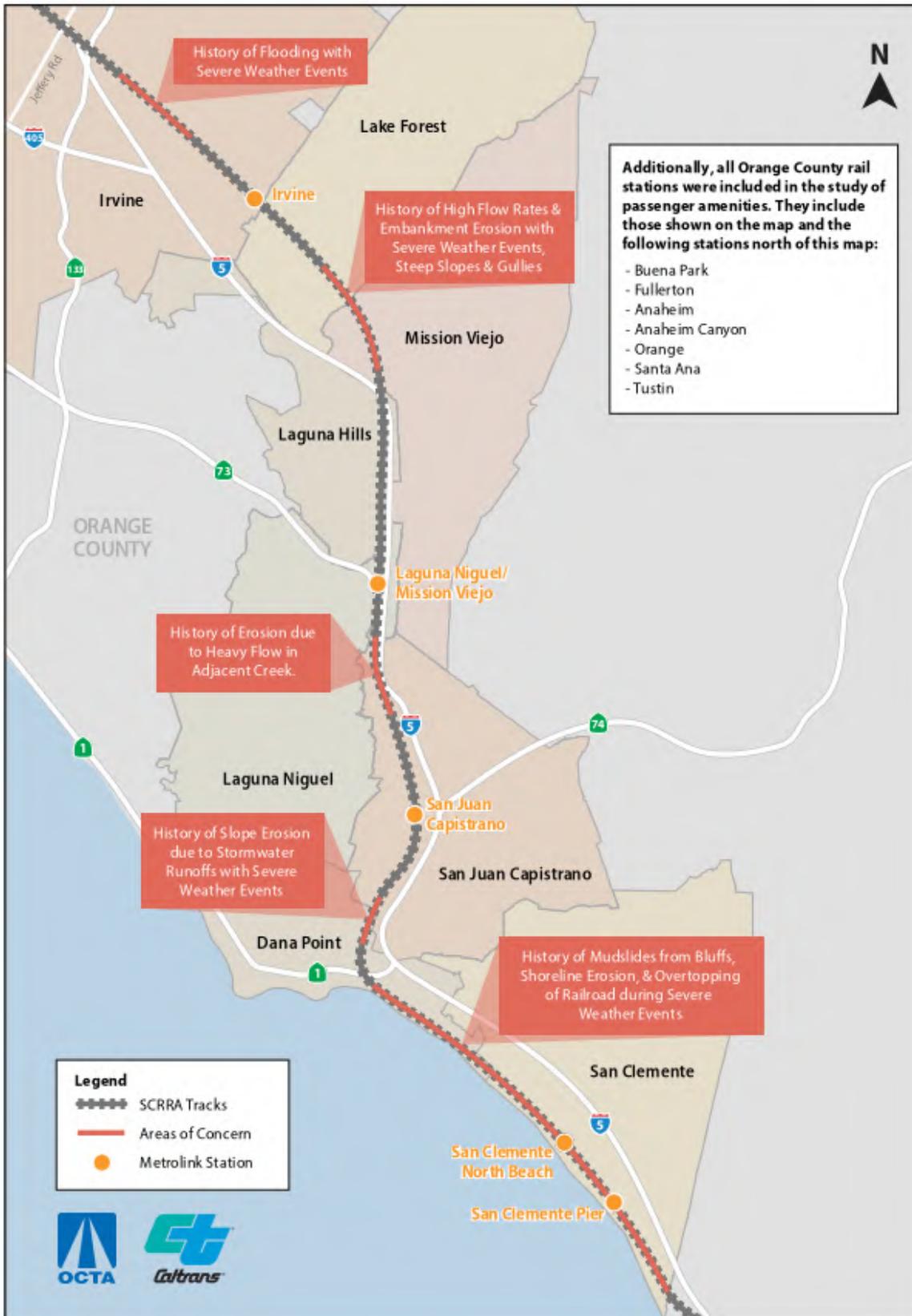
The study relied on stakeholder and public engagement (see Chapter 3). In order to assess the climate-related risk to the OCTA system, the study used a two-tiered approach. First, OCTA assessed the exposure to future climate threats along the full 25-mile segment to identify potential areas of high risk (see Chapter 4). After conducting this systemwide scan, OCTA conducted detailed site-specific or facility-level assessments to understand risk to specific aspects of the system identified in the systemwide scan and to identify cost-effective climate adaptation strategies (see Chapter 5). The process is described in greater detail below:

- 1. Develop methodology:** The first stage in the study was to develop a methodology to apply to both the systemwide and facility-level assessments.
- 2. Forecast climate data:** Existing and forecast climate change data was assessed and down-scaled to the Orange County region to characterize future climate projections.
- 3. Systemwide scan:** After developing the climate change projections, the data was applied to the OCTA system to identify assets and locations exposed to future climate risk.

4. **Facility-level assessments:** Detailed facility-level assessments of the three areas identified to be of high risk and high priority to the OCTA system were conducted. These studies tailored future climate projections to specific aspects of the OCTA system and identified adaptation strategies OCTA and partner agencies can adopt to mitigate these risks.
5. **Recommend adaptation strategies:** Through each of the facility-level assessments, OCTA evaluated the efficacy and cost-effectiveness of the identified adaptation strategies and identified recommended actions to implement.

This report summarizes these key study findings and establishes a preliminary plan of action for OCTA to prepare for climate change.

FIGURE 1 | Project Area Map



## 3.0 COMMUNITY ENGAGEMENT

During the course of the study, OCTA developed and implemented a comprehensive outreach strategy to provide stakeholders and the public with the opportunity to engage in the Rail Defense Against Climate Change Plan. Moreover, the outreach team facilitated working group meetings and a robust survey campaign to reach area agencies and transit users along the corridor and nearby Metrolink stations. The purpose of the stakeholder engagement was to establish coordination amongst key agencies and stakeholders in the region in order to help define climate risks, identify risks to the system, and inform adaptation strategies. The purpose of the public outreach was to understand ridership demographics, riders' perspectives of existing rail travel, and to identify ways to improve the ridership experience.

At the onset of the study, an Outreach Plan was developed to direct the overall outreach approach. In response to the unprecedented situation regarding the COVID-19 pandemic and out of an abundance of caution for public health and safety, a significant change in this strategy was developed in April 2020. This new outreach strategy focused on a safer, virtual online engagement approach and meeting format and no longer included in-person public outreach.

---

### 3.1 STAKEHOLDER ENGAGEMENT PROCESS

Formed in late 2019, a Project Working Group (PWG) convened key stakeholders from within the County to assist in planning for future climate change related adaptation strategies, increase public awareness, and help identify effective methods to engage those they represent. The PWG included representatives from OCTA, Southern California Regional Rail Authority (SCRRA, commonly referred to as Metrolink), local cities, county agencies, Caltrans, California Coastal Commission, California State Parks, and other organizations. Three PWG meetings took place between November 2019 and September 2020. The first meeting was conducted in person at OCTA Headquarters with subsequent meetings held online due to COVID-19.

Members provided valuable feedback regarding hazards, adaptation options, relevant policies and processes, and shared information about related work along the rail corridor. PWG members were also encouraged to support the outreach process by promoting the survey through their own group and agency networks.

A smaller group of stakeholders called the Project Development Team (PDT) included several OCTA staff, Metrolink, and Caltrans. This group met more regularly and helped to guide the direction of the project.

---

### 3.2 PUBLIC OUTREACH PROCESS

Outreach activities were conducted from Aug. 3, 2020 to Sept. 30, 2020. The outreach strategy and approach included virtual meetings and a survey available in both English and Spanish to engage transit corridor riders and gather valuable feedback on the community's perspective on necessary improvements to OC rail stations.

The survey research was qualitative, which means that results cannot be considered representative of the total population of interest. Informal research methods are useful to explore a group's opinions and views, allowing for the collection of verifiable data. This data can reveal information that may warrant further study and is often a cornerstone for generating new ideas.

Survey questions were focused on station amenity improvements and designed to:

- Establish respondent travel habits and use,
- Assess perceived challenges,
- Identify opportunities for improvement,
- Gather respondent demographics,
- Determine respondent geography, and
- Receive new contact information.

The survey was available from August 3 to September 30, 2020, and a total of 1,341 surveys were collected (1,265 English and 76 Spanish). A detailed outreach report outlining all engagement activities and complete survey results are in Appendix A.

The following figures describe the demographics of survey respondents, indicating the age, racial/ethnic, income, and geographic diversity of the respondents.

FIGURE 2 | Age of Survey Respondents

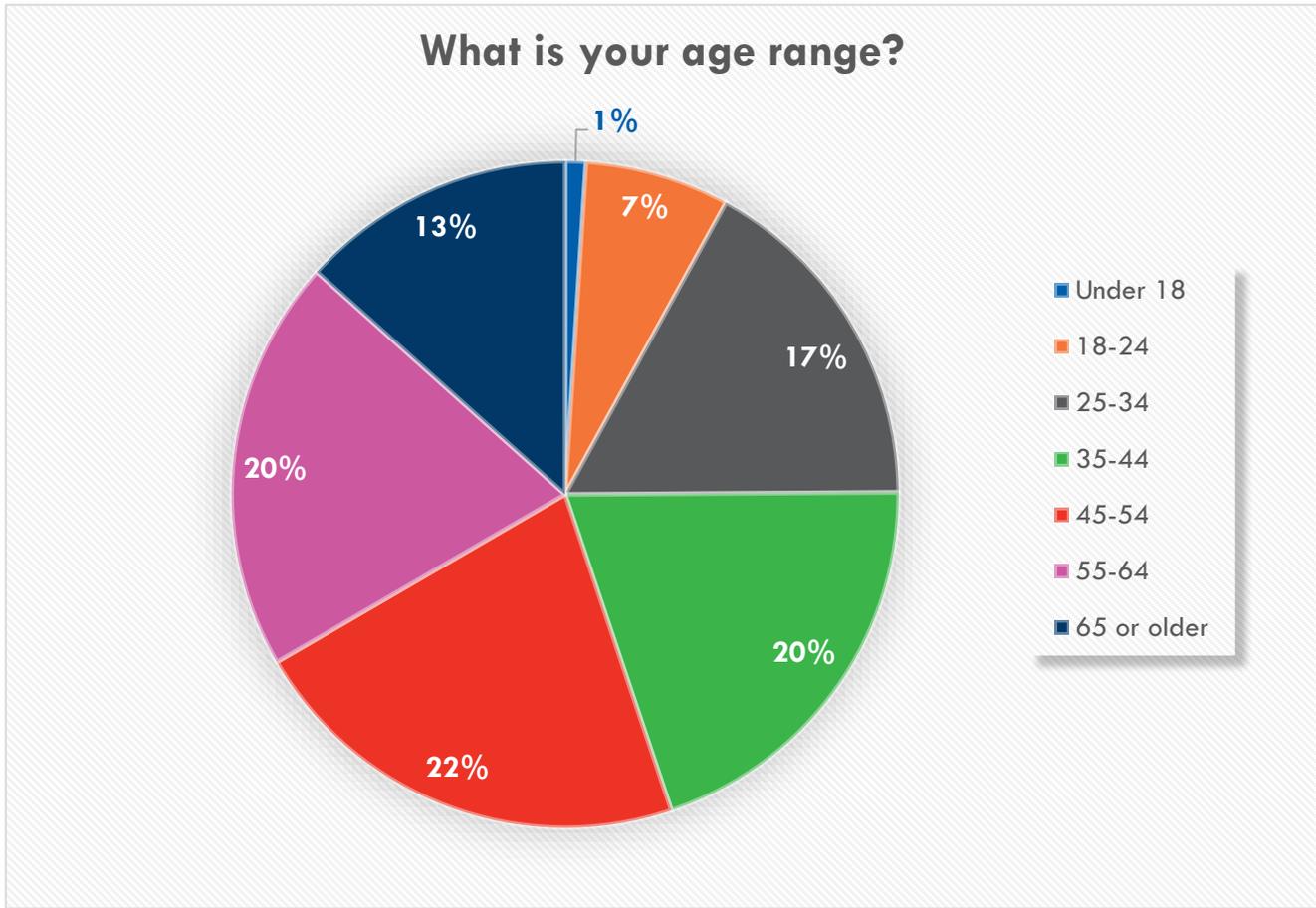


FIGURE 3 | Race/Ethnicity of Survey Respondents

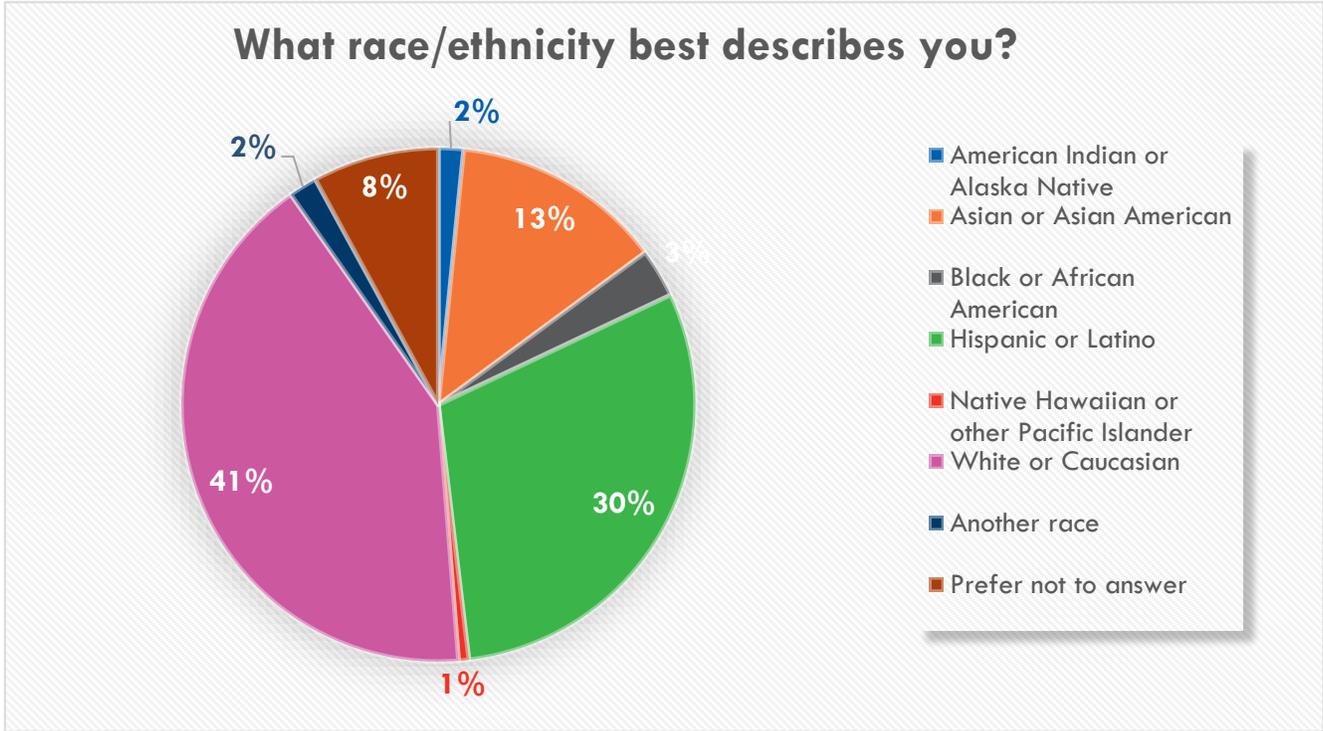
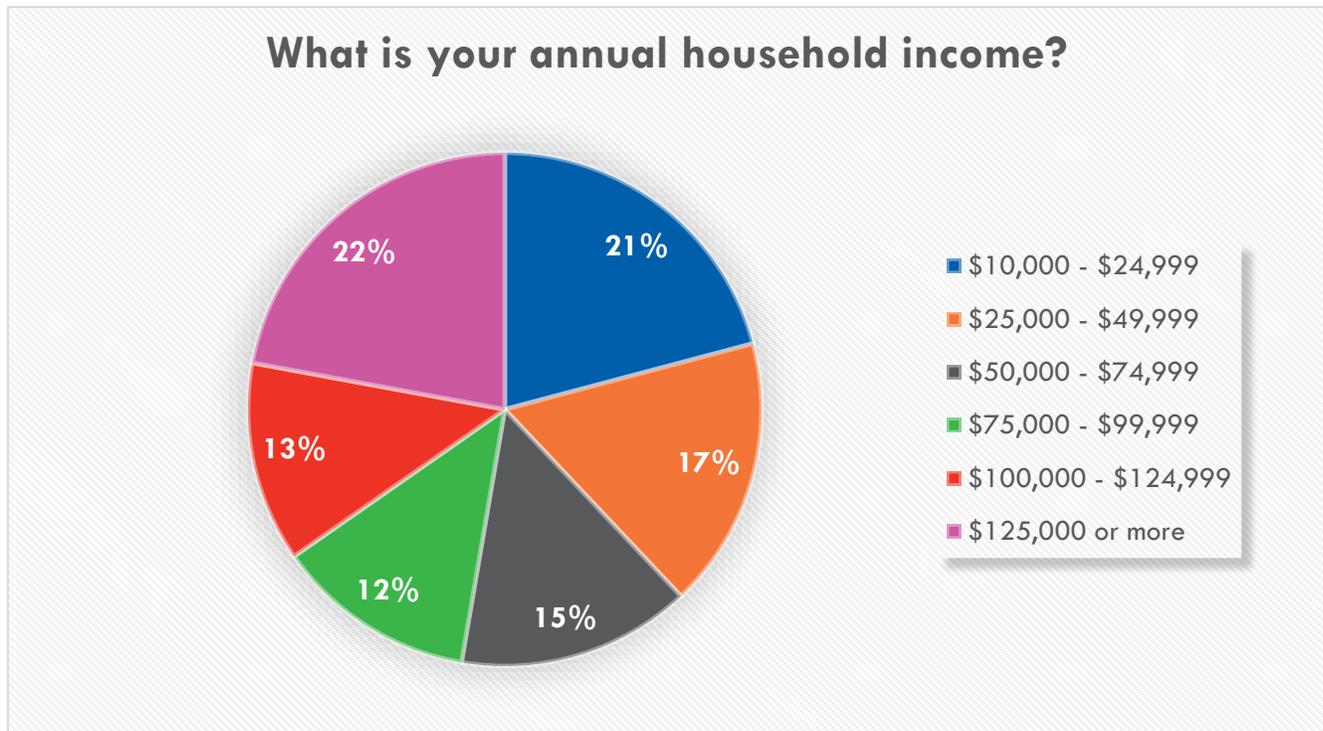
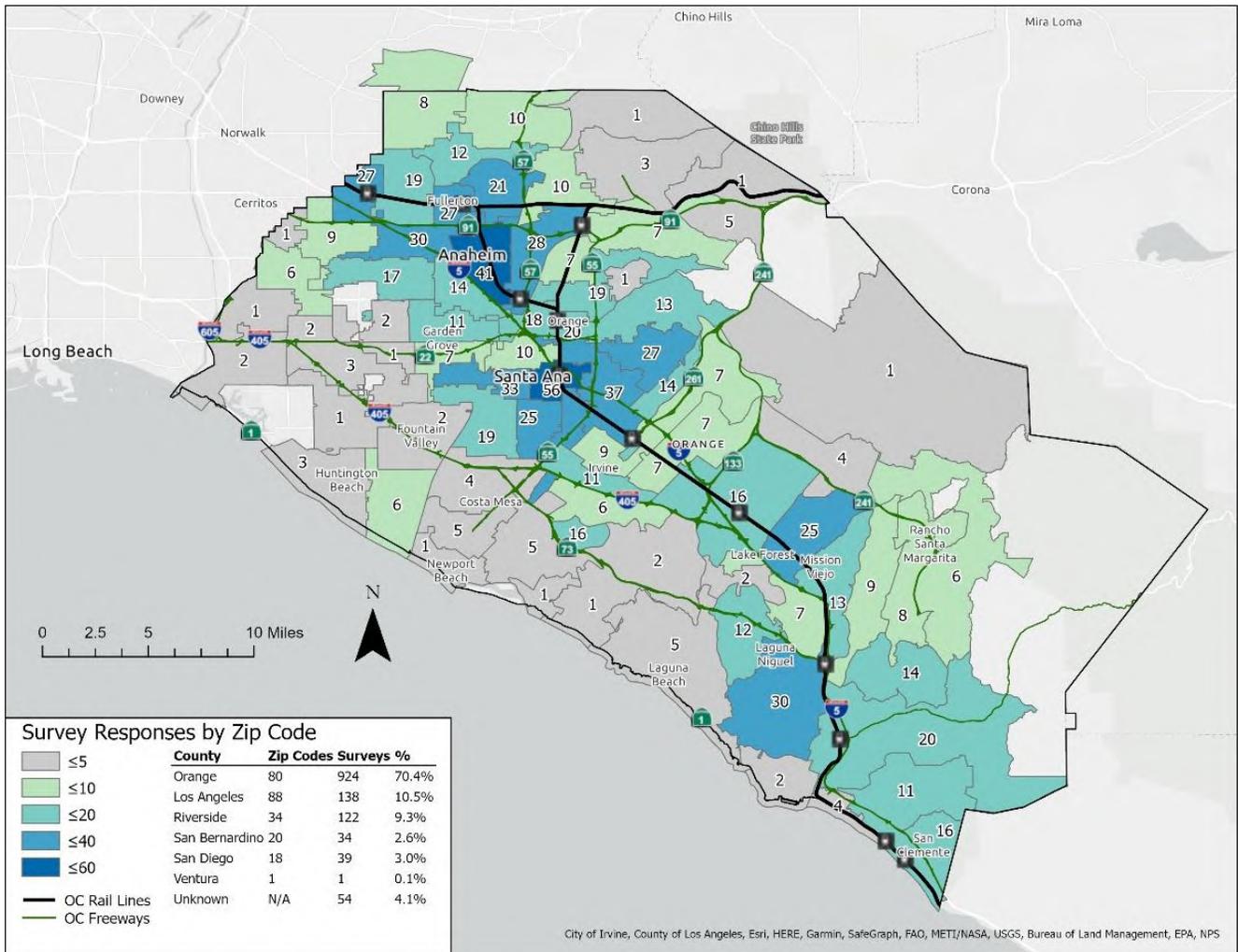


FIGURE 4 | Annual Household Income of Survey Respondents



**FIGURE 5 | Geographic Distribution of Survey Respondents**



Based on the information collected, respondents represented a diverse mix of opinions, age, income, ethnicity and geography. Several key findings include:

- Nearly half (49%) of respondents wait 15 minutes or less, and 90% wait less than a half hour.
- Respondent travelers are largely (68%) committed to rail travel regardless of the weather conditions, with another 26% hesitant to travel and 6% unlikely to travel in bad weather.
- Survey respondents expressed a significant interest (66%) in riding the train more if station improvements were conducted. An additional 26% were undecided if improvements would increase their likelihood to travel by rail.

Table 1 summarizes additional key findings. The findings are considered in greater detail in each of the facility-level assessments and were used to inform which adaptation strategies were recommended for implementation.

**TABLE 1 | Survey Key Findings**

<b>ADDITIONAL ONLINE SURVEY FINDINGS</b>	<b>#1 CHOICE</b>	<b>#2 CHOICE</b>	<b>#3 CHOICE</b>	<b>#4 CHOICE</b>
<b>Most traveled stations</b>	Fullerton	Irvine	ARTIC	Santa Ana
<b>How often respondents travel on Metrolink/Amtrak.</b>	Several times per month 57%	1 to 3 days per week 25%	4 or more days per week 18%	
<b>Vehicles are the primary travel option when rail service is interrupted.</b>	Car 51%	Wouldn't travel 20%	Rideshare 15%	Bus 13%
<b>Respondents top station amenity improvements are:</b>	More shade 79%	More accurate information 58%	More seating 41%	Restrooms 38%
<b>Four of five working age population groups had near or above 20% participation.</b>	45-54 22%	55-64 20%	35-44 20%	25-35 17%
<b>Survey respondents were evenly represented by each income bracket.</b>	\$10k-24,999 21%	\$25k-49,999 17%	\$50k-74,999 15%	\$125k+ 22%

# 4.0 SYSTEMWIDE EXPOSURE SCAN

## 4.1 FUTURE CLIMATE PROJECTIONS IN ORANGE COUNTY

The Orange County region is at risk of the climate hazards summarized in Figure 6. According California’s Fourth Climate Change Assessment, the Los Angeles region including Orange County is at risk of experiencing increased temperatures, including higher annual average daily maximum temperatures and greater intensity and frequency of extreme heat events (State of California, 2018). The region is also at risk of experiencing more frequent wildfires and more extreme drought events due to dry conditions. Simultaneously, wet extremes in the region are also expected to be exacerbated by climate change and projections estimate that the wettest day of the year will get wetter over time. Further, the coastal areas of the region are at risk of sea level rise, storm surge, and erosion.

FIGURE 6 | Climate Hazards in Orange County

				
HIGH HEAT	WILDFIRE	DROUGHT	COASTAL FLOODING	INLAND FLOODING
Increased average temperatures and more frequent annual heat-related health events.	Potential increase in number and severity of wildfire events, particularly in the eastern portion. May also exacerbate flooding/debris concerns.	More intense and frequent drought events.	Sea level rise, storm surge, and erosion all pose a risk to coastal infrastructure.	Inland flooding is expected to be exacerbated by increased precipitation and stormwater runoff.

## 4.2 THREATS TO THE RAIL SYSTEM

For each climate hazard, potentially exposed portions of the alignment and its assets were identified. In some cases, this was a broad swath of the alignment, whereas in other cases there were more discrete areas of exposure. The following sections detail the specific climate risks to the OCTA rail system.

### 4.2.1 COASTAL FLOODING

Sea level rise (SLR) and relevant coastal hazards, including storm surge, were identified to be a risk to the coastal portion of the rail system. Based on an exposure scan using modeled sea level rise data from the US Geological Survey (USGS) Coastal Storm Modeling System (CoSMoS) (USGS, 2020), almost all of the coastal rail corridor is exposed to future coastal flooding under at least some increment of SLR. The corridor comprises

the coastal cities of Dana Point and San Clemente from where the rail reaches the coast near Capistrano Beach down to the southern border of Orange County with San Diego County. It was assumed this entire corridor warranted more detailed study, so it was the focus of one of the detailed assessments.

**FIGURE 7 | Coastal rail corridor in southern Orange County**



## 4.2.2 INLAND FLOODING

Changes in precipitation patterns can impact the frequency and magnitude of flooding affecting the rail system. In order to identify portions of the OCTA rail line at risk of precipitation-based flooding in inland areas, the areas were identified that cross, closely parallel, or are otherwise near the Federal Emergency Management Agency (FEMA) National Flood Hazard Layer's (NFHL) 1% Annual Chance Flood Hazard (otherwise known as the Base Flood Elevation or 100-year flood) (FEMA, 2020). 500-year floodplains were also reviewed. Some of these areas were visited during the field assessment as well.

Several key areas were identified, including:

- An over 5-mile segment of rail from the rail trench in Mission Viejo at the northern end, then south out of the trench, parallel to Oso Creek Tributary and Oso Creek at the southern end to where Oso Creek veers away from the alignment. This area warranted further investigation and was the focus of the one of the detailed analyses in Chapter 5.
- Segment of rail beginning in southern San Juan Capistrano where the rail parallels San Juan Creek, out to the mouth of San Juan Creek. The Orange County Flood Control District's San Juan Creek Flood Risk Management Feasibility Study is likely to address flood risk on the lower portion of San Juan Creek through measures such as deeper channelization. Therefore, this area was not carried forward for further analysis.

- Various smaller areas, most of which appeared lower risk to the rail than the two areas mentioned above.

Future heavy precipitation projections were developed to help analyze these areas in more detail and are described in Chapter 5.

### 4.2.3 SLOPE FAILURE AND EROSION

Changing precipitation patterns as well as SLR and changing coastal storm patterns can affect erosion and increase the likelihood of slope failure. As part of the exposure scan, slopes that could pose risks to the rail system were topographic and geologic data as well as field observations. The assessment applied topographic data from two Digital Elevation Models (DEMs).<sup>1,2</sup> Portions of the rail that could be affected by coastal cliff retreat and shoreline erosion per the CoSMoS projections were flagged.

Several potential areas at risk were identified, including:

- Various potential erosion issues along this segment in Mission Viejo where and near where the rail sits in the trench. These were carried forward for one of the detailed assessments described in Chapter 5.
- Oso Creek in San Juan Capistrano just downstream of where the creek flows in a concrete channel. The east bank closer to railroad has erosion protection, but the west bank along agricultural fields has vertical banks that are actively eroding. Farther downstream, the creek has migrated rapidly and banks are unstable with high cut banks. This area was not prioritized for more detailed analysis, because erosion appears to be contained on the bank closest to the rail.
- Steep slope to the east of the rail in southern San Juan Capistrano where the alignment parallels San Juan Creek and Camino Capistrano. This area was not prioritized for more detailed analysis, as slope failure risk appears to be lower than other areas.
- Along the approximately 7-mile coastal rail segment, there are various bluff failure and erosion threats on the landward side of the tracks. Shoreline erosion associated with SLR affects the entire segment. This area was carried forward for one of the detailed assessments described in Chapter 5.

---

<sup>1</sup> For the coastal portion of the study area, the assessment used elevation data from the 2016 USGS Coastal National Elevation Database (CoNED) Topobathymetric Model (1930 - 2014) for the Southern Coast of California and Channel Islands. [https://coast.noaa.gov/htdata/raster2/elevation/CA\\_Southern\\_CoNED\\_DEM\\_2016\\_8658/](https://coast.noaa.gov/htdata/raster2/elevation/CA_Southern_CoNED_DEM_2016_8658/)

<sup>2</sup> For the inland portion of the study area, the assessment used elevation data from OC DPW originally developed by USGS as part of the National Elevation Dataset (NED). <http://prg.ocpublicworks.com/documents/ocsurvey/geospatial/KMZFile/Geospatial%20Data%20Details.pdf>

**FIGURE 8 | Slope along eastern side of rail in San Juan Capistrano**



#### 4.2.4 HIGH HEAT

Rising temperatures and high heat events under future climate scenarios present a potential threat to passenger comfort and health at stations along the corridor. To understand these impacts, projections from the California Heat Assessment Tool (CHAT) were used (California Natural Resources Agency, 2020). CHAT uses data about past heat events and public health impacts as well as projected increases in temperature to forecast changes in the number of heat-related public health impacts in the future. For this study, public health impacts were reviewed for each station city. The results of the analysis indicate that heat-related health events are expected to increase into the future, particularly for more vulnerable populations and particularly in inland rather than coastal areas. One of the analyses in Chapter 5 reviews this issue in more detail and provides recommended amenity improvements for the most affected stations.

Heatwaves can also affect the frequency and duration of power outages. Power outages can affect the OCTA rail corridor disrupting signaling and communications infrastructure. The relationship between heat waves and power outages is complex, involving many factors. Projecting how future climate changes could affect future power outages involves many intermediary assumptions about population growth, technology development, policy changes, and electrical infrastructure investment and management. These various factors influence overall peak electricity demand and supply, which both need to be understood to quantify how heat-related power outages could change over time in the study area. Given this complexity and the lack of readily available projections, the number of future heat-related power outages in the study area were not quantified. However, it can be assumed that power outages will represent an increasing challenge for the rail system in the future. Some general recommendations regarding power outages are discussed at the end of Chapter 5.

Hotter conditions are also projected to increase the stress on the rail itself, potentially leading to expansion and track buckling. General recommendations on this issue are discussed at the end of Chapter 5.

## 4.2.5 WILDFIRE

Future wildfire projections were reviewed for southern Orange County.<sup>3</sup> In general, the projections show increases in wildfire risk in the future. The future wildfire projections are fairly coarse, and several historical and current information sources were used to better assess direct exposure of the rail itself. For instance, California Department of Forestry and Fire Protection (CalFire) data regarding fire hazard severity zones (FHSZ) were reviewed (State of California, n.d.). The CalFire FHSZs account for factors including fire weather, such as wind, fuel, and slope. There are no areas of the Orange County Metrolink alignment that overlap with existing FHSZs. Figure 9 shows these areas in Orange County and their proximity to the alignment.

While direct exposure of the roughly 25-mile rail corridor to wildfire does not appear to be a major threat, wildfire can have consequential indirect impacts on the system. These include possible power outages, either directly due to fire or wind damage to the utility system or through Public Safety Power Shutoffs (PSPS) and air quality issues. As previously noted, general recommendations related to power outages are discussed at the end of Chapter 5.

Dry Santa Ana winds are a contributing factor to wildfires in the region. According California's Fourth Climate Change Assessment, there is still much uncertainty about how climate change will affect these winds. There has not been a significant trend of change detected in these events over a historical record of the past 60 or more years (State of California, 2019).

---

<sup>3</sup> Three sets of projections were used: (1) MC2 - EPA Climate Impacts Risk Assessment (CIRA), developed by John Kim, USFS; (2) MC2 - Applied Climate Science Lab (ACSL) at the University of Idaho, developed by Dominique Bachelet; and (3) University of California-Merced model, developed by Leroy Westerling, University of California-Merced.

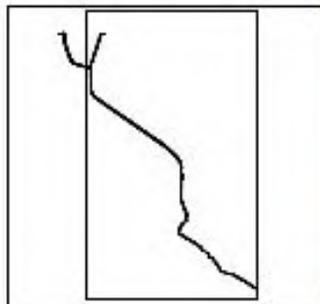
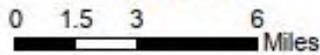
FIGURE 9 | CalFire Fire Hazard Severity Zones

1 in = 3.9 miles Overview Page

# Systemwide Exposure Scan:

## CalFire Fire Hazard Severity Zones

- Local Responsibility Areas
- State Responsibility Areas
- OCTA Mainlines and ROW**
- Mainline
- ROW



Notes: Asset and centerline data provided by Orange County Transportation Authority. Coastal flooding and cliff retreat data from USGS CoSMoS v3. Inland flooding data from FEMA. Slope failure data from two DEMs: USGS Coastal National Elevation Database and National Elevation Dataset. Heat data from California Heat Assessment Tool. Wildfire data is a summary of three models: MC2-EPA, MC2-University of Idaho, UC Merced.

## 4.2.6 DROUGHT

Drought has been identified to primarily be a concern for managing vegetation at OCTA stations and along the right of way (ROW). The assessment identified that the region's terrestrial ecosystem will become more and more unstable over time. How these changing conditions affect vegetation at rail stations or alongside rail infrastructure will vary by species, but these changes warrant further investigation.

With respect to this topic, studies have primarily been conducted at a large scale rather than for regional and local contexts. A study conducted by researchers at University of California Davis provides a statewide perspective on the stress that climate change is projected to put on plant species under a business-as-usual climate scenario (Thorne, 2017). The results show that the southern part of California around Orange County and farther south in San Diego County are areas where vegetation will experience considerable climate-related stress. What the study defines as the southwest coastal region, including Los Angeles and San Diego, is expected to experience 63-69% climatically exposed vegetation by the end of the century. This means that this region's terrestrial ecosystem will become more and more unstable over time. What these changing conditions will mean for different plant species will differ based on their adaptability and other factors such as population growth and urbanization. One of the detailed assessments in Chapter 5 discusses recommendations for vegetation management under future climate conditions.

---

## 4.3 AREAS IDENTIFIED FOR FACILITY-LEVEL ASSESSMENTS

The results of the systemwide assessment identified three key areas of study that align with OCTA priorities, which were selected for facility-level assessments. These OCTA system areas are described below and summarized in Figure 10.

- **Coastal Alignment:** Sea level rise and storm surge were identified as risks to the continued operation of rail along the coastal alignment.
- **Mission Viejo Trench/Oso Creek Tributary:** Inland flooding and slope failure were identified to pose a risk to the rail in this location.
- **Passenger Rail Stations:** High heat events were identified to pose a risk to passengers at rail stations. Additionally, drought was identified as a risk to the vegetation at rail stations, which may have implications for maintenance over time.

FIGURE 10 | Selected Facility Level Assessments

## OCTA Systemwide Exposure Scan

-Field assessment to understand existing asset conditions  
- Future climate conditions



### Coastal Alignment

**Hazard(s):** Erosion and coastal flood risk



### Mission Viejo Trench / Oso Creek Tributary

**Hazard(s):** Flooding and erosion /sediment control



### Passenger Rail Stations

**Hazard(s):** Heat and weather exposure for passengers. Drought impacts to vegetation

## 5.0 FACILITY-LEVEL ASSESSMENTS

After identifying the facilities of interest in coordination with OCTA, the project team conducted facility-level assessments aimed at estimating lifecycle costs of inaction and adaptation options as well as prioritizing these options for the rail system. The facility-level analyses are summarized in this section, including analyses of the following facilities and relevant climate hazards:

- Coastal alignment: erosion and flood risk (MP 200.2 – 207.4)
- Mission Viejo Trench and Extended Oso Creek Tributary (010)/Oso Creek: Flooding and Erosion/Sediment Control (MP 189.0 – 194.6)
- Passenger weather exposure at stations and green infrastructure solutions

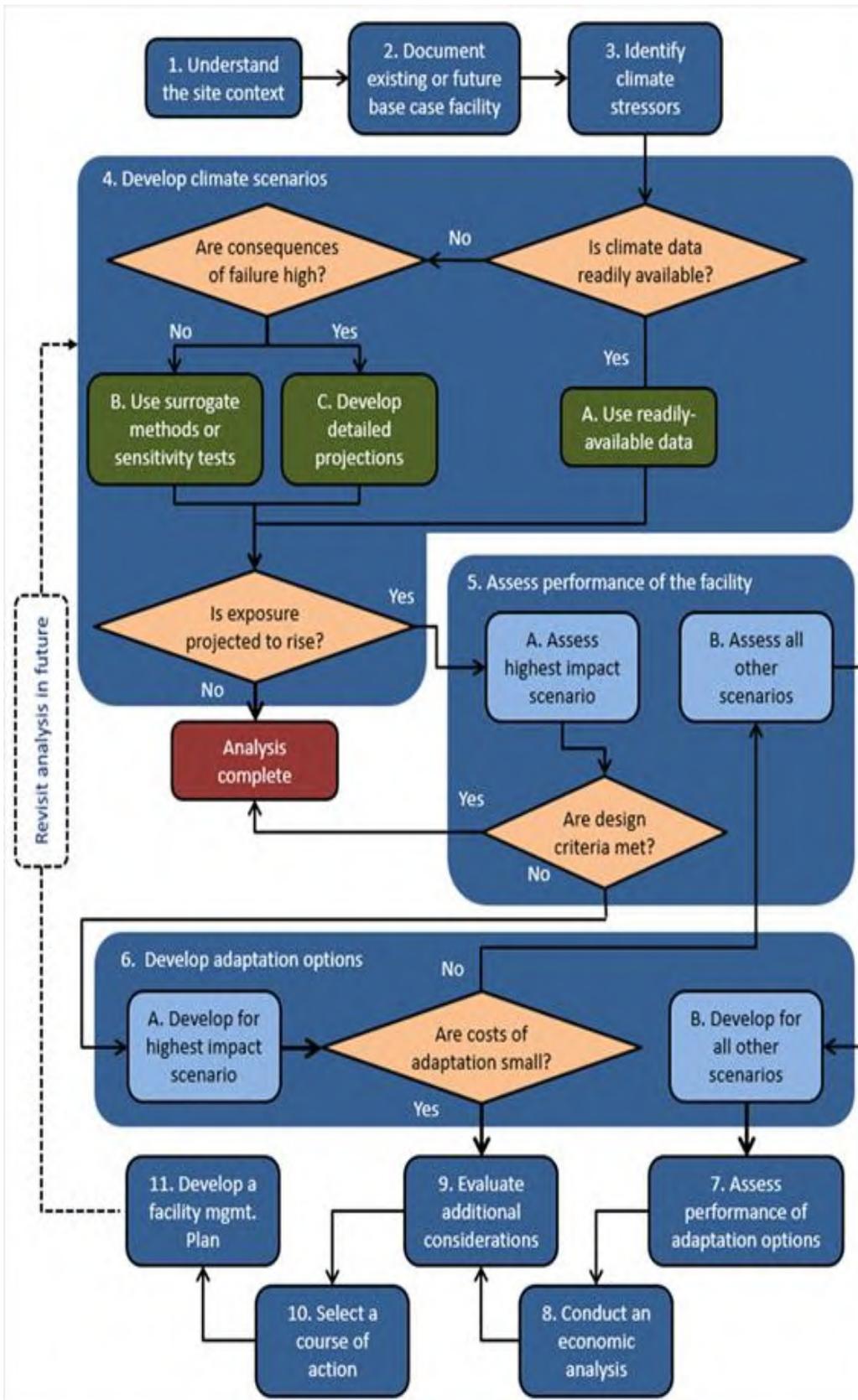
Each facility-level assessment applies the Federal Highway Administration (FHWA) Adaptation Decision-Making Process (ADAP), which follows the steps depicted in Figure 11 (Federal Highway Administration, Office of Planning, Environment, and Realty, 2019). ADAP was applied to conduct these studies because 1) it is a valuable and vetted framework to consider facility-level adaptation strategies and to develop recommended actions, and 2) while this is not a highway-specific study, it is a transportation study. Further, the Federal Transit Authority (FTA) does not have a separate decision-making framework for these types of studies. The ADAP steps are summarized in the bullets below:

- **Step 1, Understand the Context:** The purpose of this step is to document the context of the site and other key agencies and stakeholders involved in managing the site.
- **Step 2, Document Existing or Future Base Case Facility:** This step provides information on the facility that are relevant to the analysis.
- **Step 3, Identify Climate Stressors:** The purpose of this step is to identify the climate-related hazards that could potentially affect the site or are affecting the site.
- **Step 4, Develop Climate Scenarios:** The purpose of this step is to develop climate projections applicable for assessing the climate risk at the site and for assessing tradeoffs between adaptation options.
- **Step 5, Assess Performance of the Facility:** This step assesses whether the base case facility meets design criteria or other performance standards under the different climate scenarios.
- **Step 6, Develop Adaptation Options:** If the base facility does not meet design criteria or performance standards in Step 5, then the assessment progresses to Step 6. During this step feasible adaptation options are identified, including developing preliminary cost estimates for these strategies.
- **Step 7, Assess Performance of the Adaptation Options:** The purpose of this step is to evaluate the efficacy of the adaptation options identified in Step 6 under each climate scenario.

- **Step 8, Conduct an Economic Analysis:** During this step an economic analysis is conducted, including a lifecycle cost assessment for the different adaptation options. This analysis will account for changing climate conditions over time, damage and disruption costs, costs of the adaptation options themselves, and assumptions about discount rate and other relevant parameters. Note that in these analyses costs avoided under adaptation options that would have been incurred under the base case option will be characterized as benefits.
- **Step 9, Evaluate Additional Considerations:** The purpose of this step is to consider factors other than the economic considerations, including stakeholder input through the Project Working Group (PWG) and the public survey.
- **Step 10, Select a Course of Action:** This step recommends which adaptation strategy or strategies to select.
- **Step 11, Develop a Facility Adaptation Plan:** Based on what course of action is selected in Step 10, this step documents important considerations for the long-term management of the facility.

The facility-level assessments documented in the following sections generally followed this order, however, this chapter presents a summary of each study rather than detailing each step in the assessment process.

FIGURE 11 | FHWA ADAP Process



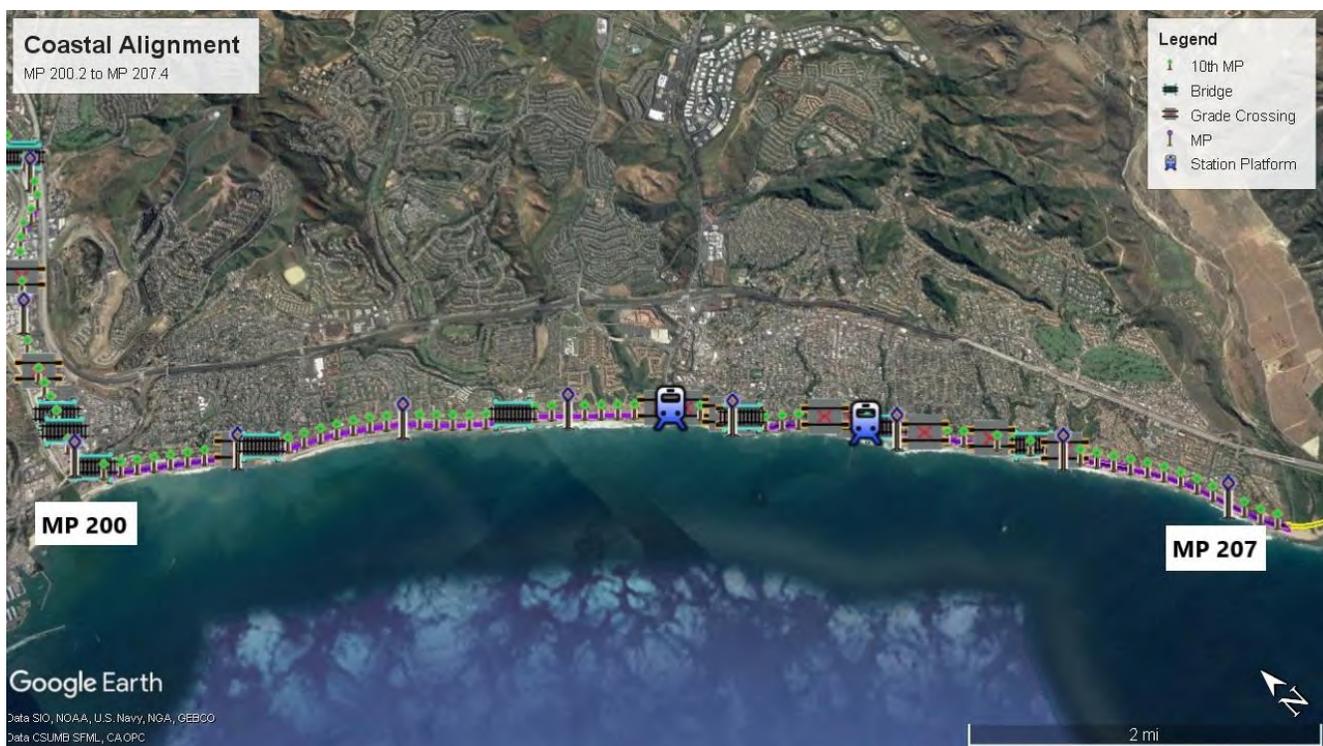
## 5.1 COASTAL ALIGNMENT: EROSION AND FLOOD RISK (MP 200.2-207.4)

### 5.1.1 CONTEXT

#### Overview

This climate change adaptation assessment focuses on the portion of the OCTA-owned ROW and rail that follows along the Pacific Ocean shoreline in the cities of Dana Point and San Clemente. The segment of interest corresponds to a roughly seven-mile portion of the line between milepost (MP) 200.2 at the north end in Dana Point and MP 207.4 at the south on the border with San Diego County. Figure 12 presents a map showing the location of the rail line in this area.

FIGURE 12 | Coastal Alignment



This OCTA-owned portion of the ROW and rail – the Orange Subdivision – service Metrolink and Amtrak passenger trains, and BNSF freight trains. The area of interest is between the San Juan Capistrano and Oceanside stations and includes San Clemente North Beach and San Clemente Pier stations. This study area is within Orange County and does not include the portions of the ROW in San Diego County or Oceanside station.

The corridor in this area is threaded between the Pacific Ocean and high coastal bluffs, finger canyons and other man-made developments. In the northern portion of the study area, from MP 200.2 to MP 203.7, the rail line lies approximately 150-200 feet from the shoreline, separated from it by park facilities (in the northern portion of this segment) or a row of homes (in the southern portion of this segment). The rail line is also generally 50-150 feet from the bluffs in this stretch, separated from them by the Pacific Coast Highway. South of MP 203.7 (just past San Clemente North Beach station) to the San Diego County border, the rail line lies directly on the beach adjacent to the bluffs.

There are several relevant studies/projects/programs relevant in this area, including:

- The currently planned San Clemente beach nourishment project, a partnership between USACE and the City of San Clemente, involves placing sand along the beach between Cristobal and Linda Lane (an area that includes San Clemente Pier) and replenishing this sand at regular intervals for the next 50 years. It is currently in the design phase. The precursor study to the project is called the USACE San Clemente Shoreline Feasibility Study (USACE, 2012).
- City of San Clemente Sea Level Rise Vulnerability Assessment (City of San Clemente, 2019).
- City of San Clemente Local Coastal Program (LCP), including the Land Use Plan (LUP) certified by the California Coastal Commission in 2018 (City of San Clemente, 2020).
- City of Dana Point Sea Level Rise Vulnerability Assessment (City of Dana Point, 2019).
- City of Dana Point LCP Amendment
- Caltrans District 12 2019 Climate Change Vulnerability Assessments (Caltrans, 2020).
- Metrolink's Southern California Optimized Rail Expansion (SCORE) program (Metrolink, n.d.).
- LOSSAN, Los Angeles to San Diego Proposed Rail Corridor Improvements in the State of California, Draft Program Environmental Impact Report/Statement (State of California, Department of Transportation, 2004).
- 2018 California State Rail Plan (Caltrans, 2018).

The next few sections discuss the shoreline characteristics and geological setting.

### **Shoreline Characteristics**

The coast along the rail line consists of beach and/or revetment with several features including parks and residences. The north half of the rail alignment from MP 200 through 203.6 is dominated by parks and residences. In this portion of the alignment, the rail line is separated from the beach by park infrastructure, roads, parking lots, and residences. From the southern end of the residences, MP 203.6, to the southern end of the alignment within Orange County, MP 207.3, the rail line is protected by beaches, beaches with revetment, and in a couple of locations mostly revetment with beaches that are impassable to pedestrians at high tides or significant wave action. Where beaches with significant width are present the relatively steep beach extends from mean sea level (MSL) to a top of bank, where a fairly dramatic flattening of the beach occurs.

During high water levels and wave conditions, significant wave breaking will occur along these revetments and may lead to wave overtopping as shown below in Figure 13.

**FIGURE 13 | Photo of wave approaching the shoreline on the left and overtopping of tracks due to these waves near Transect 87 on October 27, 2015, (Metrolink, 2016)**



Portions of the southern coastal corridor are protected by rip-rap revetment. These areas include MP 203.85-204.53, 205.15-205.42, 205.88-206.21, and 206.9-207.2 (Figure 14). Some other portions of the rail are protected by rock with soil and vegetation.

**FIGURE 14 | Revetment at MP 207.03**



In general, the revetment protects the railway infrastructure and bluff toe from adverse coastal wave impact and runup conditions. Historically, the revetment has effectively arrested landward retreat of the shoreline. However, subaerial (downward) erosion of the beach in front of the revetment may be increasing. Likewise, isolated areas along the revetment crest have several wide gaps which may expose the track and ballast to high wave attack and undermining. Elevation of rock protection does not appear to extend above rail line at all locations. Albeit unverified, limited inspection indicated that the revetment was constructed without an underlayer consisting of smaller graded riprap, bedding or geotextile for separation, strength and filtration.

## Geological Setting

The northern stretch of the railway alignment adjacent to Capistrano Beach (MP 200 to MP 203.5) is physically separated from steep coastal bluffs (80 to 140 feet high) on the order of 70 to 120 feet. This separation is due to the presence of both Pacific Coast Highway and paved pedestrian walkway and bike path. This separation may be assumed to provide an adequate setback distance from the bluffs and therefore does not pose a significant hazard to the existing railway infrastructure.

The southern stretch of the railway alignment adjacent to San Clemente Beach (MP 203.5 to 207) is more complex. This stretch had low to high bluffs (or no bluff) with typical physical separations from about 20 to 50 feet, respectively, with a few exceptions. Portions of the physical separation in this stretch are due to the presence of the San Clemente Pedestrian Beach Trail. This public trail includes a narrow access road, walking trail and bike path and may be assumed to provide a reasonable physical setback from the railway alignment where the bluffs are lower, less steep and vegetated. However, there are four main exceptions to these generalized conditions which are located near:

- MP 204.13 to MP 204.55 (high, steep bluffs with Mariposa Pedestrian Bridge below)
- MP 205.43 to MP 205.48 (high, steep bluffs with residential properties above)
- MP 205.82 to MP 205.88 (high steep bluffs with residential properties above)
- MP 206.0 to MP 206.5 (high, steep bluffs with San Clemente State Park above)

The principal exception is the location of the Mariposa Pedestrian Bridge (MP204.13 to MP 204.55) where there is no significant separation distance with steep, high bluffs. The Mariposa Walkway Bridge is an elevated pedestrian trail approximately 1,000 feet long located between the existing railway and steep high bluffs backed by residences along Buena Vista Street in San Clemente. The elevated walkway was constructed to allow for safe pedestrian and light vehicle access along the San Clemente Beach Trail. The steep ground in the area has historically experienced surficial erosion, sloughing, landslides and general landward retreat which is likely to continue which threaten the serviceability of the existing railway infrastructure.

On November 16, 2019 a small bluff failure (landslide) near MP 204.20 occurred (see Figure 15). The landslide mass descended downslope and impacted the steel truss bridge deck and a double pile support pier foundation. The bridge deck had a lateral displacement of several inches along the top of one reinforced concrete support pier cap (Bent 3, counting from the north) and about one inch at another (Bent 2). Although not measured, the rigid support pier system may have had only a minor level of lateral displacement. Rail services and public access to the bridge were suspended temporarily. Remedial action for the landslide, which will be further addressed via a project to be completed by the City of San Clemente, appears to have only included removal of the failed soil mass that was in direct contact with the bridge deck. Partial soil removal was provided to the support pier. The landslide mass remains intact with limited erosion control BMPs and may be subject to accelerated erosion with significant sedimentation along the east side of the tracks which may block drainage and pond water. It is important to note that MP 205.43 to MP 205.48 and MP 205.82 to MP 205.88 are isolated locations with high bluffs with near vertical inclinations which may appear to be precariously stable. However, these areas do not have visibly obvious signs of having gross instability issues in the past.

**FIGURE 15 | Recent Landslide at MP 204.20 in contact with the Mariposa Walkway Bridge deck**

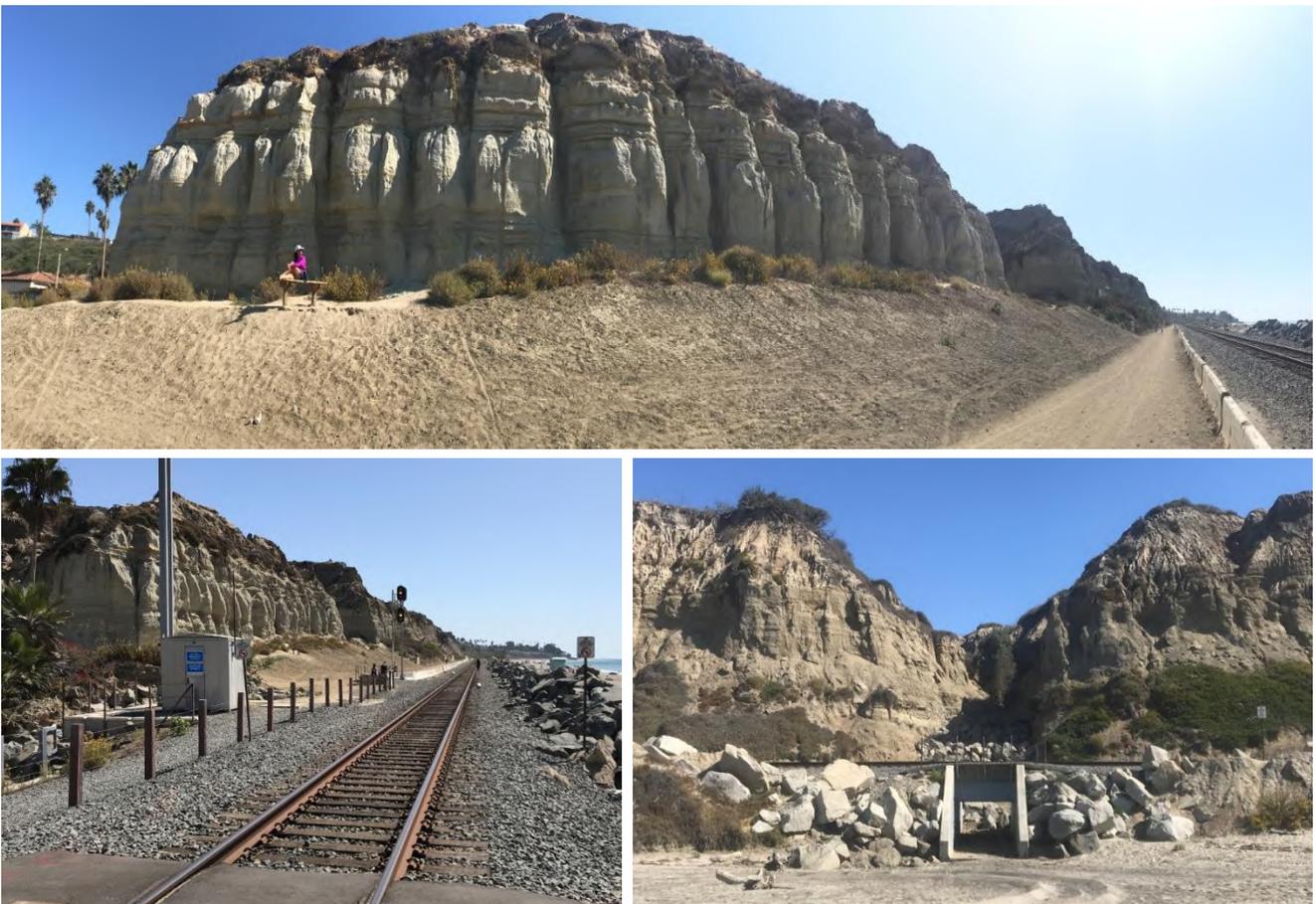


Lastly, the half mile of steep and high bluffs along the San Clemente State Park have similar conditions to those described in the previous isolated areas. The average separation setback from the bluff toe and the railway alignment is only about 20 feet. However, these bluffs are considered grossly stable from a geotechnical perspective due to the presence of lightly to moderately indurated claystone, siltstone and sandstone formations. They do present erosion issues, as is discussed below.

The San Clemente State Park area adjacent to the rail is marked by high bluffs with sparse vegetation (see images included in Figure 16). There is severe erosion in the finger canyons that cut into the bluffs, numerous zones of shallow surficial sloughing and landslips. The soil is highly erodible with significant mass wasting occurring.

As noted above, these bluffs are considered grossly stable from a geotechnical perspective due to the presence of lightly to moderately indurated claystone, siltstone and sandstone formations. However, these poorly vegetated exposed natural slopes and unprotected grounds of the State Park are exceptionally prone to excessive erosion during periods of heavy precipitation. The unmitigated erosion is clearly reflected in the heavy accumulations of sediments that have been collected and restrained from reaching the adjacent beach.

**FIGURE 16 | San Clemente State Beach area (MP 206.03 - 206.05)**



At San Clemente State beach, there are stacked concrete Interblock units placed at the mouth of finger canyons to slow sediment transport. Very heavy accumulations of sediment are being blocked by placed K-Rail (Figure 17).

FIGURE 17 | Sediment block by K-rail at MP 206.04



The hillside erosion and discharge of water and sediment under the rail can provide sediment to the beach. If the eroded sediments are collected and hauled offsite or left in place on the landward side of the tracks, this can deprive one of the historic supplies of sediment to the beach and may contribute to the ongoing erosion and loss of beach along this coastline.

### **Climate Change**

Given the study area's proximity to the coast, sea level rise (SLR) and its attendant effects on wave heights and beach erosion are some of most prominent climate stressors posing risks to OCTA infrastructure in this area. Beach erosion could undermine the revetments in areas where they are founded on erodible material. Since much of the revetment along the alignment was constructed long ago, the material underlying the base of the revetment is unknown. Increased wave heights could displace the rocks leading to failure of the railway embankment in addition to overtopping related impacts such as service disruptions and railway ballast erosion. Changes to coastal storm intensity and frequency may also exacerbate these threats and lead to overtopping of the rail line and other OCTA facilities. Landslides may occur along the bluffs if ocean waters overtop the rail line and erode the toe of the slopes, potentially bringing the displaced soils down onto the rail line.

Likewise, increased precipitation, both in terms of seasonal totals and during short-duration events, has the potential to trigger landslides on the bluffs. Furthermore, the bluffs could become more sensitive to seismic activity if perched groundwater elevations increase due to increased precipitation and the bluffs become more precarious and unstable. Strong winds may be erosive and could contribute to bluff degradation in some manner. Periods of prolonged drought could affect slope vegetation and surface stabilizing root systems.

Of the many hazards, this study chose to focus on the two of the most prominent given available climate data and project resources: (1) sea level rise coupled with storm surge and (2) precipitation change (short-duration events).

## 5.1.2 KEY FINDINGS

### Sea Level Rise, Storm Surge, and Coastal Erosion

Sea Level Rise projections were obtained from the 2018 California statewide guidance (California Natural Resources Agency and California Ocean Protection Council, 2018). The two tide gauges included in the projections that are closest to our study area are located in Los Angeles and La Jolla. The La Jolla tide gauge was selected because the projections at La Jolla are slightly higher than those at Los Angeles.

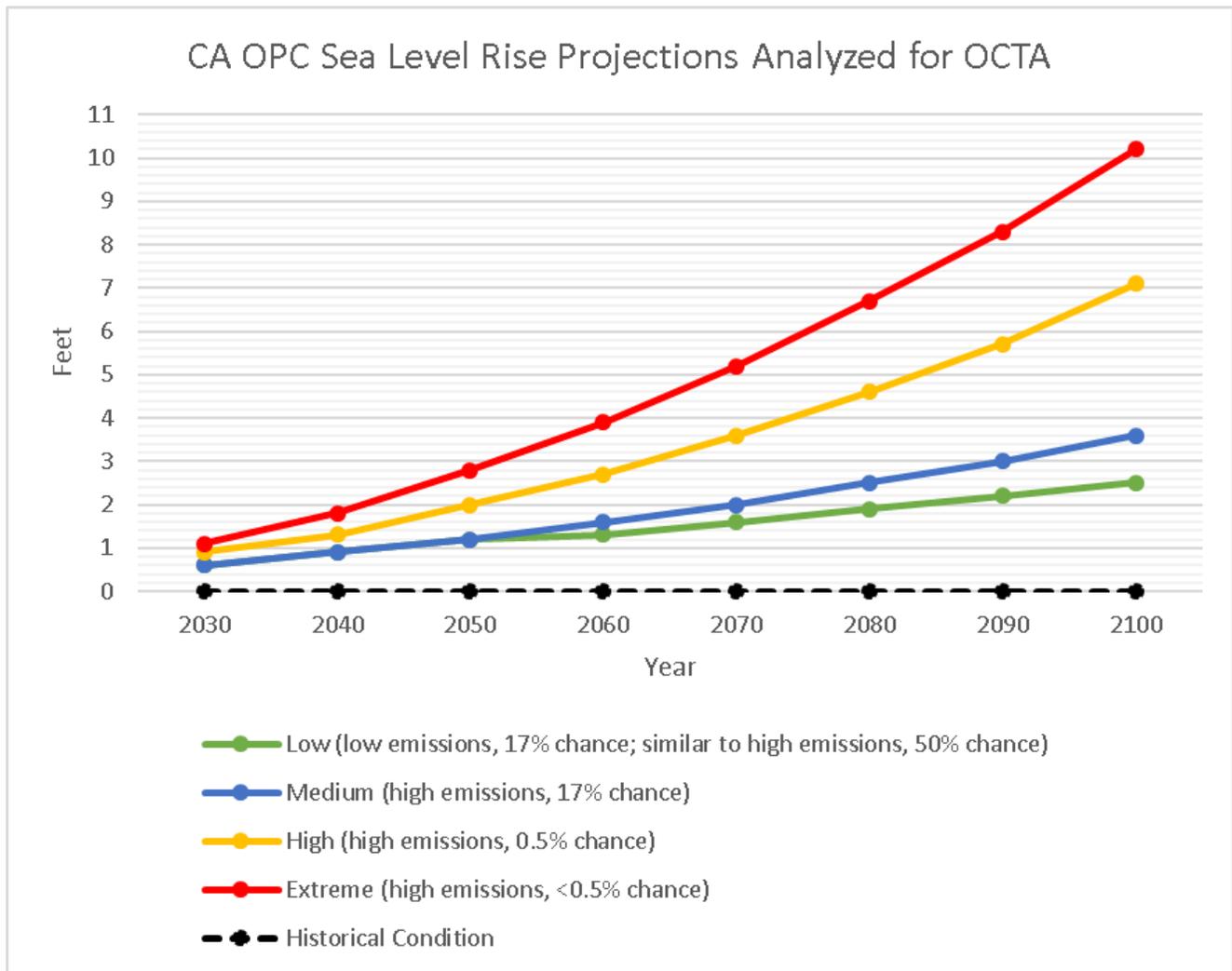
Three sea level rise scenarios were chosen for the quantitative analysis, and an additional scenario was assessed qualitatively. For clarity, we refer to these as “Low”, “Medium”, “High”, and “Extreme” scenarios. The scenarios are as follows:

- **Low scenario:** This scenario is part of Representative Concentration Pathway (RCP) 2.6, the State’s “low emissions” global greenhouse gas emissions assumption for its SLR projections. Under this low emissions assumption, this scenario corresponds to the upper end of the range bracketing 66% sea level rise probability range. In other words, if the low emissions scenario occurs, SLR has a 17% chance of meeting or exceeding this scenario. The State guidance labels the upper end of this 66% probability range as “Low Risk Aversion”. Note that the low emissions 17% chance projection is very similar to the 50% chance high emissions projection out to 2100.
- **Medium scenario:** This scenario is part of RCP 8.5, the State’s “high emissions” global greenhouse gas emissions assumption. Under this high emissions assumption, this scenario corresponds to the upper end of the range bracketing 66% sea level rise probability range. In other words, if the high emissions scenario occurs, SLR has a 17% chance of meeting or exceeding this scenario. Again, the State guidance labels the upper end of this 66% probability range as “Low Risk Aversion”.
- **High scenario.** This scenario is also part of the RCP 8.5 high emissions assumptions. Under RCP 8.5, there is a 1-in-200 or 0.5% probability of meeting or exceeding this scenario. The State guidance labels this 1-in-200 chance scenario as “Medium-High Risk Aversion”.
- **Extreme scenario:** Per State guidance and feedback from the California Coastal Commission, we also qualitatively looked at the H++ “Extreme Risk Aversion” scenario. It is part of the RCP 8.5 high emissions scenario. It is not associated with an annual probability but well exceeds the 0.5% chance probability projections.

Figure 18 shows these three sets of SLR projections out to year 2100 calculated against a baseline year of 2000. In 2050, both the Low and Medium projections show 1.2 feet of change and the High projection shows 2 feet of change. In 2100, the Low, Medium, and High SLR increments are 2.5, 3.6 feet, and 7.1 feet, respectively. The Extreme SLR projection is 2.8 feet for 2050 and 10.2 feet for 2100.

These scenarios, along with projections of shoreline erosion, were used to model how total water levels for different return period storms are expected to change over the coming decades. That said, there could be changes in intensity and frequency of storm events, including changes in El Niño events, associated with climate change that also affect these projected water levels.

**FIGURE 18 | California Ocean Protection Council Sea Level Rise Projections Used in this Study**



## Precipitation Change

We processed future extreme precipitation projections for the overall study area. The projections for Mariposa Promontory were selected from this larger set of projections.

These were processed from Global Climate Models (GCM) that have been downscaled to a local resolution by the Scripps Institute of Oceanography with a technique called Localized Constructed Analogs (LOCA) (UCSD, n.d.). The LOCA projections were downloaded from the University of California, Berkeley Geospatial Innovation Facility's Cal-Adapt Data Server (UC Berkeley, n.d.).

Extreme precipitation estimates were developed based on ten GCMs assessed by California state agencies as being relatively representative of climate change across the state<sup>4</sup> (State of California Department of Water Resources, 2015). These were developed for two emissions scenarios: RCP 4.5 and RCP 8.5. RCP 4.5 assumes greenhouse gas emissions peak around 2040 and then decline. RCP 8.5 assumes emissions continue to rise through the end of this century (Cal-Adapt, 2020).

Percentage changes between backcasted historical conditions and forecasted future conditions were calculated. The project team then applied these percentage changes to the National Oceanic and Atmospheric Administration (NOAA) Atlas 14 precipitation values (NOAA, 2017). NOAA Atlas 14 provides estimates of rainfall depths for a variety of different durations and return periods. These estimates are based on observed historical data.

Figure 19 shows the precipitation values for the 100-year event in the analysis area for the GCMs and RCPs discussed in years 2040, 2070, and 2100. Historical values from NOAA Atlas 14 are also shown.

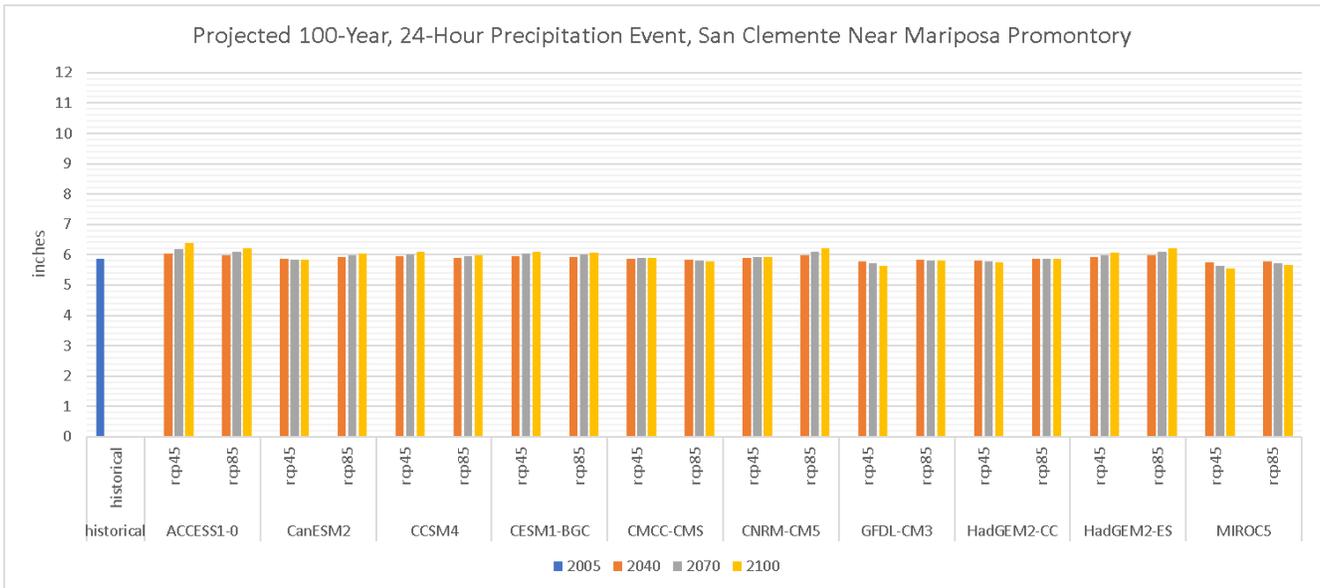
There is limited variation between historical and future conditions across the different future years, GCMs, and RCPs. Thus, future rainfall-induced erosion rates are not expected to vary heavily from current conditions.

Because of this, the analysis focused on better understanding future coastal impacts. Combined impacts of precipitation changes and SLR should be considered in facility design and management. Given the limited changes in future precipitation expected in the study area and the scope of the analysis, combined impacts of precipitation- and coastal based erosion were not assessed in detail.

---

<sup>4</sup> The models are: ACCESS 1-0, CanESM2, CCSM4, CESM1-BGC, CMCC-CMS, CNRM-CM5, GFDL-CM3, HadGEM2-CC, HadGEM2-ES, and MIROC5.

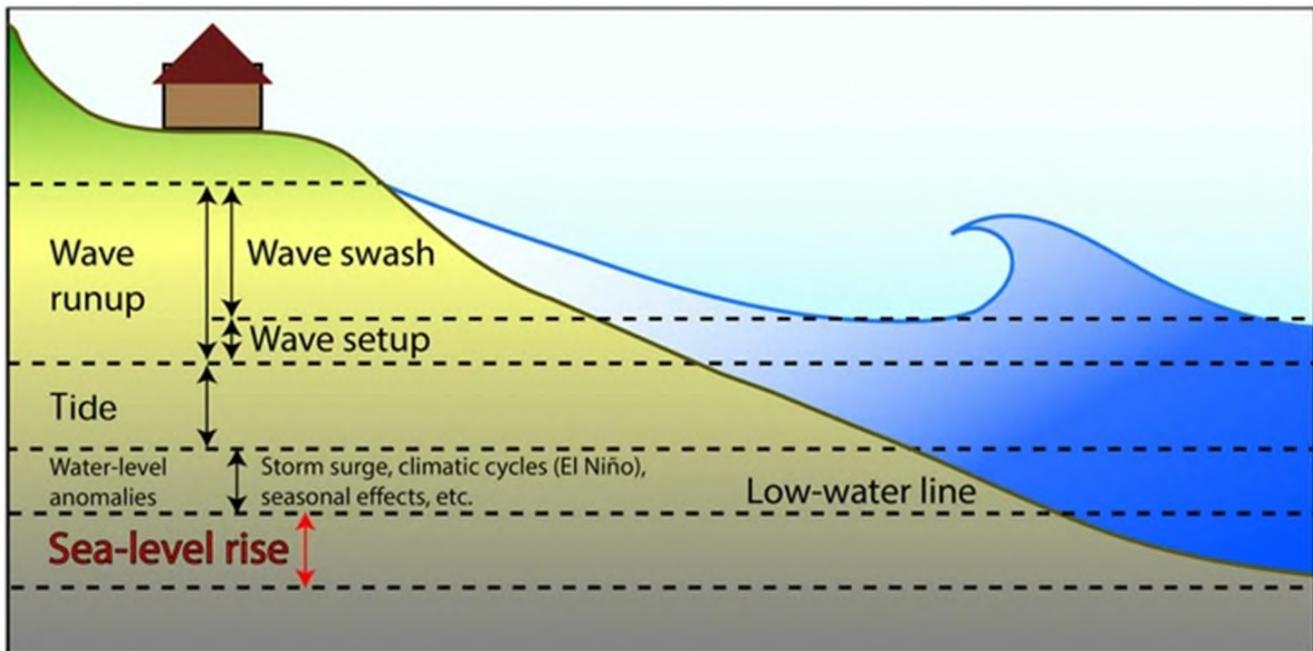
**FIGURE 19 | Projected 100-Year, 24-Hour Precipitation Event, San Clemente Near Mariposa Promontory**



### Coastal Impacts

The west coast of the U.S. has relatively steep relief offshore and thus does not produce the large storm surges characteristic of the East and Gulf Coast Regions. The extreme still water levels are limited to a few feet above normal high tides. However, direct exposure to the Pacific Ocean results in large waves in excess of 20 feet during extreme events, with large wave periods that exceed 15 seconds. Some of the largest wave events reach up to approximately 18 seconds. These large waves with the corresponding long wave periods generate large wave setup. This setup combined with the extreme water levels and wave runup lead to 100-year total water levels along this section of coastline ranging from +13 ft, North American Vertical Datum of 1988 (NAVD88) to +22 feet, NAVD88. For this location, the mean sea level (MSL) is +2.6 feet NAVD88. At the southernmost end of Orange County, the 100-year total water level increases to 30 feet. This may be due to the coastal bathymetry in this area that resembles a coastal headland, which would tend to focus wave energy. This is consistent the area being a renowned surf break. Figure 20 shows the different components of total water level.

FIGURE 20 | Components of Total Water Level (Vitousek, et al., 2017)



The coastal impacts were assessed using the following approach with more detailed explanation below:

- Utilize NOAA extreme water levels based on long term tide gauge records dating back to 1900 for return interval water levels. Extreme still water levels were obtained from the NOAA analysis of the Newport Beach tide gauge, (National Oceanographic and Atmospheric Administration, 2020).
- For future sea level rise trends, add the SLR to the extreme NOAA water levels. We chose to analyze future years 2040, 2070 and 2100, along with existing conditions, to establish three different time series of projected sea levels.
- Recurrence interval deep water wave heights periods and directions were obtained from USACE (2020) Wave Information Study hindcasts (U.S. Army Corps of Engineers, 2020).
- Local offshore and coastal bathymetry was based on a USGS DEM (United States Geological Survey, 2016).
- SLR induced beach recession was based on results from the CoSMoS model applied to the Southern California Bight (Erikson, et al., 2017).
- Use FEMA guidance to calculate wave setup and runup on beaches or wave runup on revetments.
- Use the beach elevation to tune the calculated runup elevation to match (within +/- 1 foot) the FEMA Total Water Levels, which are based on historical observation. For this planning-level study, a detailed coastal analysis including storm induced beach erosion was not performed. Thus, the analysis of the wave runup was tuned using the beach elevation in order to match (within +/- 1 foot) the FEMA Total Water Levels.

For cases with runup on revetments:

- Calculate wave overtopping at the crest of the revetment based on European guidance (Van Der Meer, et al., 2018).
- Calculate the stable armor size using USACE (2002) guidance (U.S. Army Corps of Engineers , 2002).
- For a given rock size, calculate armor damage for use in repair or replacements costs across all the return intervals and SLR scenarios.
- For each tenth milepost, Figure 21 shows approximate current infrastructure elevations with the FEMA Total Water Levels, which are based on historical observations.<sup>5</sup> The approximate elevations of the infrastructure in this figure – the top of rail, bottom of shoreside ballast, top of revetment, and visible toe of revetment – were estimated visually with satellite imagery in Google Earth and the DEM. The FEMA elevations were applied on a transect basis.

Figure 21 shows that for most of the analysis area, the rail elevation exceeds all the historical FEMA Total Water Levels, including the 500-year event. There are several key exceptions:

- For MP 202.1-202.5 and MP 203.1-203.8, some of the water levels meet or exceed the rail. However, in these locations, there are structures between the water and the rail. These would likely prevent the rail from being overtopped under current conditions.
- MP 203.9-204.5 (corresponds with Mariposa Promontory), where the 500-year event exceeds the top of the revetment and rail, and the 100-year event exceeds the revetment and rail in some places.
- MP 206.8-207.2 is a narrow stretch of beach near the county line. Here, the top of revetment exceeds the 500-year event elevation. However, there is some unrevetted portion of the transect where the 500-year event exceeds the top of the rail.
- MP 207.3-207. is the final segment before the county line. Here, the FEMA water levels are much higher than the adjacent area. The 500-, 100-, 50-, 25- and 10-year events easily exceed the top of rail. The 2-year event meets the top of rail. The calculated runup results for this transect appear to be larger than those experienced by Metrolink with the rail in this area. It is possible the winter profile and storm degradation of the shore were not consistent with those calculated and used by FEMA for this transect. The bathymetric contours offshore of this area resemble a headland. This offshore configuration will certainly focus incoming waves, resulting in more intensive and damaging wave action. One additional factor is the cobble and boulder beach that can be seen at lower tide levels in this area. Depending on the profile of this cobble beach it may inhibit overall erosion depths and thereby limit water depths and wave heights.

The calculated wave runup shown in the next few figures are based on the calculated runup assuming a continuous revetment slope extending to this elevation. For runup values in excess of the existing revetment crest, the water would propagate across the top of the revetment and toward the ballast and rail without reaching this calculated runup height. The values shown, for the calculated runup on a continuous revetment, are provided for illustrative purposes only as an indication of the revetment crest that would be needed to

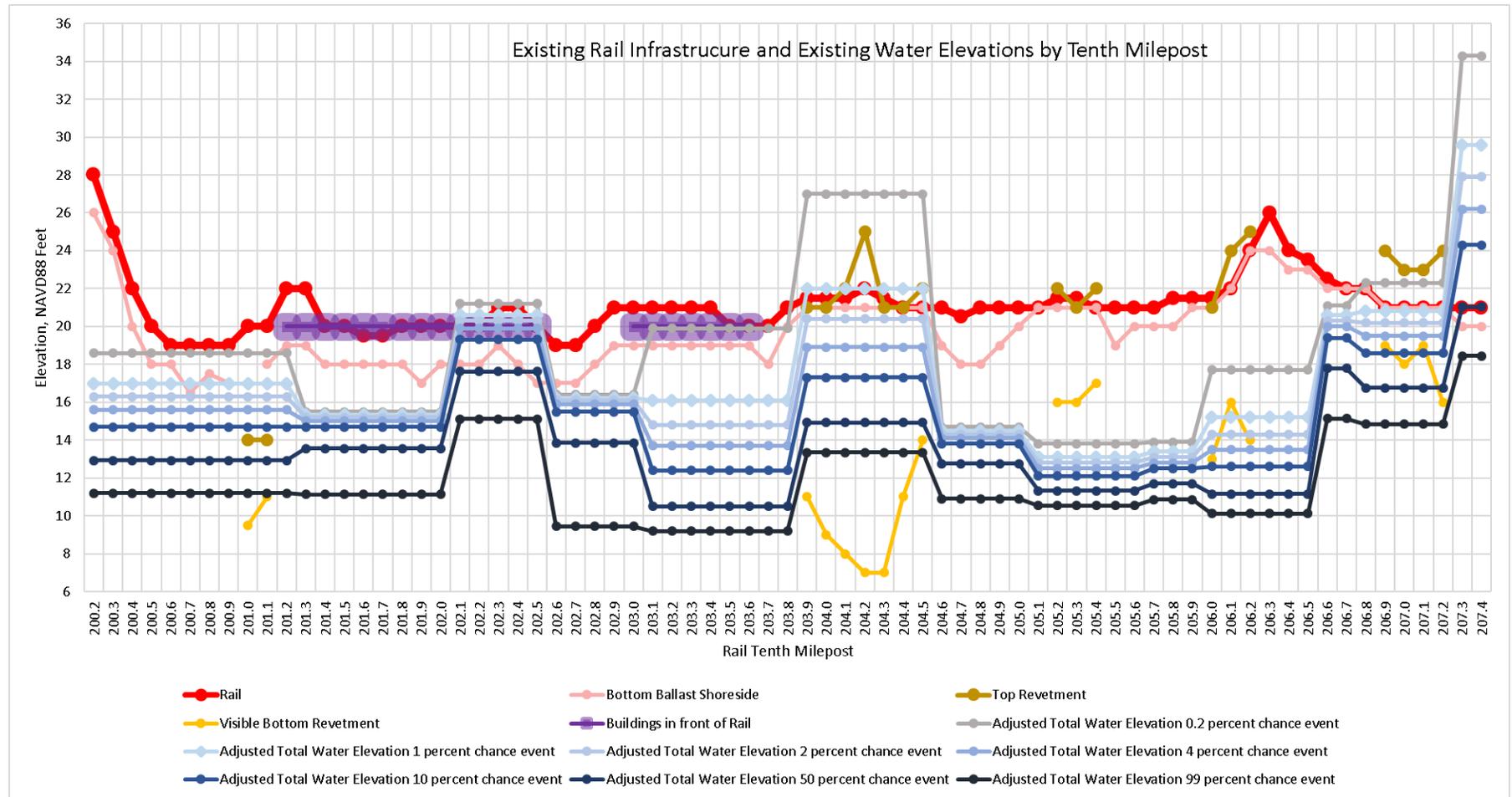
---

<sup>5</sup> The FEMA Total Water Levels were adjusted for some discrepancies.

prevent significant overtopping. For cases where the runup elevation exceeds the top of the revetment wave overtopping may cause damage to the ballast and potentially undermine the rail. Figure 22, Figure 23, and Figure 24 show existing rail elevations with future water elevations (i.e., wave runup) for 2100 under the Low, Medium, and High SLR scenarios. For the Extreme SLR scenario, the future water elevations would be even higher than those shown in the High SLR scenario.

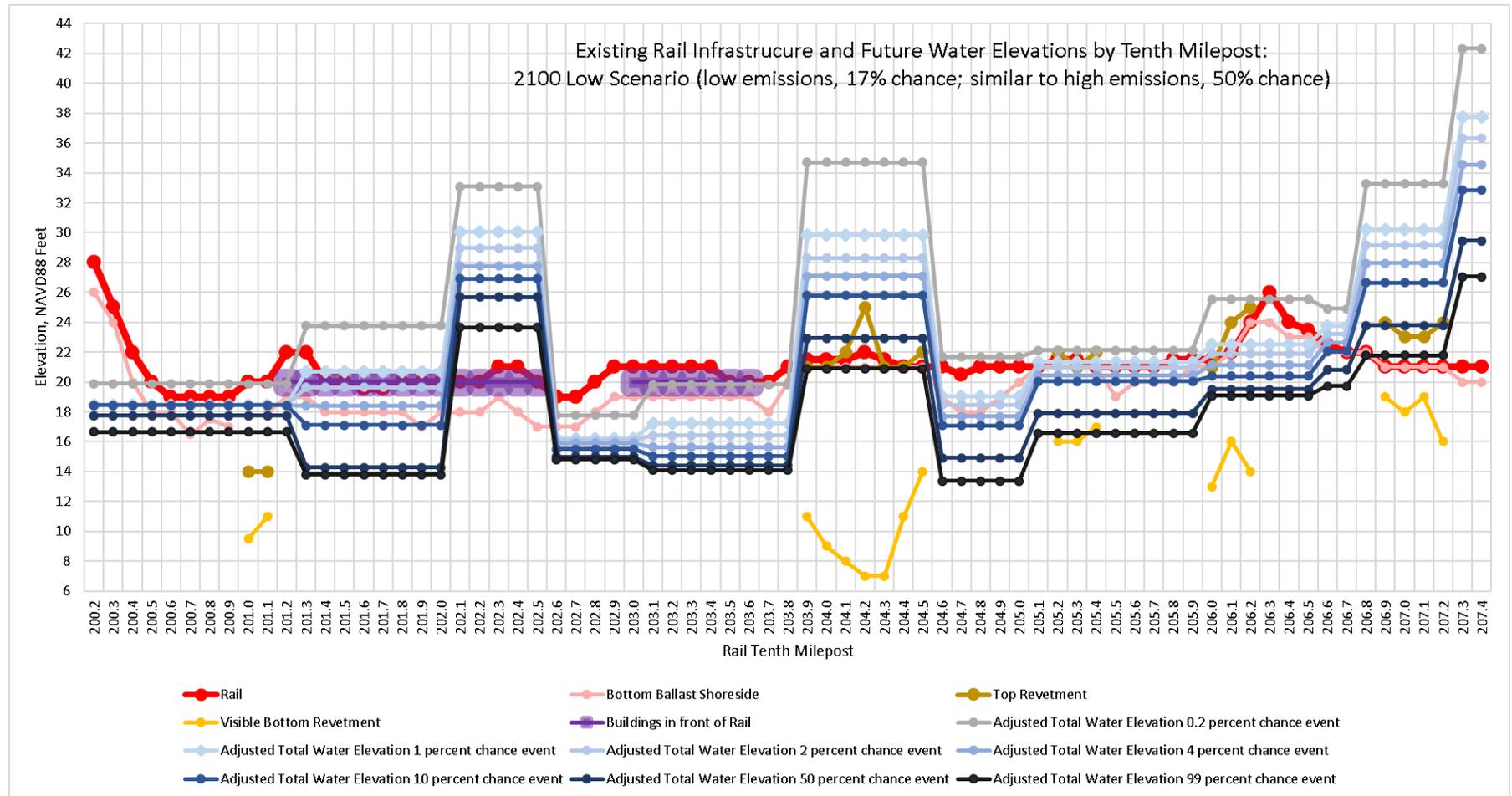
**FIGURE 21 | Existing Rail and Existing FEMA Total Water Level Elevations**

Elevations calculated runup assuming a continuous revetment slope extending to this elevation. For runup values in excess of the existing crest, the water would propagate across the top of the revetment and toward the ballast and rail without reaching this calculated runup height. The values shown are provided as an indication of the revetment crest that would be needed to prevent significant overtopping.



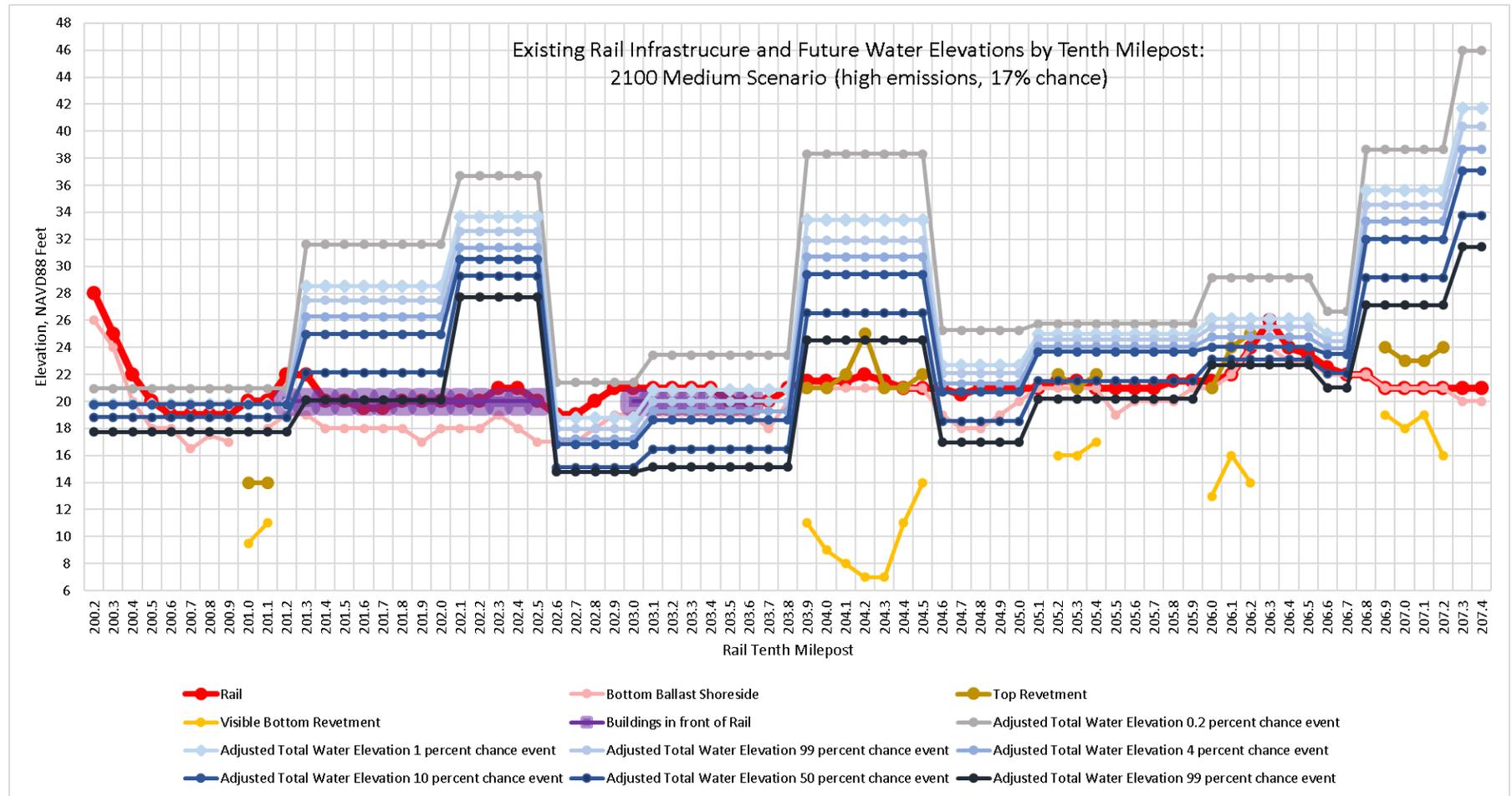
**FIGURE 22 | Existing Rail and Future Total Water Level Elevations: 2100 Low Scenario**

Elevations calculated runup assuming a continuous revetment slope extending to this elevation. For runup values in excess of the existing crest, the water would propagate across the top of the revetment and toward the ballast and rail without reaching this calculated runup height. The values shown are provided as an indication of the revetment crest that would be needed to prevent significant overtopping.



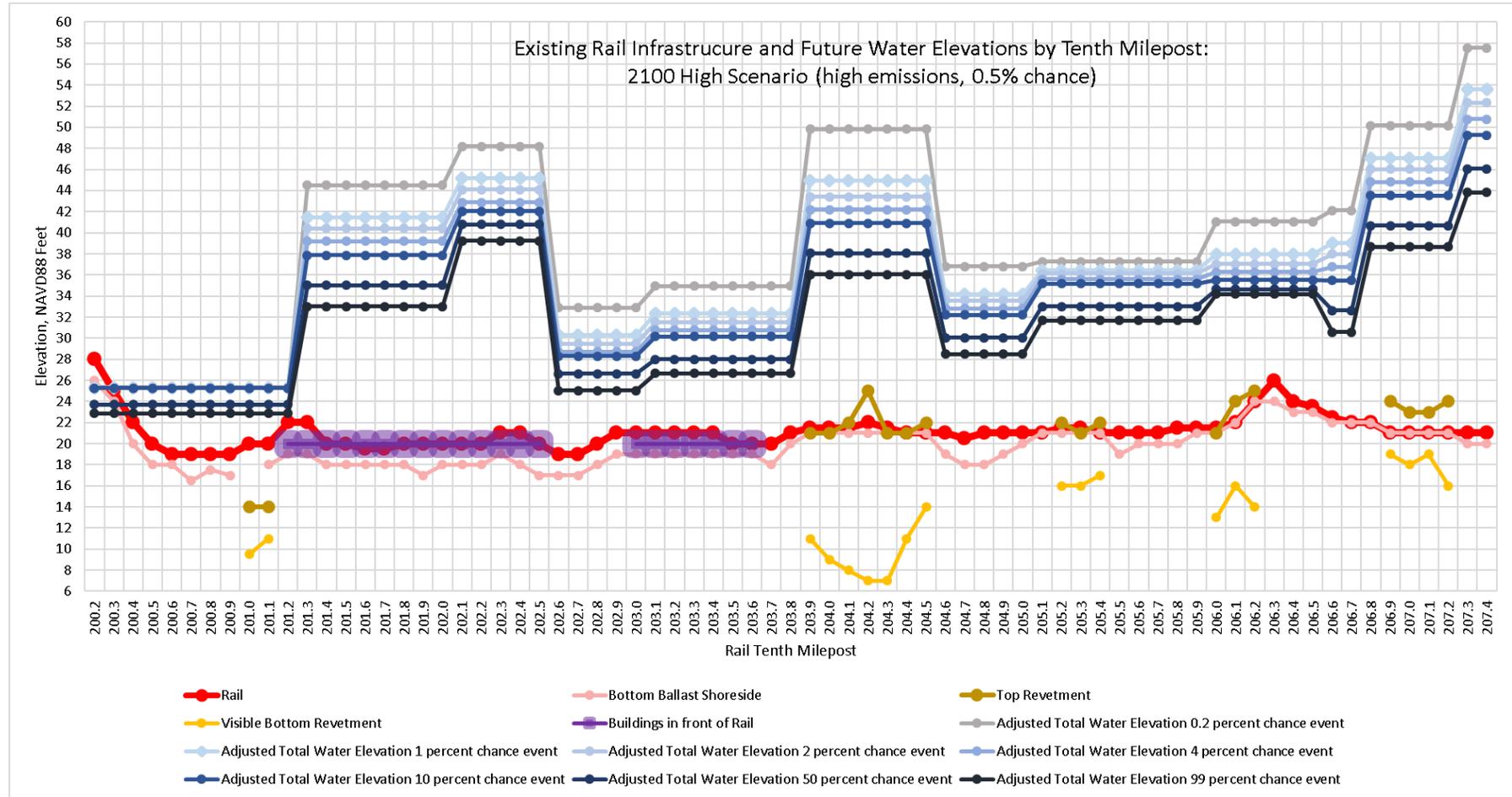
**FIGURE 23 | Existing Rail and Future Total Water Level Elevations: 2100 Medium Scenario**

Elevations calculated runup assuming a continuous revetment slope extending to this elevation. For runup values in excess of the existing crest, the water would propagate across the top of the revetment and toward the ballast and rail without reaching this calculated runup height. The values shown are provided as an indication of the revetment crest that would be needed to prevent significant overtopping.



**FIGURE 24 | Existing Rail and Future Total Water Level Elevations: 2100 High Scenario**

Elevations calculated runup assuming a continuous revetment slope extending to this elevation. For runup values in excess of the existing crest, the water would propagate across the top of the revetment and toward the ballast and rail without reaching this calculated runup height. The values shown are provided as an indication of the revetment crest that would be needed to prevent significant overtopping.



The combination of SLR, erosion, and flooding could threaten not only the rail and embankment, but also associated infrastructure, such as bridges, culverts, stations, signaling and communications infrastructure, and pedestrian crossings.

Furthermore, if wave runups are not prevented from overtopping the rail, they could exacerbate erosion issues in locations such as Mariposa Promontory, where the bluffs lie close to the rail. Furthermore, examination of the USGS CoSMoS cliff retreat and shoreline position projections show that without the rail and associated protective infrastructure, erosion would be substantial along much of the analysis area, threatening additional infrastructure and coastal property.

## Adaptation Options

Numerous adaptation options to reduce risk and improve resiliency may be considered for the study area. Identifying and selecting options in this corridor is complex given that performance of different options varies by location along the coast, future timeframe, and climate scenario. The environmental setting, regulatory setting, and multitude of stakeholders, even in current conditions, add to this complexity.

Potential adaptation options to evaluate were selected earlier in the study and were shared with the Project Working Group.

Adaptation options have been organized in three ways:

- A set of primarily coastal adaptation options (i.e. alternatives). Given that parameters for these options vary based on location, timeframe, and climate scenario, these are ‘packages’ of adaptation options implemented along the corridor.
- A set of specific adaptation options for the landward side of the tracks at Mariposa Promontory, where the bluffs pose the highest risk to the rail. The coastal adaptation options (previous bullet) play a crucial role in managing this risk. But these options on the landward side are somewhat independent of the coastal options so are evaluated as such. These are more focused on precipitation-related risks. While precipitation projections are not expected to change substantially under different climate scenarios at this location, we have included discussion of these options for current conditions.
- A set of general recommendations for the coastal corridor. These are considered relatively low-cost, high-priority actions that could improve the corridor’s resiliency. These are provided in the recommendations section below.

The coastal options are organized as follows:

1. **Baseline revetment alternative.** Continue using approximately 2-ton riprap for revetments. Maintain the same revetment slope of about 1V:1.33H (or steeper) that exists on current revetments. It is assumed this would be used to repair damages from storm events (i.e., replacement of existing riprap in kind without changing the height or slope of the revetment) and to add protection in new locations where it is needed as the sea rises and water levels increase. The other options are compared to the baseline alternative.
2. **Improve revetment alternative.** As the sea level rises and the beach erodes, increase the revetment crest height to protect the rail against the 100-year wave runup (same as baseline). Install new revetment where needed to prevent overtopping during this event. Increase armor rock size so that the revetment withstands total damage during the 100-year event and partial damage during the 50-year event. When

revetment improvement or new installation is needed to meet these standards, change the revetment slope to 1V:1.5H. This would require more beach space to be occupied by the revetment in some areas. The option is flexible in that it can be adjusted and implemented depending on how SLR actually occurs rather than choosing parameters to design to well ahead of time.

**3. Improve revetment and add impermeable seawall with wave deflector on top of the revetment where needed.**

The revetment improvements would be similar to those described in option 2 above. However, this option would involve adding a low seawall on top of the revetment when initial improvement or installation is required. This wall would be up to 5 feet higher than the top of the revetment upon installation, thus reducing the amount of armor rock needed. That said, depending on the location and scenario, additional armor rock overlay would still be needed upon installation of the seawall.

The wall could be made of precast concrete and designed so that additional panels could be added in the future to increase its height. Figure 25 presents a hypothetical schematic of a more robust hybrid shoreline revetment having larger riprap stone (up to 10 tons) which fronts a relatively impermeable segmental seawall.

The design of the revetment and seawall should follow the engineering and design guidelines presented in the USACE Coastal Engineering Manual (U.S. Army Corps of Engineers, 2002). The overall seawall resistance and stability are highly dependent on the configuration of the foundation element and the long-term ability of the fronting revetment and underlying prepared ground to sustain repeated direct attack from up rushing broken waves. Careful evaluation of impulsive hydrodynamic forces on the wall face and foundation bearing materials is essential. This evaluation was beyond the scope of this analysis.

With the application of the revetment and seawall option, it is assumed the elevation of the rail itself would remain the same as current conditions. In other words, it would not be elevated along with the revetment crest height and seawall height. Elevating the rail would be costly and require extensive disruption of the rail service. Furthermore, elevating the rail cannot be done in discrete locations like the elevation of the revetment or seawall. It needs to be raised in unison with adjacent segments to maintain a gradual grade.

Overall, the specific design of this option would need to be further refined and evaluated for feasibility and cost effectiveness. Like the baseline revetment and improved revetment options, the improved revetment with seawall option is flexible in that it can be adjusted and implemented depending on how SLR actually occurs rather than choosing parameters to design to well ahead of time.

**4. Relocate the rail away from the coastline in southern Orange County.** The concept and cost for this option are based on an alternative presented in the 2004 LOSSAN Programmatic Environmental Impact Report/Environmental Impact Statement, which included several project alternatives (State of California, Department of Transportation, 2004). The alternative of interest is called the San Clemente Long Two-Segment Tunnel – Double Tracking option. For this option, a two-segment rail tunnel would be built along Interstate 5 from San Onofre State Beach in northern San Diego county to Avenida Aeropuerto in San Juan Capistrano, a length of 9.6 miles total. Figure 26 shows a rough concept of this alternative location. The two-segment design would allow for station in San Clemente.

A rough, top-down cost estimate was developed based on the cost provided in the EIR/EIS, inflation, and more recent high-level cost estimates for tunneling a segment of the same rail corridor away from the Del Mar bluffs in San Diego County (San Diego Association of Governments, 2020). The estimate for this

option was assumed \$5.19 billion. There is likely to be substantial error in this figure since it is only a top-down estimate based on per-mile costs. But this order-of-magnitude cost is still helpful for evaluating adaptation options. The technical feasibility of the tunnel was not evaluated in detail. According to the EIR/EIS, this option would include double tracking the rail.

Additional options were suggested by various stakeholders but were not carried forward for detailed analysis. These options included:

- A series of bridges or causeways over the vulnerable area, similar to the Trestles Bridge in northern San Diego county. For the most vulnerable portions of the study area in southern Orange County, it is not likely practical or feasible to raise the railway track just to jump or span localized areas of potential wave attack. The projected coastal conditions vary considerably based on the location within the 7-mile study area. If the rail is to remain in its current location, it is preferable that coastal protection measures can be implemented flexibly in terms of both location and elevation. Furthermore, construction of a series of bridges or causeways in the narrow rail corridor would likely be much more disruptive to rail service than the four options presented above. Also, removing existing coastal revetment in these areas would render the steep bluffs much more susceptible to wave attack and resulting erosion, jeopardizing the rail, the stability of these slopes, and the properties on top of these bluffs.
- A series of pile walls supporting rail infrastructure (without revetment) to minimize coverage of beach and upland areas. Most of the vulnerable portions of the coastal alignment are already protected by large rock revetments that have been in place for decades. Removing the existing rock revetments and replacing them with tall vertical pile wall systems without frontal protection is not recommended from an engineering perspective. Vertical walls have extremely high reflectivity of breaking and broken wave energy, such that the potential erosion in front of the wall is significantly increased. This option would also require disruption of rail service for extended periods of time. The possibility of high vertical walls being placed in less vulnerable portions of the coastal corridor was not assessed in detail.
- Nature-based solutions, such as beach nourishment, dunescapes, and cobble beaches. These solutions would be implemented outside of the ROW by third parties rather than OCTA or Metrolink. Recommendations are provided later in this document.

Beach nourishment and similar solutions can reduce beach erosion, helping to protect rail infrastructure. Successfully slowing this erosion would reduce the future wave runup elevation. The extent of this protection depends on the specific location along the corridor. In the highly vulnerable portions of the rail corridor with very narrow beach (such as Mariposa Promontory) and where the rail is it is unlikely to provide suitable protection to the rail without additional coastal armoring.

The currently planned San Clemente beach nourishment project, a partnership between USACE and the City of San Clemente, involves placing sand along the beach between Cristobal and Linda Lane (an area that includes San Clemente Pier) and replenishing this sand at regular intervals for the next 50 years. It is currently in design phase. The precursor study to this project, the USACE San Clemente Shoreline Feasibility Study, reviewed a series of reaches between San Mateo Point to Dana Point Harbor, an area that contains the entire coastal segment in the study area. Of these areas, the area between Cristobal and Linda Lane (Reach 6) was deemed economically justifiable for a project, in part due to the armored revetment already in place in other reaches (USACE, 2012).

FIGURE 25 | Improved Revetment with Seawall Concept with Hypothetical Elevations



FIGURE 26 | Potential Coastal Alignment Relocation



Adaptation options for the landward side of the tracks at Mariposa Promontory, where the bluffs pose the highest risk to the rail, were also developed. As discussed in other sections, the coastal adaptation options described earlier are crucial to protecting the bluffs and reducing erosion and slope failure risks that could in turn affect the rail. Options specific to the landward side of the tracks at Mariposa promontory are limited, particularly given the extent of the ROW. They include the following:

- **Do Nothing.** This option assumes that no specific new action will be taken to address potential adverse conditions with respect to the bluffs, pedestrian bridge and railway infrastructure in the subject area. This option also assumes that there are not significant changes in or improvement of regular site inspections or scheduled maintenance.
- **Upper bluff improvements.** Inasmuch that it is not likely that any direction or advice to upper bluff property owners could be enacted or enforced makes it impractical to assume that any site-specific remedial action or mitigation of potentially adverse site conditions are possible. It could be suggested that ground landscaping, irrigation, runoff controls and other site improvements be thoughtful and cognizant of the precarious stability of the bluffs. This is not an adaption option that OCTA could implement.
- **Lower bluff improvements.** Due to various laws and code enforcements by City, County, State and Federal authorities and obvious physical restrictions in the subject area, it may not be possible to perform any significant or effective preemptive stabilization or mitigation activities that would reduce the potential for slips, sloughs and landslides of the lower bluffs outside of the railway ROW or potentially within it as well. Measures such as slope reinforcement using soil nailing, drilled shafts walls, dynamic fencing, sprayed shotcrete, tieback anchor walls, soldier beam with lagging walls or other engineered mechanical means of improving ground stability that may be technically feasible but not permitted. For the adaptation option analysis, it was assumed that a light treatment, such soil nail wall with a thin shotcrete facing, would be implemented.
- **Horizontal drains.** The installation of horizontal slope drains to enhance the relief of continuously perched and seasonal groundwater levels in the bluffs may be considered. Horizontal drains may provide some minor level of control with adverse groundwater conditions but only to the extent that they effectively pinch and perforate zones of relatively permeable soil. Horizontal drains installed in very low permeability soils are only marginally effective in reducing groundwater seepage destabilizing effects. Horizontal drains that do function should not be allowed to discharge collected water directly on down slope soils in order to avoid causing further site erosion and rilling.
- **Debris removal.** The complete or partial removal of landslide debris within railway right-of-way may always be an episodic problematic condition that requires immediate attention when it occurs. Material that reaches the railway tracks should be systematically removed based on a detailed assessment of the actual site conditions before work is started. This would include the evaluation of potential for triggering further movement of the landslide debris and its likely effects to the bluffs above and the railway infrastructure below. The need for retaining walls, drainage systems, slope grading, revegetation, erosion control and accessibility need to be considered. Remedial work for a recent landslide included the placement of both stacked Interblock units and K-rail without erosion control BMPs.

## Adaptation Options Analysis

### Coastal Adaptation Options

The primary benefit of the coastal adaptation options compared to the baseline would be avoided damage and disruption that will otherwise occur under the baseline option or if no additional protection is added at all.

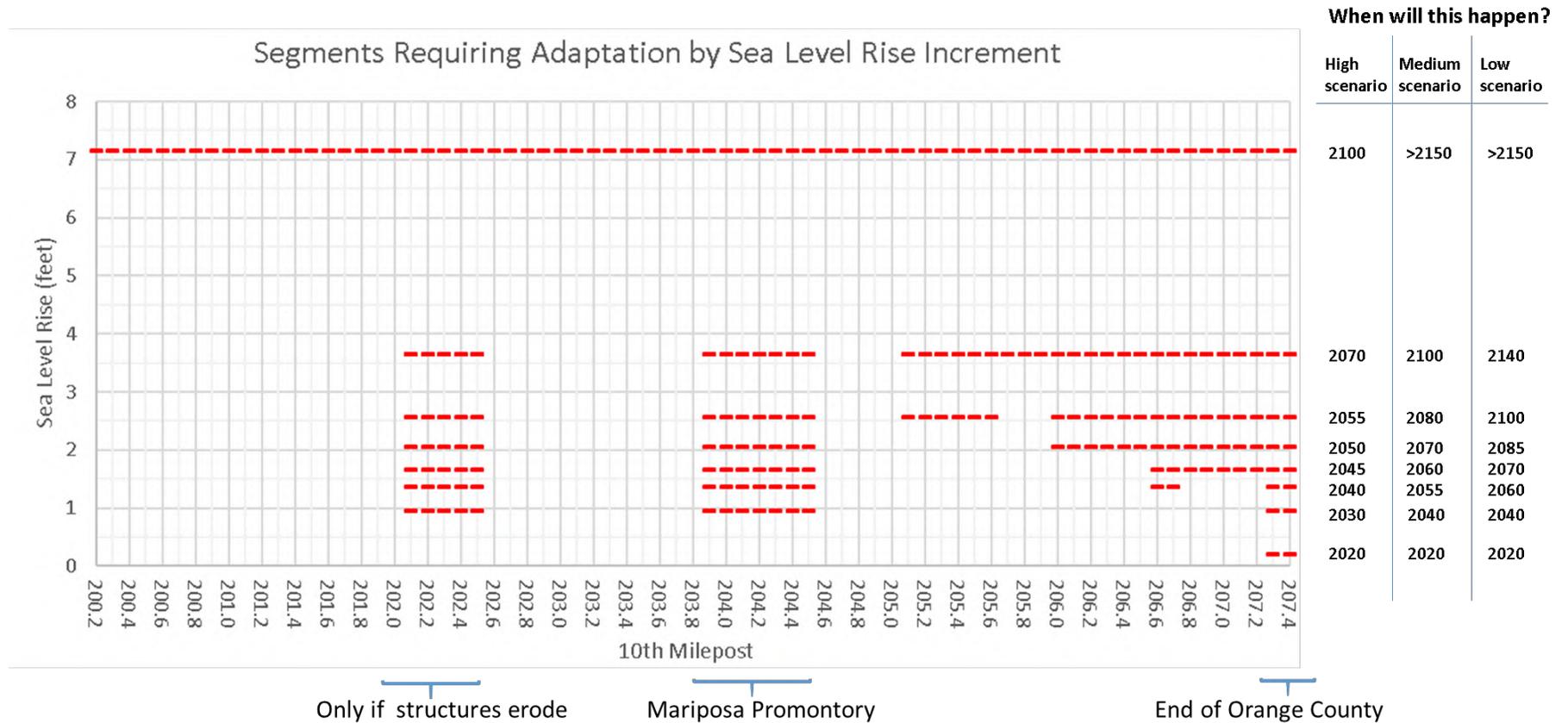
Each of the three flexible adaptation options (baseline revetment, improved revetment, and improved revetment with seawall) was assessed against a set of performance criteria under the different SLR scenarios. These criteria included ensuring that the revetment or seawall crest exceeds the 100-year wave runup and that the armor rock withstands total and partial damage under the 100- and 50-year events. For each adaptation option, timeframe, railway segment<sup>6</sup>, and climate scenario, if performance criteria were not met, it was assumed that the option would either be installed if it did not already exist or enhanced if it did already exist.

Figure 27 shows when adaptation may be needed at each tenth milepost for each SLR increment studied. The x-axis shows tenth mileposts, and the y-axis shows SLR increments. The red dashed lines show which tenth milepost segments need adaptation for each SLR increment assessed. The three columns on the right of the chart correspond with the three SLR scenarios. The columns list when the different SLR increments are expected to occur under the three scenarios. According to the calculations, MP 207.3-207.4 (southern end of Orange County) is the one area where an intervention may be needed under current conditions. In 2040 under all three scenarios, a first intervention at 203.9-204.5 (Mariposa Promontory) is needed (along with MP 202.1-202.5, assuming the structures between the rail and ocean erode, though this is unlikely to happen in such a short timespan). Intervention would be needed at all locations in 2100 under the High scenario. Interventions would likely be needed at more transects sooner under the Extreme scenario.

---

<sup>6</sup> This were based on FEMA Coastal Transect numbers.

**FIGURE 27 | Segments Requiring Adaptation by SLR Increment**  
 (Red dashed lines show where adaptation is needed)



The performance criteria assessment process enabled the estimation of material quantities for the different options out to 2100 under each scenario. Unit costs were then applied to these quantities to estimate order-of-magnitude installation costs. The analysis is intended to be planning-level; feasibility of adaptation options and associated material quantity was not assessed in detail at individual locations. In some cases where large increases in wave runups are expected, continuing to build the revetment upward and outward could become infeasible at some point. Conceptual engineering analysis will be needed in the most affected areas in the near term (now or within the next few years for MP 207.3-207.4 to clarify current conditions versus FEMA total water level estimates), with additional conceptual engineering in the future as water levels increase.

In addition to lifecycle installation costs, lifecycle hazard-related costs to OCTA were also modeled based on each option, segment, scenario, and year. These hazard-related costs included damage repair costs of coastal protection infrastructure, rail ties, and rail ballast. For this planning-level analysis damage costs were not estimated for bridges, culverts, signal infrastructure, other miscellaneous infrastructure, or the rail itself; obviously if these were damaged, damage costs would increase. The hazard-related costs did include disruption costs in the form of a bus bridge provided if service were disrupted. Damage and disruption costs to other stakeholders (rail passengers, freight rail service, shippers, public and private property owners, etc.) were not modeled in this analysis but are obviously important to consider in decision making.

Costs were aggregated across segments and timeframes and discounted. For this analysis, a real discount rate of 2% was used.<sup>7</sup>

OCTA faces significant costs along the coastal corridor, regardless of climate scenario and adaptation option chosen. Table 2 shows present discounted lifecycle cost for each adaptation option by climate scenario and simulation percentile. Across scenarios, the improved revetment and improved revetment with seawall performed relatively similarly and had the lowest lifecycle costs among the four options. The baseline revetment had the second highest within each scenario, with permanent disruption under the High scenario. Baseline costs ranged from \$206-511 million depending on the scenario and percentile shown. The relocation option was by far the costliest, at \$5.2 billion regardless of scenario.

For the two more likely climate scenarios (Low and Medium), improved revetment lifecycle costs ranged from \$42-64 million across percentiles shown. Improved revetment with seawall ranged from \$54-73 million for the same scenarios. Lifecycle costs under the less likely High scenario were much higher for both options. Under that scenario, lifecycle costs were relatively lower for the improved revetment with seawall option (\$156-180 million across the percentiles shown) versus the improved revetment (\$161-186 million across the percentiles shown). Under the Extreme scenario, which was not assessed quantitatively, lifecycle costs for all three flexible options.

---

<sup>7</sup> This real discount rate is the nominal discount rate minus expected inflation. The analysis assumes even future inflation for all prices and costs, and that the real discount rate captures the time value of money after removing this inflation. The choice of discount rate can heavily influence estimations of present discounted costs. Lower discount rates result in higher estimates of these costs, and higher discount rates result in lower estimates of these costs. Sensitivity analysis – in this case, testing the sensitivity of results to different discount rates – is a helpful tool for this type of economic analysis and was performed for this study. Discount rates can substantially decrease future costs associated with the impacts of climate change. Given how much the assumption affects economic analysis of both climate change mitigation and adaptation, there is a lot of debate about which discount rates to use. The International Panel on Climate Change discusses a range of 0.1-2.5% for climate change related analysis (see 17.4.1.4: [https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap17\\_FINAL.pdf](https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap17_FINAL.pdf)).

**TABLE 2 | OCTA Present Discounted Total Lifecycle Costs by Adaptation Option and Climate Scenario (includes Installation and Hazard Costs; 2% Discount Rate)**

SCENARIO	ALTERNATIVE	LOW END 80% CONFIDENCE INTERVAL	BEST GUESS	HIGH END 80% CONFIDENCE INTERVAL
<b>Low (low emissions, 17% chance)</b>	Baseline Revetment	\$206,754,000	\$241,672,000	\$274,045,000
<b>Low (low emissions, 17% chance)</b>	Improved Revetment	\$42,928,000	\$44,166,000	\$47,137,000
<b>Low (low emissions, 17% chance)</b>	Revetment w/Seawall	\$54,384,000	\$55,622,000	\$58,593,000
<b>Medium (high emissions, 17% chance)</b>	Baseline Revetment	\$222,059,000	\$254,280,000	\$302,699,000
<b>Medium (high emissions, 17% chance)</b>	Improved Revetment	\$59,356,000	\$60,749,000	\$63,785,000
<b>Medium (high emissions, 17% chance)</b>	Revetment w/Seawall	\$67,976,000	\$69,369,000	\$72,405,000
<b>High (high emissions, 0.5% chance)</b>	Baseline Revetment	\$395,059,000	\$455,201,000	\$510,289,000
<b>High (high emissions, 0.5% chance)</b>	Improved Revetment	\$161,384,000	\$166,986,000	\$185,589,000
<b>High (high emissions, 0.5% chance)</b>	Revetment w/Seawall	\$156,878,000	\$162,078,000	\$179,650,000
<b>All scenarios</b>	Relocation	\$5,185,900,000	\$5,185,900,000	\$5,185,900,000

Table 3 presents the results as benefit cost ratios. The benefits are discounted lifecycle hazard-related costs savings compared to the baseline option. The costs are the discounted lifecycle installation cost of each option. The improved revetment and improved revetment with seawall options both have benefit cost ratios well above 1 for all three scenarios. The ratios drop somewhat under the High scenario, which is driven by installation cost increases; with higher SLR, more material is needed to protect the rail. The relocation option is far below 1 for all three scenarios.

This economic analysis indicates that the improved revetment and improved revetment with seawall are the two most cost-effective options of those included in the analysis. The relative performance of the different alternatives was consistent across different discount rates used in a sensitivity test.

Under the Extreme (H++) scenario, performance of the baseline revetment, improved revetment, and improved revetment with seawall options would likely to be worse, and the relocation option would perform relatively better than it did for the three scenarios shown in the results.

**TABLE 3 | OCTA Benefit Cost Ratios (2% Discount Rate; Benefits are avoided Hazard-related Costs from Baseline; Costs are Installation costs)**

SCENARIO	ALTERNATIVE	LOW END 80% CONFIDENCE INTERVAL	BEST GUESS	HIGH END 80% CONFIDENCE INTERVAL
Low (low emissions, 17% chance)	Baseline Revetment	-	-	-
Low (low emissions, 17% chance)	Improved Revetment	4.09	4.88	5.56
Low (low emissions, 17% chance)	Revetment w/ Seawall	3.23	3.85	4.39
Low (low emissions, 17% chance)	Relocation	0.03	0.04	0.05
Medium (high emissions, 17% chance)	Baseline Revetment	-	-	-
Medium (high emissions, 17% chance)	Improved Revetment	2.98	3.50	4.27
Medium (high emissions, 17% chance)	Revetment w/ Seawall	2.60	3.05	3.72
Medium (high emissions, 17% chance)	Relocation	0.03	0.04	0.05
High (high emissions, 0.5% chance)	Baseline Revetment	-	-	-
High (high emissions, 0.5% chance)	Improved Revetment	2.21	2.60	2.86
High (high emissions, 0.5% chance)	Revetment w/ Seawall	2.29	2.69	2.96
High (high emissions, 0.5% chance)	Relocation	0.06	0.08	0.09

The different adaptation options have several key benefits and drawbacks in addition to the lifecycle costs discussed earlier in this document. This section qualitatively summarizes these for some important types of considerations. It is important to note that the benefits and drawbacks of the three more flexible options (i.e., those other than relocation) vary based on location and setting, and it is recommended that adaptation be done in a way that is suitable for each specific location. The following relative benefits and drawbacks pertain to the study area for the scenarios analyzed out to 2100.

#### Protection of rail from hazards

The relocation option would provide the most benefit in terms of avoided coastal hazard and bluff failure costs by eliminating the rail’s exposure to these hazards.

The improved revetment and improved revetment with seawall options provide similar levels of protection. They are likely feasible for the Low, Medium, and High scenarios through 2100, though this would need to be corroborated with a conceptual engineering analysis of specific locations. It was not determined whether they would provide sufficient protection under the Extreme scenario in 2100. Given the higher level of coastal protection under these options versus the baseline revetment, they also provide greater protection from bluff failure and erosion resulting from wave attack over the top of the rail.

The baseline revetment option provides by far the least protection benefit to the rail system. It would likely not be viable in 2100 under the High or Extreme scenarios.

#### Protection of other landward property from hazards

The relocation option and abandonment or removal of existing coastal armoring would likely result in the highest level of damage of to property other than the rail. Depending on the specific location and timeframe, this could include multiuse trails (such as the San Clemente Beach trail which parallels the rail on the landward side), private property along the bluffs that the rail currently protects, or other public or private property. Figure 28 and Figure 29 show the projected shoreline position with and without adequate coastal protection with 6.6 feet of SLR. This is the closest increment of SLR to this study's High scenario in 2100. The shoreline position projections are from USGS CoSMoS with and without the "Hold the Line" option.

The improved revetment and improved revetment with seawall options provide the most protection to other property on the landward side of the rail.

The baseline revetment provides some protection but under higher levels of SLR studied here, it becomes inadequate.

#### Protection of beach space for recreational purposes

Relocation of the rail and removal of existing coastal armoring would likely provide the most beach space, albeit only temporarily. Without coastal protection, this space would eventually erode with continued sea level rise and associated impacts.

Of the three revetment options, the baseline revetment has the steepest slope and would therefore take up the least beach space, even if it were built upward. The improved revetment with seawall option would take up somewhat less beach space than the improved revetment option for the same level of protection.

It is important to note that the three revetment options would likely only be implemented in areas such as Mariposa Promontory where the beach is already very narrow and recreational options are limited.

#### Beach access

The relocation option could temporarily provide more beach given that there would no longer be an active rail line adjacent to the beach. But assuming existing coastal protection is removed, shoreline retreat could eventually eliminate some of this access.

Each of the revetment options could be implemented in a way that maintained similar levels of beach access to existing conditions. The recommendations include providing at least as much beach access as there is currently.

### Environmental impacts

This depends heavily on the specific location and requires further study.

The relocation option would be a large-scale heavy infrastructure project with significant environmental impacts, though they would occur outside of the coastal zone.

The three revetment options would likely have greater adverse impacts on the coastal environment. It is assumed that options taking up less beach space would have fewer coastal environment impacts. Thus, the baseline revetment would likely have fewer impacts, followed by the improved revetment with seawall, followed by the improved revetment.

Sediment transfer between the landward side of the tracks and the beach would need to be accounted for in further analysis. It is likely that the revetment options could be implemented in a manner that ensured at least as much sediment transfer as currently exists, in order to help nourish the beach.

### Aesthetics and noise

The relocation option would likely reduce noise and aesthetic impacts along the coast but increase noise and aesthetic impacts along the new alignment.

The three revetment options are assumed to have similar noise impacts to the existing rail. Aesthetic impacts are expected to be relatively comparable, though the improved revetment with seawall option might be considered to have more of an adverse aesthetic impact by some.

### Rail and station considerations

Relocation could enable increased rail capacity along the corridor through improvements such as double tracking.

- The two existing San Clemente rail stations would be relocated and likely consolidated into one station.
- Relocation would result in easier access to freeway for rail passengers.

### Permitting/regulatory challenges

All four options present significant permitting challenges.

The relocation option would be a massive, multi-billion infrastructure project with miles of heavy construction, including tunneling. While it would avoid coastal permitting challenges, it would include its own set of permitting challenges.

All three revetment options involve increasing coastal armoring as conditions worsen over time. Depending on the specific location and setting, it is expected to be challenging to gain approval from the CCC or that approval will be conditional on OCTA meeting certain criteria.

For a given height of shoreline protection, the baseline revetment is expected to be the easiest to permit because it takes up the least beach space, followed by the improved revetment with seawall, and then the improved revetment, which takes up the most beach space.

**FIGURE 28 | Shoreline Position with and without Coastal Armoring, 6.6 feet SLR, Mariposa Promontory (USGS CoSMoS)**



**FIGURE 29 | Shoreline Position with and without Coastal Armoring, 6.6 feet SLR, southern Orange County (USGS CoSMoS)**



## Mariposa Promontory Bluff Adaptation Option Analysis

The Mariposa Promontory bluff strategies were evaluated from a qualitative perspective:

- **Do Nothing. Very poor performance.** If nothing is done to improve the site conditions then continued, possibly accelerated, uncontrolled bluff failures and wave attack may continue to threaten the railway infrastructure.
- **Upper Bluff Improvements. Fair performance.** Although probably infeasible for OCTA to implement given that this is outside of the OCTA ROW, selective on-site improvements to residential properties could have limited to significant influence in maintaining stable upper bluff conditions. However, the strategy would probably be highly impractical and contentious to implement. The improvements were assumed to be a light treatment of a soil nail wall with a thin shotcrete facing.
- **Lower Bluff Improvements. Good performance.** Preemptive lower bluff improvements for ground stabilization or failure mitigation by various means is technically viable. However, site physical constraints and authorized permission by others may be very problematic. The improvements were assumed to be a light treatment of a soil nail wall with a thin shotcrete facing.
- **Horizontal Slope Drains. Poor performance.** Relief of perched and seasonal groundwater may be effective given appropriate soil conditions and site access. Post-drainage control of collected groundwater must not be allowed to create new erosion and drainage issues.
- **Landslide Debris Removal. Good performance.** At times, the surgical removal of landslide debris will be required after the material has stopped moving. A state of precarious equilibrium may exist which should be carefully evaluated before any remedial work is permitted to proceed. Complimentary site work such as soil retention systems, internal/surface drainage, and erosion control BMPs may be required.

### 5.1.3 RECOMMENDATIONS

The following actions are recommended for the coastal area:

- **Continued vigilance in monitoring the existing shoreline protection revetment performance and regular maintenance.** Ensure that the existing revetment meets the Metrolink standard specifications for riprap. The specification could be amended to include commentary regarding handling/placement methods that ensure a tighter and more stable final configuration. Tight placement requires the use of an articulated excavator with a claw-thumb bucket or similar equipment. A 1.5H:1V or shallower slope should be used where possible. The revetment crest should exceed the top of rail and, in some cases, needs to be widened to match the Metrolink standard drawing.
- **Prevent high-volume overtopping of the rail and destruction of the revetment,** as it is crucial not only to the rail itself but also the stability of the bluffs behind the rail.
- **Formalize design/performance criteria like those used in this study** (e.g., revetment or other coastal protection should protect the rail from excessive overtopping during the 100-year wave runoff and should withstand total damage during the 100-year event and partial damage during the 50-year event). These performance criteria will need to be monitored in a forward-looking manner. 'Adaptation triggers' should be set based upon the best available projections and on the amount of time it takes to implement a solution. For instance, in the year 2030, if conditions are expected to worsen so that criteria

are not met in 2040 and a solution takes 10 years to be planned, designed, and construction, then planning should be triggered immediately. Multiple projections need to be reviewed in this process, though projections will likely be relatively similar to one another for only 10-20 years into the future before diverging. The monitoring should be done on at least an annual basis. This monitoring process also needs to regularly review the best available climate projections. For the time being, SLR projections can be obtained from California OPC. The monitoring process should account for how SLR and erosion projections affect the performance criteria (e.g., wave runup height and no-damage rock armor size), as were estimated in this study. In addition to monitoring these relatively near-term changes, a longer-term analysis should be performed from time to time, perhaps every 5-10 years. As sea levels get much higher and more of the beach erodes, the relative performance of different options may change. For instance, the relocation option could perform better, despite not being cost-effective now.

- **Where and when the rail is not expected to meet performance criteria, enhanced coastal protection is strongly recommended.** The improved revetment (larger rock armor size, more gradual slope, higher crest) or the improved revetment with seawall option is highly recommended. These two options performed the best in the lifecycle cost analysis. While both have some drawbacks, based on our current understanding of possible conditions out to 2100, they appear to be the most reasonable options in areas where the performance criteria are not met. Optimal design concept and parameters should be evaluated further during the conceptual engineering phase.
- **Both preferred revetment options can be applied flexibly**, in terms of (1) location and (2) degree of protection at a given location, and (3) adjustability of this protection over time (i.e., both can be added onto). It is much easier to adapt these solutions based on how the climate actually changes and how climate science continues to evolve. Contrast these to more rigid, one-size-fits-all approaches which do not provide this adaptability.
- **While somewhat costlier than the improved revetment under the Low and Medium scenarios, the improved revetment with seawall option would likely take up somewhat less beach space.** While it would likely be implemented in areas where beaches are very narrow and recreational opportunities are limited, it still may be more favorable to permitting agencies.
- **The addition of a new revetment or armor layer onto an existing revetment should only be done where necessary to ensure the performance criteria are met and rail service is not disrupted.** Permitting is likely only feasible for additional coastal armoring where and when it is critical to protect the rail infrastructure and service.
- **Per CCC, coastal armoring projects (installation of new revetment or enhancement of an existing one) should be “designed to eliminate or mitigate adverse impacts on local shoreline sand supply” and beach access.** “Any adaptation strategies that include armoring should include an analysis of impacts to resources and also reference the requirement to mitigate for beach loss, natural sand supply deposits from coastal bluffs, and restrictions in public access and recreation that occurs with the placement of rip-rap and other structures.” Refined cost estimates will need to factor in the cost of mitigation for any lost public trust resources, as required by Coastal Act Section 30235. Any economic impact on the region’s tourism and subsequent impact on the regional economy should be analyzed as well. CCC recommended that further planning include a broad group of key stakeholders. Impacts on nonmotorized transportation and the trail system should also be discussed.

- **Emphasize the regional importance of maintaining rail service in this corridor and the massive impacts if this service is disrupted.** It should also emphasize that inadequate coastal protection would likely lead to accelerated shoreline erosion and cliff retreat on the landward side of the rail, including both the damage/destruction of public property such as trails and infrastructure and private property, such as blufftop homes.
- **According to the coastal hazard analysis, the southern end of Orange County (roughly MP 207.3-207.4) is the most exposed area to wave attack under existing conditions.** As discussed earlier, conceptual engineering analysis is needed to better estimate wave runup levels at the site, overtopping volumes, and erodibility of the both the beach and offshore material, as well as feasibility and cost-effectiveness of adaptation options.
- **Aside from this area, Mariposa Promontory (roughly MP 203.9-204.5) and other portions of southern Orange County (roughly MP 206.8-207.2) should be prioritized for further protection.**
- **Given the extent of the OCTA ROW and existing conditions, major intervention on the bluffs at Mariposa Promontory is not recommended.** Instead, monitoring and periodic debris removal coupled with improved protection on the coastal side of the rail are suggested.
- **Coordinate with regional beach nourishment efforts.** Beach nourishment will help slow beach erosion and reduce wave runup that could impact the rail. Beach nourishment would be performed by other agencies and occur outside of the rail ROW. OCTA may be able to assist with access and permit needs for these efforts.
- **Stockpile riprap rock nearby so that it can be readily accessed when needed.**
- **In the long term, as conditions worsen, explore the cost-effectiveness of the use of concrete armor units on the coastal revetments.**
- **Move accumulated sediment on landward side of tracks over to the coastal side of the tracks where feasible.**
- **Further study the impacts of future water levels and associated forces on bridges, including abutments, piers, and superstructures.** Bridge 204.1 should be a priority for further study.
- **For coastal culverts, regular inspections and culvert outlet headwall rock riprap maintenance and replacement are near term measures that can be implemented to protect the outlets (similar to existing protocol).**
- **For existing culverts, verify culvert headwall/concrete apron cutoff wall depths in relation to existing ground and anticipated culvert outlet and wave scour.** Where cutoff wall depths are less than anticipated scour depths, recommended mitigation consists of buried riprap armoring beyond the headwall cutoff wall to anticipated scour depth. Supplemental rock riprap at headwall sides should be provided where coverage is deficient. New culvert designs should follow Metrolink design standards with embankment riprap sized to resist wave action and headwall/apron cutoff wall depths below anticipated scour elevation. The standard Metrolink cutoff wall depth for culvert headwalls is 3 feet. This depth may not be sufficient for the actual scour depth at the culvert outlet. The cutoff depth should be below anticipated scour depth calculated using 1) culvert outlet scour with design flow through the culvert (FHWA HEC-14), 2) wave scour per FHWA HEC-18 and HEC-25, and 3) long term beach degradation. The use of Type V cement for concrete structures will prevent deterioration from salt water.

- **Conduct a more detailed hydrology and hydraulic analysis for culverts 200.8, 201.84, 201.95, and 205.8 to assess potential capacity issues and potential replacement needs.**

#### **5.1.4 INCORPORATING FEEDBACK FROM THE CALIFORNIA COASTAL COMMISSION AND ESTABLISHING ADAPTATION TRIGGERS**

As described earlier in the report, input and feedback from the CCC helped shape the recommendations of this study. OCTA is committed to working with CCC and other stakeholders to find solutions to preserve coastal resources and rail infrastructure along this corridor.

CCC input was incorporated in several ways, including the following:

- The CCC’s recommendation for adaptation triggers to flexibly implement options as conditions change over time was considered and a possible initial set of triggers for OCTA to use for this corridor are detailed in this section.
- CCC recommended assessing short-term adaptation strategies that do not require armoring, such as dunescapes and cobble beaches. While OCTA does not have the jurisdiction to implement these solutions directly, this report recommends that OCTA collaborate with other stakeholders, such as the City of San Clemente and USACE, that may lead the implementation of these solutions along the corridor.
- Citing the Coastal Act, CCC clarified that coastal armoring would only be authorized where “necessary to protect a coastal dependent use or existing structures in danger from erosion, represents the least damaging alternative for protecting this use, and is designed to eliminate or mitigate adverse impacts on local shoreline sand supply”. This study recommends that coastal armoring should only be implemented when and where necessary to protect the rail infrastructure from physical damage and rail service from disruption.
- When armoring is a viable option per the Coastal Act, there are several factors that need to be assessed and potentially mitigated as part of a coastal armoring project. These factors include beach loss, local shoreline sand supply from bluffs, beach access, indirect impacts to tourism industry and regional economy, and impacts to the coastal trail system. While the scope of this study does not include the analysis all of these factors in detail, subsequent project(s) would need to incorporate some if not all of the detailed environmental impact analyses and mitigation measures recommended by CCC.
- CCC recommended that the economic analysis include repair costs needed over the full life cycle of adaptation options. Lifecycle damage repair and disruption costs were included in this study’s analysis. There were several additional requests regarding the economic analysis, including beach loss mitigation costs, that is beyond the scope of this study. This would need to be included in subsequent coastal adaptation projects analysis.
- CCC recommended further study of the relocation option, including analysis of multiple relocation alternatives. While this is also beyond the scope of this study, it is discussed below as an input needed for adaptation triggers.

- CCC’s recommendation to assess the Extreme (H++) SLR scenario was incorporated into this study. This was assessed qualitatively as part of this project.
- Per CCC’s recommendation, references to related planning processes, such as LCPs and the City of San Clemente/USACE beach nourishment project, were included in the report.

The coastal analysis was structured to enable decision making about adaptation options along the corridor over several different timeframes. The CCC recommended establishing ‘adaptation triggers’ – rules about certain actions to take once certain conditions or events occur – along the corridor. Adaptation triggers could be based on information developed by this study and additional information from future studies. They could be developed with the following information:

- Hazard-related information:
  - » Performance criteria, such as those discussed earlier in the report (e.g., prevent unacceptable levels of rail overtopping and full revetment damage during the 100-year storm event, and prevent partial revetment damage during the 50-year storm event).
  - » Better information on current water levels for different return period storm events. As described earlier in the report, FEMA total water levels were one of the primary data sources used for estimating current wave runup values. However, there was some disconnect between this information and what has been experienced on the rail at the southern end of Orange County (MP 207.3-207.4). Clarifying these current water levels for different return period events is crucial to understanding future conditions and determining when action is needed. It is expected that FEMA will update these current total water levels from time to time. Tracking these updates will be important.
  - » SLR projections for different scenarios, as documented in this study. While the state’s SLR guidance used in this study is relatively recent (2018), the state will eventually update these SLR estimates and will continue to do so over time. Similarly, future beach erosion estimates are another important information source to track. This study used the USGS CoSMoS beach erosion projections associated with different SLR increments. An important detail is how expected beach nourishment projects, such as the City of San Clemente/USACE project, would affect these erosion projections.
  - » Information on current beach profile at different locations along the corridor, such as the information used for this study from the coastal topobathy data. Like other data sources, this information will change over time and needs to be tracked accordingly.
- Adaptation options. More study of adaptation options, such as conceptual engineering of coastal protection options in most vulnerable areas and further study of the relocation alternative, can help refine some of the information listed here:
  - » Lifecycle costs of different adaptation options, such as those presented in this study. These should include both capital and maintenance/repair costs, as this study estimated at an order-of-magnitude level. They should eventually include additional costs that the CCC suggested, such as beach loss mitigation costs. As the CCC recommended and as this study did, these options should be compared across the entire corridor rather than a single location along it. Because

some options, such as relocation, apply to the entire corridor, they need to be compared with the aggregate costs of other adaptation options across the corridor as well. While some strategies, such as targeted coastal armoring when and where needed, are more flexible than others, they still need to be analyzed from a corridor-wide perspective.

- » Time to implement the adaptation options. This study did not go into detail about the time needed to implement each viable adaptation option (or packages or adaptation options). Better information of the time and steps needed for implementing these options is needed to use the adaptation trigger approach.
  - » Information on performance of adaptation options. Though this study did model expected damage costs at a corridor-wide level, this information would be assessed in more detail in preliminary design.
  - » Information on other benefits and drawbacks of adaptation options. Again, this study gathers some of this information, but it will need to be enhanced if adaptation options are carried forward through to preliminary design.
  - » Further coordination with other regional transportation agencies involved with the coastal LOSSAN corridor, such as Caltrans, Metrolink and NCTD, is needed. This will refine the adaptation options for the overall corridor, particularly the relocation option, which would affect the alignment in both Orange and San Diego counties.<sup>8</sup>
- General assumptions about the lifecycle cost analysis, including discount rate and duration of analysis period (i.e., how far into the future the analysis should span). This study discusses these assumptions in more detail.

With the information above, adaptation triggers could be determined in the following manner:

- When and where the rail is not expected to meet its performance criteria (e.g., overtopping limited to acceptable levels during 100-year event) under a chosen scenario<sup>9</sup>, an adaptation option should be implemented so that it meets its performance criteria<sup>10</sup>. The adaptation option should be selected among the viable set of adaptation options based on its lifecycle costs and other benefits/drawbacks compared to the other viable options.

---

<sup>8</sup> Given that the relocation option would be a major project requiring significant regional coordination that could take decades to implement, it may need to be studied earlier than it otherwise would according to the lifecycle cost analysis alone.

<sup>9</sup> Generally, a range of SLR scenarios should be used, as is done in this study. Lifecycle costs should be modeled for each of these scenarios. However, a single scenario needs to be used to trigger whether or not the performance criteria is expected to be exceeded in the near-term (roughly the next 10-20 years, depending on the time it takes to implement adaptation options, as described below). For this single trigger, a more conservative/higher impact scenario should be used. It is recommended that the High SLR scenario used in this study be used for this near-term trigger. (As a reminder, what is referred to as the High SLR scenario in this study is OPC's 1-in-200 chance, Medium-High Risk Aversion, High Emissions scenario.) The Extreme SLR scenario should also be looked at, though it is only assessed qualitatively so would not suffice as a trigger in the context of this study. Note that in the nearer term, there is higher agreement among the models, so the selection of a trigger scenario is less consequential.

<sup>10</sup> Again, this should be assessed across a range of scenarios. Doing so can will enable more cost-effective design, and it will likely be required from a regulatory standpoint. If OCTA does need to select an individual scenario to design to in certain situations, it is recommended that the High SLR scenario be used for the reasons stated in the previous footnote.

- Alternatively, even if existing rail is expected to meet its performance criteria, a viable adaptation option can be implemented if its expected lifecycle costs are lower than the do-nothing alternative and other viable adaptation options, and it is likely to be acceptable from a regulatory perspective.
- Because adaptation options cannot be implemented instantaneously, OCTA must implement them preemptively. When an option should be implemented depends on the time it would take to fully execute that option. For instance, if an adaptation option is needed in 2060 and it takes 10 years to implement, then implementation should commence in 2050. To anticipate this timing, OCTA should assess present expected lifecycle costs not only at the current point of time, but also future expected lifecycle costs at the point when it is expected that performance criteria will no longer be met. Following these adaptation triggers requires having a working, corridor-wide model of (1) expected future conditions vis-à-vis the rail (such as wave runup), and (2) adaptation option lifecycle costs. This type of model was developed for this study but can be enhanced by the additional input information mentioned above and be converted into a working tool that can be used and adjusted repeatedly over the coming years. This tool should be regularly maintained and updated based on recent information on conditions and potential adaptation options. The update could be conducted by OCTA on a roughly annual basis.

Based on the information developed in this study, a potential set of adaptation triggers is as follows:

- On an annual basis, review the most recently estimated NOAA Relative Sea Level Trend for the La Jolla gauge.<sup>11</sup> These trends should be updated annually by NOAA. The OPC SLR projections used for this study are based on a baseline sea level from 2000.<sup>12</sup>
- Use the Relative Sea Level Trend to estimate the amount the sea level has risen since the projection baseline of 2000. Convert this increment from millimeters (the units of the NOAA trend) to feet (the units of the OPC projections). Use the upper end of the confidence interval for the trend.
  - » For instance, in early 2021, NOAA lists the trend as 2.13 +/- 0.26 mm/year. The upper end of the confidence interval is 2.39 mm. 2021 minus 2000 is 21 years. 21 years multiplied by 2.39 mm/year equals a SLR increment of 50.19 mm. To convert this to feet, multiply by a conversion factor of 0.00328 ft/mm. Thus, the current SLR increment in feet is approximately 0.16 feet.
  - » Note that this Relative Sea Level Trend is a linear trend calculated over many decades of observations at La Jolla gauge. Relying on a linear SLR rate is not appropriate for planning several decades ahead, as SLR is projected to rise in a non-linear manner. Thus, OCTA will need to revisit this process as the trend becomes non-linear over time. This could be done whenever the information in this study is updated, such as once every five years (see last bullet below). If actual trends depart sharply from this linear assumption, perhaps NOAA will update their methods for calculating the trend as well. Furthermore, the profile of the beach will change over time, which will further complicate decision making. It is important the OCTA uses the potential triggers listed here on a short-term basis only (i.e., for the next five years until the information in this study is revisited and updated).

---

<sup>11</sup> Available here: [https://tidesandcurrents.noaa.gov/sltrends/sltrends\\_station.shtml?id=9410230](https://tidesandcurrents.noaa.gov/sltrends/sltrends_station.shtml?id=9410230)

<sup>12</sup> These projections are likely to be periodically updated as well. This process will need to be adjusted when new projections are issued.

- The SLR increment in feet can then be used to compare with the OPC SLR projections used for this study. Figure 27 showed at what 10<sup>th</sup> mileposts and SLR increments adaptation would be needed based on the criteria used in this study. As discussed, action needs to be taken preemptively based on the time it takes to implement an adaptation options. As a rough assumption, it is anticipated that the coastal armoring options (including the improved revetment with seawall, which is likely the preferred option among the three coastal armoring options explored) will take at least six years<sup>13</sup> to fully execute and that relocation would take much longer, perhaps several decades<sup>14</sup>. To account for these times, the triggers listed below are lower than the SLR increments shown in this study.<sup>15</sup> The triggers for beginning environmental assessment/preliminary design are as follows for the initial<sup>16</sup> adaptation:
  - » Now: MP 207.3-207.4<sup>17</sup> for coastal armoring (the analysis indicates that adaptation is needed at this location under current conditions; however, as described earlier in this report, given the disconnect between the FEMA water level data and actual observed conditions, current water levels at this location need to be better understood to determine when adaptation is needed)
  - » 0.54' SLR (preempting 0.96' SLR): MP 203.9-204.5<sup>18</sup> for coastal armoring
  - » 0.94' SLR (preempting 1.36' SLR): MP 206.6-206.7 for coastal armoring
  - » 1.24' SLR (preempting 1.66' SLR): MP 206.8-207.2 for coastal armoring
  - » 1.64' SLR (preempting 2.06' SLR): MP 206.0-206.5 for coastal armoring
  - » 2.14' SLR (preempting 2.56' SLR): MP 205.1-205.6 for coastal armoring
  - » 2.26' SLR (preempting 3.66' SLR): further planning analysis of relocation options recommended; even if it is not a preferred alternative to implement at this point, this further analysis will help clarify timing for implementation
  - » 3.24' SLR (preempting 3.66' SLR): MP 205.7-205.9 for coastal armoring
- This method is only appropriate for the near term, as the information that feeds into this will change over time. At least every five years, this study should be updated. Study updates should incorporate the latest information discussed in the previous bulleted lists in this section, including climate projections, beach profile, adaptation costs, relative performance of the adaptation options to one another, and other factors.

---

<sup>13</sup> Assuming 2 years for environmental and 30% design, 1 year for 100% design, 2 years for permitting, and 1 year for construction.

<sup>14</sup> A placeholder assumption of 20 years was used here.

<sup>15</sup> These were calculated by multiplying the duration of execution by 0.07 feet/year. This rate of change is expected under the High SLR scenario used for this study between roughly 2040 and 2060. Note that this assumption is not appropriate for later in the century, when SLR rates are expected to increase. But, the information in this study will have been updated by then anyway.

<sup>16</sup> These rules would only apply to the initial application of an adaptation option, such as the first additional layer of rock armor and seawall without extension.

<sup>17</sup> Each tenth milepost range in this list is assumed to be inclusive of endpoints of the range.

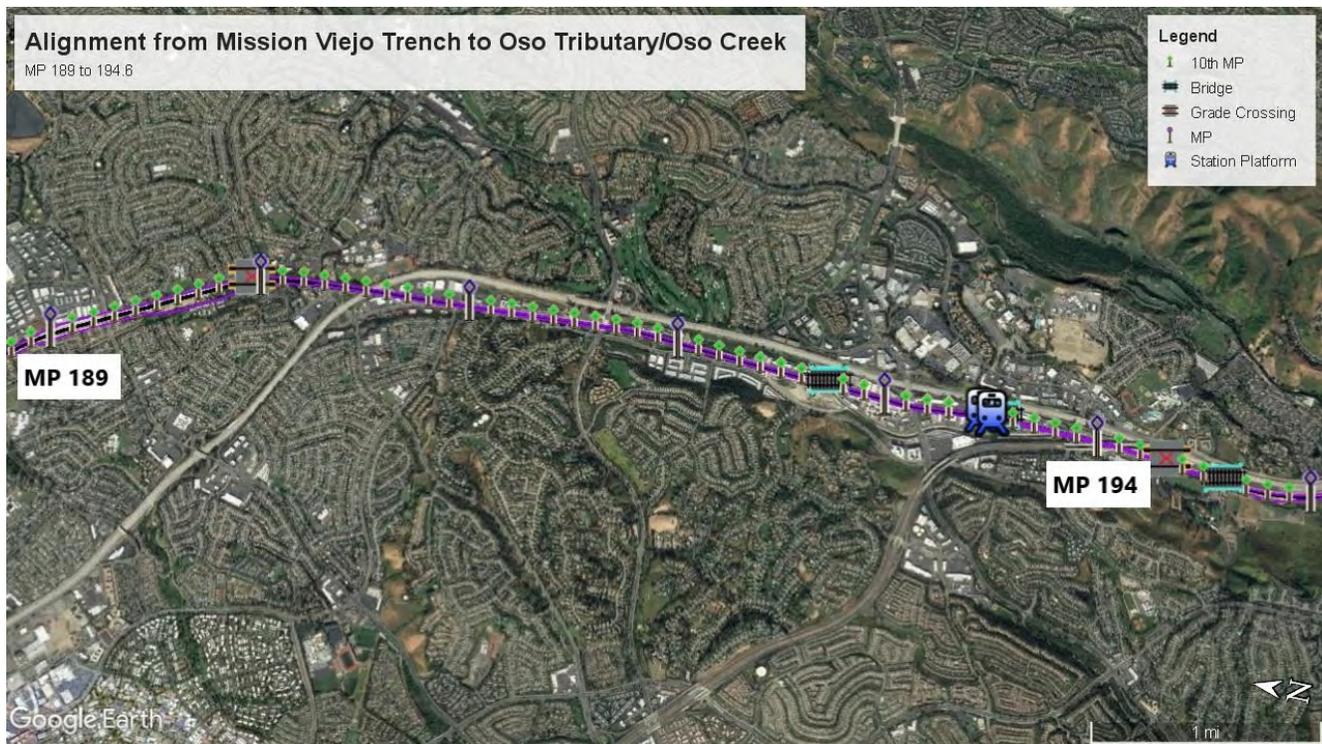
<sup>18</sup> MP 202.1-202.5 were also flagged for adaptation under this increment but are not included here, as it is assumed the residences between the ocean and rail will remain, at least for the next several decades.

## 5.2 MISSION VIEJO TRENCH AND EXTENDED OSO CREEK TRIBUTARY (O10)/OSO CREEK: FLOODING AND EROSION/SEDIMENT CONTROL

### 5.2.1 CONTEXT

The area of concern extends from the rail trench in Mission Viejo at the northern end and then south out of the trench, parallel to Oso Creek Tributary and Oso Creek at the southern end. This segment, MP 189.0 to 194.6, traverses portions of Mission Viejo, Laguna Niguel, and, at its very southern end, San Juan Capistrano (see Figure 30). The Oso Creek Tributary, also referred to as La Paz Channel on the FEMA Flood Insurance Rate Maps (FIRMs) and as O10 in the San Juan Creek Watershed Hydrology Study, is adjacent to the OCTA tracks from MP 189.35 on the north to MP 192.0 on the south at the confluence with Oso Creek.

FIGURE 30 | Alignment from Mission Viejo Trench to Oso Tributary/Oso Creek



It is part of the OCTA-owned Orange Subdivision rail alignment that services Metrolink and Amtrak passenger trains, and BNSF freight trains. It is between the Irvine and San Juan Capistrano stations and includes Laguna Niguel/Mission Viejo station.

### Mission Viejo Trench and Vicinity

There have been various erosion issues along the segment in Mission Viejo where and near where the rail sits in the trench. The Mission Viejo trench is located from about MP 188.90 to 189.70 and was excavated to allow the railway alignment to pass through a local elevation high. It is approximately 1 mile long with cut slopes up to approximately 30 feet deep at its maximum and generally features 2H:1V cut slopes. The trench initially had soil slopes but many of these slopes are now covered with concrete (shotcrete), a response to persistent erosion concerns.

While many of the exposed cut slopes along the trench have been protected with concrete, some exposed and eroding slopes remain unprotected. OCTA has an ongoing slope rehabilitation project that has identified remaining locations in the Mission Viejo Trench section for shotcrete slope projection. OCTA is in the process of funding this slope protection work.

The following descriptions focus on facility areas with recommended adaptation options (not areas with existing mitigation measures).

#### West Track Embankment MP 188.7 to 188.85

Immediately north of the trench section the tracks are elevated on embankment up to approximately 20 feet high with side slopes partially covered with ballast. There is also an existing culvert under the rail embankment located at approximate MP 188.0 flowing from east to west. Portions of the existing embankment on the west side of the tracks are not covered with ballast and have some rill and gully erosion on the embankment (see Figure 31).

**FIGURE 31 | West Track Embankment MP 188.7 to 188.85**



### MP 188.9 to MP 189.25

This section of the rail right of way has some portions of existing concrete (shotcrete) slope paving on both sides of the tracks from approximate MP 189.10 to MP 189.25. It is understood that the additional concrete slope paving may be extended to the north to approximately MP 188.95. The main access roads are located at the top of the cut slopes and are unpaved (no gravel). Erosion rills and gullies are present on the unprotected slopes. Sediment has accumulated at the toe of slopes near the tracks from previous erosion (prior to slope paving) and from continued erosion of the access road and areas above the cut slope.

### West Access Road at MP 189.27 to 189.35

The nearly 500-foot long descending subparallel access road is located from Alicia Parkway down to the railway CP Lettengarver 189.3 below. This sloped area is suffering severe soil erosion and mass wasting along an exposed west side slope. A 12-foot wide descending access road traverses an approximately 45-foot maximum height 2H:1V cut slope in the area (Figure 32 and Figure 33). The lower cut slope along the east side of the access road is paved with concrete slope protection. The upper cut slope along the west side appears to have once been hydroseeded. Poorly performing ground is located along about 200 feet of the access road's west side where there are significant surficial erosion and shallow sloughing failures. Private residential property is located to the west of the slope crest.

**FIGURE 32 | Aerial View at Area 2: MP 189.27 - 189.35**



**FIGURE 33 | View Looking West at Area 2: MP 189.27 - 189.35**

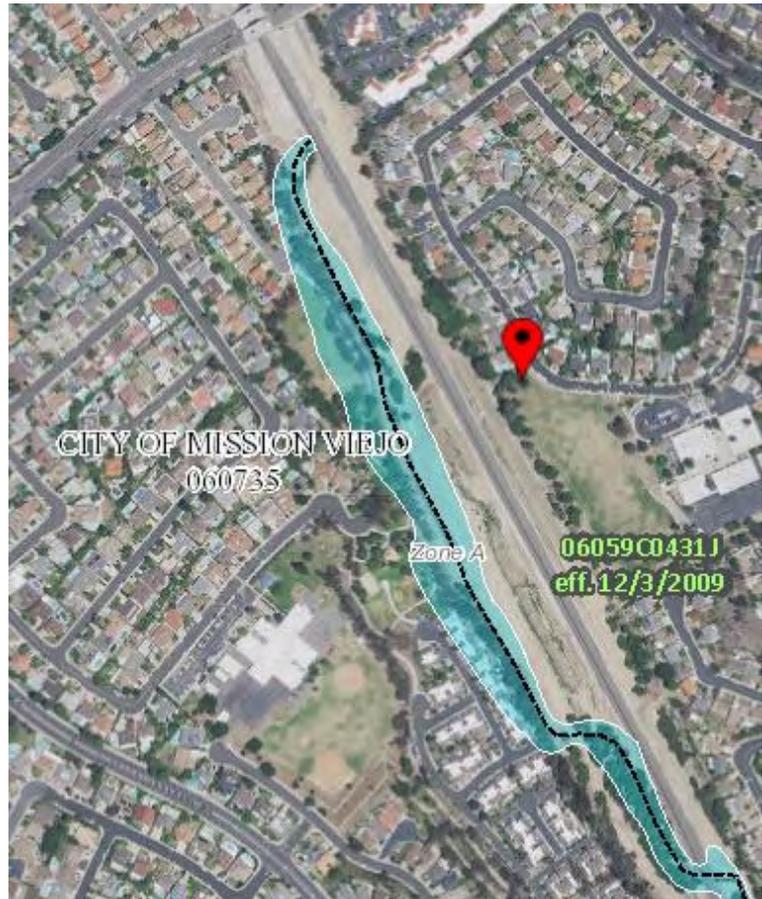


Cut slopes at a 2H:1V inclination in this material are likely grossly stable. Most of the west side cut slope has established shallow root vegetation consisting of grass and ice plant. However, the denuded west side slopes have erosion rills and upwardly progressing shallow arcuate scarps generated from surficial sloughing. A perched or shallow groundwater condition is not anticipated at the site. The soils at the site may have dispersive properties.

**Channel MP 189.34 to 189.75**

There is a culvert with headwall at approximate MP 189.34 (under track embankment and east access road). The drainage channel downstream of the culvert has rock slope protection (RSP) and articulated concrete block (ACB) revetment (Zone A). However, portions of the ACB are in need of repair and additional RSP is lacking on the south bank between the culvert outlet and the ACB/access road. The channel on west side of tracks downstream of culvert is in the FEMA 100-year flood zone. The existing FEMA Flood Insurance Rate Map (FIRM) 100-year Zone A floodplain is depicted in **Figure 34**.

**FIGURE 34 | FEMA Zone A 100-year Floodplain MP 189.34 to 189.90**



The existing RSP lined channel appears in relatively good condition, however the east channel bank has some erosion rills/gullies associated with runoff from the unprotected dirt area in the vicinity of the east access road.

#### MP 189.75 to 189.90

In this section, there are culverts along at the east access road near MP 189.75 that are within the FEMA 100-year Zone A floodplain. The vegetated channel on the west side of tracks is in the floodplain too.

Site observations indicate that there is significant area on both sides of the tracks without erosion protection. The box culvert at MP 189.86 shows signs of scour at the culvert entrance and exit.

### Oso Creek Tributary and Oso Creek

The rail line along Oso Creek and Tributary from MP 189.35 to approximately MP 192.40 is double track with triple track from approximately MP 192.40 to MP 193.40 and double track again from approximately MP 193.40 to MP 193.90, and single track for the remainder of the alignment along Oso Creek. The distance of the creek to the tracks and track heights above the creek vary along the alignment.

As it emerges from the trench, the rail closely parallels and sometimes crosses over the Oso Creek Tributary (referred to as O10 in the San Juan Creek Watershed Hydrology Study) and then Oso Creek.

Oso Creek and Tributary are mapped in the FEMA 100-year floodplain with some areas mapped in the 500-year floodplain. The Oso Creek and Tributary floodplain mapping displays a number of different 100-year floodplain designations from Zone A (approximate 100-year flood zone) to detailed Zone AE with base flood elevations, and floodway limits.

Based on field observations, there was evidence of scour along several creek locations, with the most notable location at MP 192.1 to 192.38 south of the wastewater treatment plant.

### Climate Change

The primary climate stressor that may adversely impact the trench and associated railway infrastructure is heavy precipitation and associated stormwater runoff. Heavy precipitation, potentially enhanced by climate change, could exacerbate the erosion and sedimentation already observed in the vicinity of the access road.

## 5.2.2 KEY FINDINGS

### Precipitation Change

Future extreme precipitation projections were processed for the study area. These were developed across the drainage basin that feeds into the downstream point of Oso Creek in the analysis area.

These were processed from Global Climate Models (GCM) that have been downscaled to a local resolution by the Scripps Institute of Oceanography with a technique called Localized Constructed Analogs (LOCA) (UCSD, n.d.). The LOCA projections were downloaded from the University of California, Berkeley Geospatial Innovation Facility's Cal-Adapt Data Server (UC Berkeley, n.d.).

Extreme precipitation estimates were developed using ten GCMs assessed by California state agencies as being relatively representative of climate change across the state<sup>19</sup> (State of California Department of Water Resources, 2015). These were developed for two emissions scenarios: RCP 4.5 and RCP 8.5. RCP 4.5 assumes greenhouse gas emissions peak around 2040 and then decline. RCP 8.5 assumes emissions continue to rise through the end of this century (Cal-Adapt, 2020).

Percentage changes between backcasted historical conditions and forecasted future conditions were calculated. The project team then applied these percentage changes to the National Oceanic and Atmospheric Administration (NOAA) Atlas 14 precipitation values (NOAA, 2017). NOAA Atlas 14 provides estimates of rainfall depths for a variety of different durations and return periods. These estimates are based on observed historical data.

Figure 35 shows the precipitation values for the 100-year event in the analysis area for the GCMs and RCPs discussed in 2040, 2070, and 2100. Historical values from NOAA Atlas 14 are also shown.

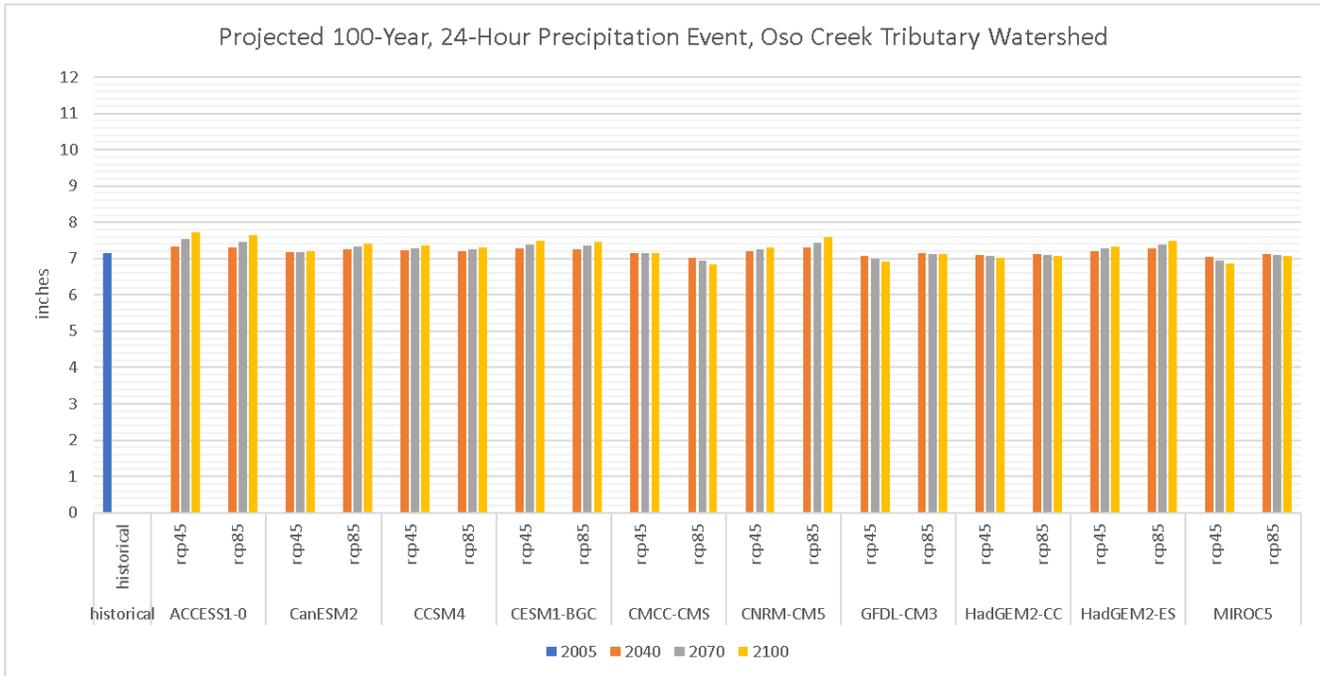
There is limited variation between historical and future conditions across the different future years, GCMs, and RCPs. Thus, future rainfall-induced erosion rates are not expected to vary heavily from current conditions.

To better understand future climate conditions, some of these projections were used as inputs for the hydrology and hydraulics modeling. These were selected based on the maximum, median, and minimum values across timeframes for the 100-year event. They include rcp45/ACCESS1-0 (maximum), rcp85/CCSM4 (next to median), and rcp85/CMCC-CMS (minimum).

---

<sup>19</sup> The models are: ACCESS 1-0, CanESM2, CCSM4, CESM1-BGC, CMCC-CMS, CNRM-CM5, GFDL-CM3, HadGEM2-CC, HadGEM2-ES, and MIROC5.

**FIGURE 35 | Projected 100-Year, 24-Hour Precipitation Event in Watershed**



While exposure is not expected to rise significantly at this location on the Orange Subdivision under the scenarios and hazard analyzed, the study summarizes facility performance under current conditions and provides recommendations for how to address these issues.

### Mission Viejo Trench and Vicinity Impacts

The existing facility performance is based upon field observations of existing erosion and sedimentation, qualitative assessment of slope stability, and quantitative hydrology and floodplain analysis. The Mission Viejo Trench area is generally subject to moderate to severe erosion and sedimentation that may impact maintenance access. Future erosion and sedimentation may be similar to existing rates with deeper and wider rills that initiate material transport and accumulation of sediment along the track and access roads.

#### Floodplain Analysis

Portions of the Mission Viejo Trench south of MP 189.35 are located within the FEMA designated 100-year (Zone A) floodplain. The FEMA 100-year floodplain map suggests that portions of the track are within the 100-year floodplain. However, the FEMA 100-year Zone A floodplain is an approximate boundary without defined base flood elevations. Based upon hydrology modeling and a hydraulic floodplain analysis utilizing existing topography, the tracks are not subject to 100-year or 500-year flooding both for the existing and future conditions north of MP 189.90. Refer to the Oso Creek Tributary and Oso Creek subsection below for a description of the hydrology and hydraulic methodology and results.

#### West Track Embankment MP 188.7 to 188.85

The erosion along the west track embankment is not an immediate threat to rail operations, however, erosion of the unprotected embankment fill material exacerbates sediment accumulation at the existing culvert entrance along the west rail right of way near MP 188.8.

#### MP 188.9 to MP 189.25

The existing erosion and sedimentation issues in this area do not pose an immediate threat to rail operations, however, access road erosion poses access issues. Existing and continued sedimentation in the trackside drainage channels poses access and maintenance concerns.

#### West Access Road at MP 189.27 to 189.35

The access road is currently accessible from an entry point along Alicia Parkway. It is unknown if the existing accumulated sediments in the access road have been an issue for rail operations. The mass wasting of the slope and upwardly progressing arcuate scarps may slowly decrease its overall global stability. Slow progressive constriction, unleveling and covering of the access road may occur.

#### Channel MP 189.34 to 189.75

The existing erosion and sedimentation issues in this area do not pose an immediate threat to rail operations. However, erosion along the east cut slope between MP 189.5 and 189.75 threatens the access road and is resulting in significant sedimentation adjacent to the track. Erosion of the existing RSP channel bank and slope erosion does not currently interrupt access however, continued erosion in this area may poses access issues without continued regrading. This area is within the FEMA 100-year Zone A floodplain. However, the existing and future 100-year flood levels are well outside and below the track limits.

#### MP 189.75 to 189.90

The FEMA 100-year Zone A floodplain is mapped in this area. Existing and future 100-year flood levels are below the track (no threat to track). However, the culvert at MP 189.86 shows signs of scour at the culvert entrance and exit. Culvert entrance and exit velocities are considered erosive for unvegetated or unprotected channel banks.

### **Oso Creek Tributary and Oso Creek Impacts**

For the riverine flooding analysis, the performance criterion used was as follows: the rail ballast shall remain above the water level associated with the 100-year flood event.

Performance of the existing facilities (track and adjacent channels, culverts, and bridges) was assessed in the following manner:

- Reviewed FEMA FIRMs to determine portions of the track adjacent to or within the FEMA 100-year or 500-year floodplain
- Conducted site visits to evaluate existing channels, floodplain and facilities (channels, culverts, and bridges) to determine locations of known or potential erosion/scour/sedimentation with focus on locations where the creek and floodplain are adjacent to the track.
- Prioritized locations for detailed floodplain and scour assessment based on FEMA map and site visit evaluation.
- Analyzed existing and future condition floodplain water surface elevations and flow velocities along Oso Creek and Tributary to determine locations potentially subject to flooding and erosion/scour.

## Hydrology Analysis

Although portions of Oso Creek and Tributary contain areas of detailed FEMA floodplain mapping (base flood elevations established), the FEMA Flood Insurance Study does not contain flowrate (discharge) information for Oso Creek or Tributary. Therefore, the San Juan Creek Watershed Hydrology Study (SJC Study) (PACE, 2008) was utilized as the best available source of information for recent hydrology information.

Two general flowrate scenarios are provided for the 100-year flood; the high confidence (HC) flowrate and the expected value (EV) flowrate. The HC flow rates are higher and help account for uncertainty in the conditions. The HC flowrate is applicable only to the 100-year event. The 2- through 50-year flowrates are for the EV flowrate. The SJC Study also did not model the 200- or 500-year events. Future hydrology studies may consider benefits of including HC flowrates for the full range of storm events (2- through 500-year).

To calculate projected future condition flowrates, a unit hydrograph method hydrology study was developed utilizing the U.S. Army Corps of Engineers' (USACE) Hydrologic Engineering Center Hydrologic Modeling System (HEC-HMS) computer program.

Although the hydrology modeling used for this study does not follow the detailed method in the Orange County Hydrology Manual, it provides a streamlined approach for estimating projected future flowrates for Oso Creek and Tributary with baseline flowrates in line with the SJC Study.

In general, the results indicate that future flowrates are expected to moderately increase in proportion to the projected precipitation increases for two of the three main climate scenarios with a maximum expected increase in flowrate of approximately 13 percent.

## Floodplain Analysis

The USACE Hydrologic Engineering Center River Analysis System (HEC-RAS) computer program was utilized to determine water surface elevations (floodplain limits) and flow velocities along select portions of Oso Creek and Tributary. The flowrates from the hydrology analysis were used as inputs into the floodplain analysis.

The locations selected correspond with high priority areas identified from review of the FEMA FIRMs and site visits. The floodplain areas studied include the following limits:

- Oso Creek Tributary from MP 189.80 to MP 190.60
- Oso Creek Tributary from MP 191.40 to MP 192.0 (confluence with Oso Creek)
- Oso Creek from MP 192.0 to MP 192.75 (downstream of Camino Capistrano)

Findings included:

- Oso Creek and Tributary: 100-year historic HC flowrate and all EV flowrate (historical and all future climate scenarios) water surface elevations are below ballast. Therefore, the performance criterion (the rail ballast shall exceed the 100-year flood elevation) is met for each of the climate scenarios analyzed.
- Oso Creek: 500-year EV flowrate water surface elevations inundate ballast for some of the future scenarios between MP192.05 and MP192.20 and between MP 192.20 and MP 192.25.

- Oso Tributary: All 500-year EV flowrate (historic EV and all climate scenario EV flowrates) water surface elevations inundate ballast south of MP 191.78 to the confluence with Oso Creek (along the wastewater treatment plant).
- Upper Oso Tributary: 100-year and 500-year EV flowrate water surface elevations are below ballast elevation except 500-year EV flowrate at toe of ballast at MP 190.20 and MP 190.44.

Inundation of the ballast during extreme events may require sections of the ballast to be cleaned or replaced.

In areas where the 500-year flood water surface elevations impinge upon the track ballast, the modeled flow velocities adjacent to the ballast could cause minor localized scour, but not significant global scour along the ballasted track sections.

Note that the track is shown within the FEMA 100-year flood zone from Camino Capistrano to Crown Valley Parkway (MP 192.74 to MP 193.10), based on the hydraulic model prepared for the FEMA FIRM, which indicated bank overtopping at the Camino Capistrano bridge. Based on the current HEC-RAS hydraulic modeling, both the 100-year and 500-year flowrates (existing and future flowrates) are contained with the channel at this location, with no bank overtopping and no breakout flow to the south.

Furthermore, a high-level assessment of inland culvert capacities in the area was conducted. No capacity issues were found. This involved looking at the existing drainage basins for each of the culverts and anticipated 10- and 100-year storm event runoff rates to each of the culverts.

## Adaptation Options

Adaptation options were developed for addressing erosion and sedimentation at this site. These are generally organized as a suite of measures that can all be implemented. An exception is West Access Road at MP 189.27 to 189.35, where four potential alternatives are presented.

In the recommendations section, the options for the entire area are organized into high, medium, and low priorities. Cost estimates were developed for each of these options. The numbered options below correspond with the numbered options shown in Figure 36.

- **Mission Viejo Trench and Vicinity.** The adaptation options considered for the Mission Viejo Trench area focus primarily on controlling erosion and subsequent sedimentation that pose access concerns. Performance of the adaptation options will be dependent on maintenance of the facilities. In general, the adaptation options considered provide a moderate to high level of erosion protection but require periodic inspection and maintenance to provide a continued benefit.

West Track Embankment MP 188.7 to 188.85

- » 1. Re-grading the west track embankment slope to fill surficial rills.
- » 2. Stabilization of access road with crushed rock.
- » 3. Placement of ballast rock on west embankment slope.

MP 188.9 to MP 189.25

- » 4. Re-grading the access roads on the east and west sides of the track.

- » 5, 6. Stabilization of access road with crushed rock and cellular confinement (on steeper sections of access road).
- » 7. Construction of concrete brow ditches along tops of slopes (adjacent to access roads).
- » 8. Excavation of trackside ditches to remove accumulated sediment.
- » [Covered by existing project]. Stabilize remaining cut slopes with concrete slope paving (per current slope rehabilitation program).

MP 189.25 to 189.35

- » 9. Stabilization of gravel roads with crushed rock.
- » 10. Construction of concrete ditches at top and toe of west side access road.
- » West Access Road at MP 189.27 to 189.35. For the subject slope area there are several adaption options that may be considered.
  - 11A. Install appropriate erosion prevention and sedimentation control. Perform rill filling, apply mulch, hydroseed, soil binders, install fiber rolls, silt fencing, sediment traps, and surface water controls as needed. Requires periodic inspections and maintenance. Fair performance for this location. More robust erosion control measures could be required.
  - 11B. Install concrete slope paving with welded steel wire or rebar. It should be like the existing concreted slope below the access road and along portions of the railway alignment in the subject area. Concrete thickness from 4 to 6 inches. Include brow drainage ditch and toe drain. Minor landscaping adjustments. Excellent performance. Concrete slope paving requires minimal inspection and maintenance. Its long-term performance is excellent. It is considered a passive solution and does not affect the stability of the slope. Of the four options, this is the preferred option.
  - 11C. Low retaining wall with landscaped backfill slope and brow ditch. Wall types may include cast-in-place concrete, masonry, and modular block. Wall construction may require a temporary back cut slope to allow for continuous foundation construction. This cut may have a temporary destabilizing effect on the slope which should be minimized. The use of Interblock units is considered appropriate. Minor landscaping adjustments. Excellent performance. Retaining walls require minimal inspection and maintenance. The longevity of retaining walls depend on several factors including wall type, materials, and construction methods. Retaining walls typically improve slope stability. Temporary foundation excavations are required.
  - 11D. Although a deep-seated slope failure is not considered likely at the site, consideration could be given to slope reinforcement using conventional soil nailing with a shotcrete facing. Soil nails consist of inclined grouted steel reinforcement bars that penetrate deep into the existing slope face. A lightly reinforced shotcrete facing is placed over the slope face which is attached to the soil nails. Long soil nails passing into the adjacent private residential property should be avoided. Excellent performance. Soil nail slopes require minimal inspection and maintenance. Their long-term performance is excellent. The reinforced slope may have a significant increase in stability. No temporary excavations are required.

- 12. Repair ACB along west access road.
- 13. Install/repair RSP along south bank downstream of culvert.

MP 189.35 to 189.75

- » 14, 15. Stabilization of access roads with crushed rock and cellular confinement.
- » 16. Construction of concrete brow ditch at top of east slope.
- » 17. Stabilize remaining cut slopes with concrete slope paving (per current slope rehabilitation program).
- » 18. Erosion control and planting on east side of tracks. This will require a higher level of maintenance until planting is established or reapplication of erosion control (seeded hydraulic mulch).

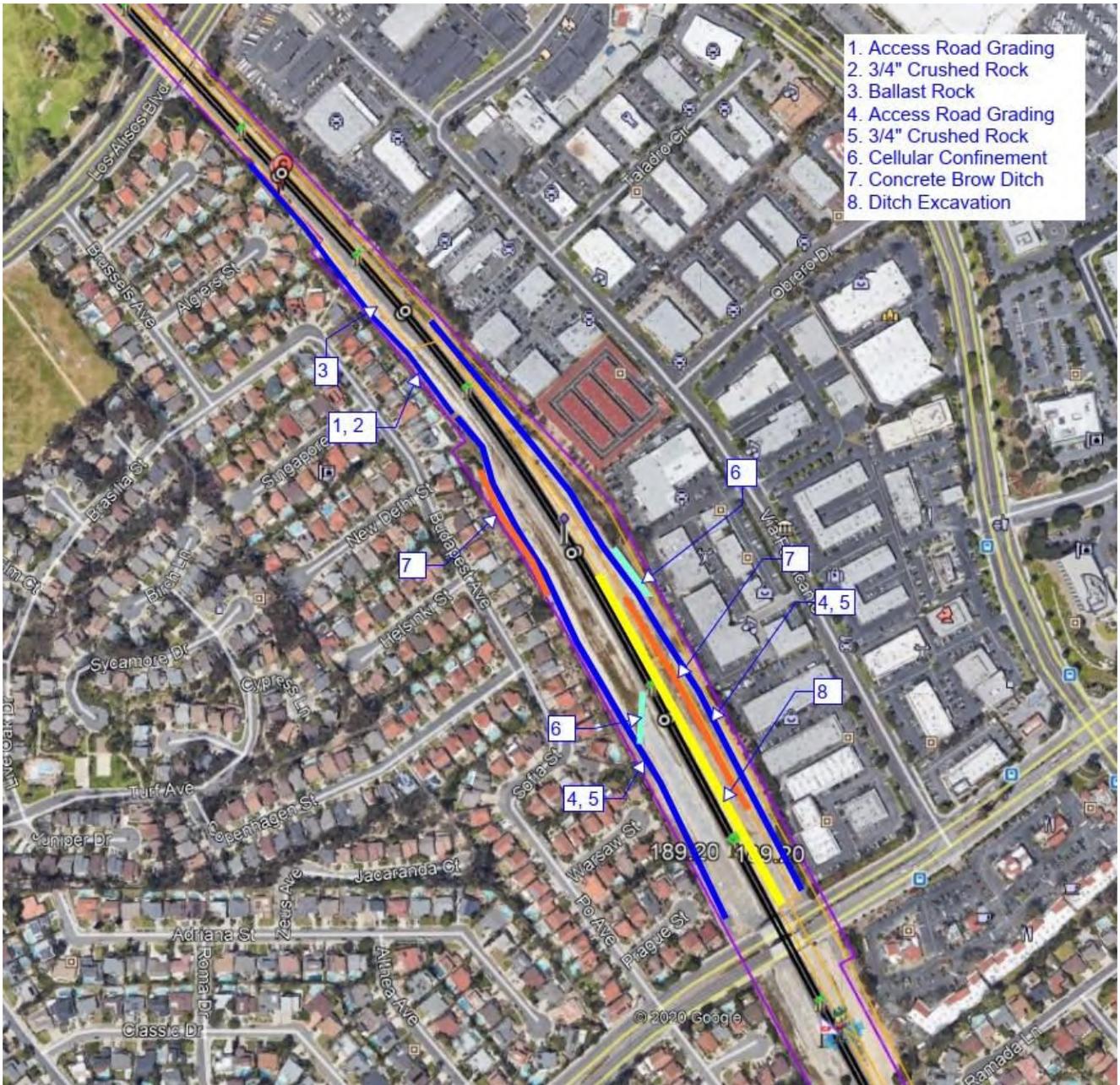
MP 189.75 to 189.90

- » 19. Install/repair RSP at culvert entrance and exit.

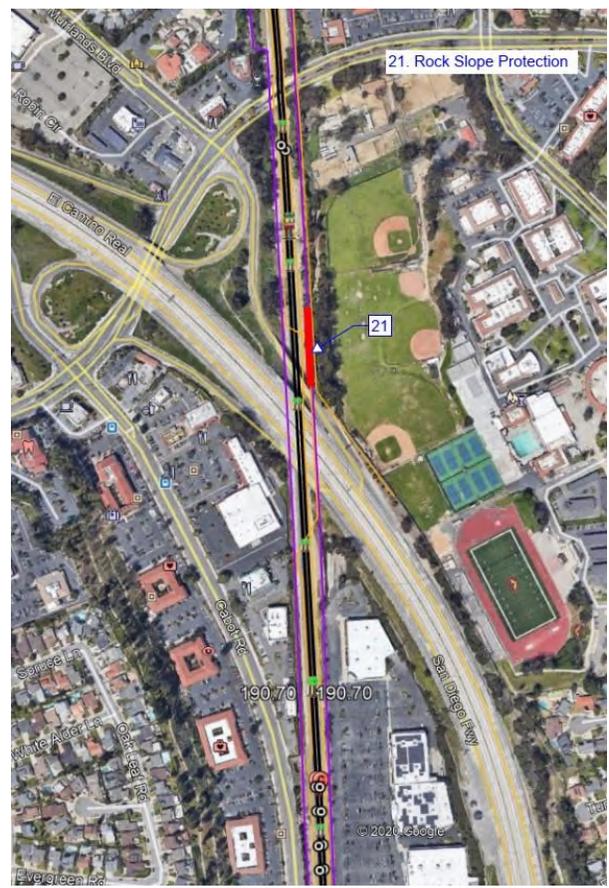
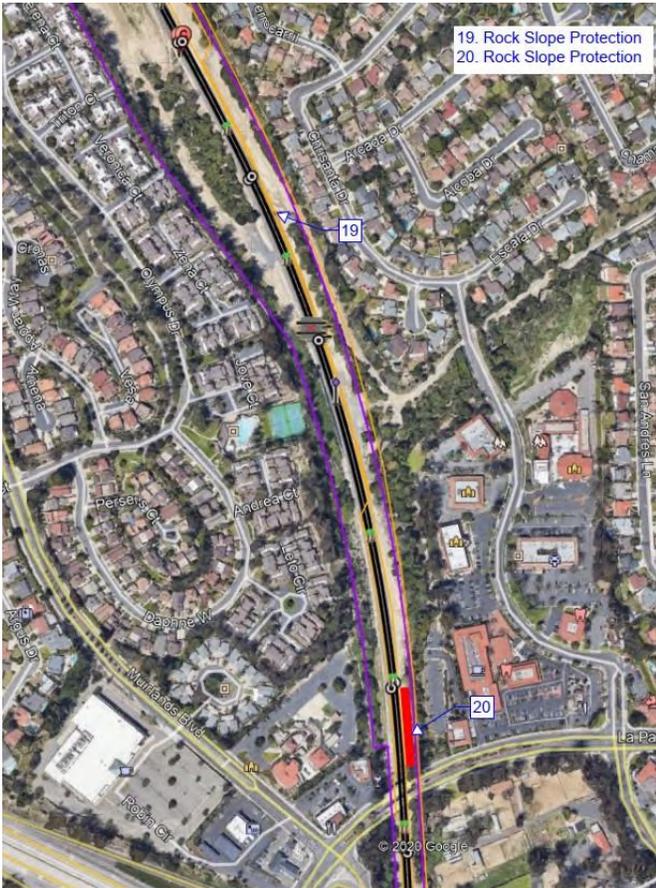
▪ **Oso Creek Tributary and Oso Creek**

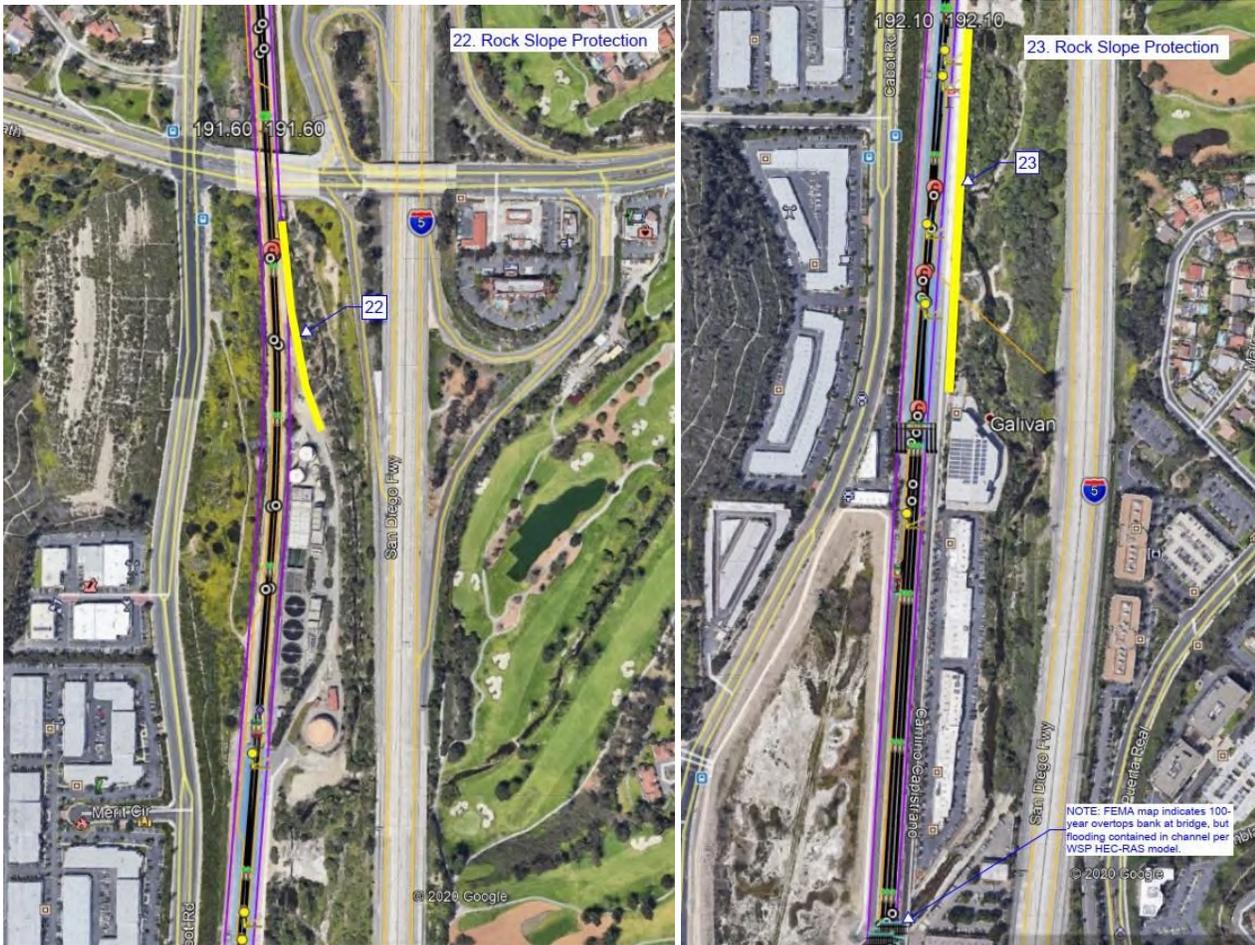
- » 20. Oso Creek Tributary MP 190.16 to 190.25: RSP on west bank of creek north of La Paz Road.
- » 21. Oso Creek Tributary MP 190.4 to 190.5: RSP on west bank of creek north of I-5.
- » 22. Although portions of Oso Creek downstream of the waste water treatment plant (MP 192.10 to 192.35) exhibit evidence of scour with existing scour protection measures in place on the east side of Camino Capistrano, this area is outside of the rail right of way. It is recommended that these areas be monitored after major storm events and scour protection mitigation measures coordinated with the City of Mission Viejo.
- » 23. Another area of Oso Creek that should be monitored includes Oso Creek downstream of the lined channel that ends near MP 194.77. The west bank of the creek is highly unstable downstream of the lined channel with significant recent erosion. The tracks are well elevated (50 feet) above the bottom of the creek, and the east bank of the creek is protected with RSP. However, due to the highly unstable nature of the creek, this area should be periodically monitored.

**FIGURE 36 | Map Series Depicting Numbered Adaptation Options in Mission Viejo Trench and Oso Creek Tributary/Oso Creek Area**









### 5.2.3 RECOMMENDATIONS

Adaptation options are assigned relative priorities (high, medium, or low). Recommended priorities are as follows:

- High:
  - » MP 188.9 to 189.25: Concrete brow Ditch (#7 in list and map above), Excavation of accumulated sediment (#8).
  - » MP 189.25 to 189.35: Gravel entrance road from Alicia Pkwy (#9), Concrete ditch lining (#10), preferred erosion control option – concrete slope paving – above access road (#11).
  - » MP 189.35 to 189.75: Concrete slope paving (#17; assuming work performed separately).
- Medium:
  - » MP 188.7 to 188.85: Access road grading (#1), Crushed rock at access road (#2), Ballast rock (#3).
  - » MP 188.9 to 189.25: Access road grading (#4), Crushed rock at access road (#5), Cellular confinement (#6).

- » MP 189.25 to 189.35: Armorflex at culvert outlet (#12), RSP culvert outlet (#13).
- » MP 189.35 to 189.75: Crushed rock access at top of East embankment (#14), Cellular confinement (#15), Concrete brow ditch (#16).
- » MP 189.75 to 189.90: RSP at culvert inlet/outlet (#19).
- Low:
  - » MP 189.35 to 189.75: Erosion Control on east side of tracks (#18).
  - » MP 190.16 to 190.25: RSP on west bank of creek north of La Paz Road (#20).
  - » MP 190.4 to 190.5: RSP on west bank of creek north of I-5 (#21).

Additional general recommendations include:

- Future hydrology studies should consider HC flowrates for the full range of storm events (2- through 500-year), rather than just the 100-year event.
- Analysis of the existing soil conditions within the Mission Viejo Trench study area indicates that the soils are predominately erosion prone with minimal to moderate suitability for planting. The erosion ratings and planting suitability were gathered from the National Resources Conservation Services (NRCS) Web Soil Survey website.<sup>20</sup> The following table presents the erosion potential and planting suitability within the Mission Viejo Trench area along with general recommendations for adaptation options based on slope inclination.

**TABLE 4 | Mission Viejo Trench Adaptation Measure Suitability**

<b>SLOPE INCLINATION (%)</b>	<b>EROSION RATING</b>	<b>ADAPTATION RECOMMENDATION</b>
<b>15+</b>	Severe	Slopes - Structural (retaining wall, shotcrete)
<b>9-15</b>	High	Slopes - Structural (retaining wall, shotcrete)
<b>2-9</b>	Moderate	Slopes - Structural or vegetation* Access Roads - 2-5% slopes: Crushed rock with water bars directed to lined ditches - 5-9% slopes: Cellular confinement with crushed rock
<b>0-2</b>	Slight	Slopes - Crushed rock or vegetation* Access road - crushed rock

\* Within Mission Viejo Trench area, based on NRCS soil survey information, soils are predominately poorly suited or unsuited for mechanical or broadcast/hydroseed planting, and are predominately moderately suited for hand planting. Recommended vegetation types include non-invasive, drought tolerant, low growing ground cover that do not require long term irrigation. Soil vegetation suitability should be based on site specific soil fertility testing. Soil fertility refers to the ability of soil to sustain vegetation/plant growth.

<sup>20</sup> NRCS Web Soil Survey. <https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm>

## 5.3 PASSENGER WEATHER EXPOSURE AT STATIONS AND GREEN INFRASTRUCTURE SOLUTIONS

### 5.3.1 CONTEXT

#### Overview

The Metrolink rail system includes rail lines that serve the broader Orange County region. Orange County, located in coastal southern California, spans both inland and coastal climate regions. The northeastern corner of the county sits within the Los Angeles River basin, the southeast corner abuts the Santa Ana Mountain foothills, and the southwest corner sits along the Pacific coast. OCTA and the cities manage the rail stations that offer Metrolink rail service within Orange County, serving upwards of 3.9 million boardings annually (OCTA, 2019). The Amtrak Pacific Surfliner also operates service through Orange County, stopping at the Fullerton, Anaheim, Santa Ana, Irvine, San Juan Capistrano, San Clemente Pier, and Oceanside stations. The OCTA and city managed rail stations are the focus of this facility-level assessment.

#### Increased Temperature

Climate conditions vary depending on proximity to the coast. OCTA manages both inland climate and coastal climate rail stations. Inland climate stations are located primarily in northern and central Orange County and have slightly lower temperatures in the winter, and slightly higher temperatures in the summer months. Stations exposed to an inland climate include Buena Park, Fullerton, Anaheim Canyon, ARTIC/Anaheim, Orange, Santa Ana, Tustin, and Irvine, as shown in Table 5. The coastal climate stations are in the southern part of the county and are exposed to a narrower range of temperatures. Stations located in a coastal climate include Laguna Niguel/Mission Viejo, San Juan Capistrano, San Clemente (North Beach), and San Clemente Pier.

**TABLE 5 | Average Monthly High Temperatures (°F) at OCTA Rail Stations** (Weather Spark, n.d.)

OCTA STATIONS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
<b>Inland Climate Stations</b>												
<b>Fullerton</b>	68	69	72	75	75	82	85	85	82	76	70	67
<b>Anaheim Canyon</b>	68	68	71	74	75	81	84	85	81	76	69	67
<b>ARTIC/Anaheim</b>	68	68	71	74	75	81	84	85	81	76	69	67
<b>Orange</b>	68	68	71	74	74	81	83	84	81	76	70	67
<b>Santa Ana</b>	68	68	71	74	74	80	82	83	80	76	70	67
<b>Tustin</b>	68	69	71	71	75	81	83	84	81	76	70	68
<b>Irvine</b>	67	68	70	72	73	78	80	81	79	74	69	67
<b>Moderate Coastal Climate Stations</b>												
<b>Laguna Niguel/Mission Viejo</b>	65	65	68	69	70	75	77	78	76	72	67	65
<b>San Juan Capistrano</b>	65	65	67	68	70	75	77	78	76	72	67	65
<b>San Clemente North Beach</b>	64	64	66	69	69	74	76	76	76	71	67	64
<b>San Clemente Pier</b>	64	64	66	69	69	74	76	76	76	71	67	64

Temperature and passenger comfort at OCTA rail stations is also influenced by the urban heat island effect. This phenomenon describes the tendency to observe higher temperatures in urban and more densely populated areas compared with nearby surrounding natural areas. Based on publicly available data developed by CalEPA, coastal stations have a lower Urban Heat Island Effect than inland stations (State of California, CalEPA, n.d.).

It is understood that Orange County will experience more hot days in the future. Data from Cal-Adapt estimates that Orange County will experience between 12 and 24 annual extreme heat days, as defined by greater than 97.2 degrees, between 2070 and end of century (Cal-Adapt, 2020). This study examined changes in the number of Heat Health Events (HHE) by station city using the California Heat Assessment Tool (CHAT) projections. A range of models were used but focused mostly on the 95th percentile Global Climate Model (GCM). The Representative Concentration Pathway (RCP) 8.5 emissions scenario was applied and impacts were examined for both General and Vulnerable populations (as defined by CHAT).

Heat impacts to riders and data was summarized by Census tract within each station city.<sup>21</sup> Vulnerable population data was only available for the “Total” time of year, meaning the HHEs projected for Vulnerable populations are provided annually. General population data was available for multiple times of the year. The “JJA” time of year was chosen for this assessment, which represents the months of June, July, and August. Because the General population data is only provided for three months out of the year versus twelve, the projections of HHEs for Vulnerable populations may be disproportionately high. In other words, there are more HHEs counted for Vulnerable populations than General populations in this assessment. A station is defined as “exposed” if the projected HHEs are greater than the 0-1 range. In summary, the most exposed station locations by population and timeframe are:

- For General populations (JJA time of year):
  - » Exposed sooner (beginning of century) and therefore would be higher priority:
    - Orange – HHEs projected to increase from historical by 1-3.
  - » Exposed by mid-century:
    - Buena Park – HHEs projected to increase from historical by 1-3.
    - Fullerton – HHEs projected to increase from historical by 1-3.
    - Orange – HHEs projected to increase from historical by 1-3.
    - Santa Ana – HHEs projected to increase from historical by 1-3.
    - Tustin – HHEs projected to increase from historical by 1-3.
- For Vulnerable populations (Annual):
  - » Exposed sooner (beginning of century) and therefore would be higher priority:
    - Buena Park – HHEs projected to increase from historical by 3-5.
    - Fullerton – HHEs projected to increase from historical by 5-7.

---

<sup>21</sup> CHAT data was missing for some census tracts within station cities. Gray areas show where city boundaries are, where CHAT data was not available.

- Santa Ana – HHEs projected to increase from historical by 7-9.
- Tustin – HHEs projected to increase from historical by 5-7.
- Irvine – HHEs projected to increase from historical by 5-7.

The coastal portions of the alignment were least exposed, likely due to the moderating effect of the Pacific Ocean on temperatures (winds off the ocean can also move pockets of heat inland).

The Metrolink station in Anaheim lies just outside of a Census tract that has similar projections to Orange in the General population analysis and Santa Ana in the Vulnerable population analysis. This station was not flagged in the analysis but given its proximity to Census Tract 864.07 the station may also be exposed and may be worth considering for further analysis. Figure 37 and Figure 38 depict the results of the exposure scan, indicating total HHEs by mid-century for general and vulnerable populations<sup>22</sup> respectively.

---

<sup>22</sup> The California Heat Assessment Tool uses the following indicators to determine vulnerability: heat health action index, social vulnerability (no high school diploma, percent outdoor workers, percent poverty, percent no vehicle access, and percent linguistic isolation), health (rate of asthma, percent low birth weight, rate of cardiovascular disease), and environment (PM2.5 concentration, ozone exceedance, percent impervious surfaces, change in development, percent no tree canopy, and urban heat island). This designation may not capture all population vulnerabilities, nor those specific to transit riders such as access to jobs or other opportunities, or transit dependence.

**FIGURE 37 | Heat Health Events, RCP 8.5, 2041-2060, General Populations**

1 in = 4.1 miles Overview Page

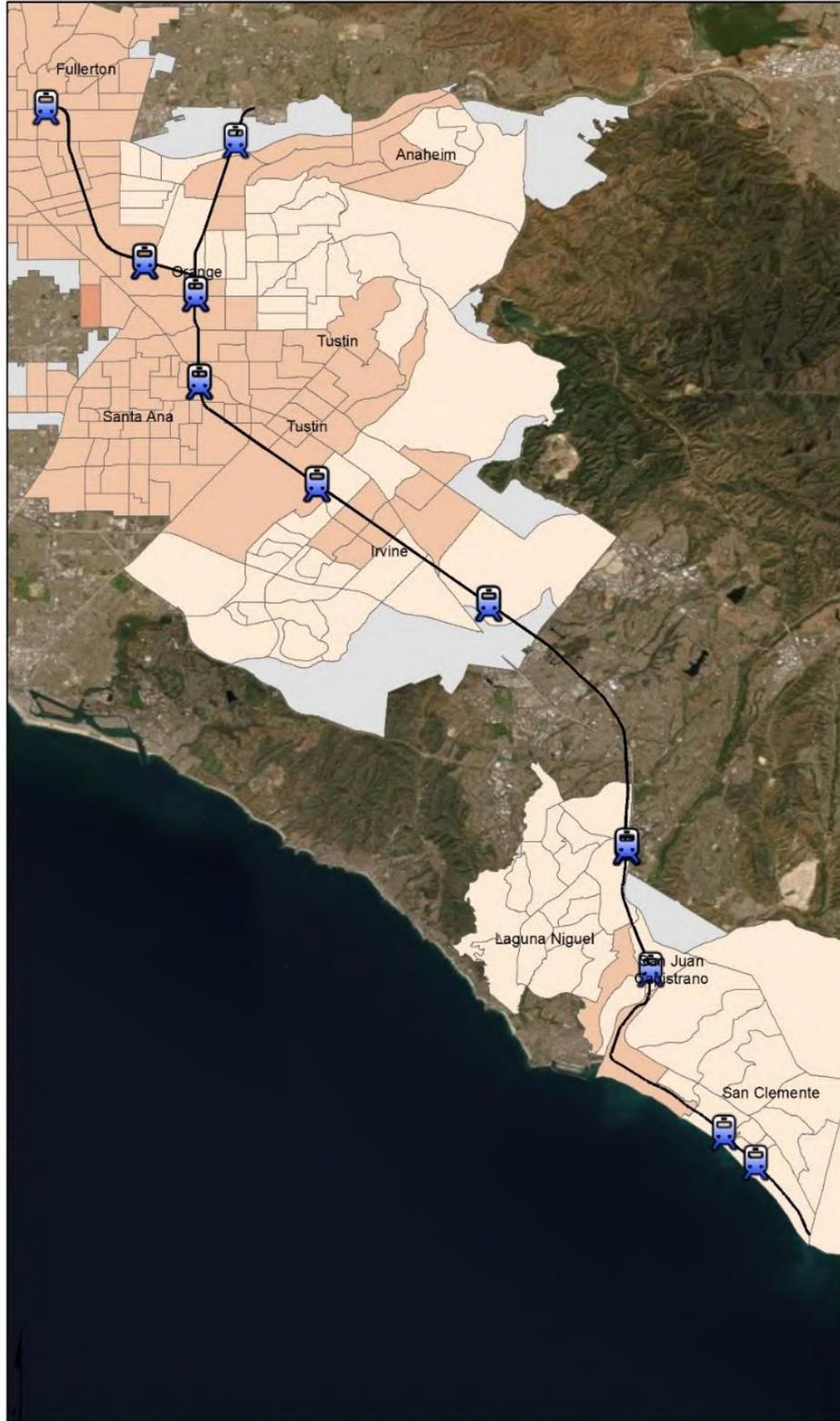
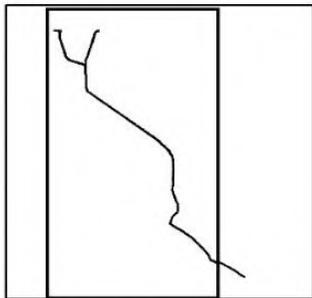
# Systemwide Exposure Scan:

**JJA Heat Health Events\*, RCP 8.5, 2041-2060 General Populations**

-  Station Platforms
-  Station City Boundaries
- OCTA Mainlines and ROW**
-  Mainline
- Projected Annual HHEs**
-  0 - 1
-  1 - 3
-  3 - 5
-  5 - 7
-  7 - 9
-  9+



0 1.5 3 6 Miles



Notes: Asset and centerline data provided by Orange County Transportation Authority. Coastal flooding and cliff retreat data from USGS CoSMoS v3. Inland flooding data from FEMA. Slope failure data from two DEMs: USGS Coastal National Elevation Database and National Elevation Dataset. Heat data from California Heat Assessment Tool. Wildfire data is a summary of three models: MC2-EPA, MC2-University of Idaho, UC Merced. \*Heat Health Event (HHE) data represents 95th percentile model results. "JJA" represents HHEs projected for the months of June, July, August. "Total" represents the HHEs projected annually.

FIGURE 38 | Heat Health Events, RCP 8.5, 2041-2060, Vulnerable Populations

1 in = 4.1 miles Overview Page

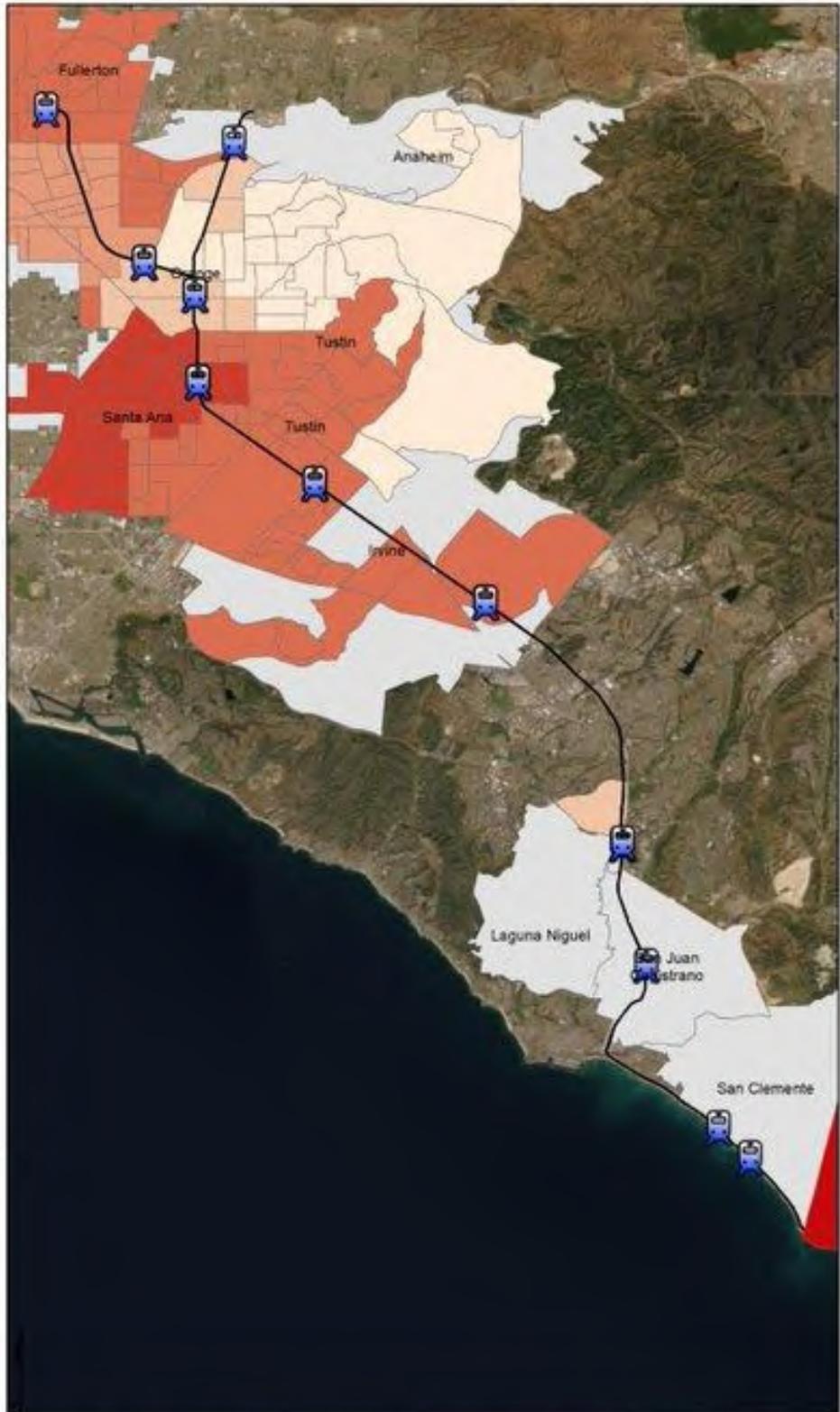
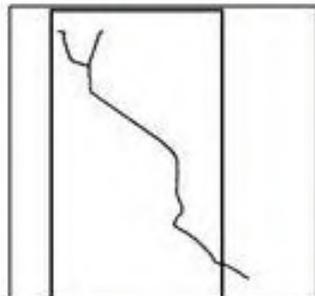
# Systemwide Exposure Scan:

**Total Heat Health Events\*, RCP 8.5, 2041-2060  
Vulnerable Populations**

-  Station Platforms
-  Station City Boundaries
- OCTA Mainlines and ROW**
-  Mainline
- Projected Annual HHEs**
-  0 - 1
-  1 - 3
-  3 - 5
-  5 - 7
-  7 - 9
-  9+



0 1.5 3 6 Miles



Notes: Asset and centerline data provided by Orange County Transportation Authority. Coastal flooding and cliff retreat data from USGS CoSMeS v3. Inland flooding data from FEMA. Slope failure data from two DEMs: USGS Coastal National Elevation Database and National Elevation Dataset. Heat data from California Heat Assessment Tool. Wildfire data is a summary of three models: MC2-EPA, MC3-University of Idaho, UC Merced. \*Heat Health Event (HHE) data represents 95th percentile model results. "JA" represents HHE's projected for the months of June, July, August. "Total" represents the HHE's projected annually.

## Drought and Precipitation

The Orange County region's average annual rainfall is approximately 13 inches, with an inch variation between coastal and inland locations. Climate change estimates predict longer droughts as well as shorter duration, higher intensity rainfall (Blickenstaff, Gangopadhyay, Ferguson, Condon, & Pruitt, 2013). Future changes to drought periods and precipitation patterns could change as a result of these temperature changes. Extreme climate conditions have occurred recently, with drought occurring from 2012-2016 (Lund, Medellin-Azuara, Durand, & Stone, 2018) and heavy rainfall during the 2017-2018 season.

A study conducted by researchers at University of California Davis provides a statewide perspective on the stress that climate change is projected to put on plant species under a business-as-usual climate scenario. The results show that the southern part of California around Orange County and farther south in San Diego County are areas where vegetation will experience considerable climate-related stress. What the study defines as the southwest coastal region, including Los Angeles and San Diego, is expected to experience 63-69% climatically exposed vegetation by the end of the century. This means that this region's terrestrial ecosystem will become more and more unstable over time.

The California's Fourth Climate Change Assessment indicates that the Los Angeles region, including Orange County, will experience an increase in more dry and wet extremes into the future (State of California, 2019). This means that the wettest days will be wetter than they are now, and the driest days will be drier. Each scenario has its own adverse effects on vegetation. Long droughts kill vegetation without supplemental irrigation while high-intensity rainfall can displace sediment and cause erosion. Stations must adapt not only for the passenger experience, but also adopt more resilient features and practices to minimize risk and maintenance as conditions change in the region due to climate change. This requires a change in water conservation measures, vegetation, and operations and maintenance.

### 5.3.2 KEY FINDINGS

#### Station Prioritization

In order to prioritize which OCTA stations were most in need of investment to mitigate the impacts of future climate hazards, the following criteria were applied to categorize and rank the stations:

- **Current Amenity Needs** were determined based on the inventory of station amenities conducted by the project team in late 2019. Several plans and sources of data provided by the Southern California Regional Rail Authority (SCRRA) and OCTA offered a baseline inventory of amenities. The *Nonmotorized Metrolink Accessibility Study*, published in 2013, includes network design, information/wayfinding, station amenities, and bike parking as metrics to understand station-level accessibility. The presence or absence of station amenities that have the most direct relationship to heat risk over time were used to derive the scores for each station, including bathroom facilities, water fountains/hydration stations, food/beverage vendors, indoor waiting areas, and outdoor shaded areas. This factor was weighted 3x in the final scores.
- **Current First/Last Mile Needs** were based on the inventory of first/last mile facilities that serve each station area and are present at the stations themselves. The presence or absence of these facilities are not directly related to heat risk over time but influence the overall accessibility of these stations to those who use them and include bike lanes connecting the station to the off-site bike network, bike racks and

lockers on site, EV charging stations on site, and consideration of whether these on-site facilities are shaded or not. This factor was weighted 1x in the final scores.

- **Current Ridership Numbers** reflect total station boardings for 2018. This factor captures current utilization of each station and is one way to reflect the relative importance of the station in the overall rail network. This factor was weighted 2x in the final scores.
- **Future Population Needs** reflect the anticipated future levels of development in the areas surrounding the station. These assessments were based on discussion with the project team and the anticipated household and job growth within one mile of the station, measured as a percent change between 2016 and 2045 based on the OCTA model. This factor is a proxy for future utilization of each station and is one way to capture the relative importance of the station in the overall rail network in 2045. This factor was weighted 2x in the final scores.
- **Climate Exposure Score** was based primarily on the projected number of HHEs for Vulnerable populations by the middle of the 21st century, for the area surrounding each station. These projections are based on CHAT data and reflect the 95th percentile of the Global Climate Model. This factor illustrates the anticipated heat conditions by mid-century and was weighted 3x in the final scores.

The results of this prioritization scan are summarized in Table 6, where near-term and long-term priority stations are identified.

**TABLE 6 | Station Investment Prioritization**

Stations	Current Amenity Needs	Current First/Last Mile Needs	Current Ridership	Future Population Needs	Climate Exposure	Recommended Investment Timing
Buena Park						Near-Term
Fullerton						Not Needed
Anaheim						Not Needed
Anaheim Canyon						Near-Term
Orange						Long-Term
Santa Ana						Long-Term
Tustin						Near-Term
Irvine						Long-Term
Laguna Niguel/Mission Viejo						Near-Term
San Juan Capistrano						Not Needed
San Clemente (North Beach)						Not Needed
San Clemente Pier						Not Needed
<b>Key</b>	High need                Moderate need                Low need					

**Summary of Survey Results**

The public survey conducted by OCTA provided useful information at the station level to determine which station amenities are preferred by riders who regularly use these stations. This section summarizes the results of the survey for each of the near-term priority stations, which is then used to inform the recommended course of action.

Question 6 of the survey asked riders, “What train station amenities would be most helpful during a very hot, windy, or rainy day?” and presented the following possible answers:

- More shaded or covered area
- More water fountains
- More seating
- More accurate information about when my train will arrive so I don’t have to wait outside too long
- Water misters on platform

- Fans on platform
- Restrooms
- Better information about safety precautions from harsh weather
- Other

Overall, riders identified more shade, more accurate information about train arrival, and more seating as the top three station amenity preferences as summarized in Figure 39.

For riders at each of the near-term stations these preferences were fairly well aligned with the preferences from riders overall. The top three preferred station amenities for riders at each of these stations were a combination of:

- More shaded or covered areas,
- More accurate information about when my train will arrive so I don't have to wait outside too long,
- Restrooms; and
- More seating.

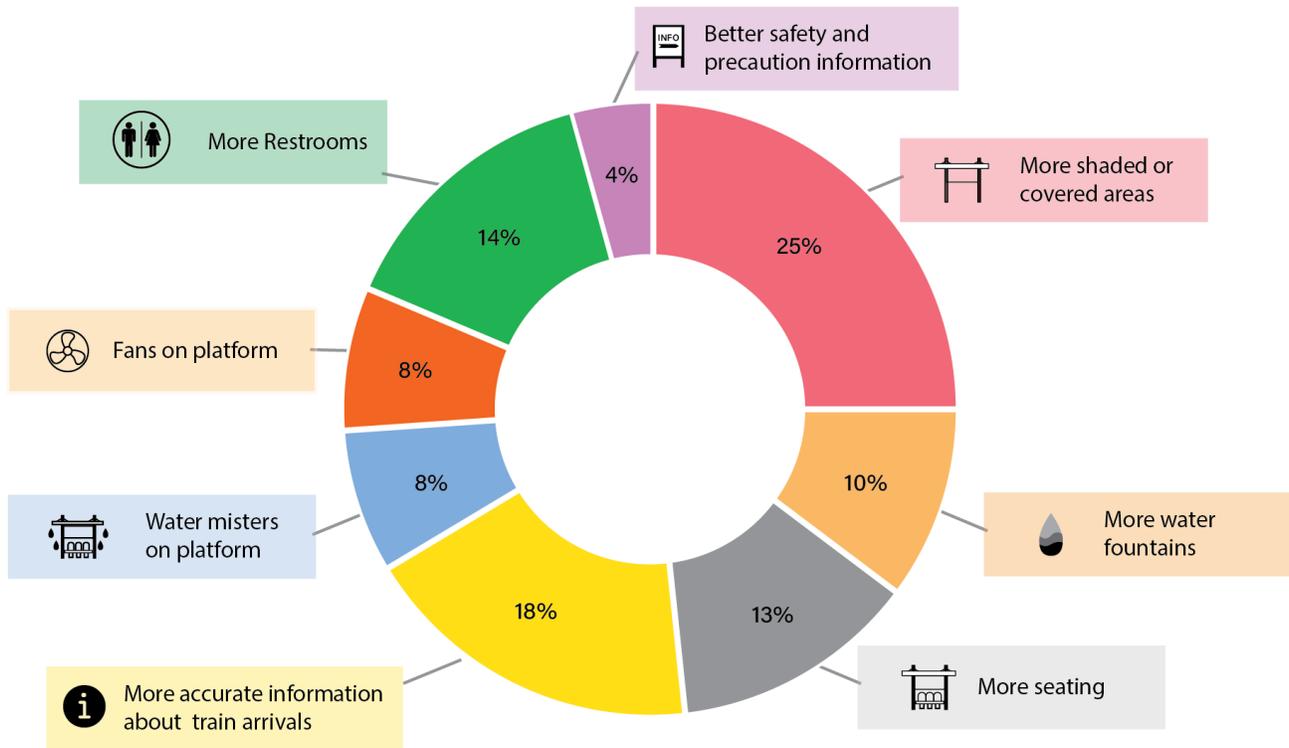
The specific breakdown of preferences by station are summarized on the following pages.

**FIGURE 39 | Survey Results Summary**

**What train station amenities would be most helpful during a very hot, windy, or rainy day?**

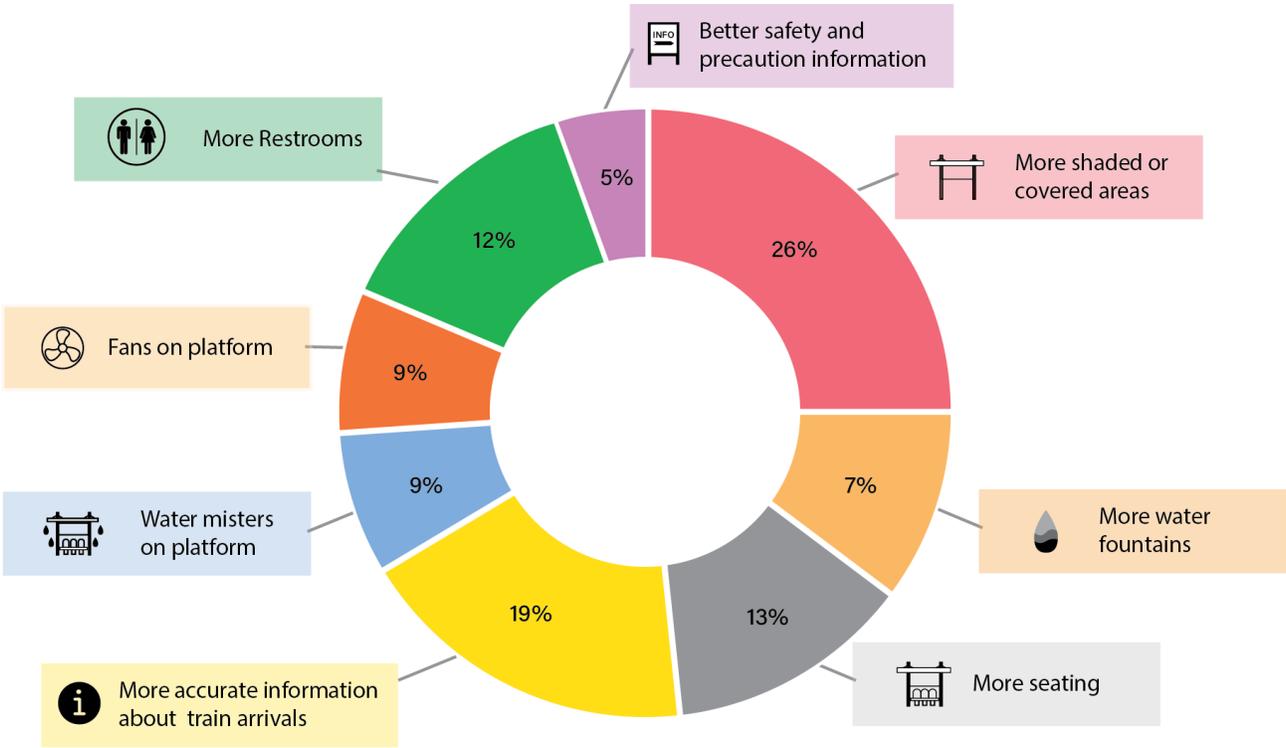


# Anaheim Canyon Station



The top three station amenity preferences for Anaheim Canyon passengers are: 1) more shaded or covered areas, 2) more accurate information about train arrival, and 3) restrooms. 25% of Anaheim Canyon station passengers prefer that OCTA install more shade and covered areas to improve passenger experience during high heat, rainy, and/or windy days. A passenger also suggested through comments that planting more trees to improve shade would be helpful to improve comfort at the station.

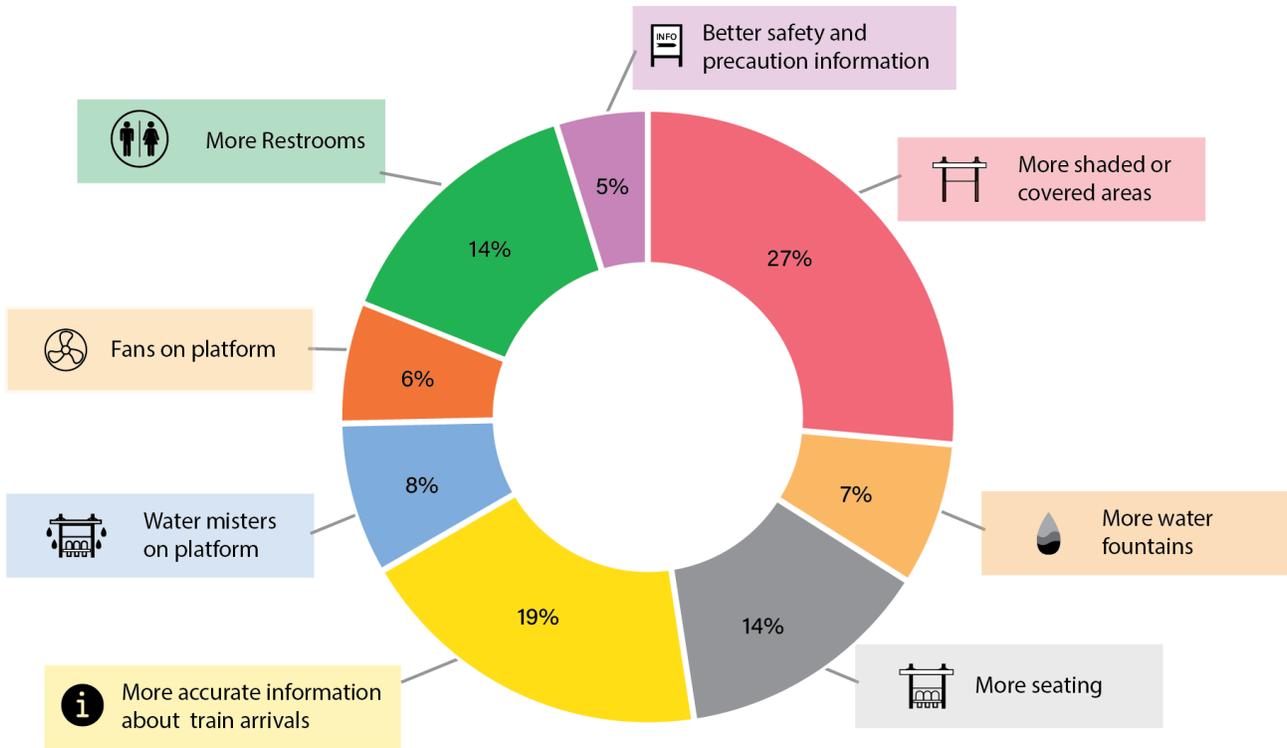
# Buena Park



The top three station amenity preferences for Buena Park passengers are: 1) more shaded or covered areas, 2) more accurate information about train arrival, and 3) more seating. Other comments from respondents included:

- Misters as well as heaters would be a good addition.
- Additional shade for ADA areas and ramps would be beneficial, as well as more information about ADA features to guide passengers .
- More detail on digital displays that indicate when trains will be arriving would be helpful.

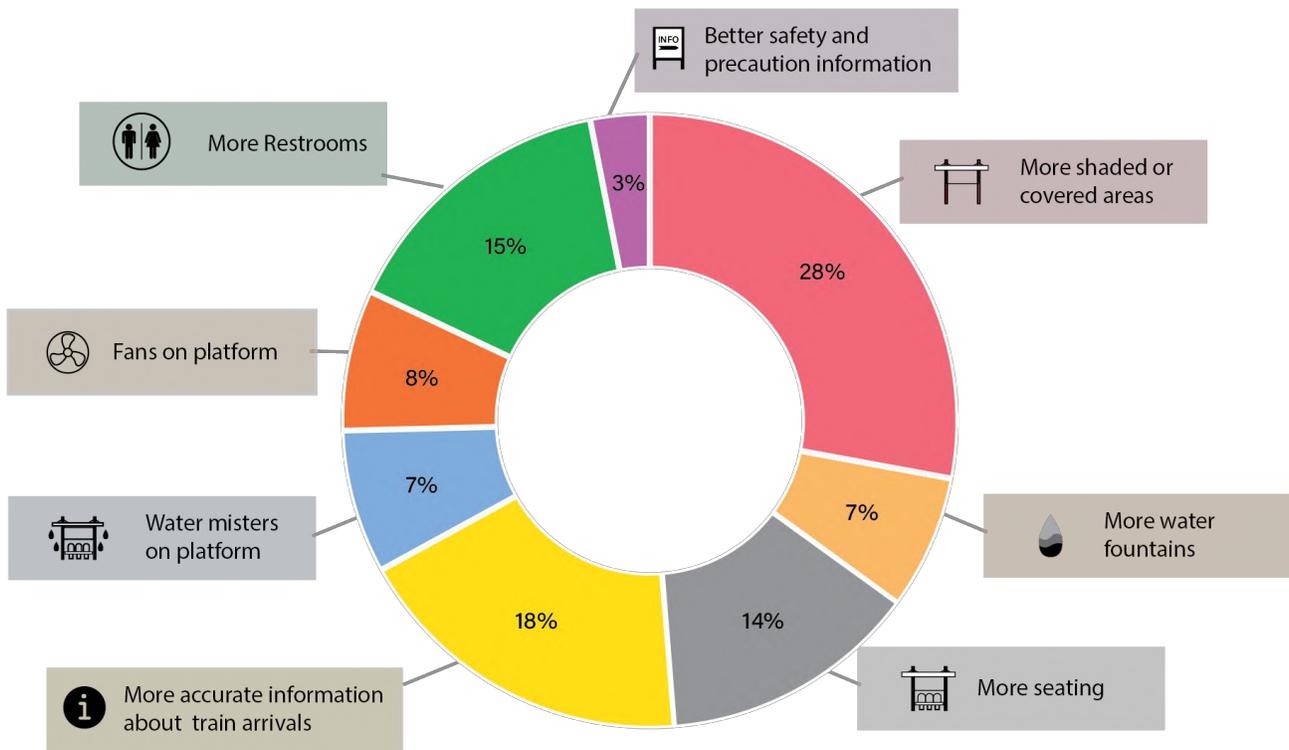
# Laguna Niguel/Mission Viejo



The top four station amenity preferences for Laguna Niguel passengers are: 1) more shaded or covered areas, 2) more accurate train arrival information, 3) more seating, and 4) restrooms. Other comments from respondents included:

- Rain and shade covers need to be wide enough to actually provide cover.
- More trees would be nice. Or a tree/shady sitting oasis for people who enjoy shade and nature to help relax during the trip.
- Information board indicating when the train will arrive and which platform to be at, etc.

# Tustin



The top station amenity preferences for Tustin passengers are: 1) more shaded or covered areas, 2) more accurate train arrival information, 3) restrooms, and 4) more seating. Other comments from respondents included:

- Please have more signs labeling platforms.
- It would be helpful to have more covered and shaded areas.
- Restrooms should be available at all stations.

The survey results are generally helpful to inform what riders would like to see at stations to improve their experience under extreme weather conditions. The key takeaway from the survey is that increased shade and cover should be considered when selecting a course of action across near and long-term priority stations.

### 5.3.3 RECOMMENDATIONS

Detailed recommendations are presented for the near-term priority stations, and higher-level recommendations are presented for the long-term priority stations. The recommendations were identified based on the following factors:

- Existing station amenities,
- Research conducted to identify effective adaptation strategies for OCTA rail stations, including cost-effectiveness,
- Rider preferences indicated in the public survey results; and
- Feedback from OCTA on the various adaptation strategies identified and their efficacy/ability to be applied in the OCTA context.

Further, strategies that address each of the relevant climate hazards (high-heat events, drought, and precipitation patterns) were selected for each near-term station. The recommendations for near-term priority stations are detailed in the following sub-sections, indicating what hazard the strategy addresses, whether the strategy should be implemented in the near or long-term, and a cost estimate for implementing the suite of strategies.

#### **Anaheim Canyon**

In the near-term, OCTA should prioritize improving passenger comfort at Anaheim Canyon station by installing more shade, more seating, and a new hydration station. These strategies also align with the public survey results. In the long-term, OCTA should expand shade at the station and also implement green solutions that would help to reduce maintenance costs and manage precipitation at the station.

Given that there is a planned station improvement project at Anaheim Canyon, OCTA should consider planting new vegetation that is drought tolerant as part of this project to reduce maintenance costs over time. OCTA should also install a bioretention feature and plant new trees, which would both have direct benefits to passenger experience at stations. Permeable pavement is recommended as a long-term action since the parking lot will be renovated with the new development planned at the station.

#### **Near-term priority actions:**

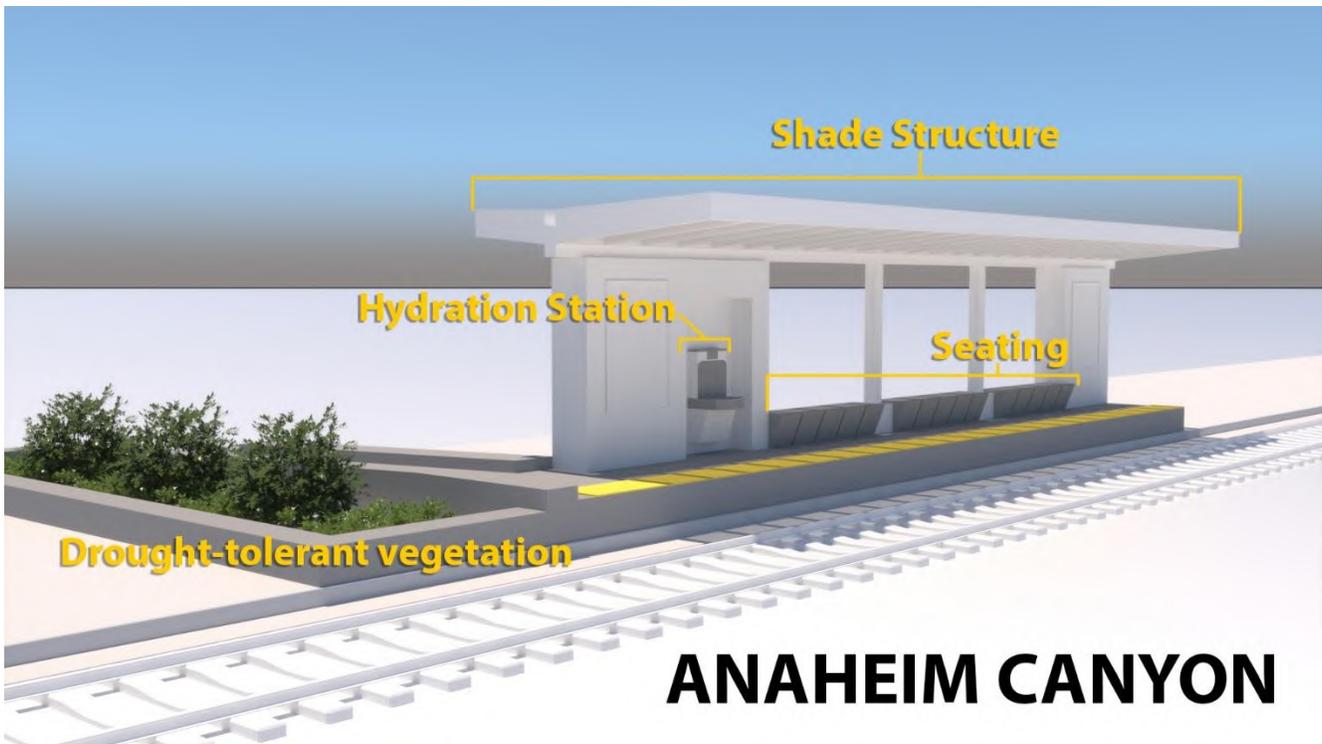
OCTA should consider implementing the following strategies in the near-term:

- Strategies to address high heat:
  - » Install two additional structures on existing platform to provide additional shade for passengers, similar to existing shade structures. Also install shade structure over front concrete waiting area with bike racks (currently under construction).
  - » Install additional seating under new shade structure to enable passengers to rest while waiting for train arrival.
  - » Install hydration station near passenger waiting area.

- Strategies to address drought:
  - » Renovate landscaping and plant drought tolerant species during station improvement project, including installing drip irrigation.

A simplified rendering of these strategies is depicted in Figure 40. It is estimated that implementing these near-term strategies would cost roughly \$928,000.

**FIGURE 40 | Anaheim Canyon Recommended Near-Term Actions**



**Long-term priority actions**

In the longer-term, OCTA should consider implementing the following adaptation strategies at Anaheim Canyon station:

- Strategies to address high heat:
  - » Cover existing parking (bike and vehicle) with shade structure.
- Strategies to address drought/precipitation:
  - » Install a bioretention feature at the bottom of the slope just before the sidewalk and station parking lot.
  - » Siting and application of permeable pavement should be coordinated with the new development slated to replace existing station parking lot.

If implemented these strategies would cost roughly \$714,000, resulting in a total station improvement cost of \$1,642,000.

## Buena Park

Much like Anaheim Canyon station, OCTA should prioritize increasing shade and seating at Buena Park to improve passenger comfort. Additionally, OCTA should improve the water fountain at Buena Park. These three strategies are cost-effective and are understood to reduce the impacts of high heat events on people and shade structures can simultaneously cover passengers during rain events. In the long-term, OCTA should focus on expanding shade structures at Buena Park and improving landscaping on the station property through planting new trees and, also, a bioretention feature. These strategies will help to improve the resilience of the station property over time and help to reduce water consumption for maintenance. Permeable pavement will have additional co-benefits with respect to water quality for Brea Creek (a few hundred feet away) by reducing stormwater impacts from the station footprint. As a note, if OCTA opts to plant trees and install needed irrigation they can consider also purchasing and planting the drought tolerant native species identified through this assessment.

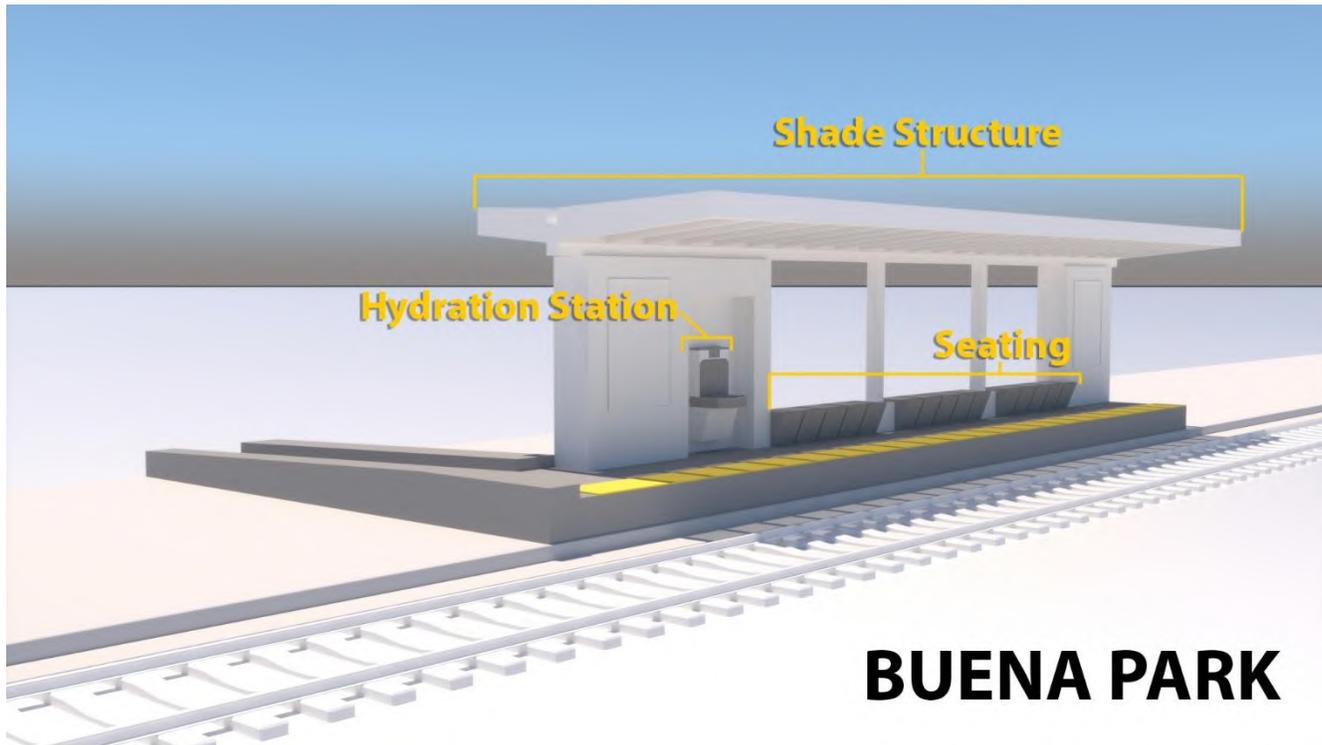
### Near-term priority actions

OCTA should consider implementing the following strategies in the near-term:

- Strategies to address high heat
  - » Install shade structure on platform adjacent to public restroom, similar to existing shade structure.
  - » Install additional seating under new shade structure.
  - » Upgrade existing water fountains and replace with hydration station near bathrooms or passenger waiting area.

These strategies are depicted in Figure 41 and are estimated to cost a total of \$26,000.

FIGURE 41 | Buena Park Recommended Near-Term Actions



#### Long-term priority actions

In the longer-term, OCTA should prioritize the following strategies:

- Strategies to address high heat:
  - » Plant landscaping and trees that will grow to produce shade and mitigate heat, including installing irrigation.
- Strategies to address drought/precipitation:
  - » Install bioretention features by replacing some landscaped islands within the parking lot.
  - » Install permeable pavement.

These strategies are estimates to cost \$1,336,000, resulting in a total station improvement cost of \$1,362,000.

#### Tustin

OCTA should again prioritize installing shade, seating and upgrading the water fountain at Tustin station in the near-term. Additionally, OCTA should replace planters along the bus loop with tree boxes, which will simultaneously improve drainage at the station and also increase shade at this location. In the long-term, OCTA should add additional tree boxes at the inlet of the bus loop and explore options to connect to recycled water. There isn't a cost estimate available for the recycled water connection, since this would require conversations with Irvine Ranch Water District (IRWD) to learn more about what this would entail. The recycled water connection would help to improve the sustainability of the maintenance of the newly installed tree boxes.

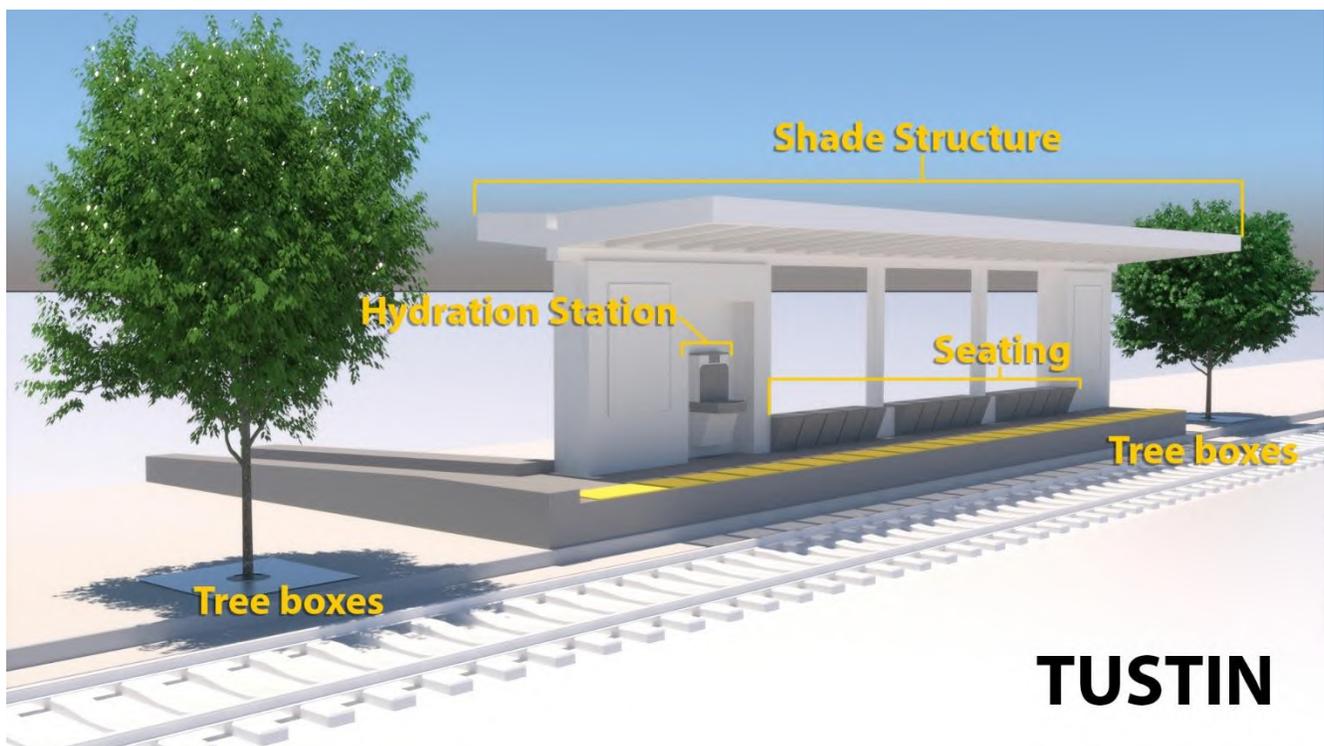
### Near-term priority strategies:

OCTA should consider implementing the following strategies in the near-term:

- Strategies to address high heat:
  - » Install shade structures:
    - Four new shade structures on north platform.
    - Two new shade structures on south platform, similar to existing platform shade structures.
    - Install two shade structures over bike lockers on either side of the station.
    - Install shade structure or shade trees (boxed planters) in two waiting areas at front of station.
  - » Where not already present, install additional seating under new shade structures to enable passengers to rest while waiting for train arrival.
  - » Upgrade existing water fountains and replace with hydration station near passenger waiting area.
- Strategies to address high heat/precipitation/drought:
  - » Tree boxes - Remove planters in the northern corner of the bus loop and within the bus loop and replace with tree boxes.

Figure 42 depicts these strategies and they are collectively estimated to cost \$284,000 to implement.

**FIGURE 42 | Tustin Recommended Near-Term Actions**



### Long-term priority actions

In the longer-term, OCTA should prioritize the following strategies:

- Strategies to address precipitation/drought:
  - » Tree Boxes – Existing inlets near bus loop could be replaced with a tree box as a mid-term investment strategy —ten to fifteen years in the future.
  - » Recycled water - Explore recycled water connection opportunities with IRWD. A recent assessment of a water utility map from IRWD shows recycled water lines on adjacent arterial streets but not into station.

These strategies are estimated to cost \$23,000, resulting in a total station improvement cost of \$308,000.

### Laguna Niguel/Mission Viejo

OCTA should again prioritize increasing shade along platform waiting areas as well as seating in the near-term. Additionally, OCTA should invest in installing a new hydration station for passengers. These amenities will create an immediate benefit to passengers, especially in high heat conditions, which are expected to become more frequent under future climate scenarios.

In the long-term, OCTA should continue to improve upon existing shade structures and also improve landscaping and bioretention due to the station's proximity to Oso Creek. Green strategies, like installing permeable pavement, will have co-benefits to maintain the water quality of the creek and also reduce the impact that possible flooding as a result of extreme precipitation events may have on station property. As a note, if OCTA opts to plant trees and install needed irrigation they can consider also purchasing and planting the drought tolerant native species identified through this assessment.

### Near-term priority actions

OCTA should consider implementing the following strategies in the near-term:

- Strategies to address high heat:
  - » Where not already present, install additional seating under new shade structures to enable passengers to rest while waiting for train arrival.
  - » Install hydration station near bathrooms or passenger waiting area.
- Strategies to address high heat/precipitation:
  - » Install three new shade structures on the east platform and west platform (six total), similar to existing platform shade structures. Also install shade structure at waiting area and bike racks (10 total).

These strategies are depicted in Figure 43 and estimated to cost \$191,000.

FIGURE 43 | Laguna Niguel/Mission Viejo Recommended Near-Term actions



#### Long-term priority actions

In the longer-term, OCTA should prioritize the following strategies:

- Strategies to address high heat:
  - » Cover existing parking (bike and vehicle) with solar panels.
- Strategies to address drought/precipitation
  - » Install bioretention along Oso Creek.
  - » Recycled Water - Explore recycled water connection opportunities.
- Strategies to address high heat/precipitation:
  - » Tree box along curb inlet on Forbes Road adjacent to Oso Creek.
  - » Install permeable pavement within parking lot.

These strategies are estimated to cost \$2,053,000, resulting in a total station improvement cost of \$2,243,000.

#### Long-Term Priority Stations

OCTA should prioritize implementing the above recommended strategies at the near-term priority stations, however, based on the feedback received during the public survey the following strategies should be prioritized for each of the long-term priority stations.

## Orange

At Orange, OCTA should prioritize:

- Creating a covered walkway connection between covered parking garage (covered bike and vehicle parking) and station area.
- Offering a shuttle service between off-site parking and the station area; particularly on days that exceed a certain temperature.

These strategies will provide additional shade and comfort for passengers within the existing station footprint.

## Santa Ana

At Santa Ana, OCTA should prioritize:

- Installing cool roof treatment on station structures.
- Planting additional vegetation and landscaping.
- Installing A/C, fans, or misters in indoor and outdoor covered areas.

## Irvine

At Irvine, OCTA should prioritize:

- Installing A/C, fans, or misters in indoor and outdoor covered areas.
- Installing cool roof treatment on station structures.
- Planting additional vegetation and landscaping.

---

## 5.4 GENERAL RECOMMENDATIONS

This section provides general recommendations in addition to the site-specific recommendations described in the previous sections of this chapter.

### 5.4.1 HYDROLOGY AND HYDRAULICS

As described in previous chapters, the analysis found that 100-year high confidence (HC) HC (85<sup>th</sup> percentile) flow rate estimates derived from historical observations exceed the 100-year expected value (EV) (50<sup>th</sup> percentile) future flow rate estimates that were developed as part of this project for different future timeframes and climate scenarios. The Orange County Hydrology manual recommends using these 100-year HC flow rates. Because these flow rates exceed the expected future flow rates, it is recommended that OCTA use these 100-year HC flow rates for future design of bridges and culverts that use a 100-year flow design criterion. For example, these can be used in current and planned OCTA projects, such as the MP 197.9 San Juan Creek bridge replacement, Irvine station project (which includes culvert replacements), the siding project from Stonehill Road to Beach Road at MP 200.1, and the Orange County Maintenance Facility project. It is recommended that OCTA regularly revisits this assumption by obtaining the most recent recommended climate projections and compares future heavy precipitation and flow estimates to the current HC heavy precipitation and flow estimates.

It is recommended that future hydrology studies should consider HC flowrates for the full range of storm events (2- through 500-year), rather than just the 100-year event. This will enable OCTA and stakeholders to understand the impacts of higher frequency/lower magnitude and lower frequency/higher magnitude flood events and evaluate design alternatives accordingly.

#### **5.4.2 TEMPERATURE-RELATED RAIL STRESS**

To account for changes in rail stress (compression or expansion of continuous welded rail) with changing climate conditions, it is recommended that Metrolink reviews the information it uses to calculate the rail zero-stress temperature. Calculating zero stress temperature typically relies on the following statistics: average and record monthly maximum temperatures for the warmest month of the year and the average and record monthly minimum temperatures for the coldest month of the year. These statistics should be updated to reflect current rather than historical conditions. Newly installed and existing rail should be stressed based on this information. While we were unable to confirm what data sources Metrolink uses for these climate statistics, they are likely based on historical meteorological conditions. These data need to be reviewed and updated regularly to account for climate change that has already occurred and will occur in the future. It is recommended that Metrolink also examine projected future climate projections for the next several decades when deciding on climate statistics to use in calculating the rail-zero stress temperature.

#### **5.4.3 POWER SHUTOFFS RESULTING FROM FIRES, HEATWAVES, OR WIND**

One of the main consequences to the rail system resulting from an extended power outage associated with a high-heat, high wind, or wildfire event would be the potential disruption of the Metrolink Signal and Communications System.

To plan for these kinds of events requires an understanding of the Metrolink Signal and Communications System, including where and how they operate. The rail in this study's focus area is controlled by Metrolink.

The components of the wayside signals include signals at control points, intermediate signals and crossing signals. The wayside signals have signal houses associated with them that are powered by local power drops. Consequently, the power sources differ by location. There are battery backups in the air-conditioned houses to keep the digital controls from overheating. The battery backups are not intended to withstand long term power outages. The signal system is a fail-safe system, meaning it will activate a stop signal or a gate down signal at a crossing if it loses power or a component fails.

A widespread power outage would create a condition that all signals not on battery- powered backup would display red signals and trains would stop, caused by either train engineer or the Positive Train Control system (PTC). The signal gates would also be switched to the down position. The signals on battery backup would fail when the batteries drain. Currently, the batteries are not sized for long term power outages and typically last for a few hours. However, additional batteries is one option to increase resilience during extended outages. Adding additional batteries could require larger wayside signal houses to hold the additional batteries. However, this solution implemented at one location along the alignment is dependent on other portions having sufficient electricity or battery backup as well. Thus, a more coordinated strategy across the overall system would be needed to adequately address potential longer-term outages.

The signal system operates as a centralized train control system with PTC collision avoidance system added to it. PTC is GPS-based safety technology that can stop a train and prevent train-to-train collisions, over-speed derailments, and unauthorized train movement. Metrolink’s PTC system combines GPS, wireless radio and computing technology to send up-to-date visual and audible information and notify train crew members when a train must be slowed or stopped (see Figure 44 and Figure 45). If an engineer does not respond to the PTC warning system, onboard computers will activate the brakes and safely stop the train.

The trains are dispatched from a dispatch center. The Metrolink system center is located at the DOC (Dispatch Operations Center) in Pomona. The BNSF controlled track is controlled from their center in San Bernardino. A dispatch handoff is done when trackage rights change. The DOC was built with redundant power sources so that if one power grid source is lost, the other will take over. The facility also has a back-up generator.

The communication network maintains communication with dispatch, trains, back office server, and wayside signals. It uses three communication systems: GPS, fiberoptic cables and radio signals.

The Metrolink Signal and Communications System is a complex network with some redundancies built in.

However, its primary purpose is to prevent collisions. If a component fails the network will react to stop trains to avoid collision. Under prolonged power outage, the system would come to a halt eventually without some hardening of critical portions of it.

Any strategies to enhance the resilience of the Metrolink Signal and Communications System for an extended power outage would require a network approach with stages of procedures and protocols developed to deal with different scenarios. It would also require agreements with the other users of the network.

FIGURE 44 | Metrolink PTC System Components

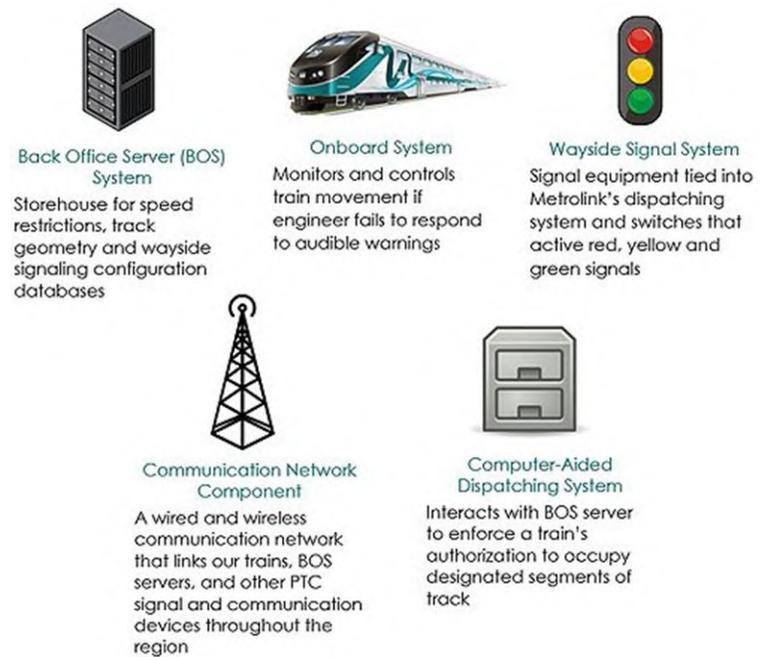
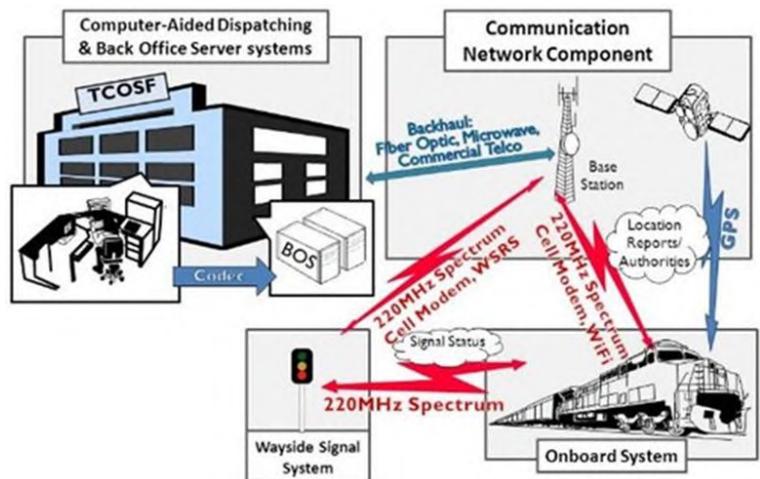


FIGURE 45 | How the PTC System Operates



---

## 5.5 COST OF RAIL SERVICE DISRUPTION

Climate-related impacts that result in disruptions to or extended outages of the rail line would have cascading impacts on rail passengers, freight, and broader impacts to the transportation network and the community. For rail passengers, bus bridges would likely substitute rail transportation for the duration of the outage. A passenger rail bus bridge would likely be used in the event of a disruption, which is estimated to cost approximately \$26,000 per day, however, this cost may vary based on which sections of the rail are disrupted. Disruption to the rail would also impact freight service, which is operated by BNSF. The estimated freight disruption cost to BNSF is \$38,376, which is based on a study conducted by the University of Illinois (Lovett, Dick, & Barkan, 2015).

Another metric to consider in order to measure the impact of disruption to freight service is the value of goods not delivered during the outage. Estimates suggest that the value of goods not delivered in one day of service could range somewhere between \$144,000 to \$120 million or an average of \$60.1 million. Additionally, another consideration is the possibility of transporting the daily freight goods via truck rather than train during a disruption. A study conducted by SANDAG estimated that switching from rail to trucks to transport freight goods would cost an average of \$605,812 per day (Diehl, 2019). These identified cost estimates are not meant to be definitive, but to be preliminary estimates to guide OCTA decision-making.

Finally, a disruption to the rail line would have impacts to the broader transportation network and the community in Orange County. Primary impacts to the transportation network could include increased congestion on the roads due to the rail riders who opt to use private vehicles during the rail disruption. Increased traffic volumes could result in decreased roadway safety and increased vehicle emissions, which could serve to reduce the local air quality in the region depending on the length of the rail disruption.

The continued prevalence of rail disruptions could make these community impacts more common, resulting in concerns for reliability of the rail service. Ongoing reliability concerns could make these modal shifts more regular and extend these community impacts. These costs were not quantified in the assessment but should be considered as well.

## 6.0 CONCLUSION

This report establishes a plan for OCTA to respond to and prepare for future climate-related risk. The plan articulates the climate-related risks to the OCTA rail system, including coastal flooding, riverine flooding, slope failure and erosion, high heat events, wildfire, and drought, and identifies recommended actions for OCTA to adopt to reduce risks and disruptions to service into the future. It includes both general and site-specific recommendations, the latter covering the coastal rail alignment, the rail along Mission Viejo trench and Oso Creek, and passenger rail stations identified to be in need of investments, including Anaheim Canyon, Buena Park, Tustin, and Laguna Niguel/Mission Viejo stations. The recommendations indicate which strategies should be prioritized in the near-term to mitigate climate risks at these locations and which strategies can be implemented in the long-term to further bolster the resilience of the system.

Additional steps will need to be taken to transform these recommendations into action, including identifying funding and financing sources to cover the costs of these strategies, continued engagement with relevant state and local agencies to coordinate these efforts, and in some cases conducting environmental reviews to secure needed permits. In the process of this study, OCTA has already begun to take action on these next steps, including coordinating across local agencies through the project working group, conducting public outreach, and engaging with key stakeholders such as the California Coastal Commission to gauge the feasibility of coastal adaptation strategies under California state policy. These coordination efforts will need to continue, and further research may be needed to identify and secure funding for adaptation strategies that require high upfront capital costs, like the coastal resilience strategies. The report's recommendations also identify topics in need of further research and study.

This study marks an important initial step in OCTA's understanding of climate risks to the rail system and is critical to taking steps to address these risks. As the regional, state, national, and international understanding of these risks evolves over time, OCTA should revisit this topic to continue to ensure and enhance the resiliency of the system.

## 7.0 REFERENCES

Blickenstaff, K., Gangopadhyay, S., Ferguson, I., Condon, L., & Pruitt, T. (2013). *Climate Change Analysis for the Santa Ana River Watershed*. U.S. Department of the Interior Bureau of Reclamation. Retrieved from <https://www.usbr.gov/lc/socal/basinstudies/OWOWReferences/FinalReport/TM%201%20Climate%20Change.pdf>

Cal-Adapt. (2020). *Extreme Heat Days & Warm Nights*. Retrieved from <https://cal-adapt.org/tools/extreme-heat/>

California Natural Resources Agency. (2020). *California Heat Assessment Tool*. Retrieved from <https://www.cal-heat.org/>

California Natural Resources Agency and California Ocean Protection Council. (2018). *Sea-Level Rise Guidance, 2018 Update*.

Caltrans. (2004). *LOSSAN, Los Angeles to San Diego Proposed Rail Corridor Improvements in the State of California, Draft Program Environmental Impact Report/Statement*.

Caltrans. (2018). *California State Rail Plan*. Retrieved from <https://dot.ca.gov/programs/rail-and-mass-transportation/california-state-rail-plan>

Caltrans. (2020). *2019 Climate Change Vulnerability Assessments*. Retrieved from <https://dot.ca.gov/programs/transportation-planning/2019-climate-change-vulnerability-assessments>

City of Dana Point. (2019, October). *City of Dana Point Sea Level Rise Vulnerability Assessment*. Retrieved from <https://www.danapoint.org/home/showpublisheddocument?id=29034>

City of San Clemente. (2019, October). *City of San Clemente Sea Level Rise Vulnerability Assessment*. Retrieved from City of San Clemente Local Coastal Program: <https://www.san-clemente.org/home/showpublisheddocument?id=54174>

City of San Clemente. (2020). *City of San Clemente Local Coastal Program*. Retrieved from <https://www.san-clemente.org/departments-services/planning-services/long-range-planning/local-coastal-program>

Diehl, P. (2019, July 28). Del Mar is weak link in San Diego's coastal railroad. *Del Mar Times*. Retrieved from <https://www.delmartimes.net/news/story/2019-07-28/del-mar-is-weak-link-in-san-diegos-coastal-railroad>

Erikson, L., Barnard, P., O'Neill, A., Vitousek, S., Limber, P., Foxgrover, A., . . . Warrick, J. (2017). Coastal Storm Modeling System (CoSMoS) for Southern California, v3.0, Phase 2. doi:<http://dx.doi.org/10.5066/F7T151Q4>

Federal Highway Administration, Office of Planning, Environment, and Realty. (2019). *Adaptation Decision-Making Assessment Process (ADAP)*. Retrieved from FHWA: [https://www.fhwa.dot.gov/environment/sustainability/resilience/ongoing\\_and\\_current\\_research/teacr/adap/index.cfm](https://www.fhwa.dot.gov/environment/sustainability/resilience/ongoing_and_current_research/teacr/adap/index.cfm)

FEMA. (2020). *Using the National Flood Hazard Layer Web Map Services (WMS) in Google Earth*. Retrieved from Mapping Information Platform: <https://hazards.fema.gov/femaportal/wps/portal/NFHLWMSkmzdownload>

Lovett, A. H., Dick, T. C., & Barkan, C. P. (2015). *Determining Freight Train Delay Costs on Railroad Lines in North America*. Urbana, IL: Rail Transportation and Engineering Center (RailTEC), Department of Civil Engineering, University of Illinois at Urbana-Champaign. Retrieved from <https://railtec.illinois.edu/wp/wp-content/uploads/2019/01/Lovett-et-al-2015-IAROR.pdf>

Lund, J., Medellin-Azuara, J., Durand, J., & Stone, K. (2018, October). Lessons from California's 2012-2016 Drought. *Journal of Water Resources Planning and Management*, 144(10). Retrieved from <https://ascelibrary.org/doi/full/10.1061/%28ASCE%29WR.1943-5452.0000984>

Metrolink. (2016). *Restoration of Rip Rap on the Orange Subdivision over the Weekend of March 5th and 6th*.

Metrolink. (n.d.). *SCORE*. Retrieved from Metrolink: <https://metrolinktrains.com/score#:~:text=Metrolink's%20Southern%20California%20Optimized%20Rail,the%20program%20complete%20by%202028>.

National Oceanographic and Atmospheric Administration. (2020). Center for Operational Oceanographic Products and Services, Tides and Currents. Retrieved April 2020, from <https://tidesandcurrents.noaa.gov/>

NOAA. (2017). *NOAA ATLAS 14 Point Precipitation Frequency*. Retrieved from Hydrometeorological Design Studies Center, Precipitation Frequency Data Server: [https://hdsc.nws.noaa.gov/hdsc/pfds/pfds\\_map\\_cont.html](https://hdsc.nws.noaa.gov/hdsc/pfds/pfds_map_cont.html)

OCTA. (2019). *Metrolink Factsheet*. Retrieved from [http://www.octa.net/pdf/Factsheet\\_MetrolinkService2020.pdf](http://www.octa.net/pdf/Factsheet_MetrolinkService2020.pdf)

San Diego Association of Governments. (2020, June 5). *Comprehensive Multimodal Corridor Plans [slides for Transportation Committee Item 6 on June 5, 2020]*. Retrieved from [https://www.sandag.org/uploads/meetingid/meetingid\\_5299\\_27523.pdf](https://www.sandag.org/uploads/meetingid/meetingid_5299_27523.pdf)

State of California. (2018). *California's Fourth Climate Change Assessment, Los Angeles Region*. Retrieved from [https://www.energy.ca.gov/sites/default/files/2019-11/Reg%20Report-%20SUM-CCCA4-2018-007%20LosAngeles\\_ADA.pdf](https://www.energy.ca.gov/sites/default/files/2019-11/Reg%20Report-%20SUM-CCCA4-2018-007%20LosAngeles_ADA.pdf)

State of California. (2019). *California's Fourth Climate Change Assessment: Los Angeles Region Report*. Retrieved from [https://www.energy.ca.gov/sites/default/files/2019-11/Reg%20Report-%20SUM-CCCA4-2018-007%20LosAngeles\\_ADA.pdf](https://www.energy.ca.gov/sites/default/files/2019-11/Reg%20Report-%20SUM-CCCA4-2018-007%20LosAngeles_ADA.pdf)

State of California. (n.d.). *California Fire Hazard Severity Zones (FHSZ)*. Retrieved from CA State Geoportal: <https://gis.data.ca.gov/datasets/31219c833eb54598ba83d09fa0adb346>

State of California Department of Water Resources. (2015, August). *Water.gov*. Retrieved from Perspectives and Guidance for Climate Change Analysis: <https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/All-Programs/Climate-Change-Program/Climate-Program-Activities/Files/Reports/Perspectives-Guidance-Climate-Change-Analysis.pdf>

State of California, CalEPA. (n.d.). *Urban Heat Island Interactive Maps*. Retrieved from [calepa.ca.gov/climate/urban-heat-island-index-for-california/urban-heat-island-interactive-maps/](http://calepa.ca.gov/climate/urban-heat-island-index-for-california/urban-heat-island-interactive-maps/).

State of California, Department of Transportation. (2004). *LOSSAN, Los Angeles to San Diego Proposed Rail Corridor Improvements in the State of California, Draft Program Environmental Impact*



*Report/Statement*. Retrieved from [https://books.google.com/books?id=57E2AQAAMAAJ&pg=RA16-SA12-PA22&lpg=RA16-SA12-PA22&dq=caltrans+environmental+impact+statements+district+12+Lossan&source=bl&ots=46wOhrwuj3&sig=ACfU3U2NCgK1ecnFCXVk\\_2FQFTBMSkwNMg&hl=en&sa=X&ved=2ahUKEwiCuKyqzenpAhWul3IEHa2Y](https://books.google.com/books?id=57E2AQAAMAAJ&pg=RA16-SA12-PA22&lpg=RA16-SA12-PA22&dq=caltrans+environmental+impact+statements+district+12+Lossan&source=bl&ots=46wOhrwuj3&sig=ACfU3U2NCgK1ecnFCXVk_2FQFTBMSkwNMg&hl=en&sa=X&ved=2ahUKEwiCuKyqzenpAhWul3IEHa2Y)

Thorne, e. a. (2017). The Impact of Climate Change Uncertainty on California's Vegetation and Adaptation Management. *Ecosphere*, 8(12). Retrieved from <https://esajournals.onlinelibrary.wiley.com/doi/full/10.1002/ecs2.2021>

U.S. Army Corps of Engineers . (2002). *Coatal Engineering Manual (CEM), Engineer Manual 1110-2-1100*. Washington, D.C. : USACE.

U.S. Army Corps of Engineers. (2020, April). *Wave Information Studies*. Retrieved from USACE : <http://wis.usace.army.mil/hindcasts.html?dmn=pacific>

UC Berkeley. (n.d.). *Index of data/scripps/loca/met*. Retrieved from <http://albers.cnr.berkeley.edu/data/scripps/loca/met/>

UCSD. (n.d.). *LOCA Statistical Downscaling (Localized Constructed Analogs)* . Retrieved from <http://loca.ucsd.edu/>

United States Geological Survey. (2016). *2016 USGS Coastal National Elevation Database (CoNED) Topobathymetric Model (1930 - 2014) for the Southern Coast of California and Channel Islands*. Retrieved from National Oceanographic and Atmospheric Administration Data Access Viewer: [https://coast.noaa.gov/hpdata/raster2/elevation/CA\\_Southern\\_CoNED\\_DEM\\_2016\\_8658/](https://coast.noaa.gov/hpdata/raster2/elevation/CA_Southern_CoNED_DEM_2016_8658/)

US EPA. (2018, September 12). *Cool Fixes for Hot Cities Part 2: Los Angeles* . Retrieved from epa.gov: [https://www.epa.gov/sites/production/files/2018-09/documents/heat-island-webcast-cool-fixes-part-2-2018-09-12\\_0.pdf](https://www.epa.gov/sites/production/files/2018-09/documents/heat-island-webcast-cool-fixes-part-2-2018-09-12_0.pdf)

USACE. (2012). *The Final Report for the San Clemente Shoreline Feasibility Study* . Washington D.C.: U.S. Government Printing Office.

USGS. (2020). *CoSMos 3.0: Southern California*. Retrieved from [https://www.usgs.gov/centers/pcmssc/science/cosmos-30-southern-california?qt-science\\_center\\_objects=0#qt-science\\_center\\_objects](https://www.usgs.gov/centers/pcmssc/science/cosmos-30-southern-california?qt-science_center_objects=0#qt-science_center_objects)

Van Der Meer, J., Allsop, N.W.H. , Bruce, T., De Rouck, J., Kortenhaus, A., Pullen, T., . . . Zanuttigh, B. (2018). *EurOtop*. Retrieved April 2020, from <http://www.overtopping-manual.com/>

Vitousek, S., Barnard, P. L., Fletcher, C. H., Frazer, N., Erikson, L., & Storlazzi, C. D. (2017). Doubling of coastal flooding frequency within decades due to sea-level rise. *Nature*. Retrieved from <https://www.nature.com/articles/s41598-017-01362-7/figures/1>

# 8.0 APPENDIX A





## Rail Infrastructure Study Defense Against Climate Change

# Outreach Summary Report

November 30, 2020



Page intentionally left blank.

## Table of Contents

<b>I. EXECUTIVE SUMMARY .....</b>	<b>1</b>
A. Outreach Team.....	1
B. Survey Campaign.....	1
C. Key Findings.....	2
<b>II. PUBLIC OUTREACH.....</b>	<b>3</b>
A. Project Working Group Meetings .....	3
B. Outreach Events .....	4
C. Outreach Schedule .....	4
<b>III. TOOLS &amp; RESOURCES .....</b>	<b>5</b>
A. Contact Database .....	5
B. Comment Log & Issues Matrix .....	5
C. Branding .....	5
D. Fact Sheet.....	6
E. Survey Card .....	6
F. Website .....	7
<b>IV. NOTIFICATION EFFORTS .....</b>	<b>7</b>
A. Electronic Communications Tool Kit .....	8
B. Electronic Mail Notifications .....	8
C. Online Media Plan .....	9
D. Social Media Posts.....	9
E. Online Paid Advertisements.....	10
i. Facebook Ads.....	10
ii. Geofencing.....	11
F. OCTA Blog & Other Media.....	12
<b>V. ONLINE SURVEY .....</b>	<b>12</b>
A. Survey Highlights.....	13
B. Survey Results .....	13
i. Travel Habits .....	13
ii. Perceived Challenges.....	16
iii. Improvement Opportunities.....	19
iv. Demographics.....	21
v. Geographic Distribution.....	24

vi. New Contacts.....	24
C. Infographic.....	25
<b>VI. CONCLUSION .....</b>	<b>25</b>

## Tables

<b>Table 1:</b> Key Findings .....	2
<b>Table 2:</b> PWG Meetings .....	4
<b>Table 3:</b> Electronic Mail Distributions.....	8
<b>Table 4:</b> Social Media Posts .....	9
<b>Table 5:</b> Facebook Advertisements .....	10
<b>Table 6:</b> Geofencing Advertisements .....	11
<b>Table 7:</b> Geofencing by Ad Placement.....	12
<b>Table 8:</b> OCTA Blog & Media Notifications .....	12

## Appendix

<b>Appendix A:</b> Project Working Group Meetings.....	27
<b>Appendix B:</b> Media Plan A & B .....	50
<b>Appendix C:</b> Contact Database .....	53
<b>Appendix D:</b> Comment Log & Issues Matrix .....	74
<b>Appendix E:</b> Fact Sheets .....	88
<b>Appendix F:</b> Survey Card .....	99
<b>Appendix G:</b> Tool Kit .....	103
<b>Appendix H:</b> Electronic Mail Notifications .....	106
<b>Appendix I:</b> Online Media Plan .....	111
<b>Appendix J:</b> Social Media Posts .....	117
<b>Appendix K:</b> Facebook Advertisements .....	124
<b>Appendix L:</b> Geofencing Advertisements .....	139
<b>Appendix M:</b> Blogs and Other Media .....	145
<b>Appendix N:</b> Survey .....	154
<b>Appendix O:</b> Zip Code Map .....	216
<b>Appendix P:</b> Infographics .....	219

## I. EXECUTIVE SUMMARY

The Orange County Transportation Authority (OCTA), in partnership with the California Department of Transportation District 12 (Caltrans) District 12, conducted a study about how climate change affects the Orange County (OC) Rail Corridor. The Orange County Rail Infrastructure Study Defense Against Climate Change Plan (study) focused on the rail infrastructure and operations as well as station amenities to establish a proactive approach to deal with changing and extreme climate conditions. The study identified preventative measures that can be used in developing near-term, mid-term and long-term strategies. In addition, through future state and local funding opportunities, the study recommends ways to keep OC rail safe and reliable for the more than 40,000 daily riders and 12 stations in the County.

During the course of the study, OCTA developed and implemented a comprehensive outreach strategy to provide stakeholders with the opportunity to engage. Moreover, the outreach team facilitated working group meetings and a robust survey campaign to reach area agencies and transit users along the corridor and nearby Metrolink stations.

### A. Outreach Team

Arellano Associates (AA) was tasked with leading the stakeholder and public engagement process for this study. AA worked to inform the public about the study, gain insight on how climate change affects passenger travel along the rail corridor, and receive valuable feedback on potential rail station amenity improvements. All outreach efforts were implemented at the direction of OCTA Public Outreach Department.

### B. Survey Campaign

Outreach activities were conducted from Aug. 3, 2020 to Sept. 30, 2020. Due to the COVID-19 pandemic any in-person activities were avoided. The outreach strategy and approach included virtual meetings and a Typeform survey available in both English and Spanish to engage transit corridor riders and gather valuable feedback on the community's perspective on necessary improvements to OC rail stations.

The survey research was qualitative, which means that results cannot be considered representative of the total population of interest. Informal research methods are useful to explore a group's opinions and views, allowing for the collection of verifiable data. This data can reveal information that may warrant further study and is often a cornerstone for generating new ideas.

Survey questions were focused on station amenity improvements and designed to:

- Establish respondent travel habits and use,
- Assess perceived challenges,
- Identify opportunities for improvement,
- Gather respondent demographics,
- Determine respondent geography, and
- Receive new contact information.

The survey was available from August 3 to September 30, 2020, and a total of 1,341 surveys were collected (1,265 English and 76 Spanish).

### C. Key Findings

The following findings were prepared to inform the technical team with recommended improvement alternatives. Based on the information collected, respondents represented a diverse mix of opinions, age, income, ethnicity and geography.

- Nearly half (49%) of respondents wait 15 minutes or less, and 90% wait less than a half hour.
- Respondent travelers are largely (68%) committed to rail travel, regardless of the weather conditions, with another (26%) hesitant to travel in bad weather.
- Survey respondents expressed a significant interest (66%) in riding the train more if station improvements were conducted. An additional 26% were undecided if improvements would increase their likelihood to travel by rail.

The following table summarizes additional key findings.

*Table 1: Key Findings*

Additional Online Survey Findings	#1 Choice	#2 Choice	#3 Choice	#4 Choice
Most traveled stations	Fullerton	Irvine	ARTIC	Santa Ana
How often respondents travel on Metrolink/Amtrak.	Several times per month 57%	1 to 3 days per week 25%	4 or more days per week 18%	
Vehicles are the primary travel option when rail service is interrupted.	Car 51%	Wouldn't travel 20%	Rideshare 15%	Bus 13%

Additional Online Survey Findings	#1 Choice	#2 Choice	#3 Choice	#4 Choice
Respondents top station amenity improvements are:	More shade 79%	More accurate information 58%	More seating 41%	Restrooms 38%
Four of five working age population groups had near or above 20% participation.	45-54 22%	55-64 20%	35-44 20%	25-35 17%
Survey respondents were evenly represented by each income bracket.	\$10k-24,999 21%	\$25k-49,999 17%	\$50k-74,999 15%	\$125k+ 22%

## II. PUBLIC OUTREACH

At the onset of the study, an Outreach Plan was developed to direct the overall outreach approach. In response to the unprecedented situation regarding the COVID-19 pandemic and out of an abundance of caution for public health and safety, a significant change in this strategy was developed in April 2020. This new outreach strategy included the elimination of public in-person pop-up events at the train stations and instead moved toward a safer, virtual online engagement approach and meeting format.

### A. Project Working Group Meetings

A Project Working Group (PWG) was formed in November 2019 and included key stakeholders from within the County to assist in planning for future climate change related mitigation strategies, increase public awareness and help identify effective methods to engage those they represent. The PWG included representatives from transit and regulatory agencies, local jurisdictions and the environmental community. For the full list of PWG members, see Appendix A.



Members provided valuable feedback regarding scenarios presented and collaborated with the Team to assess and categorize hazards that are present along the rail corridor in the County. PWG members were also encouraged to support the outreach process by promoting the survey through their own group and agency networks.

Three (3) PWG meetings took place between November 2019 and September 2020 (see table below). The first meeting was conducted in-person at OCTA Headquarters with subsequent meetings held online due to COVID-19. Summaries and images of each meeting can be found in Appendix A.

*Table 2: PWG Meetings*

No	Date Sent	Time	Format / Location	Members Attended
1	11/21/19	9:00 – 10:30 a.m.	In-person; OCTA Headquarters	16
2	03/25/20	10:00 – 11:30 a.m.	Online; GoToMeeting webinar	26
3	09/30/20	10:00 – 11:30 a.m.	Online; GoToMeeting webinar	25

## B. Outreach Events

The original Outreach Plan’s approach for this study was to conduct two (2) rounds of six (6) Metrolink Station pop-up events along the OC Rail study corridor. The goal of the pop-up events was to share information and gather input from the community via the public survey. In addition to surveying rail riders, the outreach team planned to engage participants at municipal bus stops near the rail station. These outreach events were planned from March to May 2020 for the first round and August to September 2020 for second. Preliminary logistics and planning had already begun prior to the March 2020 Stay At Home order and included the following:

- Metrolink Station Identification and confirmation
- Outreach to corridor cities for surveying and platform approval
- Informational survey card design and translation for rail car and station placement
- Preliminary scheduling of event staffing and promotional item giveaways

## C. Outreach Schedule

Due to the statewide public health shutdown, the outreach schedule and plan was altered in April 2020 to quickly implement the outreach program. The plan heavily relied on the utilization of online advertisements and social media and an additional media plan, which will be further explained in Section IV. The original and updated outreach plans can be found in Appendix B.

### III. TOOLS & RESOURCES

The team utilized a variety of tools to support the public engagement process including a contact database, comment log and an assortment of communication resources.

#### A. Contact Database

A master contact database was created at the beginning of the study and served as a resource for the team to maintain the Project Development Team (PDT) and Project Working Group (PWG) member lists. The database was maintained throughout the study to include new contacts received from the public inquiry sign-up featured on the website or through survey participation. The study received contact information from 1167 interested parties. A copy of this list is available in Appendix C.

#### B. Comment Log & Issues Matrix

To track public inquiries, a comment log was developed and maintained throughout the study. This resource was located in Smartsheet, a collaborative, online project management tool, which allowed for quick input and tracking of public comments collected from social media engagement and surveys. Information recorded in the comment log included the following:

- Stakeholder Name
- Stakeholder Type
- Date Received
- Source
- Issue / Comment
- Category
- Lead
- Follow up Action
- Notes & Contact
- Database
- Location

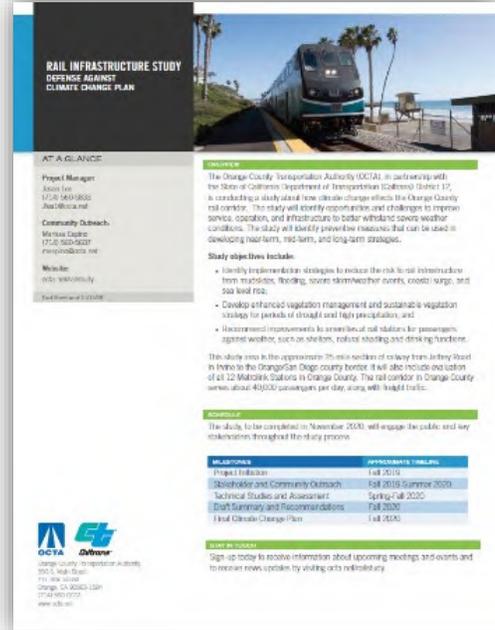
A total of 543 comments were documented in the comment log. Comments received in Spanish were translated and added into the matrix. A copy of the complete log can be found in Appendix D.

#### C. Branding

AA, in coordination with OCTA Public Outreach and Marketing, created representative branding for the study. Branding was used in all marketing efforts, on the study website and in the collateral materials.

## D. Fact Sheet

The main, sharable informational resource for the study was a fact sheet. The two-sided fact sheet included an overview of the study and outlined the study area and objectives. The resource, which was available online, also included a study timeline and offered ways to stay informed. The back of the fact sheet included a full size study area map, outlining the areas of concern along the OC rail tracks from Irvine to San Clemente. To engage the diverse community of OC and the environmental justice population, the fact sheet was translated in five languages, including: English, Spanish, Vietnamese, Chinese and Korean. Each fact sheet can be seen in Appendix E.



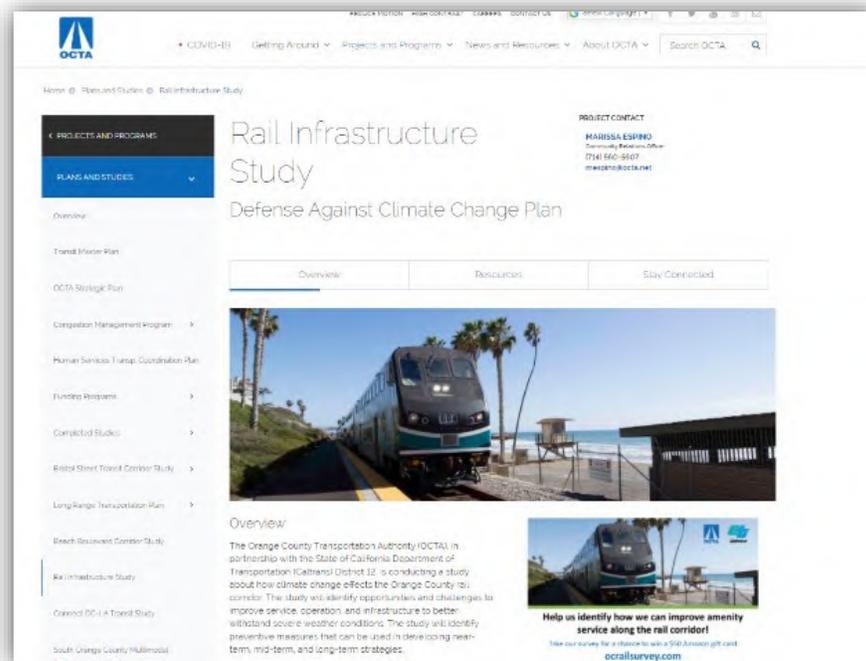
## E. Survey Card

Prior to COVID-19, a postcard-sized promotional survey card was developed. Metrolink was requested to place the survey card on every train seat all over the County. The bilingual (English and Spanish) card contained the survey name and QR code for easy mobile access. It was decided, after the change in outreach tactics and decrease in Metrolink ridership related to COVID-19, to instead post the survey card on the study website. The survey card was then changed to a full page (8.5" x 11") document, with both languages shown on one side. See Appendix F for copies.



## F. Website

A study webpage ([www.octa.net/railstudy](http://www.octa.net/railstudy)) was created by OCTA and used to provide general updates and information to the public. The webpage offered background information, study schedule, and links and details about the online survey. The webpage also featured a sign-up contact form for interested parties to stay connected throughout the duration of the study. The multilingual fact sheet was also posted for public viewing or download. As of November, the study webpage had received 772 views.



## IV. NOTIFICATION EFFORTS

The change in outreach tactics during spring 2020 expanded the online survey electronic noticing focus. Tactics included:

- Sharing an electronic toolkit with cities, agency partners and stakeholders;
- Promoting the survey to Metrolink riders using e-blasts;
- Posting online advertisements,
- Posting on to social media platforms, such as Facebook and Twitter; and
- Offering information in both English and Spanish.

The following is a detailed look at each notification tool.

## A. Electronic Communications Tool Kit

To reach a wider audience, an electronic “tool kit” was created to build the public’s study awareness and to promote the online survey. The tool kit was designed for easy information sharing and included: copy and written language for e-blast, website post, newsletter announcement, event calendar additions and social media post. It was



distributed to PDT and PWG members as well all four of OCTA’s public committees, Caltrans and all Orange County cities. Stakeholders were encouraged to share the online survey with their respective constituencies. As a result of this effort, cities, such as the City of Mission Viejo, posted a survey link on their website. Reference Appendix G to review the tool kit.

## B. Electronic Mail Notifications

Electronic email blasts (e-blast) significantly enhanced the outreach process. On August 11, 2020, OCTA distributed an e-blast to its bus rider stakeholders to announce the online survey. In partnership with Metrolink, a separate e-blast was distributed on August 24, 2020 by Metrolink to its rider community. This combined effort led to the largest increase in survey participation throughout the media campaign. The final e-blast was sent out as a thank you to the stakeholder database, specifically to all those who participated in the survey, along with an announcement to a randomly selected Amazon gift card winner.

Copies of the communications may be found in Appendix H. Details are shown below.

*Table 3: Electronic Mail Distributions*

No	Date Sent	Notice	Sent
1	08/11/20	OCTA Rider Database	19,099
2	08/24/20	Metrolink Rider Database	62,333
3	11/05/20	Study Database: Thank You	1,167
<b>Total</b>			<b>82,599</b>

As a result of electronic notifications and the online Media Plan effort, the local Public Broadcasting Service (PBS) KLCS station interviewed OCTA’s Chief Executive Officer Darrell Johnson at the Irvine Metrolink Station in September 2020. The show is called “Sustaining Us” and will run on KLCS, available in Los Angeles, Orange, Riverside and San Bernardino Counties, later this year.

### C. Online Media Plan

Accompanying this plan was an additional online Media Plan which listed out a schedule of social media and online advertising efforts during the summer months. This comprehensive document contained a schedule of notification platforms, run dates, intended English and Spanish language, copy, and approved graphics, as well as budget allocation for paid advertisements. See Appendix I for a copy of the media plan.

### D. Social Media Posts

To build study awareness and survey participation, an OCTA social media campaign was created. The campaign included four (4) @goOCTA Facebook posts and two (2) @goOCTA Twitter posts distributed over the span of two months. The @goOCTA media pages were communicated in English only (Spanish content was featured in paid advertisements). Social media proved to be a useful engagement tool to reach the study corridor communities. A full list of the social media posts are listed in the table below. Copies of each can be found in Appendix J.

*Table 4: Social Media Posts*

No	Platform	Post Date	Impressions	Clicks	Likes	Shares	Comments
1	Facebook #1	08/05/20	436	7	14	4	0
2	Twitter #1	08/13/20	N/A	N/A	7	3	1
3	Facebook #2	08/18/20	379	9	9	0	3
4	Facebook #3	08/27/20	254	6	5	1	0
5	Twitter #2	09/03/20	N/A	N/A	1	4	0
6	Facebook #4	09/28/20	263	6	6	2	0
Total			1,332	28	42	14	4

## E. Online Paid Advertisements

Considering the in-person outreach limitations brought on by COVID-19, a robust online advertisement campaign was implemented and included paid social media advertisements and geofencing advertisements placed on targeted project corridor desktop, tablet and mobile devices.

### i. Facebook Ads

Seven (7) Facebook paid advertisements, three (3) English and four (4) Spanish, were implemented during the notification campaign. All linked directly to the study survey. When developing the ads, zip codes, language preference and demographics of the Facebook population along the study corridor were utilized to target advertisements. In addition, ad targeting was also defined by individuals who were interested in rail, public transit and commuting to maximize the reach of potential riders. This effort resulted in over 335,000 impressions and nearly 3,000 link clicks (see Table 5). Images of each ad may be viewed in Appendix K.

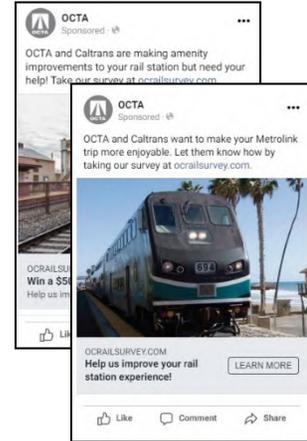


Table 5: Facebook Advertisements

No	Ad Dates	Language	Impressions	Clicks	Likes	Shares	Comments
1	08/03/20 – 08/09/20	English	75,663	528	59	10	19
2	08/03/20 – 08/09/20	Spanish	32,279	238	65	5	6
3	08/18/20 – 08/24/20	English	62,718	558	97	7	15
4	08/18/20 – 08/24/20	Spanish	25,960	237	77	6	0
5	08/31/20 – 09/06/20	English	60,540	553	99	14	15
6	08/31/20 – 09/06/20	Spanish	25,163	298	84	17	14
7	09/14/20 – 09/20/20	Spanish	52,719	546	185	18	28
<b>Total</b>			<b>335,042</b>	<b>2,958</b>	<b>666</b>	<b>77</b>	<b>97</b>

## ii. Geofencing

A geofence is a virtual perimeter for a real-world geographic area. Through the geofencing campaign, the outreach team placed digital ads promoting the survey on websites and online content, reaching the public through desktops, tablets and mobile devices within the set boundaries. The target area for this campaign included all rail stations in OC, along with stations accompanying parking lots and nearby bus stops in an effort to reach the low-income community. In consideration for the change in commuting patterns brought on by the COVID-19 and the Stay At Home order, historical geofencing data from January and February 2020, December 13-21, 2019 and August 24-31, 2020 was targeted and used to reach rail riders who regularly commuted prior to the pandemic and rode during special events in 2019. Six different ad sizes and designs were developed and directly linked to the survey for easy-to-click access.



In total, three (3), two-week campaigns were implemented. Two (2) campaigns were shared in English. The third campaign focused on the Spanish speaking community with accompanying Spanish artwork. Language preference and demographics were used to help identify and place ads to those most likely to participate in the Spanish language survey. This effort along with previously referenced online advertisements to the Spanish speaking community helped to further engage the surrounding Environmental Justice population. Collectively, geofencing campaigns resulted in nearly 329,000 impressions with 533 ad clicks.

Results of this effort can be seen below, in Table 6 and 7. Geofencing graphics and maps of the geofenced stations may be accessed in Appendix L.

*Table 6: Geofencing Advertisements*

No	Campaign Dates	Language	Impressions	Clicks
1	08/10/20 – 08/23/20	English	180,000	209
2	09/14/20 – 09/27/20	English	74,507	102
3	09/14/20 – 09/27/20	Spanish	74,378	222
<b>Total</b>			<b>328,885</b>	<b>533</b>

*Table 7: Geofencing by Ad Placement*

Device Type	Impressions	Clicks
Mobile	225,790	469
Personal Computer	85,752	30
Tablet	17,343	34

## F. OCTA Blog & Other Media

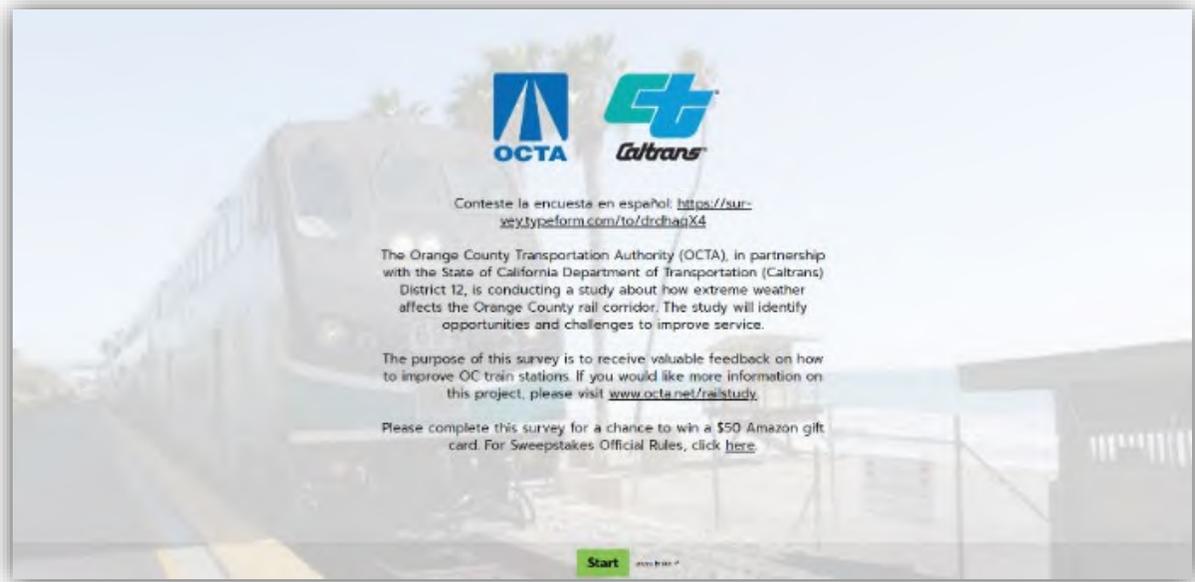
In addition to various e-blasts, OCTA also shared the study and survey information on OCTA’s “On the Move” blog and through a formal press release. Copies of both the blog, and the press release are detailed below and can be found in Appendix M.

*Table 8: OCTA Blog & Media Notifications*

No	OCTA Blog & Media Notice	Date
1	Press Release	08/19/20
2	On the Move Blog Post	08/20/20
3	On the Move Newsletter	08/24/20

## V. ONLINE SURVEY

In order to gain valuable feedback from the corridor community, an online station amenity focused survey was conducted during the study. The purpose of the survey was to gain insight on how extreme weather affects rail travel in the County and to gauge the types of amenity improvements the surrounding community would like to see at their rail stations. The results of the survey will be used to assist cities and partner agencies in making climate change rail station improvements across OC. Full survey details and analysis are available in Appendix N.



## A. Survey Highlights

The development choices and execution of this survey are highlighted as follows:

- The Typeform survey tool was selected for this survey;
- The survey was offered in dual languages (English & Spanish);
- A vanity URL ([www.ocrailsurvey.com](http://www.ocrailsurvey.com)) was created for easy access;
- The survey was available to the public for 59 days;
- 1,341 total surveys were collected during the campaign;
- 1,054 survey respondent shared their contact email and will remain connected; and
- A \$50 Amazon gift card was raffled to increase survey engagement.

## B. Survey Results

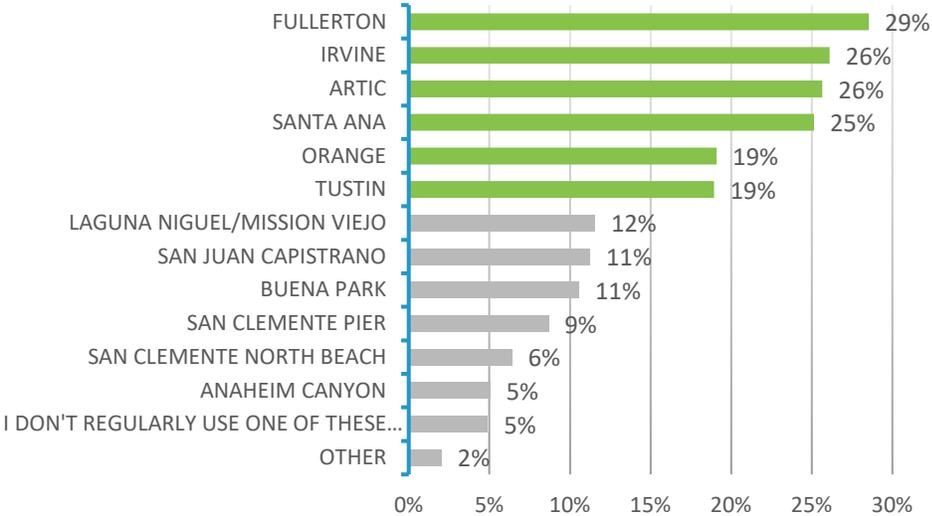
The 13-question survey was developed in online format only, due to limitations of COVID-19. For questions #1 and #6, respondents had the ability to select as many responses as they like, therefore, responses to the questions reflect more than 100%.

### i. Travel Habits

This survey included two (2) questions to gauge the respondent's current travel habits. Questions on use established a baseline perspective for the survey population and helped to determine if survey participation was reflective of existing rail travelers in the OC.

### Which Metrolink/Amtrak stations do you use?

(Choose as many as you like)

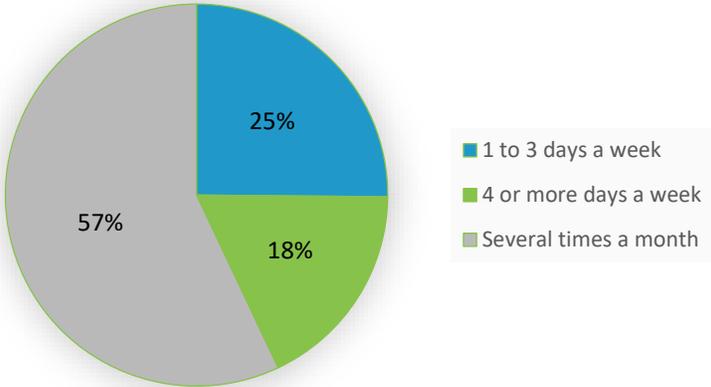


Option	Total*
Fullerton	378
Irvine	346
Anaheim Regional Transportation Intermodal Center (ARTIC)	340
Santa Ana	333
Orange	253
Tustin	251
Laguna Niguel/Mission Viejo	153
San Juan Capistrano	149
Buena Park	140
San Clemente Pier	115
San Clemente North Beach	85
Anaheim Canyon	67
I don't regularly use one of these stations	65
Other	27

Other	Count
Oceanside	5
Riverside	5
Corona	4
Los Angeles (Union Station)	3
Norwalk	2
San Bernardino	2
Palmdale	1
Santa Clarita	1
Blue line	1
OCTA bus	1
On to Stockton	1
I was laid off and no longer commute with Metrolink	1

\*Based upon 1,325 respondents.

### How often do you ride Metrolink/Amtrak?



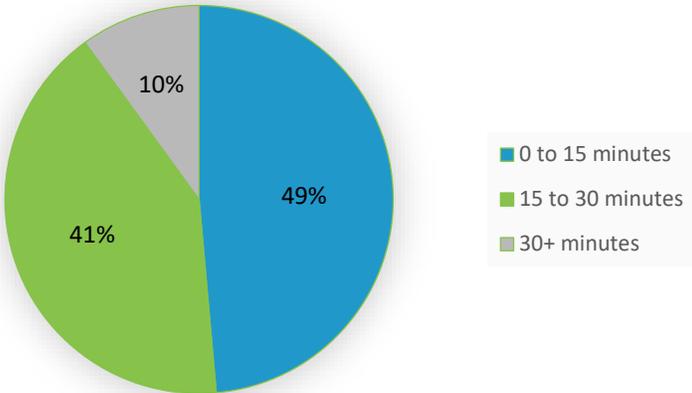
Option	Total*
1 to 3 days a week	317
4 or more days a week	225
Several times a month	719

\* Based upon 1,261 respondents.

ii. Perceived Challenges

Three (3) questions were asked to set a baseline reference of challenges experienced by rail travelers.

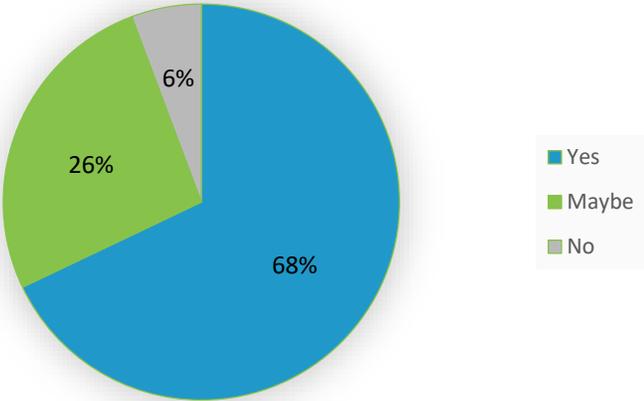
How long do you typically wait at a station?



Option	Total*
0 to 15 minutes	637
15 to 30 minutes	543
30+ minutes	131

\* Based upon 1,311 respondents.

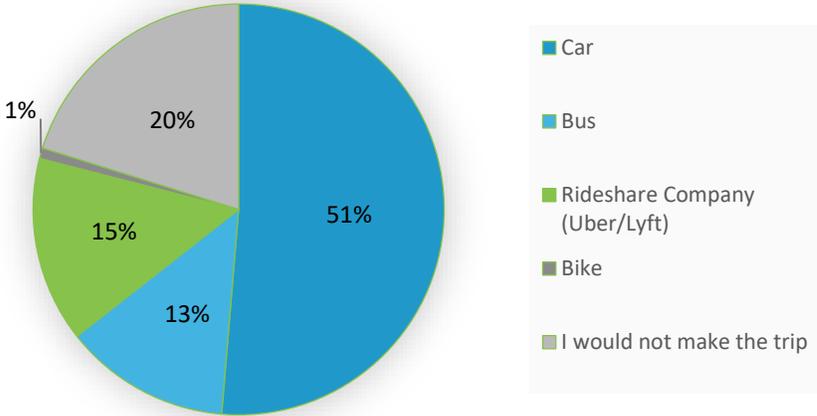
### Would you still ride the train if it was too hot, windy, or rainy?



Option	Total*
Yes	904
Maybe	351
No	76

\* Based upon 1,331 respondents.

### If train service was interrupted due to severe weather, how would you travel instead?



Option	Total*
Car	682
Bus	174
Rideshare	194
Bike	11
I would not make the trip	268

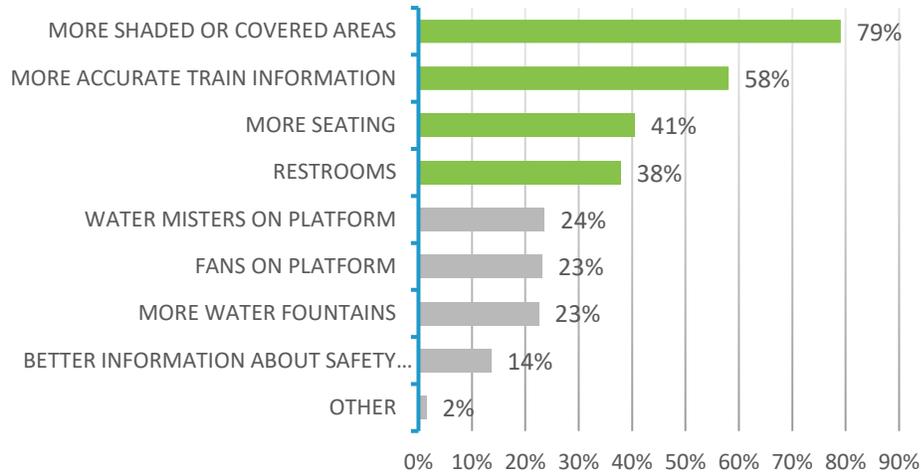
\* Based upon 1,329 respondents.

### iii. Improvement Opportunities

Three (3) questions were asked to identify respondent improvement priorities. The final question was an open-ended inquiry, presented to allow for unrestricted comment.

#### What train station amenities would be most helpful during a very hot, windy, or rainy day?

(Choose as many as you like)

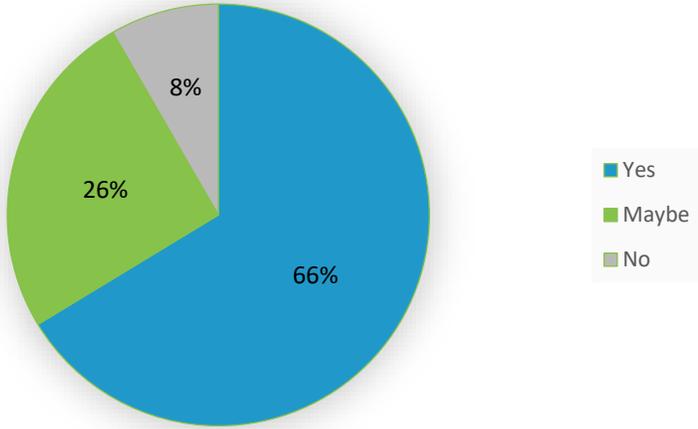


Option	Total*
More shaded or covered areas	1,054
More accurate information about when my train will arrive (so I don't have to wait outside too long)	774
More seating	541
Restrooms	505
Water misters on platform	315
Fans on platform	309
More water fountains	301
Better information about safety precautions from harsh weather	182
Other	20

\* Based upon 1,333 respondents.

Other	Count
Add charging stations for electronics	3
Good/more frequent service without delays	3
Prevent homeless squatters, urination and harassment	3
Better window tinting; no one wants to sit on the sun side.	1
Change Fullerton Station (and others if needed) to load on north side in the morning and south side in the evening; no track three loading.	1
Add a cafe at the Santa Fe Station to hangout	1
Free Wifi	1
Make ticket machines easier to read on sunny days	1
Offer annual pass to minimize ticket buying process	1
Offer food/drinks	1
Chilled, filtered water dispenser	1
Pick-up service	1
Seldom use the train	1
Nothing, I arrive a few minutes before train arrival	1
Cancel trains; ridesharing is more practical	1
Won't ride until there is a vaccine for COVID	1

### Would you consider riding the train more if there were added station improvements?



Option	Total*
Yes	884
Maybe	338
No	111

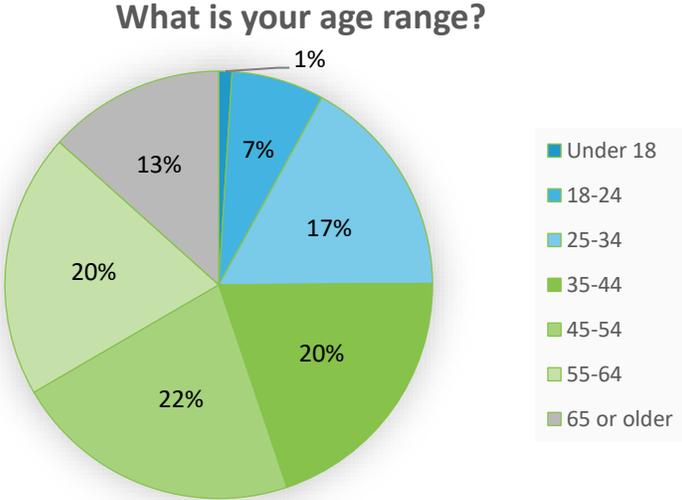
\* Based upon 1,333 respondents.

### Other comments related to station amenities.

A total of 512 comments were collected from survey respondents. All comments have been included and categorized in the study's Comment Log and Issues Matrix along with all comments received from the social media, website comment form, email, mail and other forms of public input. To review comments, see Appendix D.

iv. Demographics

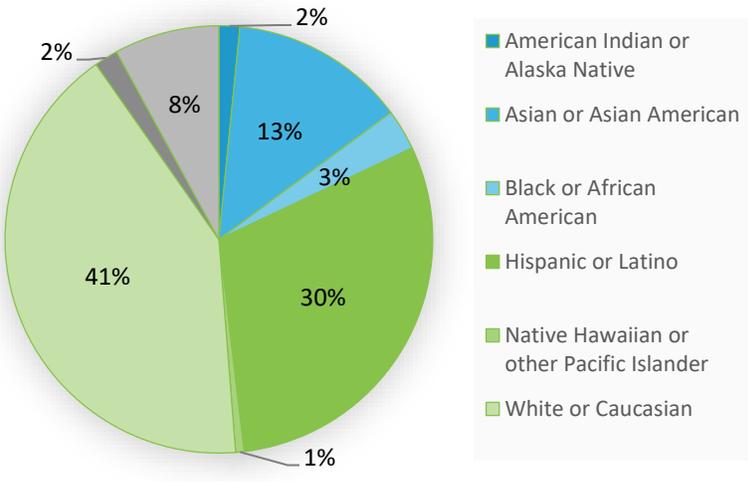
Three (3) questions were chosen for this survey to determine the age, ethnicity and income.



Option	Total*
Under 18	6
18-24	101
25-34	221
35-44	261
45-54	285
55-64	262
65 or older	175

\* Based upon 1,311 respondents.

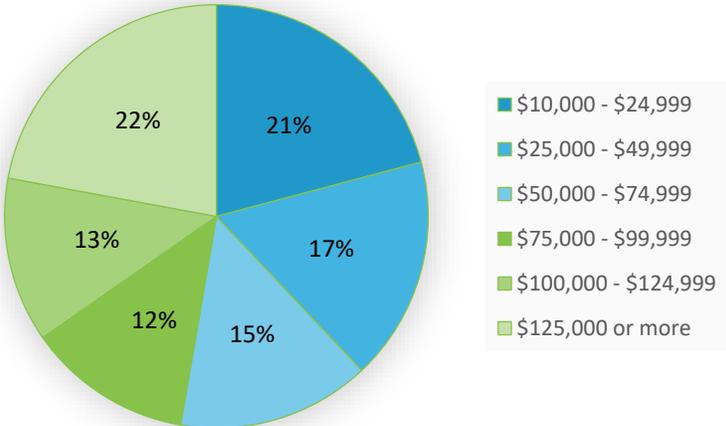
### What race/ethnicity best describes you?



Option	Total*
American Indian or Alaskan Native	22
Asian or Asian American	186
Black or African American	43
Hispanic or Latino	421
Native Hawaiian or other Pacific Islander	9
White or Caucasian	580
Another race	25
Prefer not to say	111

\* Based upon 1,397 respondents.

### What is your annual household income?



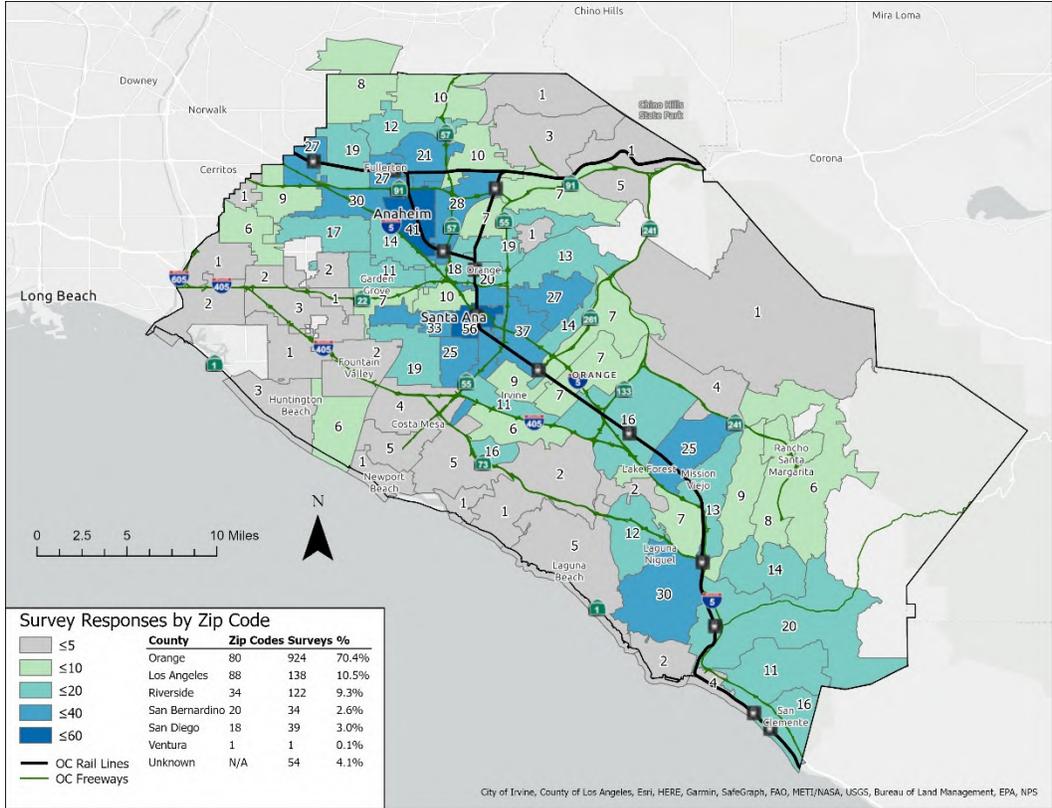
Option	Total*
\$10,000 - \$24,999	255
\$25,000 - \$49,999	209
\$50,000 - \$74,999	180
\$75,000 - \$99,999	154
\$100,000 - \$124,999	154
\$125,000 or more	270
\$10,000 - \$24,999	255

\* Based upon 1,222 respondents.

v. Geographic Distribution

What zip code do you live in?

The majority of respondents shared their home zip code (96%, 1,287), with more than 70% of them residing in OC. Survey participants also recorded in adjacent counties as well, including Ventura, Los Angeles, Riverside, San Bernardino and San Diego Counties. The respondent distribution map (below) indicated the level of participation by county zip code totals. A larger version of the map and a table of respondent participation by city zip code can be found in the Appendix O.

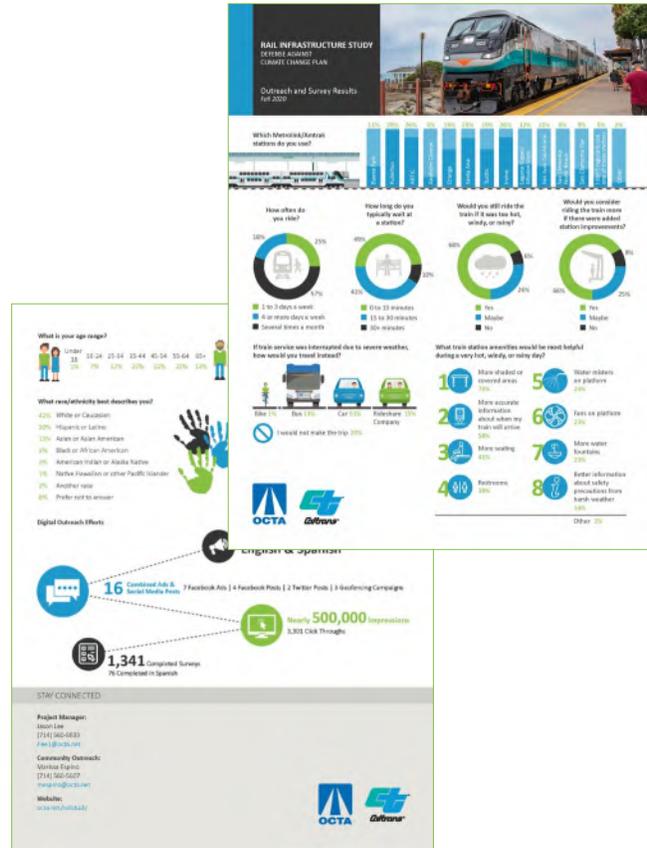


vi. New Contacts

A total of 1,054 respondent emails were collected during the survey. These interested parties have been added to the study’s stakeholder database (Appendix C) and will receive future notifications as the study moves forward.

### C. Infographic

Following the close of the online survey, an infographic sheet was prepared to visually highlight the success of the outreach efforts used to engage the public in addition to the communal response to the survey. These graphic results were posted to the study website for interested parties to view, share or download. The infographic was also shared directly in a thank you e-blast sent to participant stakeholders and other key stakeholders included in the study database. The double-sided, 8.5" x 11" infographic sheet was prepared in two languages (English and Spanish). Refer to Appendix P for a copy of the infographic.



## VI. CONCLUSION

The survey findings represent a varied mix of respondent age, ethnicity and economic status of the diverse population of rail transit ridership. The findings indicate rail travelers desire greater assurance and consistency from their rail service, which could result in their increased use of travel by rail. Findings from this survey, along with the work from the technical studies, will be considered in future rail planning.

# APPENDIX

# Appendix A

---

## *Project Working Group*

[Project Working Group Roster](#)  
[Project Working Group #1 Summary](#)  
[Project Working Group #2 Summary](#)  
[Project Working Group #3 Summary](#)

**OCTA Rail Infrastructure Study  
Project Working Group**

#	Agency/Organization	Contact Name	Title
1	California Coastal Commission	Zach Rehm	Senior Transportation Program Analyst
2	California State Parks Orange Coast District	Riley Pratt, Ph.D.	Senior Environmental Scientist
3	California State Parks Orange Coast District	Richard M. Haydon #81, SPSIII	South Sector Superintendent
4	City of Anaheim	Chris Zapata	City Manager
5	City of Anaheim	Rudy Emami	Public Works Director
6	City of Buena Park	James B. Vanderpool	City Manager
7	City of Buena Park	Nabil Henein	Public Works Director/City Engineer
8	City of Fullerton	Ken Domer	City Manager
9	City of Fullerton	Meg McWade	Public Works Director
10	City of Irvine	John Russo	City Manager
11	City of Irvine	Mark Steuer	Public Works Director
12	City of Irvine	Mike Davis	Assistant Director, Transportation
13	City of Irvine	Jaimee Bourgeois	Deputy Director of Transportation / City Traffic Engineer
14	City of Laguna Niguel	Kathy Nguyen	Engineering Services Manager
15	City of Laguna Niguel	Tamara S. Leourneau	City Manager
16	City of Laguna Niguel	Jacki Scott	Public Works Director
17	City of Laguna Niguel	Hal Ghafari	Environmental Programs Supervisor
18	City of Mission Viejo	Dennis Wilberg	City Manager
19	City of Mission Viejo	Mark Chagnon	Public Works Director
20	City of Mission Viejo	Brett Canedy	Transportation Analyst
21	City of Orange	Rick Otto	City Manager
22	City of Orange	Chris Cash	Public Works Director
23	City of San Clemente	Tom Bonigut	Public Works Director
24	City of San Clemente	Erik Sund	Assistant City Manager

25	City of San Clemente	Cecilia Gallardo-Daly	Community Development Director
26	City of San Clemente (SUMMIT)	Leslea Meyerhoff	Principal
27	City of San Juan Capistrano	George Alvarez	City Engineer
28	City of San Juan Capistrano	Ben Siegel	City Manager
29	City of San Juan Capistrano	Steve May	Public Works Director
30	City of Santa Ana	Kristine Ridge	City Manager
31	City of Santa Ana	Nabil Saba	Interim Public Works Director
32	City of Santa Ana	Taig Wiggins	Principal Engineer
33	City of Tustin	Matthew S. West	City Manager
34	City of Tustin	Doug Stack	Public Works Director
35	County of Orange	May Doung	
36	County of Orange	Frank Kim	County Executive Officer
37	County of Orange	Shane Silsby	Director of Public Works
38	Friends of Harbors, Beaches and Parks	Melanie Schlotterbeck	Green Vision Project Coordinator
39	OC Flood/OC Public Works	Nardy Khan	Deputy Director, OC Infrastructure Programs
40	OC Public Works	Regina Hu	Manager Infrastructure Programs
41	OC Public Works	Tim Nguyen	Senior Civil Engineer
42	Orange County OC Parks	Susan Brodeur	Senior Coastal Engineer
43	Orange County OC Parks	Jennifer Jung	Project Manager
44	SANDAG	Kim Smith	Senior Environmental Planner
45	U.S. Army Corps of Engineers (USACE)	Damien A. Lariviere	Project Manager
46	U.S. Army Corps of Engineers (USACE)	Jonathan Guerrero	Study Manager
47	U.S. Army Corps of Engineers (USACE)	Susie Ming	Project Manager
48	U.S. Army Corps of Engineers (USACE)	Heather Schlosser	Lead Planner
49	U.S. Marine Corps (USMC)	Dr. Jeffery Paull	Deputy Regional Director
50	U.S. Marine Corps (USMC)	Col. Sam Jammal	MCB Camp Pendleton Chief of Staff

<b>51</b>	Caltrans	Luisa Easter	Associate Transportation Planner
<b>52</b>	Caltrans	Alyssa Murakami	Transportation Planner
<b>53</b>	Caltrans	Julie Lugaro	Associate Environmental Planner
<b>54</b>	Caltrans	Scott Shelley	Branch Chief LD-IGR/Regional/Transit
<b>55</b>	Caltrans	Marlon Regisford	Branch Chief – Policy & Technical Planning
<b>56</b>	SCRRA (Metrolink)	Katy Thorpe	Railroad Civil Engineer II

# Public Working Group Meeting Summary

OCTA Headquarters

November 21, 2019 | 9:00 - 10:30 a.m.

## ACTION ITEMS:

Item #	Description	Responsible Party	Due Date
1.	Send the presentation to attendees.	OCTA	11/27/2019
2.	Add new PWG contacts from member recommendations (Native tribes, CBOs, US Army Corps of Engineers)	OCTA/AA	12/18/2019
3.	Materials sent to members for review before PWG #2	OCTA/WSP	Week before PWG #2

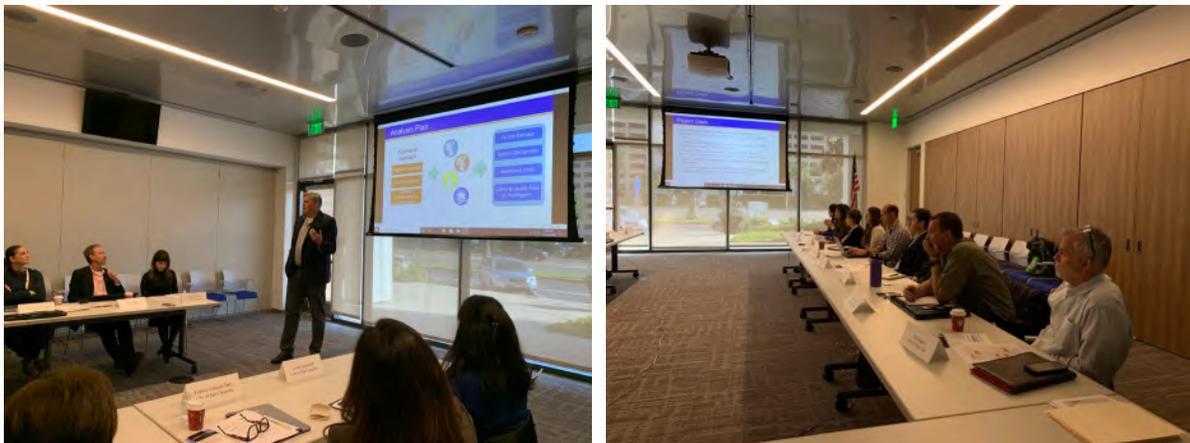
## ATTENDANCE:

See attached list, below.

## DISCUSSION:

### 1. Welcome and Introductions

The Public Working Group (PWG) meeting began with Mr. Jason Lee, OCTA Project Manager, welcoming all in attendance and sharing the purpose of the meeting. The purpose of this meeting was to provide a breakdown of the project's schedule and end goals, provide visuals of the study area and climate affected regions, show how the public will be involved, obtain feedback on the plan in place.



### 2. Project Goals and Background

Mr. Tim Grose, Project Manager with WSP, led the project background. Mr. Grose prepared the group by touching on the selected Orange County stations and the issue areas that would be

## Public Working Group Meeting Summary

covered. Ms. Lauren German, Deputy Project Manager with WSP, then highlighted the corridor and emphasized ownership by OCTA, Metrolink, Amtrak, and BNSF.

### 3. Project Workplan

After the visuals were broken down, Ms. German then touched on how the team will implement the plan. This will be done with a timeline of one year and broken down into four tasks. The first task is the coordination and administration management. Task two covers public and stakeholder participation, led by Stacey Falcioni, Outreach Manager at Arellano Associates. Task three was explained as the bulk of the technical work through the Assessment and Prioritization. Task four will consist of building out the final deliverable Report.

### 4. Public and Stakeholder Participation Plan

Ms. Marissa Espino, OCTA Community Outreach Project Manager, followed Ms. German's workplan overview by thanking attendees for participating then allowed Ms. Stacey Falcioni to proceed. Ms. Falcioni elaborated on the Outreach Workplan and talked about the pop-up event target timeline, which will take place next year. Attendees were also asked to send any additional contacts for the stakeholder or public working group database so that they can also be included in the next public working group.

She then covered the details of the collateral material and the PWG only map. Ms. Falcioni went on to explain that the purpose of hosting pop-ups events versus community workshops is to engage the public where they are in order to gather valuable feedback. She further explained the reason for having targeted pop-up events specifically at transportation centers was to target the EJ communities and public transit riders.

### 5. Assessment and Prioritization

Mr. Grose went into the background of what hazards are present to the rail corridor in Orange County. He reviewed tables and charts that laid how there is expected to a sizeable increase in the number of days the population will experience days of 95 degrees or more, by the year 2100. There is also much uncertainty when it comes to precipitation. Mr. Grose pointed out that most of the infrastructure is currently built with the assumption that climate conditions will stay the same. Along the coast are a complex set of dependencies with the the beach, the buildings between the beach and the rail, the rail infrastructure, the bluffs behind the rail, and the buildings atop the bluffs. Attendees were asked to be called on when OCTA might need assistance with this type of coordination. The City of San Clemente has already completed a Sea-Level Rise Accessibility Assessment which has helped point toward specific highly vulnerable areas. Mr. Grose also summarized what the technical team will be looking at with the chart below:

## Public Working Group Meeting Summary

### Asset Types and Hazards of Focus

	Coastal Flooding	Inland Flooding	Slope Failure	High Heat	Wildfire
Rail, Ballast, etc.	X	X	X	X (rail buckling)	X (service disruption)
Bridges	X	X	X		
Culverts	X	X	X		X (debris blockage)
Station Infrastructure	X	X	X		
Station Amenities				X (passenger comfort/health)	
Electrically-Powered Equipment	(to be assessed with Rail)	(to be assessed with Rail)	(to be assessed with Rail)	X (electricity outages)	X (electricity outages)
Other Equipment	(to be assessed with Rail)	(to be assessed with Rail)	(to be assessed with Rail)		(to be assessed with Rail)

The rows show the different components of the rail system to be analyzed, the columns are the different hazards that will be reviewed, and the squares in blue are what will be prioritized. (Regarding the public participation portion of the overall study, the main ask from the public will be in relation to station amenities and passenger comfort.)

The methodology is currently in the process of being finalized. The next steps are to look at climate projections across the system in Orange County and then review to find the most exposed areas. After will come a more detailed rendering with projected facilities and service amenities. There will be a lifecycle cost analysis of adaptation options and a no-build analysis which will be helpful for evaluating decisions. Once facility-level assessments are complete there will be a set of recommendations, including timing.

Mike Flood, National Resiliency Lead from WSP, then touched on climate change regarding the Analysis Plan. He explained the need to change perspective when it comes to decisions, long-term system effects and acceptance of risks for this project study. He described the Federal Highway Administration Adaptation Decision-Making Assessment process that will be applied for this project. That process includes analyzing multiple climate scenarios, the full consequences of damage or disruption, and cost effectiveness.

#### 6. PWG Comments/Questions:

From the Q&A Session forward, PWG members provided their feedback on the plan and activity presented. Comments and questions presented, and their responses have been categorized and summated below.

- Comment: (California State Parks Orange Coast District) Impacts should be separated out, wave events, tidal changes and sea level rise which is a long-term inundation question that needs to be resolved.
- Question: (Alyssa Murakami, Caltrans) For those that cannot take the digital survey, will print be offered?
- Comment: (Stacey Falcioni) Yes, printed surveys will be an option.
- Question: (Riley Pratt, OC Parks) – Will you go to the public?
- Comment: (Tim Grose) – For the station amenities questions, yes. For the ROW adaptations (which are more conceptual and technical at this point), alternatives would be brought to the public after this study.
- Question: (Rudy Emami, Anaheim) – Outreach seems to be rider focused, how will you cater to climate change and amenities?

## Public Working Group Meeting Summary

- Response: (Tim Grose/OCTA) - The focus of the outreach is more related to station infrastructure; the study is highly technical, public outreach is required, so we will involve others. If any portion fails, we will not have customer service.
- Question: (Leslea Meyerhoff, City of San Clemente) - Are we coordinating with Camp Pendleton or owners in San Diego County?
  - Response: (Lauren German) – We could involve them, if you have point of contacts that would be helpful.
  - Question: What are you most concerned about when considering climate change?
  - Comment: (Mike Davis, City of Irvine) – Employees that come in by rail every day. What effects would it have if the rails were taken out? What does it mean for traffic and daily life for those employees?
  - Comment: San Clemente – Leslea Meyerhoff, San Clemente) – Referenced San Clemente grant received.
  - Comment: (California State Parks) Assessment considers assets and values, going to involve tradeoffs (Natural resource, parks and protection).
  - Comment: (Susan Brodeur, OC Parks) Capistrano Beach – assessment method underway. Getting feedback from the Beach folks. Options discussed include:
    - Protect (strong support for this) by coming up with options on how to maintain
    - Retreat and adapt
    - Partnership Opportunities by working collaboratively to protect the shoreline. San Clemente is already a partner.
  - Comment: (California State Parks) A regional, larger problem is going to take collective thought to come to agreements on this.
  - Question: (OCTA to San Clemente) Any lessons learned from your recent bluff landslide experience?
  - Response: (San Clemente) Privately owned, very close to Metrolink tracks, the trail is currently close and now we are now trying to clear out the dirt and debris.
  - Comment: (Katy Thorpe, Metrolink) has images of the recent landslide and flooding.
  - Comment: (Susan Brodeur, OC Parks) It will be important to get the involved. Contacts to include next round include Suzy Maine and Heather Slosser from LA District.
  - Comment: (San Clemente) Establishing baseline environmental conditions is important and a 50-year project of beach nourishment.
  - Comment: (Caltrans) District 12 doing vulnerability assessment now.
  - Comment: What is the Federal Government’s role?
  - Response: (Project Team) OCTA owns the railroad right of way.
  - Comment: What is the SCRRA on the Map referencing?
  - Response: (Project Team) SCRRA is Metrolink – Southern California Regional Rail Authority
  - Comment: (City of Laguna Niguel) Will there be outreach to local agencies in advance of any public outreach to ensure fuller participation?
  - Response: (OCTA) Yes, we will coordinate with the cities beforehand.
  - Comment: (California State Parks) At some point we need a “no-return” type of solution for climate change problems, not just short-term action that paves over.

*Public Working Group Meeting Summary*



## Public Working Group Meeting Summary

### ATTENDEES

PWG Member	Organization
Julie Lugaro	Caltrans
Sofia Perez	OCTA
Katy Thorpe	Metrolink
Jacki Scott	City of Laguna Niguel
Rudy Emami	City of Anaheim
Leslea Meyerhoff	City of San Clemente
Cecilia Gallardo-Daly	City of San Clemente
Taig Higgins	City of Santa Ana
Zach Rehm	California Coastal Commission
Kathy Nguyen	City of Laguna Niguel
Alyssa Murakami	Caltrans
Brett Canedy	City of Mission Viejo
Riley Pratt	State Parks
Mike Davis	City of Irvine
Salvador Munoz	OCTA
Susan Brodeur	Orange County OC Parks

Project Team Member	Organization
Jason Lee	OCTA
Marissa Espino	OCTA
Tim Grose	WSP
Mike Flood	WSP
Lauren German	WSP
Stacey Falcioni	AA
Yarely Ortiz	AA

# Public Working Group Meeting Summary

Go to Meeting Webinar

March 25, 2020 | 10:00 - 11:30 a.m.

## ACTION ITEMS:

Item #	Description	Responsible Party	Due Date
1.	Send the meeting recording to attendees	OCTA	3/30/20
2.	Send follow-up questions to PWG members	OCTA	3/30/20

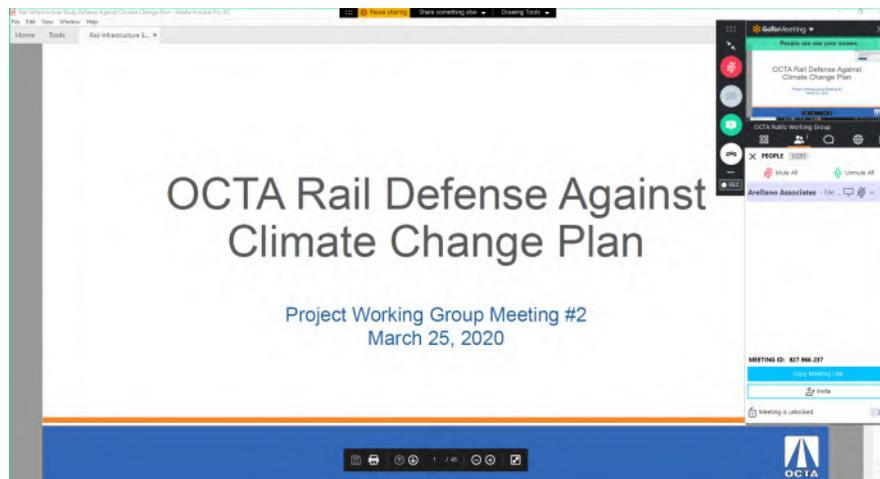
## ATTENDANCE:

See attached list, below.

## DISCUSSION:

### 1. Welcome & Introductions

The Public Working Group (PWG) meeting began with Jason Lee, OCTA Project Manager, greeting all and Tim Grose, Project Manager with WSP, proceeding with his welcome to all in attendance. Stephanie Espinoza, Project Coordinator at Arellano Associates, asked participants to mute their microphones when not speaking, to sign-in to the meeting via a Google Document link posted in the chat feature and to verbally ask questions when prompted or to manually type questions into the chat feature. She then read off the list of participants, including those only on the phone, before the presentation began.



## Project Goals and Status Update



## Public Working Group Meeting Summary

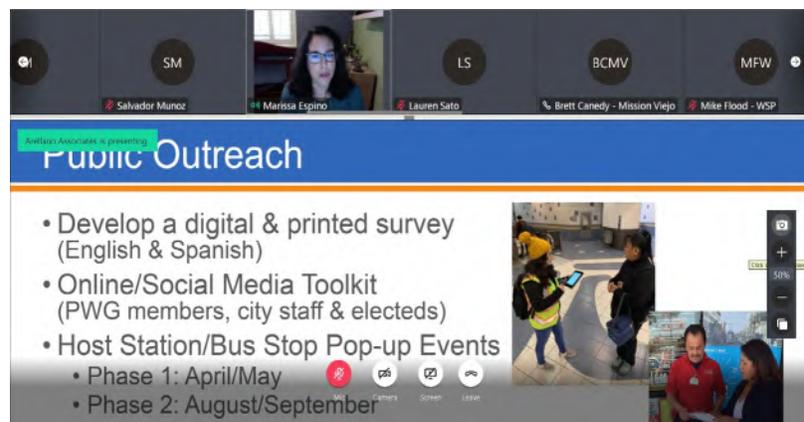
The purpose of this meeting was to review findings to-date, provide recommendations on the best ways to evaluate adaptation options and provide an update on public outreach in light of the current COVID-19 pandemic. Tim Grose gave an overview of the project background and reminded the PWG members of the project study area and timeline. Marissa Espino, OCTA Community Outreach Project Manager, continued the presentation by thanking attendees for amidst the current health crisis. Marissa also discussed the importance of the members' participation to the study and encouraged participation for the third and final PWG scheduled for fall 2020. At the third PWG, it is expected the project team will share evaluation findings, priorities, and implementation strategies.

### 2. Public Outreach

Marissa spoke on the current public outreach strategy and the affect the COVID-19 pandemic is taking on planned public outreach efforts.

Current outreach efforts being developed by the project team include the development of a digital survey in English and Spanish in order to gather valuable feedback. This approach would be bolstered by creating an online/social media toolkit for stakeholders, city staff and elected offices to encourage survey participation.

Public comments would be gathered through the survey, comment cards collected and through the project email.



Due to the current pandemic, Marissa explained there is uncertainty if the station and bus pop-up events would still occur as planned. The first phase of events were originally scheduled for the end of April through May while the second Phase is scheduled for August and September. Marissa told the PWG members the project team will continue to monitor how the pandemic will affect outreach as the team devises a plan to connect with the public through online engagement tools.

### 3. Right-of-Way (ROW) Field Assessment Findings

Tim Grose went into the process of how the project team selected areas for investigation. This was initially done through review of relevant reports, maps, data, and guidance provided in the RFP. The project team went on to conduct field assessment of the ROW with Metrolink in December and continued other field assessments of areas outside of the ROW on other days. Tim then shared the features and issues of five separate areas along the ROW.

### 4. Station Amenity Findings

## Public Working Group Meeting Summary

Tim continued the presentation by discussing the purpose of the station amenities inventory. Tim shared there was a variation in amenities among stations and showed examples of each including shade structures, vegetation, station houses and water fountains.

### 5. Systemwide Exposure Scan

Following the review of current amenities, Tim explained the objective of the systemwide exposure scan was to view the climate projections in the entire area for different climate hazards. Climate hazards included flooding, slope failure, heat waves, wildfire, and drought.

- Question: Tim Nguyen (County of Orange) Does anyone know the position of the Coastal Commission on the issue of sea level rise is? Is it to retreat?
- Response: Zachary Rehm (Coastal Commission) There is a guidance document for public infrastructure. Retreat is one of many strategies that should be considered.

### 6. Draft Detailed Assessments

The draft detailed assessments showed the group where the project is heading. During this stage, the project team is devising different adaptation options and costs. One of the goals is to determine which actions need to be prioritized. Currently, the project team is finalizing the selection of the detailed assessments. Tim emphasized the need for comments and input from the PWG on the higher priority assessments. He showed the High, Medium and Low Priority Assessments and opened the meeting for discussion on adaptation options, benefits, drawbacks and other considerations. Comments regarding the High Priority Assessments are summated below:

- Question: Melanie Schlotterbeck (Friends of Harbors, Beaches and Parks) What is the timeframe for this? If it is short term, there may be different options, than long-term strategies.
- Response: The study is looking at both short-term and long-term solutions and strategies.
- Comment: Susan Brodeur (OC Parks) You should participate as a stakeholder in a Regional Sediment Restoration Project. We are working on initiating a committee to look at long term regional strategy with County, Cities, State Parks, CCC, ACOE, etc.
- Response: Jason Lee (OCTA) OCTA will coordinate with the regional effort. This study is primarily focused on actions that can be taken within the rail right-of-way. Strategies should be thought of as coordinated among agencies and communities.
- Comment: Leslea Meyerhoff (City of San Clemente): San Clemente Supports a regional approach to addressing the effects of SLR along coastline.
- Comment: Jennifer Jung (OC Parks) OC Parks supports regional approach as well.
- Comment: Riley Pratt (State Parks) Agreed, but effort of coordination hasn't gone past phone conversations. Large scale regional problems should have large scale regional solutions that fits the needs of the problems.
- Comment: Jennifer Jung (OC Parks) We also have City of Dana Point on board to start a Reginal Collaboration Group.

## Public Working Group Meeting Summary

- Comment: Mike Flood (WSP): A Regional Collaboration Group sounds like a great idea. This can be a forum to start the collection of collaborative ideas. People can send their ideas to the project team to see what long term vision might look like.
- Question: Jason Lee (OCTA): Could this be a county-led effort to gather all of the interested stakeholders?
- Comment: Jennifer Jung (OC Parks) Should this Regional Collaboration Group be a part of this OCTA Rail Study or a separate group that would participate in the OCTA Rail Study, as well as other studies, grants?
- Response: Jason Lee (OCTA) This study is focused on rail specifically, so it should be a different group leading this with more of a broad scope.
- Comment: Jennifer Jung (OC Parks) Yes, I agree. I would be happy to start a communication for this group. If people would like to send me their contact information.
- Comment: Meg McWade (City of Fullerton): I agree an ongoing Regional Group/Approach makes sense.
- Comment: Luisa Easter (Caltrans) I agree with Jason Lee that this effort is specific to rail, but I like hearing that other agencies are interested in continuing this effort at a broader scale. Caltrans will share any info on grants available to support these efforts.
- Comment: Marlin Regisford (Caltrans) Adaptation planning grant is expired, but the spirit of the grant program has been rolled over to the sustainable transportation grant program and is looking for projects that meet these needs. Recommends looking at this program for further funding and development of projects.
  
- Question: Melanie Schlotterbeck (Friends of Harbors, Beaches and Parks) Can you pose these questions in a google form and allow us time to think about it and add them over the next week?
- Response: Yes, we can send it out with the follow up email.
  
- Comment: Brett Kennedy (City of Mission Viejo) The city engineering staff should be involved to look at the erosion issues.
- Response: We will follow up.
  
- Comment: Melanie Schlotterbeck (Friends of Harbors, Beaches and Parks) I would look at how to incorporate shaded spaces for handicap visitors. Also, what vegetation can be added for cooling effect.
  
- Comment: Melanie Schlotterbeck (Friends of Harbors, Beaches and Parks) I would re-look at the wildfire risk along the 91 freeway in Anaheim Hills/Yorba Linda. I can send Marissa details on a wildfire study we completed. That is the most dangerous area in that geography. More fires start there than any other roadway in that territory.
- Response: We can look at that area more closely, though the study area is from Jeffrey Rd. in Irvine south to county border.
  
- Comment: Mike Davis (City of Irvine) If you need input from City of Irvine engineers regarding areas in Irvine, let me know.

## *Public Working Group Meeting Summary*

### **7. Next Steps**

Following the Q&A session, Tim Grose again mentioned the shifting outreach schedule. He concluded by reminding the group that the next PWG is slated for the fall.



## Public Working Group Meeting Summary

### ATTENDEES

PWG Member	Organization
Riley Pratt	California State Parks
Alyssa Murakami	Caltrans District 12
Luisa Easter	Caltrans District 12
Marlon Regisford	Caltrans District 12
Scott Shelley	Caltrans District 12
Meg McWade	City of Fullerton
Mike Davis	City of Irvine
Hal Ghafari	City of Laguna Niguel
Kathy Nguyen	City of Laguna Niguel
Brent Canedy	City of Mission Viejo
Leslea Meyerhoff	City of San Clemente
George Alvarez	City of San Juan Capistrano
Zach Rehm	Coastal Commission
May Duong	County of Orange
Tim Nguyen	County of Orange
Susan Broadeur	County of Orange
Melanie Schlotterbeck	Friends of Harbors, Beaches and Parks
Jennifer Jung	OC Parks
Regina Hu	OC Public Works
Sofia Perez	OCTA
Huey Yann Ooi	OCTA
Salvador Munoz	OCTA
Dinah Minter	OCTA
Lauren Sato	OCTA
Christina Byrne	OCTA
Katy Thorpe	Southern California Regional Rail Authority

## Public Working Group Meeting Summary

Project Team Member	Organization
Jason Lee	OCTA
Marissa Espino	OCTA
Tim Grose	WSP
Mike Flood	WSP
Lauren German	WSP
Stacey Falcioni	AA
Stevie Espinoza	AA
Danielle Rodriguez	AA



# Public Working Group Meeting Summary

Go to Meeting Webinar

September 30, 2020 | 10:00 - 11:30 a.m.

## ACTION ITEMS:

Item #	Description	Responsible Party	Due Date
1.	Send meeting recording to attendees	OCTA	10/1/20
2.	Send draft study report to group	OCTA	end of study
3.	Send out set of slides for longer-term stations	WSP	end of study

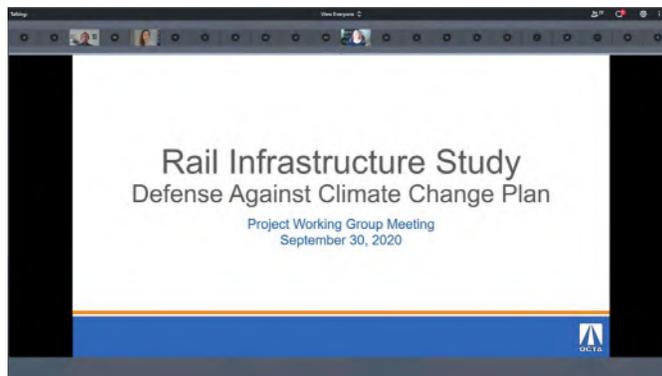
## ATTENDANCE:

See attached list, below.

## DISCUSSION:

### 1. Welcome & Introductions

The Public Working Group (PWG) meeting began with Tim Grose, Project Manager with WSP, welcoming all members to the meeting. Stephanie Espinoza, Project Coordinator at Arellano Associates, asked participants to sign-in to the meeting via a Google Document link posted in the chat feature, mute their microphones when not speaking and to verbally ask questions when prompted or to manually type questions into the chat feature.



### 2. Project Goals and Status Update

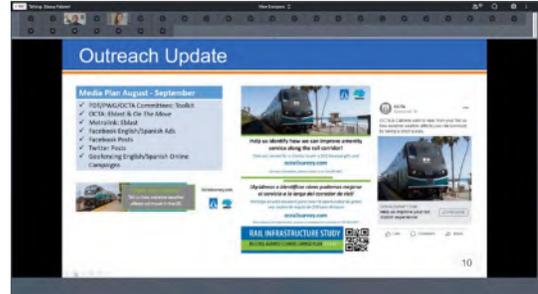
The purpose of this third and final PWG meeting was to provide project updates to the group and to gather input on adaptation options that were being presented. Tim Grose began the presentation by reminding the group of the project background, study area and timeline. He thanked the members for their continued involvement over the last year.

### 3. Public Outreach



## Public Working Group Meeting Summary

Stacey Falcioni, Project Manager at Arellano Associates, spoke on the change in public outreach strategy resulting from the in-person limitations brought on by COVID-19. She went on to explain that a fully devised online media campaign was created and implemented to promote participation for engagement and the community survey. Stacey explained that the multilingual media strategy included social media posts, social media advertisements, and online advertisements. She mentioned the utilization of the outreach toolkit and thanked those that were able to share information on behalf of the study. She showed draft results of the online media campaign and shared the number of completed surveys collected, to-date. Stacey told the PWG that the campaign was successful despite the cancellation of in-person events. A city representative asked if the Project Team could share survey results and Stacey remarked that the results of the survey would be shared at the conclusion of the study.



#### 4. Study Finding/Update

Tim Grose continued the presentation by reviewing areas under analysis, the methodology for creating adaptation options, the adaptation options, findings overview, and the preliminary recommendations. Tim then asked the group for their feedback on the Coastal Analysis Area, Mission Viejo Trench/Extended Oso Creek Tributary, and Passenger Weather Exposure at Stations recommendations. Comments regarding the recommendations are summated below.

#### **Coastal Analysis Area Recommendations**

Riley Pratt, OC Parks

- Q: Can you elaborate on the criteria used on when an intervention was necessary? You highlighted a few locations that would be more vulnerable. Were you looking at the annual event or the 50-year event? I'm trying to get a sense of what you we are planning for. Frequent level of change or worst-case scenario?
- A: We looked at a few factors 1) making sure that the rail is not over topped during the 100-year so the wave run off would not over top the rail 2) the revetment/rock would not be damaged during a 100-year event because that would be costly to repair and impact service 3) looked at partial damage to rock armor during 50-year event.

Zach Rehm, California Coastal Commission

- Q: Did you analyze an alternative of a bridge or causeway in vulnerable areas?
- A: We did not look at it in detail given the nature of the corridor. You have the Trestles Bridge in San Diego County, but there is a tighter squeeze in the alignment in some parts of Orange County. It would be hard to do an intensive bridge structure along the corridor. We did not study this in much detail. The other issue with elevating the rail is keeping a gradual enough grade so it would be a more involved process such as drilling.

## Public Working Group Meeting Summary

Susan Brodeur, OC Parks

- Q: Has there been an estimate on quantity of materials that would be transferred from inland to the beach?
- A: No, that's a good question. Are you referring to an overall beach nourishment project or looking at the bluff area?
- Q: Just the sediment you mentioned.
- A: We didn't look at that quantity, but we could.

### ***Mission Viejo Trench/Extended Oso Creek Tributary Recommendations***

Brett Kennedy, City of Mission Viejo

- Comment: Will have to run this by our Engineering staff to see if they have comments and will get back to the team.

### ***Station Amenities Recommendations***

Meg McWade, City of Fullerton

- Q: How do we find out about recommendations for stations not identified as high priority at this time?
- A: We can put something together on that and see if we can send out a longer set of slides for longer-term station.

Melanie Schlotterbeck, Friends of Harbors, Beaches and Parks

- Comment: I like the additional shade components and think those can help commuters and their environments.

## 5. Additional Questions and Answers

Zach Rehm, California Coastal Commission

- Q: Another question regarding rail protection alternatives – option 3, did you consider a seawall without the revetment or other options that minimize coverage of beach areas?
- A: We looked at that option and it's a good point. If the revetment gets bigger it would need to expand to the beach more and would need to be coordinated in the future. There are a lot of challenges to build a sea wall like that and would need to drill down which is challenging in the coastal environments.

Riley Pratt, OC Parks

- You mentioned it would cost at least 1.8 billion to realign the railroad along the I-5 corridor. How does that compare with the cost of the other solutions presented (e.g. improved rock



## *Public Working Group Meeting Summary*

revetment)? Will the final report comprehensively evaluate the tradeoffs of the various alternatives, economy and otherwise (e.g. loss of beach and habitat, changed aesthetics)?

- A: We'd like to include that in the final report as much as we can and what the trade off and options are.

### **6. Next Steps**

Following the Q&A session, Tim Grose again thanked the group for being a valuable component in the study and stated recommendations would be updated based on input from the group and the public outreach process. Tim mentioned that the draft of the final report would be available in late October/early November and the project would end at the end of 2020.



## Public Working Group Meeting Summary

### ATTENDEES

PWG Member	Organization
Zach Rehm	California Coastal Commission
Julie Lugaro	Caltrans
Alyssa Murakami	Caltrans
Cole Iwamasa	Caltrans
Luisa Easter	Caltrans
Rafael Cobian	City of Anaheim
Neelam Dorman	City of Anaheim
Yelena Voronel	City of Fullerton
Meg McWade	City of Fullerton
Jaimee Bourgeois	City of Irvine
Brett Canedy	City of Mission Viejo
Jessica Witt	County of Orange
Melanie Schlotterbeck	Friends of Harbors, Beaches and Parks
Katy Thorpe	Metrolink
Jennifer Jung	OC Parks
Riley Pratt	OC Parks
Susan Brodeur	OC Parks
Tim Nguyen	OC Public Works
Tay	Not listed
Juan Carlos Herrera	Not listed
Huey Yann Ooi	OCTA
Salvador Munoz	OCTA
Dan Phu	OCTA
Lauren Sato	OCTA
Katy Thorpe	Southern California Regional Rail Authority

## Public Working Group Meeting Summary

Project Team Member	Organization
Jason Lee	OCTA
Marissa Espino	OCTA
Tim Grose	WSP
Mike Flood	WSP
Lauren German	WSP
Stacey Falcioni	AA
Stevie Espinoza	AA
Julie Diaz	AA



# Appendix B

---

## *Media Plan A and B*



# OC Rail Infrastructure Study

## Outreach Outline Options

*As of April 6, 2020*



### Outreach Outline: Plan A

*Assumption: State health restrictions lifted as of May 1<sup>st</sup>*

- Extended Outreach Toolkit finalized in April and sent out to PWG, PDT, cities and electeds by May 1<sup>st</sup>
- Survey Card design finalized in April and sent to Metrolink Marketing by April 15<sup>th</sup>, for approval and seat drop print. Seat drop targeted for the Metrolink OC Line, the first week of May
- Engagement Survey live May 1<sup>st</sup>
- Facebook/Instagram or Geo-Fencing Survey and Event Marketing Ad Campaign targeted for end of April/May – use survey card design for layout draft, showcase survey link and event dates
- Phase 1 Pop-Up Station Events (1-6) in May
  - Buena Park Station
  - Anaheim Station
  - Orange Station
  - Tustin Station
  - Fullerton Station
  - Anaheim Canyon Station
- PWG #2 in early September, webinar and/or in-person
- Phase 2 Pop-Up Station Events (7-12) August/September
  - Santa Ana Station
  - Irvine Station
  - Laguna Niguel/Mission Viejo Station
  - San Clemente Station
  - San Clemente Pier Station
  - San Juan Capistrano Station
- Facebook/Instagram or Geo-Fencing Survey and Event Marketing Ad Campaign targeted for end of July/August/mid-September – use survey card design for layout draft, showcase survey link and event dates
- Survey closed by mid-September; raw data analyzed
- Outreach Summary Report Draft completed for technical use by September 28<sup>th</sup>
- Final Outreach Summary Report Fall 2020

### Plan A Schedule

	April	May	June	July	August	September
<b>Outreach Tool</b>	✓ Survey Eng.	✓ Pop-Ups	✓ Prepare for late summer outreach	✓ Survey Eng.	✓ Pop-Ups	✓ Pop-Ups
	✓ Ads	✓ Survey Eng.		✓ Ads	✓ Survey Eng.	✓ Survey Eng.
	✓ Extended Outreach Prep.	✓ Ads			✓ Ads	✓ Ads
		✓ Extended Outreach				✓ PWG #3
						✓ Draft Outreach Report



# OC Rail Infrastructure Study

## Outreach Outline Options

*As of April 6, 2020*



### Outreach Outline: Plan B

*Assumption: State health restrictions lifted as of July 1<sup>st</sup>*

- Extended Outreach Toolkit finalized in May/June and sent out to PWG, PDT, cities and electeds by July 15th
- Survey Card design finalized in May/June and sent to Metrolink Marketing end of June, for approval and seat drop print. Seat drop targeted for the Metrolink OC Line , the first week of August
- Engagement Survey Live end of July/August 1<sup>st</sup>
- Facebook/Instagram or Geo-Fencing Survey and Event Marketing Ad Campaign July/August/mid-September– use survey card design for layout draft, showcase survey link and event dates
- Phase 1&2 Pop-Up Station Events (1-12) in August/September – *aggressive, but we can do it*
  - Buena Park Station
  - Anaheim Station
  - Orange Station
  - Tustin Station
  - Fullerton Station
  - Anaheim Canyon Station
  - Santa Ana Station
  - Irvine Station
  - Laguna Niguel/Mission Viejo Station
  - San Clemente Station
  - San Clemente Pier Station
  - San Juan Capistrano Station
- PWG #2 in early September, webinar and/or in-person
- Survey closed in mid-September; raw data analyzed
- Outreach Summary Report Draft completed for technical use by September 28<sup>th</sup>
- Final Outreach Summary Report Fall 2020

### Plan B Schedule

	April	May	June	July	August	September
Outreach Tool		✓ Extended Outreach Prep.	✓ Extended Outreach Prep.	✓ Survey Eng. ✓ Ads	✓ Pop-Ups ✓ Survey Eng. ✓ Ads	✓ Pop-Ups ✓ Survey Eng. ✓ Ads ✓ PWG #3 ✓ Draft Outreach Report

# Appendix C

---

## *Contact Database*

Project Working Group  
Project Development Team  
Public Inquiry Sign Up  
Typeform Survey Sign Up



Agency/Organization	Contact Name	Title	Email	Phone	Attended PWG #1	Attended PWG #2	Attended PWG #3
California Coastal Commission	Zach Rehm	Senior Transportation Program Analyst			X	X	X
California State Parks Orange Coast District	Riley Pratt, Ph.D.	Senior Environmental Scientist			X	X	X
California State Parks Orange Coast District	Richard M. Haydon #81, SPSIII	South Sector Superintendent					
City of Anaheim	Chris Zapata	City Manager					
City of Anaheim	Rudy Emami	Public Works Director			X		
City of Anaheim	Rafael Cobian	City Engineer					X
City of Anaheim	Neelam Dorman	Principal Transportation Planner					X
City of Buena Park	James B. Vanderpool	City Manager					
City of Buena Park	Nabil Henein	Public Works Director/City Engineer					
City of Fullerton	Ken Domer	City Manager					
City of Fullerton	Meg McWade	Public Works Director				X	X
City of Fullerton	Yelena Voronel	Senior Civil Engineer					X
City of Irvine	John Russo	City Manager					X
City of Irvine	Mark Steuer	Public Works Director					
City of Irvine	Mike Davis	Assistant Director, Transportation			X	X	
City of Irvine	Jaimee Bourgeois	Deputy Director of Transportation / City Traffic Engineer					x
City of Laguna Niguel	Kathy Nguyen	Engineering Services Manager			X	X	
City of Laguna Niguel	Tamara S. Leourneau	City Manager					
City of Laguna Niguel	Jacki Scott	Public Works Director			X		
City of Laguna Niguel	Hal Ghafari	Environmental Programs Supervisor				X	
City of Mission Viejo	Dennis Wilberg	City Manager					
City of Mission Viejo	Mark Chagnon	Public Works Director					
City of Mission Viejo	Brett Canedy	Transportation Analyst			X	X	X
City of Orange	Rick Otto	City Manager					
City of Orange	Chris Cash	Public Works Director					
City of San Clemente	Tom Bonigut	Public Works Director					
City of San Clemente	Erik Sund	Assistant City Manager					
City of San Clemente	Cecilia Gallardo-Daly	Community Development Director			X		
City of San Clemente (SUMMIT)	Leslea Meyerhoff**	Principal			X	X	
City of San Juan Capistrano	George Alvarez	City Engineer				X	
City of San Juan Capistrano	Ben Siegel	City Manager					
City of San Juan Capistrano	Steve May	Public Works Director					
City of Santa Ana	Kristine Ridge	City Manager					
City of Santa Ana	Nabil Saba	Interim Public Works Director					
City of Santa Ana	Taig Wiggins	Principal Engineer			X		
City of Tustin	Matthew S. West	City Manager					
City of Tustin	Doug Stack	Public Works Director					
County of Orange	May Doung					X	
County of Orange	Frank Kim	County Executive Officer					
County of Orange	Shane Silsby	Director of Public Works					
County of Orange	Jessica Witt	Director of Government & Community Relations					X
Friends of Harbors, Beaches and Parks	Melanie Schlotterbeck	Green Vision Project Coordinator				X	X
OC Flood/OC Public Works	Nardy Khan	Deputy Director, OC Infrastructure Programs					
OC Public Works	Regina Hu	Manager Infrastructure Programs				X	
OC Public Works	Tim Nguyen	Senior Civil Engineer				X	X
Orange County OC Parks	Susan Brodeur	Senior Coastal Engineer			X	X	X
Orange County OC Parks	Jennifer Jung	Project Manager				X	X
SANDAG	Kim Smith	Senior Environmental Planner					
U.S. Army Corps of Engineers (USACE)	Damien A. Lariviere	Project Manager					
U.S. Army Corps of Engineers (USACE)	Jonathan Guerrero	Study Manager					
U.S. Army Corps of Engineers (USACE)	Susie Ming *	Project Manager					
U.S. Army Corps of Engineers (USACE)	Heather Schlosser*	Lead Planner					
U.S. Marine Corps (USMC)	Dr. Jeffery Paull*	Deputy Regional Director					
U.S. Marine Corps (USMC)	Col. Sam Jammal*	MCB Camp Pendleton Chief of Staff					
Caltrans	Luisa Easter	Associate Transportation Planner				X	
Caltrans	Alyssa Murakami	Transportation Planner				X	
Caltrans	Julie Lugaro	Associate Environmental Planner					
Caltrans	Scott Shelley	Branch Chief LD-IGR/Regional/Transit				X	
Caltrans	Marlon Regisford	Branch Chief – Policy & Technical Planning				X	
SCRRA (Metrolink)	Katy Thorpe	Railroad Civil Engineer II				X	



Agency/Organization	Contact Name	Title	Email	Phone	Attended PWG #1	RSVP PWG #2	Attended PWG #2	Attended PWG #3
OCTA	Jason Lee	Project Manager			x	x	X	X
OCTA	Marissa Espino	Community Relations Specialist, Principal			x	x	X	X
OCTA	Salvador Munoz	Rail Programs			x		X	X
OCTA	Sofia Perez	Associate Government Relations Representative			x		X	
OCTA	Huey Yann Ooi	HDR Program Management for OCTA Regional Rail					X	X
OCTA	Jennifer O'Connor	Marketing Program Administrator					X	
OCTA	Christina Byrne	Public Outreach Department Manager						
OCTA	Dinah Minter	Manager, Regional Rail					X	
OCTA	Andrea West	Senior Government Relations Representative, Regional Initiatives						
Metrolink	Katy Thorpe	Railroad Civil Engineer II			x	x		X
LOSSAN	Michael Litschi	Deputy Managing Director					X	
Caltrans	Luisa Easter	Associate Transportation Planner Regional-IGR-Transit Planning Branch				x	X	
Caltrans	Alyssa Murakami	Transportation Planner			x	x	X	X
Caltrans	Julie Lugaro	Associate Environmental Planner			x			
Caltrans	Cole Iwamasa	Associate Transportation Planner						X
WSP	Lauren German	Senior Rail and Transit Planner			x	x	X	X
WSP	Mike Flood	Special Projects Lead			x	x	X	X
WSP	Tim Grose	National Resiliency Lead			x	x	X	X
AA	Stacey Falcioni	Outreach Lead			x	x	X	X
OCTA	Dan Phu	Planning Program Manager				x		
OCTA	Lauren Sato	Transportation Analyst Associate				x	X	X
OCTA Rail Operations	Gerald Smith	RAIL MAINT OF WAY ADM SR						
LOSSAN	James Campbell	LOSSAN Program Manager						



Agency/Organization	First Name	Last Name	Email	Zip Code	Phone
	Brian	Yanity		92832	
Capistrano Shores Mobile Home Park	Niels	Pearson			
Surfrider Foundation	Mandy	Sackett			
Surfrider Foundation	Denise	Erkeneff			
	Aaron	Holloway		90814	
	Theodoric	Huang		90034	
	Jackson	Hurst		30144	
	Alex	Lewis		92692	
	Aaron	Holloway			
	May	Doung			
	Michelle	Succow		95820	



# Typeform Survey - OC Rail Infrastructure Against Climate Change Plan

Email address:	Zip Code
[REDACTED]	92870
[REDACTED]	92703
[REDACTED]	92866
[REDACTED]	90503
[REDACTED]	92703
[REDACTED]	92866
[REDACTED]	92010
[REDACTED]	92806
[REDACTED]	92677
[REDACTED]	92806
[REDACTED]	92677
[REDACTED]	90621
[REDACTED]	90027
[REDACTED]	92869
[REDACTED]	92840
[REDACTED]	92782
[REDACTED]	91106
[REDACTED]	92707
[REDACTED]	92804
[REDACTED]	92881
[REDACTED]	92867
[REDACTED]	92651
[REDACTED]	92672
[REDACTED]	92807
[REDACTED]	92707
[REDACTED]	92880
[REDACTED]	90068
[REDACTED]	92835
[REDACTED]	92651
[REDACTED]	92806
[REDACTED]	90814
[REDACTED]	92392
[REDACTED]	93552
[REDACTED]	90631
[REDACTED]	92705
[REDACTED]	92703
[REDACTED]	92881
[REDACTED]	92606
[REDACTED]	92831
[REDACTED]	92007
[REDACTED]	92618
[REDACTED]	92637
[REDACTED]	92802
[REDACTED]	92705
[REDACTED]	92815
[REDACTED]	92028
[REDACTED]	92702
[REDACTED]	92627
[REDACTED]	92646
[REDACTED]	92701
[REDACTED]	92805
[REDACTED]	92867
[REDACTED]	92933
[REDACTED]	92801
[REDACTED]	92801
[REDACTED]	92867
[REDACTED]	91801
[REDACTED]	92861
[REDACTED]	91763
[REDACTED]	92701
[REDACTED]	92701



Typeform Survey - OC Rail Infrastructure Against Climate Change Plan

	90638
	92806
	92683
	92701
	92704
	92688
	91605
	92780
	92780
	92804
	92835
	92673
	92882
	92701
	90019
	91739
	92646
	92780
	92626
	92804
	92832
	92780
	92801
	92677
	92603
	92602
	92705
	92677
	92274
	92706
	92703
	93021
	92503
	92780
	92648
	92704
	91106
	92614
	90638
	90621
	92704
	92866
	92880
	92694
	92587
	92867
	92630
	92694
	90638
	92705
	92691
	92856
	92562
	92701
	92626
	92706
	92805
	92805
	92867
	92679
	90621
	92832



# Typeform Survey - OC Rail Infrastructure Against Climate Change Plan

	92804
	92672
	92868
	92630
	92780
	90638
	92806
	92808
	92805
	92399
	92694
	92882
	91708
	92866
	90630
	92701
	92701
	92701
	92805
	90631
	92806
	90621
	92832
	92377
	92801
	92503
	90620
	92617
	92604
	92801
	92688
	92879
	92056
	92501
	92504
	92672
	92675
	92673
	90620
	92211
	90027
	90630
	90046
	92612
	92701
	92677
	9/675
	92807
	92618
	92501
	92694
	90065
	92614
	92688
	92677
	92618
	92868
	92804
	92677
	92651-6727
	91208
	92707
	92264



Typeform Survey - OC Rail Infrastructure Against Climate Change Plan

	92705
	92832
	92805
	92404
	92677
	90604
	90305
	92058
	92805
	92677
	92675
	92869
	92802
	92410
	92707
	92870
	92707
	92706
	92503
	92782
	92780
	92867
	90638
	90020
	92782
	92866
	92865
	92630
	92882
	92602
	91776
	91709
	92656
	92057
	90621
	92630
	92804
	92056
	92866
	92804
	92054
	90621
	90604
	92805
	90013
	92866
	92701
	92602
	92679
	92833
	92806
	92504
	92011
	92570
	90815
	92868
	92084
	92673
	90638
	92840
	92833



Typeform Survey - OC Rail Infrastructure Against Climate Change Plan

	90081
	92831
	92805
	92057
	92883
	92867
	92880
	92570
	92831
	92843
	92672
	92806
	90603
	92832
	92706
	92804
	90620
	90631
	92804
	92705
	92780
	92673
	92801
	92503
	92780
	91762
	92705
	92630
	90081
	92805
	92782
	92410
	92629
	90038
	92780
	92677
	92703
	92844
	92672
	92656
	92831
	92704
	92054
	91016
	90621
	90280
	92805
	91506
	92700
	92780
	92694
	92801
	92831
	92503
	92647
	92880
	92701
	92701
	92883
	92083
	CA 92677
	92336



Typeform Survey - OC Rail Infrastructure Against Climate Change Plan

	92410
	92691
	92618
	92865
	92625
	92620
	92610
	92867
	92701
	92805
	92805
	92054
	92677
	92701
	92509
	90720
	92703
	90621
	92703
	92833
	92869
	92802
	92591
	92617
	92883
	90621
	92612
	92672
	92867
	92677
	92656
	92705
	92619
	92880
	92507
	92707
	90621
	92691
	92832
	92801
	30144
	92701
	92834
	39834
	92868
	92701
	92701
	92869
	92881
	92503
	92833
	92653
	92780
	92672
	92782
	92701
	92630
	92606
	92866
	91711
	92806
	92806
	92606
	88123



Typeform Survey - OC Rail Infrastructure Against Climate Change Plan

	92878
	92808
	92507
	92801
	92708
	92880
	92805
	92805
	92782
	92617
	92840
	92223
	92617
	92780
	92806
	92602
	92624
	92780
	92057
	90603
	92870
	92660
	92507
	92618
	92833
	92703
	92653
	92821
	92833
	92704
	92606
	92688
	92703
	92805
	92707
	92806
	92887
	92691
	91201
	90015
	92805
	92688
	90040
	92802
	92115
	90280
	92832
	92701
	92691
	92122
	92868
	92602
	90026
	92606
	92806
	90630
	92701
	90069
	92780
	92805
	92084
	92701
	92618



Typeform Survey - OC Rail Infrastructure Against Climate Change Plan

	92701
	92054
	92802
	90603
	92701
	92373
	92507
	92882
	92843
	92780
	92677
	90621
	90291
	92584
	92618
	90650
	92833
	92506
	92024
	92624
	92806
	92832
	92833
	92841
	92806
	92663
	92806
	92503
	92882
	92503
	92832
	92881
	90603
	92867
	90605
	92660
	92677
	91340
	91803
	92821
	92701
	92411
	92704
	90621
	92701
	92704
	92704
	92704
	90631
	92703
	92780
	92551
	92630
	90621
	92692
	92804
	91801
	92707
	92694
	92703
	92780
	92677
	92626



Typeform Survey - OC Rail Infrastructure Against Climate Change Plan

	92867
	92881
	92630
	91042-2104
	92675
	92705
	92866
	92706
	92831
	92701
	92506
	91752
	92821
	92617
	90621
	92808
	92701
	90028
	92866
	92614
	92692
	92694
	92011
	92801
	92833
	92782
	92501
	92602
	92503
	93190
	91504
	92866
	92505
	91763
	92704
	92630
	90621
	92780
	92505
	92660
	92503
	92867
	92801
	92707
	92833
	92677
	90255
	90605
	92869
	92691
	92780
	92868
	92692
	92833
	92835
	92870
	90621
	92805
	92675
	92675
	92675
	92843
	92604
	90621



	92506
	92595
	92807
	92677
	92701
	92805
	92801
	93552
	92707
	92707
	92082
	92701
	92780
	92704
	92337
	92701
	9701
	90631
	92701
	92703
	92842
	92805
	92677
	91748
	92617
	92701
	92673
	90650
	92805
	92703
	92359
	92802
	92620
	92614
	92610
	92705
	92606
	92833
	91390
	92804
	92802
	90255
	91770
	92606
	91342
	92805
	92826
	92831
	92630
	92705
	92801
	91350
	92612
	92703
	92606
	91345
	92703
	92843
	92637
	90740
	92324
	92706



Typeform Survey - OC Rail Infrastructure Against Climate Change Plan

	92821
	92831
	92570
	92604
	92656
	92692
	92869
	92866
	92703
	92806
	92571
	92672
	92805
	92691
	92703
	91601
	90631
	92657
	92832
	92705
	91504
	92805
	92505
	92806
	90620
	92701
	92505
	92503
	90027
	92782
	92651
	92701
	92618
	92867
	92325
	92570
	91501
	92612
	90630
	92879
	92675
	92840
	92869
	92865
	92705
	92618
	92586
	92831
	92617
	92823
	92691
	92675
	92831
	92701
	92069
	90042
	92805
	92707
	92802
	93804
	92701
	92707



Typeform Survey - OC Rail Infrastructure Against Climate Change Plan

	92627
	92821
	92801
	92704
	92056
	92804
	92833
	92675
	92630
	92630
	92869
	92705
	92845
	92617
	92703
	92630
	92677
	92504
	92868
	92703
	92870
	92690
	92692
	90041
	92805
	92653
	92822
	92831
	92701
	92805
	92626
	92673
	90638
	92075
	92656
	92843
	92879
	92610
	92704
	92675
	90620
	92701
	91706
	90621
	92694
	92627
	92630
	92882
	92703
	92832
	92503
	92618
	92630
	92782
	92832
	92867
	92801
	92620
	92831
	92868
	92703
	90022
	92867
	92806



Typeform Survey - OC Rail Infrastructure Against Climate Change Plan

	92805
	92694
	92807
	92675
	92614
	92841
	90012
	92707
	90621
	90621
	92705
	92507
	92691
	92869
	92866
	92703
	92691
	92399
	92867
	90020
	92614
	92705
	92614
	92832
	92651
	92504
	92845
	92706
	92880
	92832
	92677
	92007
	92701
	92831
	92656
	92130
	92620
	92870
	900011
	92704
	90011
	92604
	92886
	92831
	92801
	92801
	92804
	92782
	90713
	92843
	92840
	92880
	92614
	92614
	92683
	92507
	92866
	92804
	90057
	90621
	92806
	92802
	92802



Typeform Survey - OC Rail Infrastructure Against Climate Change Plan

	90620
	92702
	90620
	92677
	92835
	92617
	90034
	92832
	91423
	92833
	92505
	92701
	92801
	92630
	90623
	90605
	92886
	92882
	90621
	91355
	92835
	92882
	92501
	92821
	92503
	92701
	92701
	90029
	92869
	92831
	92832
	92555
	90006
	92374
	92557
	90802
	92705
	92646
	90034
	92801
	92831
	92506
	92703
	92058
	92707
	90604
	92867
	92069
	90650
	90631
	92868
	90031
	92604
	92805
	90621
	90005
	92617
	92630
	92801
	90650
	92404
	92630
	90028
	92701



	92404
	92508
	92804
	92780
	92620
	90606
	91203
	92010
	92660
	92688
	91324
	92603
	92648
	92694
	92704
	92673
	92057
	92840
	92630
	92831
	92866
	92805
	92675
	92675
	92807
	92618
	92882
	92782
	92833
	92677
	92592
	92503
	92656
	92703
	93550
	92703
	92557
	92346
	92869
	91125
	92692
	92691
	92501
	92701
	92627
	92701
	92805
	92879
	92508
	90650
	92880
	91106
	92865
	90029
	92866
	92865
	92865
	92503
	90621
	92860
	90621
	92821
	92801
	91602



Typeform Survey - OC Rail Infrastructure Against Climate Change Plan

	90604
	92505
	92832
	90621
	92618
	91790
	92656
	92870
	92701
	92868
	92653
	90631
	90042
	92630
	92618
	92832
	91708
	92672
	90650
	92705
	92673
	92883
	91403
	92780
	92782
	92806
	92704
	92505
	92677
	92677
	92804
	92630
	91325
	92840
	92801
	92555
	92806
	92646
	92703
	90032
	91331
	92832
	92807
	90254
	90650
	92870
	92320
	92701
	92373
	92701
	92831
	92831
	92618
	92805
	92571
	91708
	92324
	92703
	92866
	92840
	90660
	92707
	92701
	92703



Typeform Survey - OC Rail Infrastructure Against Climate Change Plan

	92865
	92843
	92507
	90630
	91691
	90066
	91406
	92869
	92882
	92879
	82806
	92339
	90013
	92618
	92675
	92780
	90601
	92056
	92706
	92505
	92630
	92703
	92154
	92612
	92835
	92833
	92705
	92704
	92704
	92679
	92835
	92802
	92780
	92707
	92806
	92707
	92374
	90005
	92701
	92530
	92780
	92805
	92868
	92677
	92801
	92620
	92530
	92801
	92801
	92374
	92802
	92780

# Appendix D

---

## *Comment Log & Issues Matrix*

# Rail Defence Comment Log & Issues Matrix



Stakeholder	Stakeholder Type	Project Phase	Date Received	Source	Category	Issue / Comment	Lead	Follow up Action	Notes & Contact	Database	Location (City, State)
<b>COMPLETED</b>											
1	Gale Somodu	Interested Party	08/07/20	Mission Viejo News Page	Shade/Coverings	Perhaps provide more shade for people waiting to ride the train			clubisabel@yahoo.com	<input type="checkbox"/>	
2	Mark McCumsey	Interested Party	08/03/20	FB Ad #1 - English	Safety/Emergency	Why on earth are they taking a poll about taking a train trip in excessive heat if not many are traveling on the rails due to the Codevid 19? I've not traveled by rail since March 17. Get real, OCTA! Get rid of the homeless bums hanging out at the San Clemente Metrolink North Beach Station or any of the Metrolink Stations. No they have no rights to be loitering in and around the stations. You will lose passenger riders if you haven't already pre-Codevid.				<input type="checkbox"/>	
3	Clint Worthington	Interested Party	08/03/20	FB Ad #1 - English	Safety/Emergency	Fix the Ghost Train at Del Obispo in San Juan Capistrano. It is a safety issue when the crossing gates are down and there is not a train. This is the only road to get across town. When the crossing gates are down and there is not a train, it delays response by OCF and OCS. If we can send people to the moon and back multiple times, surely you can fix this. Poor, poor service by OCTA who owns the Right of Way.				<input type="checkbox"/>	
4	Bob Buckner	Interested Party	08/03/20	FB Ad #1 - English	Other	They want your email address and I won't provide that				<input type="checkbox"/>	
5	Dennis Baca	Interested Party	08/03/20	FB Ad #1 - English	Transit Service Connection	It don't take me where I need. But there is a train to the beach.				<input type="checkbox"/>	
6	Richard Hohneke	Interested Party	08/03/20	FB Ad #1 - English	Other	YOUR BUS DRIVERS REALLY SUCK. CUTTING PEOPLE OFF AND PULLING OUT IN FRONT OF BIG RIGS.				<input type="checkbox"/>	
7	Dylan Williams	Interested Party	08/21/20	Facebook Ad - English	Cleanliness General Safety/Emergency	Rail ways and stations should be the highest tech, safest and cleanest option for commuters.				<input type="checkbox"/>	
8	Ana Portillo	Interested Party	08/21/20	Facebook Ad - English	Transit Service Connection	I wish they improved the service, will be nice to move from one place to another by train, to avoid traffic				<input type="checkbox"/>	
9	Kim Wentworth	Interested Party	08/21/20	Facebook Ad - English	Seating Transit Service Connection	Be one time, shorten the time to get from point A to B. Train takes too long to go from Anaheim to San Diego. Or from Anaheim to LA. I can get their way faster by car. Having to wait 20 minutes stopped because there is only one track. Have more seating. Not fun riding having to stand up in a packed train. have seats for everybody.				<input type="checkbox"/>	
10	Clint Worthington	Interested Party	08/21/20	Facebook Ad - English	Transit Service Connection	Fix the Ghost Train at the Del Obispo crossing in San Juan.				<input type="checkbox"/>	
11	Rene Velazquez	Interested Party	08/31/20	Facebook Ad - English	Other	Remove the disposal site. It looks ugly for the train station.				<input type="checkbox"/>	
12	David Zenger	Interested Party	09/01/20	Facebook Ad - English	Other	How about an explanation about what went wrong at the Fullerton elevators addition. I mean, ya know, if it's not too much trouble.				<input type="checkbox"/>	
13	Susan Hernandez	Interested Party	09/02/20	Facebook Ad - English	Safety/Emergency	How about not overpacking the trains so that I had to stand all the way from LA to Fullerton but pay the same price as those with a seat? And surely standing in the aisles can't be safe if there is an accident.				<input type="checkbox"/>	
14	Jovita Rodriguez	Interested Party	08/03/20	FB Ad #1 - Spanish	Cleanliness Safety/Emergency	Cierto santa ana y. Otras. Lugares que son tan bonitos. All tantisimos indigentes que es una pena que no. Agan nada por. Ellos creo meresen atencion. Hi mano. Dura para que alla. Orden. Hi. Disciplina porque los quitan de. Un lado por. Oras y despues. Ha. Al mismo lugar dejando. Suciedad por. Falta de. Igiene en las paradas de los bases que no se puede ni esperar el. Bas. Ojala. Agan muho por. Ellos y tengan compasion de. Ellos  True santa ana and other Places that are so beautiful. All so many homeless that it is a shame to do nothing for. They deserve attention. and discipline because they are removed for hours and later back To the same place leaving dirtiness by. Lack of. hygiene at the point that stops that you can't even wait at. bus stop. hopefully they can do much for them and have compassion.				<input type="checkbox"/>	
15	Jaime Gonzalez	Interested Party	08/03/20	FB Ad #1 - Spanish	Safety/Emergency	Yo soy una persona que todos los días voy a trabajar pero a veces ser igual está lleno de indigentes que aún no que pague el boleto No nos deja subir al bar por favor hagan algo. Predicado tarde mi trabajo por el inconveniente por favor señor Vicente haga algo para nosotros los que trabajamos y tenemos el boleto  I am a person who goes to work every day but sometimes being the same is full of homeless people who have not yet paid the ticket. They won't let us go up to the bar, please do something. I've reached late my work due to the inconvenience please Mr. Vicente do something for us who work and have the ticket				<input type="checkbox"/>	
16	KM KM	Interested Party	08/03/20	FB Ad #1 - Spanish	Safety/Emergency	No más indigentes en el bus por favor  Please no more homeless people on the bus				<input type="checkbox"/>	
17	Romelia Garcia	Interested Party	08/03/20	FB Ad #1 - Spanish	Cleanliness	Eso de la basura que tiene que ver octa eso es de la gente sucia deberian multar a la gente que tira basura  That of the garbage that has to do with octa that is of the dirty people should fine the people who throw garbage				<input type="checkbox"/>	
18	Rene Velazquez	Interested Party	08/03/20	FB Ad #1 - Spanish	Cleanliness	POS PARA EMPEZAR? CERQUITAS DE LA ESTACIÓN DE SANTA ANA EL LUGAR DONDE TIRAN BASURA ES DA UNA MALA ( IMAGEN) PARA TODA LA GENTE Y LOS TURISTAS WUE LLEGAN O PASAN POR SANTA ANA ANTES DE ESE ( BASURERO?) LOS ARBOLES ESTABAN LIMPIOS Y AHORA ESTAN TODOS DE COJ OR CAFÉ DE TODO EL POLVO QUE SALE DE ESE LUGAR Y LUEGO EN TIEMPOS DE LLUVIA? TODO EL PAVIMENTO LLENO DE LODO. Y YA NO LE SIGO PORQUE TODAVIA HAY MÁS.  Well where to begin? Near the Santa Ana station the place where they throw the trash gives a bad image to all the people and the tourists that arrive or pass through Santa Ana. Before that (trash?) the trees were clean and now all of them have brown dirt that falls in this place. And then in times of rain? All of the pavement is full of mud. I won't continue because there is still more.				<input type="checkbox"/>	
19	Rossana San Jose	Interested Party	08/31/20	Facebook Ad - Spanish	Support	Que bueno porque es importante gracias  Good because it is important thanks.				<input type="checkbox"/>	
20	Josefina Bzan De Sa Sanchez	Interested Party	09/01/20	Facebook Ad - Spanish	Support	Qué bien porque es necesario  How good, because it is necessary				<input type="checkbox"/>	
21	Edith Tlasecaa	Interested Party	09/02/20	Facebook Ad - Spanish	Support	Que bien.  How good.				<input type="checkbox"/>	
22	Martha Perez	Interested Party	09/03/20	Facebook Ad - Spanish	Support	Me encanta viajar en tren ,porque me da oportunidad dd meditar el el paisaje y los cambios de clima , nieve en las montañas o árboles verdes !!! Linda Experiencia con mis niños !! Mis encantaba viajar a visitar a mi hermana y mis sobrinos !!  I love traveling by train, because it gives me the opportunity to meditate on the landscape and the changes in weather, the snow in the mountains or the green trees! Nice experience with my children !! I loved traveling to visit my sister and my nephews !!				<input type="checkbox"/>	
23	Rose Pizano	Interested Party	09/11/20	Facebook Ad - Spanish	Transit Service Connection	Si me gustaria se modernice la pasarela para viajar a los Angeles es muy fea y complicada lo mismo de su venta de tikez  I would like the pathway to travel to Los Angeles to be modernized, it's very ugly and complicated same as your ticket sales.				<input type="checkbox"/>	
24	Jovita Rodriguez	Interested Party	09/11/20	Facebook Ad - Spanish	Support	Para mi. es hermoso pasear en tren es un viaje muy bonito y mas cuando son largas las distancias que se. Recorren el paso del tren por. Donde yo. naci me llena de agradables momentos como saludar a los viajeros y que nos tiraran fruta y. Monedas. Que. Recogiamos cuando pasava.  For me it's beautiful to travel by train especially when it's long distances. Where I was born, it fills me with nice memories how travelers would throw fruits and coins that we would pick up as they passed.				<input type="checkbox"/>	
25	Nena Munoz	Interested Party	09/11/20	Facebook Ad - Spanish	Other	Nunca he viajado en Metrolink debe de ser padre  I have never traveled by Metrolink, it must be really nice.				<input type="checkbox"/>	
26	Odilia Yolanda Tohom Bala	Interested Party	09/11/20	Facebook Ad - Spanish	Other	Es muy bueno viajar en el metrolink rápido lo único un poco caro  It's nice to travel by Metrolink quickly, the only thing is it's a bit expensive				<input type="checkbox"/>	
27										<input type="checkbox"/>	75   Page

Stakeholder	Stakeholder Type	Project Phase	Date Received	Source	Category	Issue / Comment	Lead	Follow up Action	Notes & Contact	Database	Location (City, State)
28	Esperanza Guevara	Interested Party	09/11/20	Facebook Ad - Spanish	Support	Estaria bien ya que nunca e viajado en tren It would be nice since I have never traveled by train				<input type="checkbox"/>	
29	Illiana Aguilar	Interested Party	09/11/20	Facebook Ad - Spanish	Support	Nunca e viajado en metrolink y megustria I have never traveled by Metrolink and would like to				<input type="checkbox"/>	
30	Aleja Munoz	Interested Party	09/11/20	Facebook Ad - Spanish	Support	Y si es bien bonito viajar en tren It's very nice to travel by train				<input type="checkbox"/>	
31	Paulina Cuevas	Interested Party	09/11/20	Facebook Ad - Spanish	Support	Me gusta es agradable viajar es rápido I like it, it's nice to travel quickly				<input type="checkbox"/>	
32	Ligia Barahona	Interested Party	09/11/20	Facebook Ad - Spanish	Other	Es muy buenas preguntas gracias That's a good question thank you				<input type="checkbox"/>	
33		Interested Party	08/03/20	Typeform Survey - English	Transit Service Connection	They need to make the train accessible 24/7				<input type="checkbox"/>	
34		Interested Party	08/04/20	Typeform Survey - English	Restrooms	I used ishuttle to Tustin station after work. If I missed the train there's no bathroom around.				<input type="checkbox"/>	
35		Interested Party	08/04/20	Typeform Survey - English	Other	More straight forward ticket machines				<input type="checkbox"/>	
36		Interested Party	08/04/20	Typeform Survey - English	Support	Very good service				<input type="checkbox"/>	
37		Interested Party	08/05/20	Typeform Survey - English	Other	Please have more signs saying what platform is which. People get lost.				<input type="checkbox"/>	
38		Interested Party	08/05/20	Typeform Survey - English	Transit Service Connection	station amenities are less important than more frequent, reliable service				<input type="checkbox"/>	
39		Interested Party	08/05/20	Typeform Survey - English	Restrooms Seating Shade/Coverings	There needs to be more covered seating at stations and restrooms. If you're worried about the cleanliness of the restrooms, travel to Italy and see how they maintain their restrooms. It's simple, just have people pay a quarter and have an attendant employed at each of the restrooms to perform periodic cleaning. Or install the auto-cleaning restrooms like they have in Los Angeles. Not that hard. People in OC need to get over the fact there will be homeless people using these restrooms, they are people too and deserve to use public amenities!				<input type="checkbox"/>	
40		Interested Party	08/06/20	Typeform Survey - English	Safety/Emergency	Get rid of the homeless beggars.				<input type="checkbox"/>	
41		Interested Party	08/06/20	Typeform Survey - English	Other	Perhaps a large screen showing news				<input type="checkbox"/>	
42		Interested Party	08/06/20	Typeform Survey - English	Support	The train is great... just great				<input type="checkbox"/>	
43		Interested Party	08/06/20	Typeform Survey - English	Refreshments	Vending machines				<input type="checkbox"/>	
44		Interested Party	08/06/20	Typeform Survey - English	Refreshments	Vending machines for snacks while waiting				<input type="checkbox"/>	
45		Interested Party	08/07/20	Typeform Survey - English	Other	Buying tickets, train schedule, coupons redemption , and routs are super confusing. They are not user friendly, especially when traveling with children, can be a stressful event.				<input type="checkbox"/>	
46		Interested Party	08/07/20	Typeform Survey - English	Support	Excelente				<input type="checkbox"/>	
47		Interested Party	08/07/20	Typeform Survey - English	Support	Love the train ride conductor's always helpful				<input type="checkbox"/>	
48		Interested Party	08/07/20	Typeform Survey - English	Transit Service Connection	More frequent service would also help. If I knew I could just go to the station and there would be a train there. That would be more important than all the items at teh station.				<input type="checkbox"/>	
49		Interested Party	08/07/20	Typeform Survey - English	Shade/Coverings	More trees would be nice. Or a tree/shady sitting oasis for people who enjoy shade and nature to help relax during the trip.				<input type="checkbox"/>	
50		Interested Party	08/07/20	Typeform Survey - English	Transit Service Connection	Please consider an El Toro Road Station				<input type="checkbox"/>	
51		Interested Party	08/07/20	Typeform Survey - English	Cleanliness	Sanitizer				<input type="checkbox"/>	
52		Interested Party	08/08/20	Typeform Survey - English	Transit Service Connection	A station at Alicia in Mission Viejo would be a good place for another station.				<input type="checkbox"/>	
53		Interested Party	08/08/20	Typeform Survey - English	Safety/Emergency Shade/Coverings	Better lighting would be extremely helpful. And even more helpful would be an announcement made if train cancelled or delayed at SJC Station or an info board to check status of train. Waiting in the dark in the rain with no shelter and wondering why train didn't show up does not give one inventive to take the train again! One more idea: Show us where to stand to wait to board the train - only a couple of doors actually open, so you have to run a long way to an open door! Not easy for seniors!				<input type="checkbox"/>	
54		Interested Party	08/08/20	Typeform Survey - English	Support	Good				<input type="checkbox"/>	
55		Interested Party	08/08/20	Typeform Survey - English	Access	more staff to help passengers who are unfamiliar to use the trains. also, stairs are tough for older people. elevators should be operational at all times				<input type="checkbox"/>	
56		Interested Party	08/08/20	Typeform Survey - English	Transit Service Connection	Rail stations shld be side by side with bus stop for easier transfer.				<input type="checkbox"/>	
57		Interested Party	08/08/20	Typeform Survey - English	Shade/Coverings	Rain covers need to be wide enough to actually provide cover.				<input type="checkbox"/>	
58		Interested Party	08/09/20	Typeform Survey - English	Refreshments	Have filtered water fountain to fill up reusable water bottles				<input type="checkbox"/>	
59		Interested Party	08/11/20	Typeform Survey - English	Other	A complementary pass once in a while .				<input type="checkbox"/>	
60		Interested Party	08/11/20	Typeform Survey - English	Refreshments	A station café. Santa Ana has such a beautiful station. I wish our train stations were more like "hangouts" as they are in Taiwan and Japan. :-)				<input type="checkbox"/>	
61		Interested Party	08/11/20	Typeform Survey - English	Other	Additional ticketing machines. On a few occasions, I entered the northbound platform and because the machine was not working went back to the other platform to purchase a ticket. Since this happened, I have allowed an additional 10 minutes so I don't miss a train.				<input type="checkbox"/>	
62		Interested Party	08/11/20	Typeform Survey - English	Seating	Adequate seating				<input type="checkbox"/>	
63		Interested Party	08/11/20	Typeform Survey - English	Support	Any improvements would help the commuter especially in inclement weather.				<input type="checkbox"/>	
64		Interested Party	08/11/20	Typeform Survey - English	Support	Artic is perfect and still waiting for the crowds (coronavirus go away)				<input type="checkbox"/>	
65		Interested Party	08/11/20	Typeform Survey - English	Other	At Fullerton, the speakers need to be more numerous or louder.				<input type="checkbox"/>	
66		Interested Party	08/11/20	Typeform Survey - English	Other	bargains bargains, better pricing				<input type="checkbox"/>	
67		Interested Party	08/11/20	Typeform Survey - English	Signage/Accurate Information	Better and more accurate train info.				<input type="checkbox"/>	
68		Interested Party	08/11/20	Typeform Survey - English	Other	Better machines for ticket taking at least 2 on each side of platform please in the Norwalk station				<input type="checkbox"/>	
69		Interested Party	08/11/20	Typeform Survey - English	Safety/Emergency	better overall maintenance and security				<input type="checkbox"/>	
70		Interested Party	08/11/20	Typeform Survey - English	Seating Shade/Coverings	Better wind blocks More seats				<input type="checkbox"/>	76   Page
71		Interested Party	08/11/20	Typeform Survey - English	Cleanliness Restrooms	Clean restrooms are always appreciated				<input type="checkbox"/>	

Stakeholder	Stakeholder Type	Project Phase	Date Received	Source	Category	Issue / Comment	Lead	Follow up Action	Notes & Contact	Database	Location (City, State)
72	Interested Party		08/11/20	Typeform Survey - English	Cleanliness Restrooms	Cleaner restrooms and working ticket machines.				<input type="checkbox"/>	
73	Interested Party		08/11/20	Typeform Survey - English	Other	Covered parking				<input type="checkbox"/>	
74	Interested Party		08/11/20	Typeform Survey - English	Transit Service Connection	Easier travel options to get to downtown LA, express train options during rush hours from certain stations or limited stops				<input type="checkbox"/>	
75	Interested Party		08/11/20	Typeform Survey - English	Transit Service Connection	Extended services in the evening/night for use from Anaheim to south county for use from Disneyland and hockey games.				<input type="checkbox"/>	
76	Interested Party		08/11/20	Typeform Survey - English	Shade/Coverings Transit Service Connection	Finally. Severe weather?!? This is California, what are you talking about. The 3 days it rains. Put up more shade, done. The better? Is why don't you take the train? What's stupid about the rail travel is that I have to look up a schedule. In Japan you go to the station, because there will be a train there within 10 mins. My options to work is an hour early or 10 mins late and last train at my Santa Ana station NB towards LA leaves @ 6:12, I can't even get out of my office to the station in 12 mins. Also \$7 each way. I can drive there for \$4 round trip. It's cheaper to drive than to buy a monthly pass. The billboards talk about convenience. Well it's not, I have to get off at Fullerton and wait for the Southwest chief to get there late to change trains, or my train is behind and my connection is already there and I have to grab my bike over my shoulder and run up and over to flag the guy to wait. Want to take the train to dinner or show in Hollywood? Nope no trains back. Uber home. Wait it's the same \$ to just uber.				<input type="checkbox"/>	
77	Interested Party		08/11/20	Typeform Survey - English	Refreshments	Food at all stations				<input type="checkbox"/>	
78	Interested Party		08/11/20	Typeform Survey - English	Refreshments	Food machines				<input type="checkbox"/>	
79	Interested Party		08/11/20	Typeform Survey - English	Refreshments	food options, drink options				<input type="checkbox"/>	
80	Interested Party		08/11/20	Typeform Survey - English	Other	Free WiFi would also make me consider using the train more often.				<input type="checkbox"/>	
81	Interested Party		08/11/20	Typeform Survey - English	Other	Half staff always be friendly to the disabled and anyone else it's always the first impression thank you				<input type="checkbox"/>	
82	Interested Party		08/11/20	Typeform Survey - English	Cleanliness	Hand sanitizer, trash bins that are emptied, sanitized seats, railings, etc.				<input type="checkbox"/>	
83	Interested Party		08/11/20	Typeform Survey - English	Restrooms	Have bathroom available 24 hr free parking and fan or mister				<input type="checkbox"/>	
84	Interested Party		08/11/20	Typeform Survey - English	Refreshments Restrooms Seating Shade/Coverings	Having more food choices would be nice that aren't out of a machine. Definitely more shaded seating would be beneficial on both sides of the tracks (more comfortable seating would be appreciated). A plus also would be having sign boards that list all the trains scheduled for the day (with updated arrival times and cancellations) or at least the next two hours. Announcements are not a good substitute, they are easy to miss, not always accurate, and schedules are not available when you need them.				<input type="checkbox"/>	
85	Interested Party		08/11/20	Typeform Survey - English	Safety/Emergency	help get rid of the homeless camped out at north beach. I won't leave my car there to ride the train. Big problem!				<input type="checkbox"/>	
86	Interested Party		08/11/20	Typeform Survey - English	Other	Home drop off / pick-up would be helpful				<input type="checkbox"/>	
87	Interested Party		08/11/20	Typeform Survey - English	Support	I am glad that you are considering improvements at the stations. It is important.				<input type="checkbox"/>	
88	Interested Party		08/11/20	Typeform Survey - English	Support	I don't really ride it that much but it's been fun everytime I take the Amtrak				<input type="checkbox"/>	
89	Interested Party		08/11/20	Typeform Survey - English	Support	I love the trains				<input type="checkbox"/>	
90	Interested Party		08/11/20	Typeform Survey - English	Other	I really love traveling on the train but the cost is so high and it is hard to justify paying so much when using your car is easier and more convenient. Our family would normally use the "Angel Train" to go to the stadium...loved the price and the trip!				<input type="checkbox"/>	
91	Interested Party		08/11/20	Typeform Survey - English	Other	I use the WiFi at stations when it's available.				<input type="checkbox"/>	
92	Interested Party		08/11/20	Typeform Survey - English	Transit Service Connection	I would use the train more if I had a closer station. It can take me 40 minutes in the am to get to the station.				<input type="checkbox"/>	
93	Interested Party		08/11/20	Typeform Survey - English	Signage/Accurate Information	I'd like to see it made clearer which track the train was going to use and how to get to that track.				<input type="checkbox"/>	
94	Interested Party		08/11/20	Typeform Survey - English	Seating	If more seating is available, please make them socially distant and have a way to keep homeless people from using them for sleeping.				<input type="checkbox"/>	
95	Interested Party		08/11/20	Typeform Survey - English	Shade/Coverings	If you only could do one thing, I would vote for more covered and shaded areas. I do appreciate your train service, but don't have a work schedule or other circumstance to necessitate the need to ride the train regularly.				<input type="checkbox"/>	
96	Interested Party		08/11/20	Typeform Survey - English	Shade/Coverings	In SoCal, covered platforms to hide from the sun would be wonderful! Protection from rain isn't too much of a concern.				<input type="checkbox"/>	
97	Interested Party		08/11/20	Typeform Survey - English	Transit Service Connection	Increase weekend service, more trains, more times back to OC from LA				<input type="checkbox"/>	
98	Interested Party		08/11/20	Typeform Survey - English	Shade/Coverings	Irvine station has little to no shading and can be difficult to wait for trains under severe hot conditions.				<input type="checkbox"/>	
99	Interested Party		08/11/20	Typeform Survey - English	Access	Irvine's access to far side is problematic and needs an underpass alternative				<input type="checkbox"/>	
100	Interested Party		08/11/20	Typeform Survey - English	Safety/Emergency	It is absolutely crucial that you make significant changes to prevent homeless people from using stations and trains as their restrooms/bedrooms				<input type="checkbox"/>	
101	Interested Party		08/11/20	Typeform Survey - English	Signage/Accurate Information	It isn't always clear as to which side to be on while waiting for a train. Sometimes it changes due to track maintenance or other reasons.				<input type="checkbox"/>	
102	Interested Party		08/11/20	Typeform Survey - English	General	It really makes a difference to have protection				<input type="checkbox"/>	
103	Interested Party		08/11/20	Typeform Survey - English	General	Leisure rider				<input type="checkbox"/>	
104	Interested Party		08/11/20	Typeform Survey - English	Refreshments	Less expensive and more varied snack options, overpriced pretzels don't cut it!				<input type="checkbox"/>	
105	Interested Party		08/11/20	Typeform Survey - English	Support	Love Transit				<input type="checkbox"/>	
106	Interested Party		08/11/20	Typeform Survey - English	Support	Love your train!!!				<input type="checkbox"/>	
107	Interested Party		08/11/20	Typeform Survey - English	Other	Lower the costs!!! My family of 4 would love to ride more often but it's too expensive. It's less expensive for families to drive car instead. You must lower prices if you want more people to ride. In other countries it's MUCH cheaper to ride the public transportation. Lower prices and more families would ride more.				<input type="checkbox"/>	
108	Interested Party		08/11/20	Typeform Survey - English	Safety/Emergency	Make sure whatever amenities you add don't turn them into a homeless camp/hangout with little to no police presence.				<input type="checkbox"/>	
109	Interested Party		08/11/20	Typeform Survey - English	Misters	misters would be an awesome addition for summer time as well as outdoor heaters overhead.				<input type="checkbox"/>	
110	Interested Party		08/11/20	Typeform Survey - English	Transit Service Connection	More frequent trains and phone charging points near seating area				<input type="checkbox"/>	
111	Interested Party		08/11/20	Typeform Survey - English	Safety/Emergency	More lighting for safety reasons and officers doing rounds not sitting inside station / office				<input type="checkbox"/>	
112	Interested Party		08/11/20	Typeform Survey - English	Safety/Emergency	More lights throughout platform and security				<input type="checkbox"/>	
113	Interested Party		08/11/20	Typeform Survey - English	Transit Service Connection	More lines going more destinations				<input type="checkbox"/>	
114	Interested Party		08/11/20	Typeform Survey - English	Other	More offers and discounts during the year for families and individuals				<input type="checkbox"/>	77   Page
115	Interested Party		08/11/20	Typeform Survey - English	Seating	More seating				<input type="checkbox"/>	

Stakeholder	Stakeholder Type	Project Phase	Date Received	Source	Category	Issue / Comment	Lead	Follow up Action	Notes & Contact	Database	Location (City, State)
116	Interested Party		08/11/20	Typeform Survey - English	Safety/Emergency	more security at train stop for homeless. sad to see but maybe more social services be apart of the outreach to people.				<input type="checkbox"/>	
117	Interested Party		08/11/20	Typeform Survey - English	Safety/Emergency	More security for homeless in the area				<input type="checkbox"/>	
118	Interested Party		08/11/20	Typeform Survey - English	Shade/Coverings	More shade				<input type="checkbox"/>	
119	Interested Party		08/11/20	Typeform Survey - English	Shade/Coverings	More shade trees				<input type="checkbox"/>	
120	Interested Party		08/11/20	Typeform Survey - English	Shade/Coverings	More shaded areas at Laguna Niguel too much sun				<input type="checkbox"/>	
121	Interested Party		08/11/20	Typeform Survey - English	Shade/Coverings	More shelter				<input type="checkbox"/>	
122	Interested Party		08/11/20	Typeform Survey - English	Bike/Pedestrian Services	More silent trains and bike racks				<input type="checkbox"/>	
123	Interested Party		08/11/20	Typeform Survey - English	Other	more trains in general				<input type="checkbox"/>	
124	Interested Party		08/11/20	Typeform Survey - English	Shade/Coverings	More trees				<input type="checkbox"/>	
125	Interested Party		08/11/20	Typeform Survey - English	Support	My family and I love metrolink. It has contributed to so many loving memories. Thank you.				<input type="checkbox"/>	
126	Interested Party		08/11/20	Typeform Survey - English	Shade/Coverings	Need better shade!				<input type="checkbox"/>	
127	Interested Party		08/11/20	Typeform Survey - English	Refreshments	Need better snack OR food accommodations at SARTC and Orange!				<input type="checkbox"/>	
128	Interested Party		08/11/20	Typeform Survey - English	Transit Service Connection	Need bus service to and from station into lake forest				<input type="checkbox"/>	
129	Interested Party		08/11/20	Typeform Survey - English	Support Transit Service Connection	No Comment. Satisfied for now. Except would like to see the original Down Town Anaheim Station reopen.				<input type="checkbox"/>	
130	Interested Party		08/11/20	Typeform Survey - English	Seating	Oceanside definitely needs more seating on the far side tracks.				<input type="checkbox"/>	
131	Interested Party		08/11/20	Typeform Survey - English	Other	people would take the train more often if their experiences were positive. make the train a fun and beautiful time that doesnt make a passenger miss cars.				<input type="checkbox"/>	
132	Interested Party		08/11/20	Typeform Survey - English	Refreshments Restrooms	Restrooms and snacks would help greatly				<input type="checkbox"/>	
133	Interested Party		08/11/20	Typeform Survey - English	Restrooms	Restrooms at Tustin Metrolink would be nice.				<input type="checkbox"/>	
134	Interested Party		08/11/20	Typeform Survey - English	Safety/Emergency	safety				<input type="checkbox"/>	
135	Interested Party		08/11/20	Typeform Survey - English	Safety/Emergency	Safety measures related to hygiene is especially important - consider implementing extreme measures to prevent people from reverting back to using their personal vehicles for travel.				<input type="checkbox"/>	
136	Interested Party		08/11/20	Typeform Survey - English	Cleanliness Safety/Emergency Signage/Accurate Information	San Clemente is lacking: proper (CLEAN) seating, up to date train info(no information at all), vagrant control (not homeless!!- let me make that clear- we know our "homeless" there are only about 13 of them in town and they are a delight- the problem is not them) sleeping/urinating/defecating/leaving trash on platform-yelling, threatening, being on the tracks...				<input type="checkbox"/>	
137	Interested Party		08/11/20	Typeform Survey - English	Seating Shade/Coverings	San Juan Capistrano station is really bad as seating and covers go. It's rather unpleasant.				<input type="checkbox"/>	
138	Interested Party		08/11/20	Typeform Survey - English	Cleanliness	Sanitizer				<input type="checkbox"/>	
139	Interested Party		08/11/20	Typeform Survey - English	Other	Santa Ana is fine. I used to go to Orange and that was a pain.				<input type="checkbox"/>	
140	Interested Party		08/11/20	Typeform Survey - English	Seating	seating! more seating!				<input type="checkbox"/>	
141	Interested Party		08/11/20	Typeform Survey - English	Safety/Emergency	Security is important too. I look forward to our Redlands Station being completed and having LA and Palm Springs destinations				<input type="checkbox"/>	
142	Interested Party		08/11/20	Typeform Survey - English	Safety/Emergency	Security personnel				<input type="checkbox"/>	
143	Interested Party		08/11/20	Typeform Survey - English	Shade/Coverings	Shade/shelter really really would be nice				<input type="checkbox"/>	
144	Interested Party		08/11/20	Typeform Survey - English	Other	Since I'm retired I only ride once in a while and that was not a selection for this.				<input type="checkbox"/>	
145	Interested Party		08/11/20	Typeform Survey - English	Signage/Accurate Information	Sometimes it would be helpful to know which direction the train will be heading on the platform. For instance, Track 1 and Track 2 means nothing to someone new riding the rails. Which track is heading north and which one is going south? I would like signs that say LA Union Station or Oceanside/San Diego so at the very least I know the direction of the train in the event I am new or confused or running late, even though my end station might not exactly be LA Union Station or Oceanside/San Diego. In addition, I would like to see more of a display board of upcoming trains versus a scrolling message board. Something similar to what you see at airports with the departure/arrival board and at LA Union Station.				<input type="checkbox"/>	
146	Interested Party		08/11/20	Typeform Survey - English	Other	The automated ticketing machines can be difficult to use when the sun is glaring as it makes the display difficult to read.				<input type="checkbox"/>	
147	Interested Party		08/11/20	Typeform Survey - English	Opposition	The coronavirus is cutting back our desire to ride the train. Until it subsides, we won't be riding.				<input type="checkbox"/>	
148	Interested Party		08/11/20	Typeform Survey - English	Transit Service Connection	The most important thing for me is the frequency of trains.				<input type="checkbox"/>	
149	Interested Party		08/11/20	Typeform Survey - English	Safety/Emergency	The one thing that puts us off the most is the homeless problem at North Beach. We do not feel safe. We drive to SJC or Mission Viejo stations to avoid this. Otherwise we love taking the train to visit friends or catch Amtrak at Union Station - L A. In bad weather, it's great to avoid the traffic and bad driving conditions				<input type="checkbox"/>	
150	Interested Party		08/11/20	Typeform Survey - English	Other	The station at Laguna Niguel is not as nice as others.				<input type="checkbox"/>	
151	Interested Party		08/11/20	Typeform Survey - English	Restrooms	There are no accessible restrooms for Metro Link riders.				<input type="checkbox"/>	
152	Interested Party		08/11/20	Typeform Survey - English	Signage/Accurate Information	There should be better signage to help new or infrequent users navigate the station.				<input type="checkbox"/>	
153	Interested Party		08/11/20	Typeform Survey - English	Other	Ticketing machines that are readable in sunlight				<input type="checkbox"/>	
154	Interested Party		08/11/20	Typeform Survey - English	Transit Service Connection	Trains just need to be on time.				<input type="checkbox"/>	
155	Interested Party		08/11/20	Typeform Survey - English	Shade/Coverings	Tustin REALLY needs more sun shades in the Summer for the evening ride home to Riverside. Almost unbearable in the Summer.				<input type="checkbox"/>	
156	Interested Party		08/11/20	Typeform Survey - English	Support	Very happy with what is provided at stations				<input type="checkbox"/>	
157	Interested Party		08/11/20	Typeform Survey - English	Refreshments	Water station				<input type="checkbox"/>	
158	Interested Party		08/11/20	Typeform Survey - English	Transit Service Connection	we need a UCI shuttle to the train or light rail also Disneyland and John Wayne airport				<input type="checkbox"/>	
159	Interested Party		08/11/20	Typeform Survey - English	Safety/Emergency	We need Amtrak Police at the stations to keep customers safe				<input type="checkbox"/>	
160	Interested Party		08/11/20	Typeform Survey - English	General	We need to update to our station amenities to modern standards.				<input type="checkbox"/>	
161	Interested Party		08/11/20	Typeform Survey - English	Restrooms	Would there be more restrooms?				<input type="checkbox"/>	
162	Interested Party		08/12/20	Typeform Survey - English	Refreshments	Add drinking water fountain				<input type="checkbox"/>	

Stakeholder	Stakeholder Type	Project Phase	Date Received	Source	Category	Issue / Comment	Lead	Follow up Action	Notes & Contact	Database	Location (City, State)
163	Interested Party		08/12/20	Typeform Survey - English	Refreshments	Anaheim has nothing Auntie Anne's and Station is lifeless.				<input type="checkbox"/>	
164	Interested Party		08/12/20	Typeform Survey - English	Restrooms	Clean bathroom and more staff on site				<input type="checkbox"/>	
165	Interested Party		08/12/20	Typeform Survey - English	Signage/Accurate Information	Clear information on which track the train will be arriving on				<input type="checkbox"/>	
166	Interested Party		08/12/20	Typeform Survey - English	Access	Handicap help when you walk from the entrance to where to get the train				<input type="checkbox"/>	
167	Interested Party		08/12/20	Typeform Survey - English	Signage/Accurate Information	have information to connect with outside lines such as san diego's rail.				<input type="checkbox"/>	
168	Interested Party		08/12/20	Typeform Survey - English	Transit Service Connection	I don't want more amenities; I want more frequent train service, especially on Sundays				<input type="checkbox"/>	
169	Interested Party		08/12/20	Typeform Survey - English	General	I liked to take the train to downtown LA, to visit friends in Simi Valley and weekend trips to Santa Barbara. Since these pleasure trips and not necessary, I'm not using the train during the pandemic. I also haven't gone visiting either! Just staying home ...				<input type="checkbox"/>	
170	Interested Party		08/12/20	Typeform Survey - English	Transit Service Connection	I wish we had more stations and more busses integrated with the rail system				<input type="checkbox"/>	
171	Interested Party		08/12/20	Typeform Survey - English	Signage/Accurate Information	Information board of when the train will arrive, (estimation of time arrival), which platform to be at, etc..				<input type="checkbox"/>	
172	Interested Party		08/12/20	Typeform Survey - English	Refreshments	Maybe have food stalls				<input type="checkbox"/>	
173	Interested Party		08/12/20	Typeform Survey - English	Refreshments	More food options or beverages options ie, Starbucks or restaurants				<input type="checkbox"/>	
174	Interested Party		08/12/20	Typeform Survey - English	Safety/Emergency	More security cameras				<input type="checkbox"/>	
175	Interested Party		08/12/20	Typeform Survey - English	Shade/Coverings	More shade please				<input type="checkbox"/>	
176	Interested Party		08/12/20	Typeform Survey - English	Refreshments	More water fountain				<input type="checkbox"/>	
177	Interested Party		08/12/20	Typeform Survey - English	Refreshments Restrooms Safety/Emergency	Prefer more live staff to interact with. Improve restroom facilities. Remove homeless from being in 500 feet proximity of station and restrooms. More food and beverage options.				<input type="checkbox"/>	
178	Interested Party		08/12/20	Typeform Survey - English	Support	Public transportation is critically needed in California!				<input type="checkbox"/>	
179	Interested Party		08/12/20	Typeform Survey - English	Other	Purchase tickets on train without penalty				<input type="checkbox"/>	
180	Interested Party		08/12/20	Typeform Survey - English	Restrooms	Restroom needs a lot of improvement. It is just too dirty				<input type="checkbox"/>	
181	Interested Party		08/12/20	Typeform Survey - English	Restrooms	Restrooms				<input type="checkbox"/>	
182	Interested Party		08/12/20	Typeform Survey - English	Refreshments Restrooms	Restrooms for sure. Food and Drink station				<input type="checkbox"/>	
183	Interested Party		08/12/20	Typeform Survey - English	Shade/Coverings	Shade is important during summer days				<input type="checkbox"/>	
184	Interested Party		08/12/20	Typeform Survey - English	Restrooms Seating Shade/Coverings	Shade structures at Tustin don't work most of the day. Shade, seating, and restrooms are basic amenities that every station should have.				<input type="checkbox"/>	
185	Interested Party		08/12/20	Typeform Survey - English	Other	the train conductors some times they are very mid				<input type="checkbox"/>	
186	Interested Party		08/12/20	Typeform Survey - English	Seating	There's no-where to sit near where you board. OK, there's a few benches, but usually not enough at, for instance, Union Station, where you can wait inside - a 10 minute walk to the platform, but when you walk up the ramp where the train is supposed to be there's maybe one bench.				<input type="checkbox"/>	
187	Interested Party		08/12/20	Typeform Survey - English	Signage/Accurate Information	Trip departures/Arrivals updated on digital board				<input type="checkbox"/>	
188	Interested Party		08/12/20	Typeform Survey - English	Safety/Emergency	vandalism and thief in Buena Park station				<input type="checkbox"/>	
189	Interested Party		08/12/20	Typeform Survey - English	Support	very good				<input type="checkbox"/>	
190	Interested Party		08/13/20	Typeform Survey - English	Shade/Coverings	a permanent structure with AC might help more than just shade and fans				<input type="checkbox"/>	
191	Interested Party		08/13/20	Typeform Survey - English	Other	Cheaper fees				<input type="checkbox"/>	
192	Interested Party		08/13/20	Typeform Survey - English	Restrooms	Every Metrolink Station should have restrooms.				<input type="checkbox"/>	
193	Interested Party		08/13/20	Typeform Survey - English	Signage/Accurate Information	Fullerton Station - no consistency on which track trains leave from				<input type="checkbox"/>	
194	Interested Party		08/13/20	Typeform Survey - English	Safety/Emergency	More security on the platforms				<input type="checkbox"/>	
195	Interested Party		08/13/20	Typeform Survey - English	Other	Plugs to charge devices would be helpful.				<input type="checkbox"/>	
196	Interested Party		08/13/20	Typeform Survey - English	Shade/Coverings	Protection from the sun and rain should not be considered luxuries				<input type="checkbox"/>	
197	Interested Party		08/13/20	Typeform Survey - English	Other	The prices are too expensive to ride the Metrolink. Please make it more economical. Thank you				<input type="checkbox"/>	
198	Interested Party		08/13/20	Typeform Survey - English	Refreshments	Vending machines that work				<input type="checkbox"/>	
199	Interested Party		08/14/20	Typeform Survey - English	Other	Sometimes not costs effective for multiple people traveling together.				<input type="checkbox"/>	
200	Interested Party		08/14/20	Typeform Survey - English	Support	I love the train! My son went to school in LA and took Metro Link daily for 2 years. I take Amtrak for trips, any chance I get.				<input type="checkbox"/>	
201	Interested Party		08/14/20	Typeform Survey - English	Support	Keep up the good work				<input type="checkbox"/>	
202	Interested Party		08/14/20	Typeform Survey - English	Access	Easier options in ticket machines				<input type="checkbox"/>	
203	Interested Party		08/15/20	Typeform Survey - English	Refreshments	Would love to see vending machines and phone charging stations available				<input type="checkbox"/>	
204	Interested Party		08/16/20	Typeform Survey - English	Safety/Emergency	Safety is also a concern.				<input type="checkbox"/>	
205	Interested Party		08/16/20	Typeform Survey - English	Transit Service Connection	Awareness and frequency increased for all stations				<input type="checkbox"/>	
206	Interested Party		08/16/20	Typeform Survey - English	Access	Safer ways to access the other side of the station.				<input type="checkbox"/>	
207	Interested Party		08/16/20	Typeform Survey - English	Cleanliness	Hand sanitizer on the train would be nice.				<input type="checkbox"/>	
208	Interested Party		08/17/20	Typeform Survey - English	Shade/Coverings	Would love larger shade/shelters to wait under. The current shade structures are ineffective because they are too small.				<input type="checkbox"/>	
209	Interested Party		08/17/20	Typeform Survey - English	Shade/Coverings	Rain shelter at Laguna Niguel station is really insufficient				<input type="checkbox"/>	
210	Interested Party		08/17/20	Typeform Survey - English	Other	Person to help with train to take if it's your first time, like it was for myself. No one around to assist.				<input type="checkbox"/>	
211	Interested Party		08/17/20	Typeform Survey - English	Restrooms	Have restroom each station				<input type="checkbox"/>	
212	Interested Party		08/18/20	Typeform Survey - English	Safety/Emergency	I LOVE this station at Santa Ana, but there are incresing numbers of derelicts, homeless and junkies around that need to go. They scare me and there is little security, so I think you should know about that and address it for patrons like me. Thank you!				<input type="checkbox"/>	

Stakeholder	Stakeholder Type	Project Phase	Date Received	Source	Category	Issue / Comment	Lead	Follow up Action	Notes & Contact	Database	Location (City, State)
213	Interested Party		08/18/20	Typeform Survey - English	Transit Service Connection	More frequent, reliable train service is most important.				<input type="checkbox"/>	
214	Interested Party		08/19/20	Typeform Survey - English	Support	I love the train				<input type="checkbox"/>	
215	Interested Party		08/19/20	Typeform Survey - English	Safety/Emergency	Enhanced security				<input type="checkbox"/>	
216	Interested Party		08/19/20	Typeform Survey - English	Safety/Emergency	Stations need security for cars and people. Too many homeless and other people loitering.				<input type="checkbox"/>	
217	Interested Party		08/19/20	Typeform Survey - English	Transit Service Connection	Better ticketing machines would help as well as better connections to San Diego County.				<input type="checkbox"/>	
218	Interested Party		08/20/20	Typeform Survey - English	Safety/Emergency	Feel safer when there are real live people working there				<input type="checkbox"/>	
219	Interested Party		08/20/20	Typeform Survey - English	Support	Good option, needs more publicity				<input type="checkbox"/>	
220	Interested Party		08/20/20	Typeform Survey - English	Access	It would be nice if people in wheelchairs could enjoy the quiet car				<input type="checkbox"/>	
221	Interested Party		08/20/20	Typeform Survey - English	Bike/Pedestrian Services	Way finding for bike car				<input type="checkbox"/>	
222	Interested Party		08/20/20	Typeform Survey - English	Other	A strong focus on decreasing expenses to keep costs down is much needed to promote more train travel. Since cars costs \$100 to lease per month, how can it make financial sense for the average monthly pass to cost \$250 per month? Metro is doing a fantastic job of maintaining lower fee structure to accommodate the needs of poor working class people. Metrolink needs to be utilized more and the only way I see that is by making it more affordable. The fares are outrageous so rather than focusing on greater accommodations during a couple months of severe weather in LA, STRIVE to keep expenses down and fill as many seats on each train ride as possible. We are increasingly entering into work from home mode. Train travel needs to be cheaper and more competitive to driving. With ride sharing services now out of the picture here in CA due to extreme democratic policies this is the chance for Metrolink to increase their capabilities and bring the one way fare down to under \$5 to downtown LA. metro costs \$2 and most people don't even bother to pay that because no one checks for tickets. There is far too much competition for Metrolink so worry less about extreme weather and more about how to increase ridership. As you are aware management at Metrolink has done a very poor job of adapting to the technological advances over the past few decades so please reach out to the newly unemployed folks in silicon valley to see if they would be willing to consult and come up with cost cutting measures. The new station in placencia is a huge waste of resources. It is only a few miles extra to go to the Fullerton station. From a practical point of view it is important to understand that the average Metrolink rider owns a car and can very easily just drive instead of taking the train. Please consider being more financially competitive and drop the fares. Unless the employer is subsidizing the commuting cost, it doesn't make sense to pay so much to commute. The amenities are good enough. Convince the average commuter to switch to rail by making it more affordable to get to work. You're welcome				<input type="checkbox"/>	
223	Interested Party		08/20/20	Typeform Survey - English	Other	Is Wi-Fi possible?				<input type="checkbox"/>	
224	Interested Party		08/21/20	Typeform Survey - English	Seating Shade/Coverings	Tustin & Santa Ana need more shelter from the rain & more seats under the covers				<input type="checkbox"/>	
225	Interested Party		08/21/20	Typeform Survey - English	Signage/Accurate Information	update schedule changes				<input type="checkbox"/>	
226	Interested Party		08/21/20	Typeform Survey - English	Refreshments	Vending machine with water and snacks for late trains				<input type="checkbox"/>	
227	Interested Party		08/21/20	Typeform Survey - English	Access Shade/Coverings	I don't understand why there wasn't a walking tunnel built at the Irvine station that goes under the tracks. This could of served two purposes. Needed cover from the sun and rain and easy access for the handy cap to get to the other side of the tracks? No need for an elevator.				<input type="checkbox"/>	
228	Interested Party		08/21/20	Typeform Survey - English	Shade/Coverings	Add windscreens at certain points along platform to duck behind				<input type="checkbox"/>	
229	Interested Party		08/21/20	Typeform Survey - English	Other	More recycling at stations				<input type="checkbox"/>	
230	Interested Party		08/21/20	Typeform Survey - English	Support	Irvine station is great.				<input type="checkbox"/>	
231	Interested Party		08/21/20	Typeform Survey - English	Access	Fullerton station is a disaster... The concrete stairs leading up and over the tracks are breaking down and you can see the rebar- rust is dripping down the sides It's an embarrassment to meet anyone there now I notified the city of Fullerton- they say they can't repair unless they get permission from the railroad?!?!?				<input type="checkbox"/>	
232	Interested Party		08/21/20	Typeform Survey - English	Support	I enjoy the metrolink and am grateful to have a station close to my home				<input type="checkbox"/>	
233	Interested Party		08/22/20	Typeform Survey - English	Support	Love it				<input type="checkbox"/>	
234	Interested Party		08/22/20	Typeform Survey - English	Transit Service Connection	There should be later stops, 6:00 it's late enough. If you go to the beach and want to have dinner you have to rush cause you'll miss the 6:00 pm train.				<input type="checkbox"/>	
235	Interested Party		08/22/20	Typeform Survey - English	Shade/Coverings	Add Shade to the ADA areas/ramps				<input type="checkbox"/>	
236	Interested Party		08/22/20	Typeform Survey - English	Transit Service Connection	run more frequent or later times				<input type="checkbox"/>	
237	Interested Party		08/22/20	Typeform Survey - English	Refreshments	Food stations				<input type="checkbox"/>	
238	Interested Party		08/22/20	Typeform Survey - English	Refreshments	Food				<input type="checkbox"/>	
239	Interested Party		08/22/20	Typeform Survey - English	Support	Love the sway of trains				<input type="checkbox"/>	
240	Interested Party		08/22/20	Typeform Survey - English	Support	Fullerton station is great				<input type="checkbox"/>	
241	Interested Party		08/22/20	Typeform Survey - English	Support	Very nice right right				<input type="checkbox"/>	
242	Interested Party		08/22/20	Typeform Survey - English	Support	Love the train.				<input type="checkbox"/>	
243	Interested Party		08/23/20	Typeform Survey - English	Other Shade/Coverings	NB bound side of station smells like cat urine, covering terrible for rain, people run across tracks				<input type="checkbox"/>	
244	Interested Party		08/23/20	Typeform Survey - English	Safety/Emergency	visible security				<input type="checkbox"/>	
245	Interested Party		08/23/20	Typeform Survey - English	Transit Service Connection	I been using the trains for almost a decade now. The app has been a life savior, but can be glitchy. When trying to pull up my ticket.				<input type="checkbox"/>	
246	Interested Party		08/23/20	Typeform Survey - English	Transit Service Connection	Would like more trains operating especially during weekday daytime and weekend nights				<input type="checkbox"/>	
247	Interested Party		08/23/20	Typeform Survey - English	Refreshments	Vending machines at Laguna Niguel station?				<input type="checkbox"/>	
248	Interested Party		08/23/20	Typeform Survey - English	Transit Service Connection	More time schedules				<input type="checkbox"/>	
249	Interested Party		08/23/20	Typeform Survey - English	Safety/Emergency	Men staring at women.				<input type="checkbox"/>	
250	Interested Party		08/23/20	Typeform Survey - English	Transit Service Connection	Need train come to thermal calif 92274				<input type="checkbox"/>	
251	Interested Party		08/23/20	Typeform Survey - English	Other	I won't consider riding again until masks are not required.				<input type="checkbox"/>	
252	Interested Party		08/23/20	Typeform Survey - English	Seating	We need more chairs				<input type="checkbox"/>	
253	Interested Party		08/23/20	Typeform Survey - English	Support	Really enjoy the train				<input type="checkbox"/>	
254	Interested Party		08/24/20	Typeform Survey - English	Shade/Coverings	It is good but all OCTA bus stops should have roof				<input type="checkbox"/>	

Stakeholder	Stakeholder Type	Project Phase	Date Received	Source	Category	Issue / Comment	Lead	Follow up Action	Notes & Contact	Database	Location (City, State)
255	Interested Party		08/24/20	Typeform Survey - English	Cleanliness Restrooms	need to keep the restroom clean				<input type="checkbox"/>	
256	Interested Party		08/24/20	Typeform Survey - English	Transit Service Connection	Add more seating!				<input type="checkbox"/>	
257	Interested Party		08/24/20	Typeform Survey - English	Support	Everything seems good				<input type="checkbox"/>	
258	Interested Party		08/24/20	Typeform Survey - English	Cleanliness	Sanitizer				<input type="checkbox"/>	
259	Interested Party		08/24/20	Typeform Survey - English	Support	I like the train rides when I go on the trip				<input type="checkbox"/>	
260	Interested Party		08/24/20	Typeform Survey - English	Refreshments	Some vending machines for drinks.				<input type="checkbox"/>	
261	Interested Party		08/24/20	Typeform Survey - English	Signage/Accurate Information	Real time train info, "zoom" kiosk to talk to a human				<input type="checkbox"/>	
262	Interested Party		08/24/20	Typeform Survey - English	Support	We like used the train to relax				<input type="checkbox"/>	
263	Interested Party		08/24/20	Typeform Survey - English	Restrooms Shade/Coverings	Anaheim Canyon could benefit greatly from restrooms of shade at this time. Besides that thank you for great service				<input type="checkbox"/>	
264	Interested Party		08/24/20	Typeform Survey - English	Support	I miss riding the train!				<input type="checkbox"/>	
265	Interested Party		08/24/20	Typeform Survey - English	Transit Service Connection	Later trains				<input type="checkbox"/>	
266	Interested Party		08/24/20	Typeform Survey - English	Restrooms	More restrooms at stations would be awesome!				<input type="checkbox"/>	
267	Interested Party		08/24/20	Typeform Survey - English	Shade/Coverings	Anaheim Hills - needs shade badly in the afternoon faces the sun and the covers there now do absolutely nothing				<input type="checkbox"/>	
268	Interested Party		08/24/20	Typeform Survey - English	Signage/Accurate Information	Display stations				<input type="checkbox"/>	
269	Interested Party		08/24/20	Typeform Survey - English	Other	car seating could use some refurbishing. Also power source at seats would be helpful to allow connection to devices.				<input type="checkbox"/>	
270	Interested Party		08/24/20	Typeform Survey - English	Shade/Coverings	Need shades				<input type="checkbox"/>	
271	Interested Party		08/24/20	Typeform Survey - English	Cleanliness	SANITIZER STATION				<input type="checkbox"/>	
272	Interested Party		08/24/20	Typeform Survey - English	Transit Service Connection	This is the least of your concerns. Doing what you can to return ridership to pre-pandemic levels is much more important. Consider DISCOUNTS.				<input type="checkbox"/>	
273	Interested Party		08/24/20	Typeform Survey - English	Restrooms	Have more restrooms rather than portal potty				<input type="checkbox"/>	
274	Interested Party		08/24/20	Typeform Survey - English	Safety/Emergency	There should be some type of checking of bathrooms at stations in San Juan Capistrano there were homeless living in the restroom.				<input type="checkbox"/>	
275	Interested Party		08/24/20	Typeform Survey - English	Shade/Coverings	More covered areas for evening shade/rain protection on Track 1				<input type="checkbox"/>	
276	Interested Party		08/24/20	Typeform Survey - English	Shade/Coverings	I think more shaded area would make the biggest difference.				<input type="checkbox"/>	
277	Interested Party		08/24/20	Typeform Survey - English	Safety/Emergency	I'm not riding now because of Covid-19				<input type="checkbox"/>	
278	Interested Party		08/24/20	Typeform Survey - English	Support	Not really riding the train right now, but look forward to be able to hopefully by next year				<input type="checkbox"/>	
279	Interested Party		08/24/20	Typeform Survey - English	Refreshments	food/drinks/snacks available for purchase				<input type="checkbox"/>	
280	Interested Party		08/24/20	Typeform Survey - English	Restrooms Shade/Coverings	Biggest issue, for me is cover when it's hot out, I have to time it fairly carefully on my walk from car (Tustin/Santa Ana) to train when it's very hot. One issue that's very rarely a problem (Tustin) but when it is a problem it can cause some anxiety is bathrooms. There's not really any place you can use a bathroom that's close (especially since COVID).				<input type="checkbox"/>	
281	Interested Party		08/24/20	Typeform Survey - English	Signage/Accurate Information	Display actual arrival times for next train on a digital sign at the station				<input type="checkbox"/>	
282	Interested Party		08/24/20	Typeform Survey - English	Support	I think they have improved since the metro link started				<input type="checkbox"/>	
283	Interested Party		08/24/20	Typeform Survey - English	Shade/Coverings	I think the Laguna Niguel/Mission Viejo station needs more shade for sunny days.				<input type="checkbox"/>	
284	Interested Party		08/24/20	Typeform Survey - English	Safety/Emergency	implement procedures to eliminate homeless people from occupying benches for people waiting for buses and trains				<input type="checkbox"/>	
285	Interested Party		08/24/20	Typeform Survey - English	Transit Service Connection	Frequency is obviously the most important element.				<input type="checkbox"/>	
286	Interested Party		08/24/20	Typeform Survey - English	Bike/Pedestrian Services Restrooms	Irvine needs a better way to get bike to NB tracks. Tustin NEEDS a toilet!				<input type="checkbox"/>	
287	Interested Party		08/24/20	Typeform Survey - English	Safety/Emergency	lack of security				<input type="checkbox"/>	
288	Interested Party		08/24/20	Typeform Survey - English	Signage/Accurate Information	Knowing train timing is single most important thing				<input type="checkbox"/>	
289	Interested Party		08/24/20	Typeform Survey - English	Restrooms Shade/Coverings	Not enough shade, not enough bathrooms				<input type="checkbox"/>	
290	Interested Party		08/24/20	Typeform Survey - English	Signage/Accurate Information	Reader boards at Oceanside station to clarify which platform to be on if entering station from the north or south.				<input type="checkbox"/>	
291	Interested Party		08/24/20	Typeform Survey - English	Support	I'm glad this is being asked!				<input type="checkbox"/>	
292	Interested Party		08/24/20	Typeform Survey - English	Transit Service Connection	Notifications are key. I have noticed a lot of rider confusion especially with new riders or visitors because of this.				<input type="checkbox"/>	
293	Interested Party		08/24/20	Typeform Survey - English	Transit Service Connection	I hope Orange County line runs more late times cause if I miss the last train I'm stuck in Irvine while I live in LA				<input type="checkbox"/>	
294	Interested Party		08/24/20	Typeform Survey - English	Cleanliness Signage/Accurate Information	Cleaner trains & text alerts for late trains.				<input type="checkbox"/>	
295	Interested Party		08/24/20	Typeform Survey - English	Shade/Coverings	More shade would be great!				<input type="checkbox"/>	
296	Interested Party		08/24/20	Typeform Survey - English	Opposition	Your services fucking suck. If it wasn't because of work and long drive would never use your sorry ass trains.				<input type="checkbox"/>	
297	Interested Party		08/24/20	Typeform Survey - English	Cleanliness	Trains need to keep to schedules and cleaner trains.				<input type="checkbox"/>	
298	Interested Party		08/24/20	Typeform Survey - English	Other	Please revert Fullerton station track order, going North would be much more convenient on track 1 closer to parking lot.				<input type="checkbox"/>	
299	Interested Party		08/24/20	Typeform Survey - English	Access	I board at the Irvine station. The big issue there is the elevators failure rate as the stairs are difficult for me at my age. When the elevators are out I drive to the Tustin station.				<input type="checkbox"/>	
300	Interested Party		08/24/20	Typeform Survey - English	Transit Service Connection	It would be great to have buses and metrolink coordinate their schedules.				<input type="checkbox"/>	
301	Interested Party		08/24/20	Typeform Survey - English	Bike/Pedestrian Services	I ride a bicycle and hauling it up the stairs or waiting for the elevator at pedestrian overpasses is inconvenient compared to crossing at grade, or being able to enter the station on the side of the tracks my train will arrive at.				<input type="checkbox"/>	
302	Interested Party		08/24/20	Typeform Survey - English	Safety/Emergency	Remove homeless from parking and premises				<input type="checkbox"/>	
303	Interested Party		08/24/20	Typeform Survey - English	Signage/Accurate Information	San Clemente north beach is a nice station though it's missing train information.				<input type="checkbox"/>	

Stakeholder	Stakeholder Type	Project Phase	Date Received	Source	Category	Issue / Comment	Lead	Follow up Action	Notes & Contact	Database	Location (City, State)
304	Interested Party		08/24/20	Typeform Survey - English	Cleanliness Other	Social distancing would be helpful on board with opening windows and more single seat options.				<input type="checkbox"/>	
305	Interested Party		08/24/20	Typeform Survey - English	Access	Having an actual Metrolink personnel/office would be helpful. (e.g. purchase tickets, questions, updates, etc.)				<input type="checkbox"/>	
306	Interested Party		08/24/20	Typeform Survey - English	Support	Your services is amazing and really good				<input type="checkbox"/>	
307	Interested Party		08/24/20	Typeform Survey - English	Restrooms	Need restrooms				<input type="checkbox"/>	
308	Interested Party		08/24/20	Typeform Survey - English	Safety/Emergency	Irvine/Tustin stations feel deserted at night. Perhaps add restaurant/theater spaces, so it won't be so scary.				<input type="checkbox"/>	
309	Interested Party		08/24/20	Typeform Survey - English	Other	Improve the ticket vending machines.				<input type="checkbox"/>	
310	Interested Party		08/24/20	Typeform Survey - English	Seating Shade/Coverings	There really needs to be more shade and seating. Even without a heatwave, it is awful to stand or sit in the sun waiting for the train.				<input type="checkbox"/>	
311	Interested Party		08/24/20	Typeform Survey - English	Support	Nice stations				<input type="checkbox"/>	
312	Interested Party		08/24/20	Typeform Survey - English	Safety/Emergency	Need security.				<input type="checkbox"/>	
313	Interested Party		08/24/20	Typeform Survey - English	Support	Actually I am pretty happy about Metrolink train stations.				<input type="checkbox"/>	
314	Interested Party		08/24/20	Typeform Survey - English	Restrooms Shade/Coverings Signage/Accurate Information	Bathrooms and enclosed shelter at every station, with clear, unambiguous information on arrivals/departures, inside and out.				<input type="checkbox"/>	
315	Interested Party		08/24/20	Typeform Survey - English	Safety/Emergency	Homeless using parking lots to urinate etc.				<input type="checkbox"/>	
316	Interested Party		08/24/20	Typeform Survey - English	Refreshments	Vending machines				<input type="checkbox"/>	
317	Interested Party		08/24/20	Typeform Survey - English	Restrooms	I think that smaller stations, such as Norwalk/Santa Fe Springs should have at least one restroom. There have been times when I have to either wait 30min-1 hr to use the trains toilet or I have to walk 10 min to the nearest restaurant.				<input type="checkbox"/>	
318	Interested Party		08/24/20	Typeform Survey - English	Restrooms	It is very uneven which stations have restrooms and which do not. I think that the Tustin station would be improved by the addition of a restroom. There are other non-Amtrak stations (I.e Buena Park) that have restrooms.				<input type="checkbox"/>	
319	Interested Party		08/24/20	Typeform Survey - English	Other	Have Amtrak agents at staffed stations able to sell both Amtrak and Metrolink tickets so passengers not comfortable with TVMs have an additional way to buy tickets.				<input type="checkbox"/>	
320	Interested Party		08/24/20	Typeform Survey - English	Signage/Accurate Information	I would prefer honest communication to riders. Let the patrons know why the train is late. Take responsibility if it is the fault of Metrolink. I see blame placed on everyone else but Metrolink when the train is delayed.				<input type="checkbox"/>	
321	Interested Party		08/24/20	Typeform Survey - English	Other	Change the options for question on how often we ride!				<input type="checkbox"/>	
322	Interested Party		08/24/20	Typeform Survey - English	Transit Service Connection	Stations in suburban areas are usually so isolated from reliable public transportation and travel destinations that they are already not worth traveling to, unless you have specific connection information. Taking Metrolink in the heat makes this experience much worse.				<input type="checkbox"/>	
323	Interested Party		08/24/20	Typeform Survey - English	Environmental	Drainage is a problem at Tustin Station. Crossing under tracks flood during heavy rain or when drains aren't cleared.				<input type="checkbox"/>	
324	Interested Party		08/24/20	Typeform Survey - English	Transit Service Connection	More trains to the AV				<input type="checkbox"/>	
325	Interested Party		08/24/20	Typeform Survey - English	Signage/Accurate Information	Better arrival information is the most important.				<input type="checkbox"/>	
326	Interested Party		08/24/20	Typeform Survey - English	Support	I like the new late hours on the San Bernardino line.				<input type="checkbox"/>	
327	Interested Party		08/24/20	Typeform Survey - English	Cleanliness Restrooms	Cleaner bathrooms on the train would be great.				<input type="checkbox"/>	
328	Interested Party		08/24/20	Typeform Survey - English	Shade/Coverings	Definitely needs better rain protection, the Tustin station particularly. I would like to see horizontal barriers from the weather.				<input type="checkbox"/>	
329	Interested Party		08/24/20	Typeform Survey - English	Signage/Accurate Information	Digital sign boards with train arrivals/departures and delay updates				<input type="checkbox"/>	
330	Interested Party		08/24/20	Typeform Survey - English	Refreshments Shade/Coverings	Santa Ana needs more amenities. This is also an Amtrak stop to/from San Diego. A restaurant, expanded waiting area, shaded areas are really needed.				<input type="checkbox"/>	
331	Interested Party		08/24/20	Typeform Survey - English	Support	I enjoy the metro.				<input type="checkbox"/>	
332	Interested Party		08/24/20	Typeform Survey - English	Refreshments	Train station needs more shops/ dining.				<input type="checkbox"/>	
333	Interested Party		08/24/20	Typeform Survey - English	Shade/Coverings	Tustin station definitely needs more shade.				<input type="checkbox"/>	
334	Interested Party		08/24/20	Typeform Survey - English	Environmental General Other	There was no option for "less than once a month" or "none of the above" so I chose the maximum option. The frequency question may not give you accurate results. Also, my answers would have been different for the "extreme weather" question if you had separated them out. Hot weather has no impact on my desire to ride the train, but rain does. Having a list of items in a survey question is poor design.				<input type="checkbox"/>	
335	Interested Party		08/24/20	Typeform Survey - English	Access	ARTIC needs vacant spaces to be filled. Fullerton Station should have an easier way to cross platforms.				<input type="checkbox"/>	
336	Interested Party		08/24/20	Typeform Survey - English	Transit Service Connection	Increasing train frequency, electrification, and double tracking are all more likely to increase ridership than improved station amenities.				<input type="checkbox"/>	
337	Interested Party		08/24/20	Typeform Survey - English	Other	I don't ride as often as indicated in your survey,you didn't provide enough choices for an answer. I haven't ridden due to the Covid situation.				<input type="checkbox"/>	
338	Interested Party		08/24/20	Typeform Survey - English	Transit Service Connection	I used to ride the train every day but I have stopped since the evening schedule shifted. I would go back to riding regularly if there were more trains from Irvine going north in the evening.				<input type="checkbox"/>	
339	Interested Party		08/24/20	Typeform Survey - English	Shade/Coverings	More shading/ coverage.				<input type="checkbox"/>	
340	Interested Party		08/24/20	Typeform Survey - English	Signage/Accurate Information	At Fullerton trains now use both platforms for LA-bound service, but there's no signage or information telling you on which platform the next train will arrive. Very stressful. Need better signage to direct passengers to the right platform.				<input type="checkbox"/>	
341	Interested Party		08/24/20	Typeform Survey - English	Transit Service Connection	Better schedules for traveling				<input type="checkbox"/>	
342	Interested Party		08/24/20	Typeform Survey - English	Safety/Emergency	More enforcement to remove homeless from platforms and parking areas. I do not feel safe, especially when it gets darker earlier.				<input type="checkbox"/>	
343	Interested Party		08/24/20	Typeform Survey - English	Bike/Pedestrian Services	Make it easier to get a bicycle on the train				<input type="checkbox"/>	
344	Interested Party		08/24/20	Typeform Survey - English	Cleanliness Restrooms	Public restrooms (not portable) available at Riverside - Downtown with regular cleanings.				<input type="checkbox"/>	
345	Interested Party		08/24/20	Typeform Survey - English	Other	Covid19 is what keeps me from riding Metrolink. Not until a vaccine exists will I ride the trains again.				<input type="checkbox"/>	
346	Interested Party		08/24/20	Typeform Survey - English	Refreshments	Coffee or even a vending machine would be nice.				<input type="checkbox"/>	
347	Interested Party		08/24/20	Typeform Survey - English	Signage/Accurate Information	Train status and % capacity available on monitors, please.				<input type="checkbox"/>	
348	Interested Party		08/24/20	Typeform Survey - English	Seating	Tustin has no places other than the platform itself to sit and relax while waiting for the Train like so many other stations do.				<input type="checkbox"/>	
349	Interested Party		08/24/20	Typeform Survey - English	Other	The main reason I'm not riding the train is because the places I want to visit are closed due to Covid-19; therefore, there is no reason to make the trip.				<input type="checkbox"/>	

Stakeholder	Stakeholder Type	Project Phase	Date Received	Source	Category	Issue / Comment	Lead	Follow up Action	Notes & Contact	Database	Location (City, State)
350	Interested Party		08/24/20	Typeform Survey - English	Other	The kiosks are backed up sometimes, but I usually use the phone app instead.				<input type="checkbox"/>	
351	Interested Party		08/24/20	Typeform Survey - English	Support	Great service.				<input type="checkbox"/>	
352	Interested Party		08/24/20	Typeform Survey - English	Transit Service Connection	OCTA Bus connections should have less stops so that the frequency is higher, even if I have to walk more to a bus stop before I arrive at the Metrolink Station				<input type="checkbox"/>	
353	Interested Party		08/24/20	Typeform Survey - English	Signage/Accurate Information	Monitors showing the real-time minutes until the train is to arrive.				<input type="checkbox"/>	
354	Interested Party		08/24/20	Typeform Survey - English	Restrooms	Restrooms in all stations should be minimum requirement.				<input type="checkbox"/>	
355	Interested Party		08/24/20	Typeform Survey - English	Access	Less stairs				<input type="checkbox"/>	
356	Interested Party		08/24/20	Typeform Survey - English	Shade/Coverings	More trees please!				<input type="checkbox"/>	
357	Interested Party		08/24/20	Typeform Survey - English	Signage/Accurate Information	More frequent train arrival / departure electronic signage updates. An electronic / variable sign to announce what track next train arrives / departs from.				<input type="checkbox"/>	
358	Interested Party		08/24/20	Typeform Survey - English	Refreshments	Coffee shop.				<input type="checkbox"/>	
359	Interested Party		08/24/20	Typeform Survey - English	Refreshments	Filtered water				<input type="checkbox"/>	
360	Interested Party		08/24/20	Typeform Survey - English	Restrooms	The needs to be a restroom installed at the Tustin station, and for that matter any other station that lacks a bathroom. Metrolink is a commuter train and restrooms at the stations are a must. This applies even more so to Amtrak, given it travels even longer distances, and delays are rather frequent.				<input type="checkbox"/>	
361	Interested Party		08/24/20	Typeform Survey - English	Signage/Accurate Information	Better digital displays that show more details than what the current displays show. Screens with multiple lines of information. Like the next two or three trains arriving and the minutes before expected arrival. The single line of text on the current platform displays isn't helpful at all.				<input type="checkbox"/>	
362	Interested Party		08/24/20	Typeform Survey - English	Transit Service Connection	You're focused on the wrong thing, station amenities are a low priority over increased schedules, finding a way to make travel more affordable, taking the train is \$14 a day, I can drive there for less than half that and I dont have to deal with the odd times, I either get to work 1h30mins early or 10 mins late, then I have 12 mins after I get off to make the train or I have to uber from fullerton. In Japan you just go to the train station, 24hours a day, reduced service after 3am but still service.				<input type="checkbox"/>	
363	Interested Party		08/24/20	Typeform Survey - English	Seating	Make seats a little more comfortable.				<input type="checkbox"/>	
364	Interested Party		08/25/20	Typeform Survey - English	Shade/Coverings	Preferably more trees around the station platforms to create shade				<input type="checkbox"/>	
365	Interested Party		08/25/20	Typeform Survey - English	Refreshments	It would be nice to have something to eat and drink. A hot dog and a pelligrino.				<input type="checkbox"/>	
366	Interested Party		08/25/20	Typeform Survey - English	Other	Keep on improving performance and customer service.				<input type="checkbox"/>	
367	Interested Party		08/25/20	Typeform Survey - English	Signage/Accurate Information	Better information about track changes and arrival time				<input type="checkbox"/>	
368	Interested Party		08/25/20	Typeform Survey - English	Refreshments	Place to fill water bottles.				<input type="checkbox"/>	
369	Interested Party		08/25/20	Typeform Survey - English	Transit Service Connection	I'm less concerned about station amenities and more concerned with reliable, very frequent transfers between ARTIC and Disneyland. A Peoplemover or Monorail should be built and with a bit more frequent train service I would take the train to Disneyland ALL THE TIME!				<input type="checkbox"/>	
370	Interested Party		08/25/20	Typeform Survey - English	Refreshments Seating Transit Service Connection	Many stations in Orange County seem to accommodate commuters who drive to the station, park or are dropped off, and transfer directly to the train. While I have a car now, I did not for many years as a Metrolink rider, and had to find ways to stay comfortable during long waits which were often much more bearable at Union Station. More indoor seating and less sit-in dining spaces (with more fast-serve food stands and vending machines) would also make stations more accessible to elderly and disabled passengers, as well as students who ride the train when they don't have cars.				<input type="checkbox"/>	
371	Interested Party		08/25/20	Typeform Survey - English	Cleanliness	There are a lot of homeless at this station sometimes it smells bad				<input type="checkbox"/>	
372	Interested Party		08/25/20	Typeform Survey - English	Access	If Fullerton Station builds another parking structure at the Amtrak parking lot, include a bridge over the tracks attached to the new parking structure.				<input type="checkbox"/>	
373	Interested Party		08/25/20	Typeform Survey - English	Environmental	Hard to ride in the rain, don't like to get my feet wet.				<input type="checkbox"/>	
374	Interested Party		08/25/20	Typeform Survey - English	Support	I miss Metrolink. My last trip was on the day the Covid pandemic toppled everything on March 17. The conductor on the OC Line for the evening rush hour trip was the coolest friendliest guy. The train was half empty upon arrival at Tustin going towards LA, and we all knew why. Fear. But riding that train made me relieved of any uncertainty going on because that conductor was able to still crack wise and do his job. A real cool dude! Hope all is well!				<input type="checkbox"/>	
375	Interested Party		08/25/20	Typeform Survey - English	Support	Love riding metrolink				<input type="checkbox"/>	
376	Interested Party		08/25/20	Typeform Survey - English	Shade/Coverings	Most important thing is more coverings, for both rain and extreme sun. Severely lacking at every station.				<input type="checkbox"/>	
377	Interested Party		08/25/20	Typeform Survey - English	Cleanliness	Hand sanitizer is needed. More lines that stop in Commerce en route to OC - the 5:55pm is too early				<input type="checkbox"/>	
378	Interested Party		08/25/20	Typeform Survey - English	Safety/Emergency	Again, the Tustin station pathways to the nearby gas station and restaurants are dangerous! Additionally, homeless people bother pedestrians walking from the train station to the gas station and restaurants.				<input type="checkbox"/>	
379	Interested Party		08/25/20	Typeform Survey - English	Seating Shade/Coverings	Built indoor seating areas for safety purposes and more operation times if possible.				<input type="checkbox"/>	
380	Interested Party		08/25/20	Typeform Survey - English	Access Refreshments Signage/Accurate Information	Real food and drink vendors, accuracy on new screens (airports do it all day long) screens on both SB NB, Golf carts for disabled on arrival at LAX.				<input type="checkbox"/>	
381	Interested Party		08/25/20	Typeform Survey - English	Transit Service Connection	Need more train stop at City of Commerce.				<input type="checkbox"/>	
382	Interested Party		08/25/20	Typeform Survey - English	Other	Charging Stations				<input type="checkbox"/>	
383	Interested Party		08/25/20	Typeform Survey - English	Safety/Emergency	More security at train stations would be great! There are too many homeless who are high in life that you have no idea what they will do. Orange station has no security or protection.				<input type="checkbox"/>	
384	Interested Party		08/25/20	Typeform Survey - English	Signage/Accurate Information	It helps when you send out alerts when train runs late				<input type="checkbox"/>	
385	Interested Party		08/25/20	Typeform Survey - English	Safety/Emergency	The Fullerton station needs security presence. There's a lot of homeless people in and around the parking structure. Coming off the train at 9 at night and knowing there's no security at Fullerton is stressful. I usually run to my car in that instance.				<input type="checkbox"/>	
386	Interested Party		08/25/20	Typeform Survey - English	Refreshments Shade/Coverings	More shade areas at stations, water fountains, vending machines				<input type="checkbox"/>	
387	Interested Party		08/25/20	Typeform Survey - English	Refreshments	Drinks and vending machines				<input type="checkbox"/>	
388	Interested Party		08/25/20	Typeform Survey - English	Transit Service Connection	Continue full schedule please. My route from Laguna Niguel to Fullerton in the evening has been discontinued due to COVID-19. This has caused me to discontinue train use.				<input type="checkbox"/>	
389	Interested Party		08/25/20	Typeform Survey - English	Signage/Accurate Information	Update users on their Metrolink apps when trains delayed so they can adjust their arrival times to the station, especially when catching shuttles.				<input type="checkbox"/>	
390	Interested Party		08/25/20	Typeform Survey - English	Other	Lower the price of the train!!!				<input type="checkbox"/>	
391	Interested Party		08/25/20	Typeform Survey - English	Bike/Pedestrian Services	The Tustin station bike lockers are great. A better and more clearly marked bike path/route into/out of the station would be good.				<input type="checkbox"/>	
392	Interested Party		08/25/20	Typeform Survey - English	Bike/Pedestrian Services	Train is great. More trains would be helpful. Better bike provisions on Amtrak would be great. Metro link is good with bikes.				<input type="checkbox"/>	83   Page
393	Interested Party		08/25/20	Typeform Survey - English	Transit Service Connection	The most important improvement is "last mile" transit. For me, this is to UCI campus.				<input type="checkbox"/>	

Stakeholder	Stakeholder Type	Project Phase	Date Received	Source	Category	Issue / Comment	Lead	Follow up Action	Notes & Contact	Database	Location (City, State)
394	Interested Party		08/25/20	Typeform Survey - English	Cleanliness Restrooms Safety/Emergency Signage/Accurate Information	Cleaner restrooms, hand sanitizer stations, clearer instructions on what platforms trains arrive in, more parking spots, more light at night.				<input type="checkbox"/>	
395	Interested Party		08/25/20	Typeform Survey - English	Other	Maybe end the lockdowns? Go back to normal? Just a thought				<input type="checkbox"/>	
396	Interested Party		08/25/20	Typeform Survey - English		I normally wait at the northbound side of the Santa Ana station, which is pretty barren of anything besides a few covered benches and a ticket vending machine. Adding some basic vending machines with snacks/drinks and some drinking fountains would make that side way better since it's kind of a pain to cross the bridge to get back to the other side.				<input type="checkbox"/>	
397	Interested Party		08/25/20	Typeform Survey - English	Other Restrooms	Get restrooms, fix elevators, make tickets cheaper for students. Get more buses to do free rides from station.				<input type="checkbox"/>	
398	Interested Party		08/25/20	Typeform Survey - English	Other Restrooms Shade/Coverings	More shading and more updates on when to accept train would be very helpful. Also, better parking rates to incentive riders to park and ride and more restrooms while waiting for train at Norwalk station would make the experience much more enjoyable.				<input type="checkbox"/>	
399	Interested Party		08/25/20	Typeform Survey - English	Other	Do not repeat the same message on the intercom less than every 5 minutes some times it repeats every minute				<input type="checkbox"/>	
400	Interested Party		08/25/20	Typeform Survey - English	Shade/Coverings	The Tustin station needs improved shade. The current shade structures were not built for functionality but for design. They offer shade in the wrong area when needed most in the afternoon on the Northbound tracks.				<input type="checkbox"/>	
401	Interested Party		08/25/20	Typeform Survey - English	Other	We want WiFi on the trains!!!! Please!				<input type="checkbox"/>	
402	Interested Party		08/25/20	Typeform Survey - English	Cleanliness Restrooms Seating	If there are more bathrooms, please make sure there is frequent cleaning, more than once per day. And definitely need more seating. Thank you.				<input type="checkbox"/>	
403	Interested Party		08/25/20	Typeform Survey - English	Bike/Pedestrian Services Safety/Emergency	I need a bike locker to keep the bike safe all lockers at Fullerton station are full Please look into providing more bike lockers There is a homeless people problem near Fullerton station. At the moment i dont have car and if i try to get on at the bus stop now and then someone will always come as ask for a dollar. There should be another bus stop nearby				<input type="checkbox"/>	
404	Interested Party		08/26/20	Typeform Survey - English	Cleanliness Restrooms Safety/Emergency	The bathrooms at Mission Viejo Are constantly filled with homeless. Consistently dirty and people are living out of the restroom.				<input type="checkbox"/>	
405	Interested Party		08/26/20	Typeform Survey - English	Safety/Emergency	Please mandate mask-using in OC trains for passenger safety.				<input type="checkbox"/>	
406	Interested Party		08/26/20	Typeform Survey - English	Misters	I like the mister idea a lot.				<input type="checkbox"/>	
407	Interested Party		08/26/20	Typeform Survey - English	Safety/Emergency	There needs to be security at the train station to keep the bums and homeless people away. They make the place very scary.				<input type="checkbox"/>	
408	Interested Party		08/26/20	Typeform Survey - English	Safety/Emergency	There needs to be places to sit in the shade. There are too many vagrants hanging around the station trashing it up.				<input type="checkbox"/>	
409	Interested Party		08/26/20	Typeform Survey - English	Shade/Coverings Signage/Accurate Information	Too few shelters from sun; too hot sometimes so maybe fans/air, but is misting safe? Much more info regarding where train is and when expected with frequent updates and multiple train listings to see train after delayed train ETA.				<input type="checkbox"/>	
410	Interested Party		08/26/20	Typeform Survey - English	Transit Service Connection	More frequent trains would be helpful.				<input type="checkbox"/>	
411	Interested Party		08/26/20	Typeform Survey - English	Transit Service Connection	Finish double tracking the Anaheim Hills station area so that you can improve schedules. You know this is a bottle neck.				<input type="checkbox"/>	
412	Interested Party		08/26/20	Typeform Survey - English	Cleanliness	Bathrooms need to be cleaner.				<input type="checkbox"/>	
413	Interested Party		08/26/20	Typeform Survey - English	Bike/Pedestrian Services	More secure non-reservation bike lockers				<input type="checkbox"/>	
414	Interested Party		08/26/20	Typeform Survey - English	Restrooms Signage/Accurate Information	Restrooms and better updates when there are delays are critical.				<input type="checkbox"/>	
415	Interested Party		08/26/20	Typeform Survey - English	Signage/Accurate Information	Sometimes when I'm at a station that is closed, and I'm catching a late train, I don't know which side of the tracks the train will be arriving on....like the Pomona station. It would help to have a sign of some sort specifying this information. Thank you.				<input type="checkbox"/>	
416	Interested Party		08/26/20	Typeform Survey - English	Support	I think current amenities are good at least for me				<input type="checkbox"/>	
417	Interested Party		08/27/20	Typeform Survey - English	Signage/Accurate Information	Digital signs constantly showing the train number and waiting time				<input type="checkbox"/>	
418	Interested Party		08/27/20	Typeform Survey - English	Access Other	More parking and more elevators also				<input type="checkbox"/>	
419	Interested Party		08/27/20	Typeform Survey - English	Refreshments Signage/Accurate Information	ARTIC is an Amazing station, I work at her and use her for my train journeys. The lack of stores, amenities and proper signage I see from both sides as a major problem. The potential of the building and not matching the numbers, sadly has left ARTIC out in the cold.				<input type="checkbox"/>	
420	Interested Party		08/27/20	Typeform Survey - English	Other	Wifi would be good. Metrolink app is great				<input type="checkbox"/>	
421	Interested Party		08/27/20	Typeform Survey - English	Signage/Accurate Information	When I am waiting at Irvine and many other stations in Orange County, one thing bothers me a lot is that there is no sign telling people which direction the train travels for each platform. How are the passengers supposed to know? Which platform is going to LA and which platform is going to Oceanside and San Diego? This is the very basic information you cannot just leave to the confused passengers to figure out.				<input type="checkbox"/>	
422	Interested Party		08/27/20	Typeform Survey - English	Restrooms Shade/Coverings	I ride the OC line from LA to visit my parents often, getting off at either Laguna Niguel or SJC. Laguna Niguel, in particular, could really use some love-very spartan. It's just kind of a bummer, feels like you're in the middle of nowhere. There's no shade getting on/off the train on the platform, no bathrooms (that I'm aware of), very little tree cover or green space-just a generally awkward station to navigate. Would love to see it more developed with housing, food, shops, and a park as well.				<input type="checkbox"/>	
423	Interested Party		08/27/20	Typeform Survey - English	Environmental	Cancel the train especially in South County; the Ocean will overtake it and the resources should be sent for public sponsored ride-sharing rather than rail, which is outdated.				<input type="checkbox"/>	
424	Interested Party		08/28/20	Typeform Survey - English	Other	Friendlier service				<input type="checkbox"/>	
425	Interested Party		08/28/20	Typeform Survey - English	Transit Service Connection	Would like to see more bus stop routes and more frequencies to take the riders to the workplace destinations as we have all different departures times and destinations.				<input type="checkbox"/>	
426	Interested Party		08/29/20	Typeform Survey - English	Safety/Emergency	Better lighting.				<input type="checkbox"/>	
427	Interested Party		08/29/20	Typeform Survey - English	Support	Our recent round trip from LA Union Station - San Juan Capistrano - San Clemente on August 15 was very nice. Metrolink was very clean and everybody was very nice.				<input type="checkbox"/>	
428	Interested Party		08/30/20	Typeform Survey - English	Environmental	You really need to fix the drainage problem in the pedestrian underpass at the Laguna Niguel/Mission Viejo Station. When it rains the underpass floods with standing water. Impossible to get from parking lot to northbound track without wading through ankle deep water.				<input type="checkbox"/>	
429	Interested Party		08/31/20	Typeform Survey - English	Restrooms	Stations really need bathrooms!				<input type="checkbox"/>	
430	Interested Party		08/31/20	Typeform Survey - English	Shade/Coverings	Needs more shady areas				<input type="checkbox"/>	
431	Interested Party		08/31/20	Typeform Survey - English	Support	Love octa				<input type="checkbox"/>	
432	Interested Party		08/31/20	Typeform Survey - English	Other	I love the old ones let's keep them to keep are past.				<input type="checkbox"/>	
433	Interested Party		08/31/20	Typeform Survey - English	Other	Ticket Station on both sides on the tracks.				<input type="checkbox"/>	
434	Interested Party		08/31/20	Typeform Survey - English	Transit Service Connection	24 hour train service like all the other major large cities in the US.				<input type="checkbox"/>	
435	Interested Party		08/31/20	Typeform Survey - English	Cleanliness	There should be Sanitization stations onboard				<input type="checkbox"/>	

Stakeholder	Stakeholder Type	Project Phase	Date Received	Source	Category	Issue / Comment	Lead	Follow up Action	Notes & Contact	Database	Location (City, State)
436	Interested Party		08/31/20	Typeform Survey - English	Support	I love the Amtrak and Metrolink trains!				<input type="checkbox"/>	
437	Interested Party		09/01/20	Typeform Survey - English	Safety/Emergency	Make traveling for young women more safe.				<input type="checkbox"/>	
438	Interested Party		09/01/20	Typeform Survey - English	Support	All is good				<input type="checkbox"/>	
439	Interested Party		09/01/20	Typeform Survey - English	Transit Service Connection	Add more trains leaving LA Union Station after 6pm. Work-off at 6, so anything before that are not useful for daily commuters.				<input type="checkbox"/>	
440	Interested Party		09/01/20	Typeform Survey - English	Cleanliness Other	Fullerton station stairs going over the tracks are horrible Broken- you can see steel inside them Also you need more trash cans and empty them daily				<input type="checkbox"/>	
441	Interested Party		09/01/20	Typeform Survey - English	Refreshments	Food vendors would also improve the stations especially when you have to wait for the train or when the train is delayed				<input type="checkbox"/>	
442	Interested Party		09/01/20	Typeform Survey - English	Refreshments	Food and drink vending machines				<input type="checkbox"/>	
443	Interested Party		09/01/20	Typeform Survey - English	Transit Service Connection	24 Hour service because the world doesn't stop running at 10 pm.				<input type="checkbox"/>	
444	Interested Party		09/01/20	Typeform Survey - English	Other	Take down the fence to the Great Park				<input type="checkbox"/>	
445	Interested Party		09/02/20	Typeform Survey - English	Support	Good service				<input type="checkbox"/>	
446	Interested Party		09/02/20	Typeform Survey - English	General	The trains are comfortable. Usually no problems				<input type="checkbox"/>	
447	Interested Party		09/02/20	Typeform Survey - English	Refreshments	Snack and food vendors would be nice.				<input type="checkbox"/>	
448	Interested Party		09/02/20	Typeform Survey - English	Support	I enjoyed the train on weekends.				<input type="checkbox"/>	
449	Interested Party		09/02/20	Typeform Survey - English	Bike/Pedestrian Services	More easily accessible and rentable self-service bike lockers would be nice at major train stops.				<input type="checkbox"/>	
450	Interested Party		09/02/20	Typeform Survey - English	Other	How about not overpacking the trains so that I had to stand all the way.				<input type="checkbox"/>	
451	Interested Party		09/02/20	Typeform Survey - English	Support	Everything is great at the Santa Ana station				<input type="checkbox"/>	
452	Interested Party		09/02/20	Typeform Survey - English	Transit Service Connection	Have more trains running to and from Corona				<input type="checkbox"/>	
453	Interested Party		09/02/20	Typeform Survey - English	Other	Website says there's overnight parking at the Fullerton Station. There isn't. That caused a huge problem for me.				<input type="checkbox"/>	
454	Interested Party		09/03/20	Typeform Survey - English	Signage/Accurate Information	Real time train location screen				<input type="checkbox"/>	
455	Interested Party		09/03/20	Typeform Survey - English	Other	Let's also not forget about the state of the passenger cars and sleeper cars. They need some major updates. Europe has us beat by miles at this point.				<input type="checkbox"/>	
456	Interested Party		09/03/20	Typeform Survey - English	Safety/Emergency	More security to monitor homeless.				<input type="checkbox"/>	
457	Interested Party		09/03/20	Typeform Survey - English	General	More customer needs improvements.				<input type="checkbox"/>	
458	Interested Party		09/03/20	Typeform Survey - English	Shade/Coverings	The lack of rain and sun coverage at the Tustin station is really appalling. It's either sit in the sun or stand in a small slice of shade.				<input type="checkbox"/>	
459	Interested Party		09/03/20	Typeform Survey - English	Refreshments	More food places at stations please.				<input type="checkbox"/>	
460	Interested Party		09/03/20	Typeform Survey - English	Bike/Pedestrian Services	Bicycle access?				<input type="checkbox"/>	
461	Interested Party		09/04/20	Typeform Survey - English	Other Restrooms	Better public restroom access during the 5am-10pm period. Elevators that work and don't get stuck.				<input type="checkbox"/>	
462	Interested Party		09/04/20	Typeform Survey - English	Support	Es lo mejor para viajar. It's the best method to travel				<input type="checkbox"/>	
463	Interested Party		09/04/20	Typeform Survey - English	Support	I love the riding the train.				<input type="checkbox"/>	
464	Interested Party		09/04/20	Typeform Survey - English	Cleanliness Other	Keep it clean I pay 70 dollars a month to get to work and all these homeless at bus stop and bus always being late bus stop always dirty and stinky.				<input type="checkbox"/>	
465	Interested Party		09/04/20	Typeform Survey - English	Access	Lots of FREE easy parking				<input type="checkbox"/>	
466	Interested Party		09/04/20	Typeform Survey - English	Support	Love taking the train.				<input type="checkbox"/>	
467	Interested Party		09/04/20	Typeform Survey - English	Other	More COVID 19 prevention.				<input type="checkbox"/>	
468	Interested Party		09/04/20	Typeform Survey - English	Support	It's nice.				<input type="checkbox"/>	
469	Interested Party		09/04/20	Typeform Survey - English	Cleanliness Restrooms	Please prioritize making sure bathroom stall locks function, and that toilets aren't disgusting				<input type="checkbox"/>	
470	Interested Party		09/04/20	Typeform Survey - English	Other	Prices little high				<input type="checkbox"/>	
471	Interested Party		09/04/20	Typeform Survey - English	Restrooms	Restrooms				<input type="checkbox"/>	
472	Interested Party		09/04/20	Typeform Survey - English	General	Standing on the platform at Irvine in the rain is brutal				<input type="checkbox"/>	
473	Interested Party		09/04/20	Typeform Survey - English	Support	Your architecture is great. Keep that. It is a joy arriving at a station and experiencing the reward of great designs.				<input type="checkbox"/>	
474	Interested Party		09/05/20	Typeform Survey - English	Safety/Emergency	I get bothered by homeless asking for money.				<input type="checkbox"/>	
475	Interested Party		09/05/20	Typeform Survey - English	Support	I am pleased how the station is set up.				<input type="checkbox"/>	
476	Interested Party		09/05/20	Typeform Survey - English	Access	I use a walker so find it hard with steps. Accessibility is key.				<input type="checkbox"/>	
477	Interested Party		09/05/20	Typeform Survey - English	Transit Service Connection	Maybe also some later trains back and forth between OC and LA don't even have to be full length trains just a couple cars would do I think.				<input type="checkbox"/>	
478	Interested Party		09/05/20	Typeform Survey - English	Safety/Emergency	More security please.				<input type="checkbox"/>	
479	Interested Party		09/05/20	Typeform Survey - English	Transit Service Connection	Need to extend the train times.				<input type="checkbox"/>	
480	Interested Party		09/05/20	Typeform Survey - English	General	People don't use public transport because people love their cars too much here				<input type="checkbox"/>	
481	Interested Party		09/05/20	Typeform Survey - English	Refreshments	Restaurants (even as small as the one at Fullerton) are helpful because I can sometimes grab a meal, snack, or soda at the train station.				<input type="checkbox"/>	
482	Interested Party		09/05/20	Typeform Survey - English	Support	The workers on the train "Metrolink" they are very nice!!				<input type="checkbox"/>	
483	Interested Party		09/05/20	Typeform Survey - English	Refreshments	To be able to buy food and drinks while waiting				<input type="checkbox"/>	
484	Interested Party		09/06/20	Typeform Survey - English	Other	Add more ticket booths.				<input type="checkbox"/>	
485	Interested Party		09/06/20	Typeform Survey - English	Safety/Emergency	There needs to be more security on the train.				<input type="checkbox"/>	

Stakeholder	Stakeholder Type	Project Phase	Date Received	Source	Category	Issue / Comment	Lead	Follow up Action	Notes & Contact	Database	Location (City, State)
486	Interested Party		09/06/20	Typeform Survey - English	Support	Is in time and fast perfect service...				<input type="checkbox"/>	
487	Interested Party		09/06/20	Typeform Survey - English	Support	Just please keep the trains				<input type="checkbox"/>	
488	Interested Party		09/06/20	Typeform Survey - English	Other	Keep the elevators better maintained. The vandalism and smell of urine inside is horrible.				<input type="checkbox"/>	
489	Interested Party		09/06/20	Typeform Survey - English	Other	Less Graffiti.				<input type="checkbox"/>	
490	Interested Party		09/06/20	Typeform Survey - English	Signage/Accurate Information	More arrival time signs.				<input type="checkbox"/>	
491	Interested Party		09/06/20	Typeform Survey - English	Access	The Irvine Station could you get north side gate to let you into it have access to The great Park open I need to go that direction and currently had to go back to Sand Canyon Is a Long walk, when it could be just a few Steps to my workplace right across forma The Irvine Station thank you very much.				<input type="checkbox"/>	
492	Interested Party		09/06/20	Typeform Survey - English	Signage/Accurate Information	Updated information boards				<input type="checkbox"/>	
493	Interested Party		09/06/20	Typeform Survey - English	Support	Very good services.				<input type="checkbox"/>	
494	Interested Party		09/06/20	Typeform Survey - English	Restrooms	Would like bathrooms at San Clemente North Station!				<input type="checkbox"/>	
495	Interested Party		09/07/20	Typeform Survey - English	Support	I think my station is pretty good				<input type="checkbox"/>	
496	Interested Party		09/10/20	Typeform Survey - English	Other	Should have an annual pass or lower priced tickets.				<input type="checkbox"/>	
497	Interested Party		09/13/20	Typeform Survey - English	Transit Service Connection	Train frequency would be a real big game changer. Slightly lower Pricing options too.				<input type="checkbox"/>	
498	Interested Party		09/14/20	Typeform Survey - English	Support	Felizidades muibuen servicio gracias Congratulations, very good service thank you.				<input type="checkbox"/>	
499	Interested Party		09/14/20	Typeform Survey - English	Safety/Emergency	Maybe clean up train station in Oceanside to many bums and people showering un restrooms				<input type="checkbox"/>	
500	Interested Party		09/14/20	Typeform Survey - English	Access	Try Adding Pedestrian Grade Crossing for faster Access				<input type="checkbox"/>	
501	Interested Party		09/15/20	Typeform Survey - English	Support	Best train.				<input type="checkbox"/>	
502	Interested Party		09/15/20	Typeform Survey - English	Support	Best train.				<input type="checkbox"/>	
503	Interested Party		09/15/20	Typeform Survey - English	Opposition	Have no real interest in the train, I rode in one when I was young girl I was not planning on riding in one any time soon.... KLT.				<input type="checkbox"/>	
504	Interested Party		09/15/20	Typeform Survey - English	Support	Muy bien todo muchas gracias. All good thank you very much.				<input type="checkbox"/>	
505	Interested Party		09/15/20	Typeform Survey - English	Safety/Emergency	Security stations				<input type="checkbox"/>	
506	Interested Party		09/15/20	Typeform Survey - English	Opposition	Stop wasting taxpayer funds on rail in SoCal.				<input type="checkbox"/>	
507	Interested Party		09/16/20	Typeform Survey - English	Support	I think it's very good.				<input type="checkbox"/>	
508	Interested Party		09/16/20	Typeform Survey - English	Safety/Emergency	More security.				<input type="checkbox"/>	
509	Interested Party		09/16/20	Typeform Survey - English	Other	Must be included music				<input type="checkbox"/>	
510	Interested Party		09/16/20	Typeform Survey - English	Transit Service Connection	Q haga mas parada cercas q no estén tanretiradas. More stops closer to each other, so that stops aren't so far from one another.				<input type="checkbox"/>	
511	Interested Party		09/17/20	Typeform Survey - English	Support	I love your service, I hope many improvements are on the way!				<input type="checkbox"/>	
512	Interested Party		09/17/20	Typeform Survey - English	Support	It's ok				<input type="checkbox"/>	
513	Interested Party		09/17/20	Typeform Survey - English	Access	More information for woman with physical disabilities				<input type="checkbox"/>	
514	Interested Party		09/17/20	Typeform Survey - English	Other	The Santa Ana train station needs a lot of TLC. It's such a beautiful facility it's a shame to see it a bit neglected. It needs a good paint job, the fence is leaning or looks like its toppling, all those commercial trucks should be removed and to get more people visiting perhaps a nice restaurant should have a home there.				<input type="checkbox"/>	
515	Interested Party		09/17/20	Typeform Survey - English	Other	they need to be cleaned more often				<input type="checkbox"/>	
516	Interested Party		09/18/20	Typeform Survey - English	Signage/Accurate Information	More information.				<input type="checkbox"/>	
517	Interested Party		09/18/20	Typeform Survey - English	Safety/Emergency	Safety. I don't feel save traveling in the train anymore A man had a knife the other day and I got very scared because it was only me and him. Luckily he got down in the down but nobody checks or walks around. Nobody asks for the tickets or anything.				<input type="checkbox"/>	
518	Interested Party		09/18/20	Typeform Survey - English	Transit Service Connection	Shade covers more sitting areas				<input type="checkbox"/>	
519	Interested Party		09/19/20	Typeform Survey - English	Access	Más información sobre tickets. More ticket information				<input type="checkbox"/>	
520	Interested Party		09/19/20	Typeform Survey - English	Safety/Emergency	Tickets are not checked and there needs to be a way of letting the conductor know if you don't feel safe.				<input type="checkbox"/>	
521	Interested Party		09/20/20	Typeform Survey - English	Support	Very good services.				<input type="checkbox"/>	
522	Interested Party		09/21/20	Typeform Survey - English	Support	The station is clean and the worker are friendly.				<input type="checkbox"/>	
523	Interested Party		09/26/20	Typeform Survey - English	Transit Service Connection	More trains at late hours.				<input type="checkbox"/>	
524	Interested Party		09/27/20	Typeform Survey - English	Signage/Accurate Information	Updated app to know how close the train is.				<input type="checkbox"/>	
525	Interested Party		09/27/20	Typeform Survey - English	Seating	More seating.				<input type="checkbox"/>	
526	Interested Party		09/28/20	Typeform Survey - English	Other	The survey should have an option for people that ride less than "several times a month".				<input type="checkbox"/>	
527	Interested Party		09/28/20	Typeform Survey - English	Safety/Emergency	There should be an office for authorities/sheriff/police.				<input type="checkbox"/>	
528	Interested Party		08/04/20	Typeform Survey - Spanish	Signage/Accurate Information	Mas informacion en las estaciones More information at the stations				<input type="checkbox"/>	
529	Interested Party		08/04/20	Typeform Survey - Spanish	Cleanliness	Más limpieza en las estaciones More cleaning is needed at the stations				<input type="checkbox"/>	
530	Interested Party		08/07/20	Typeform Survey - Spanish	Other	Qué hubiera personal bilingüe Would like bilingual staff.				<input type="checkbox"/>	

Stakeholder	Stakeholder Type	Project Phase	Date Received	Source	Category	Issue / Comment	Lead	Follow up Action	Notes & Contact	Database	Location (City, State)
531	Interested Party		08/11/20	Typeform Survey - Spanish	Shade/Coverings Transit Service Connection	Casetas de espera más cubiertas para el clima extremo. Y más horarios de salida para los Angeles/Anaheim y viceversa. Gracias. Y Felicidades por todo el trabajo de servir a los demás. Gracias a todos. More covered waiting booths for extreme weather. And more departure times for Los Angeles / Anaheim and vice versa. Thank you. And Congratulations on all the work of serving others. Thank you all.				<input type="checkbox"/>	
532	Interested Party		08/12/20	Typeform Survey - Spanish	Other	Asegurar que las máquinas de cobro estén siempre trabajando o poner otra porque muchas veces la máquina en San Bernardino no está trabajando y tengo que caminar mucho a la otra máquina y a veces con riesgo de perder el tren Ensure that the collection machines are always working or put another one because many times the machine in San Bernardino is not working and I have to walk a lot to the other machine, sometimes with the risk of missing the train				<input type="checkbox"/>	
533	Interested Party		08/12/20	Typeform Survey - Spanish	Support	buena Good				<input type="checkbox"/>	
534	Interested Party		08/20/20	Typeform Survey - Spanish	Support	No yo creo que todo el servicio está bien me gusta viajar y estoy contento I think all the service is fine. I like to travel and I'm happy.				<input type="checkbox"/>	
535	Interested Party		08/23/20	Typeform Survey - Spanish	Seating Shade/Coverings	Mas sillas y mas sombras nesita la estacion More chairs and more shade is needed				<input type="checkbox"/>	
536	Interested Party		08/24/20	Typeform Survey - Spanish	Access	Que está muy limpio, pero me gustaría que siempre hubiera personal que asista con preguntas o dudas que se tengan al respecto It is very clean, but I would like there to always be staff to assist with questions or concerns that may be had in this regard				<input type="checkbox"/>	
537	Interested Party		08/31/20	Typeform Survey - Spanish	Misters Seating Shade/Coverings	Seria bueno que en tiempo de calor como lo mencionaron antes pusieran mas sombra, y asientos y si pueden rociadores ya que aqui en california casi no llueve entonces bastaria solo con ampliar las sombras It would be good if in hot weather as mentioned before they put more shade, and seats and if they can add sprinklers since here in California it hardly rains then it would be enough just to extend the shades.				<input type="checkbox"/>	
538	Interested Party		09/01/20	Typeform Survey - Spanish	Refreshments Restrooms Seating Shade/Coverings	Esta limpio pero necesitan mas baños cercas de el area de espera, tapa sol en las bancas de espera y mas fuentes de agua potable acercas del area de espera. It is clean, but needs more bathrooms near the waiting area, shade on the benches and more sources of drinking water near the waiting area.				<input type="checkbox"/>	
539	Interested Party		09/01/20	Typeform Survey - Spanish	Transit Service Connection	que esten siempre puntuales.para no esperar mucho tiempo. Would like a more punctual schedule to not wait too much time.				<input type="checkbox"/>	
540	Interested Party		09/02/20	Typeform Survey - Spanish	Safety/Emergency	Más control con los indigentes que rondan la estación. More control with the homeless who linger around the station.				<input type="checkbox"/>	
541	Interested Party		09/03/20	Typeform Survey - Spanish	Support	Buenas Good				<input type="checkbox"/>	
542	Interested Party		09/03/20	Typeform Survey - Spanish	Safety/Emergency	Con esta pandemia, mejorar las precauciones como distanciamiento social, áreas de desinfección de manos y cubrebocas disponibles, y una excelente ventilación para seguridad de salud y tener un viaje feliz y placentero observando el paisaje!!! With this pandemic, improve precautions such as social distancing, hand disinfection areas and face shields available, and excellent ventilation for health safety and have a happy and pleasant trip observing the landscape !!!				<input type="checkbox"/>	
543	Interested Party		09/03/20	Typeform Survey - Spanish	Safety/Emergency	Más control con los indigentes que se encuentran dentro de la estación y fuera de la estación. More control of the homeless people that are inside and outside of the station				<input type="checkbox"/>	
544	Interested Party		09/03/20	Typeform Survey - Spanish	Support	Muy buen servicio para viajar en tren Very good service to travel by train				<input type="checkbox"/>	
545											

# Appendix E

---

## *Fact Sheets*

# RAIL INFRASTRUCTURE STUDY

## DEFENSE AGAINST CLIMATE CHANGE PLAN



### AT A GLANCE

#### Project Manager:

Jason Lee  
 (714) 560-5833  
 jlee1@octa.net

#### Community Outreach:

Marissa Espino  
 (714) 560-5607  
 mespino@octa.net

#### Website:

octa.net/railstudy

Fact Sheet as of 11/15/19

### OVERVIEW

The Orange County Transportation Authority (OCTA), in partnership with the State of California Department of Transportation (Caltrans) District 12, is conducting a study about how climate change effects the Orange County rail corridor. The study will identify opportunities and challenges to improve service, operation, and infrastructure to better withstand severe weather conditions. The study will identify preventive measures that can be used in developing near-term, mid-term, and long-term strategies.

#### Study objectives include:

- Identify implementation strategies to reduce the risk to rail infrastructure from mudslides, flooding, severe storm/weather events, coastal surge, and sea level rise;
- Develop enhanced vegetation management and sustainable vegetation strategy for periods of drought and high precipitation; and
- Recommend improvements to amenities at rail stations for passengers against weather, such as shelters, natural shading and drinking functions.

This study area is the approximate 25-mile section of railway from Jeffrey Road in Irvine to the Orange/San Diego county border. It will also include evaluation of all 12 Metrolink Stations in Orange County. The rail corridor in Orange County serves about 40,000 passengers per day, along with freight traffic.

### SCHEDULE

The study, to be completed in November 2020, will engage the public and key stakeholders throughout the study process.

MILESTONES	APPROXIMATE TIMELINE
Project Initiation	Fall 2019
Stakeholder and Community Outreach	Fall 2019-Summer 2020
Technical Studies and Assessment	Spring-Fall 2020
Draft Summary and Recommendations	Fall 2020
Final Climate Change Plan	Fall 2020

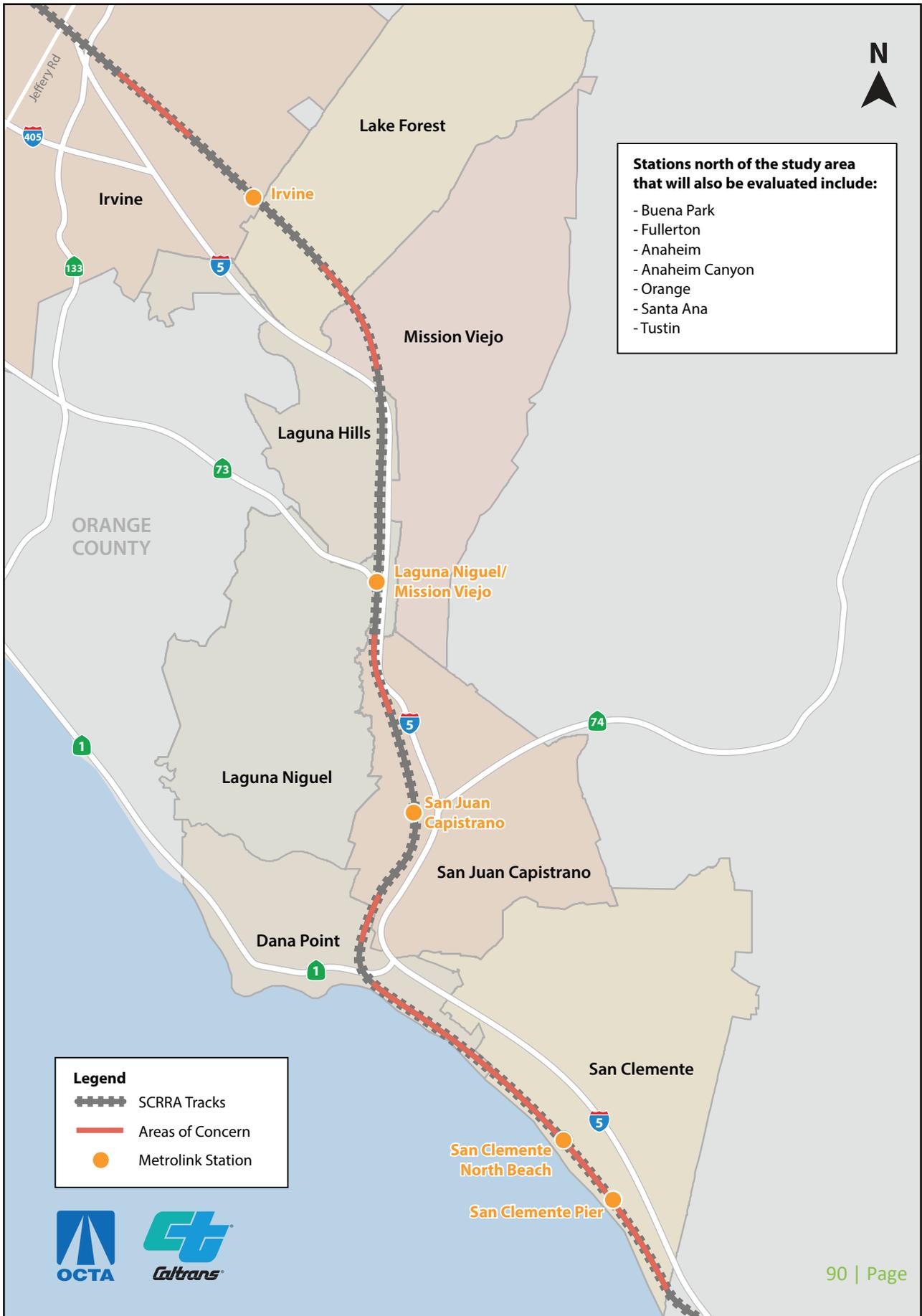
### STAY IN TOUCH

Sign-up today to receive information about upcoming meetings and events and to receive news updates by visiting [octa.net/railstudy](http://octa.net/railstudy).



Orange County Transportation Authority  
 550 S. Main Street  
 P.O. Box 14184  
 Orange, CA 92863-1584  
 (714) 560-OCTA  
[www.octa.net](http://www.octa.net)

# OCTA Rail Infrastructure Defense Against Climate Change Project Area Map



# 铁路基础设施研究

## 气候变化防范计划



### 信息一览

项目经理： Jason Lee  
(714) 560-5833  
jlee1@octa.net

社区推广： Marissa Espino  
(714) 560-5607  
mespino@octa.net

网站： octa.net/railstudy

情况介绍 (截至 2019 年 11 月 15 日)

奥兰治县交通局 (OCTA) 与加利福尼亚州交通部 (Caltrans) 第 12 区正在合作进行一项研究，以了解气候变化对奥兰治县的铁路走廊产生的影响。这项研究将确定在改进服务、运营和基础设施方面存在哪些机会和挑战，以更好地抵御恶劣的天气条件。这项研究将确定可在制定近期、中期和长期战略时使用的预防措施。

此研究的目标包括：

- 确定相应的实施战略，以降低铁路基础设施因泥石流、洪水、严重风暴/天气事件、海岸潮汐和海平面上升而面临的风险；
- 针对干旱期和高降水期制定更强有力的植被管理和可持续植被战略；以及
- 为铁路车站内用于帮助乘客抵御恶劣天气的便利设施提出改进建议，例如遮蔽场所、自然遮阳空间和饮料设施。

本次研究针对的区域是从尔湾市 (Irvine) 杰弗里路 (Jeffrey Road) 至奥兰治 (Orange)/圣地亚哥 (San Diego) 县边界的铁路段，长约 25 英里。它还将包括对奥兰治县所有 12 个 Metrolink 车站进行评估。奥兰治县的铁路走廊每天为大约 4 万名乘客提供服务，同时还承担了货运业务。

### 时间表

这项研究定于 2020 年 11 月完成，将在整个研究过程中邀请公众和关键利益相关方参与。

里程碑	大致时间表
项目启动	2019 年秋季
利益相关方和社区推广	2019 年秋季至 2020 年夏季
技术与评估	2020 年春季至秋季
总结和建议草案	2020 年秋季
最终气候变化计划	2020 年秋季

### 保持联系

请立即注册，以接收有关即将举行的会议和活动的信息，并通过访问 [octa.net/railstudy](http://octa.net/railstudy) 接收最新消息。



Orange County Transportation Authority  
550 S. Main Street  
P.O. Box 14184  
Orange, CA 92863-1584  
(714) 560-OCTA  
[www.octa.net](http://www.octa.net)

# OCTA 铁路基础设施气候变化防范项目区域图



# 철도 기반시설 연구

기후 변화 계획에 대한 대책



## 요약

<b>프로젝트 관리자:</b>	Jason Lee (714) 560-5833 jlee1@octa.net
<b>지역사회 지원:</b>	Marissa Espino (714) 560-5607 mespino@octa.net
<b>웹 사이트:</b>	octa.net/railstudy

2019년 11월 15일자 현황 보고서

## 개요

오렌지 카운티 교통국(Orange County Transportation Authority, OCTA)은 캘리포니아주 교통부(Caltrans) 제12구역과 제휴하여 기후 변화가 오렌지 카운티의 철로에 미치는 영향에 대한 연구를 진행하고 있습니다. 이 연구를 통해 악천후에 더욱 잘 대비하기 위해 서비스, 운행, 기반시설 등을 개선할 수 있는 기회 및 과제를 파악할 계획입니다. 또한 단기적, 중기적, 장기적 전략을 수립할 때 사용할 수 있는 예방 조치를 파악할 계획입니다.

### 연구 목표에 포함되는 사항:

- 산사태, 홍수, 악천후, 해일, 해수면 상승 등으로 인한 철도 기반시설의 위험을 줄이기 위한 실행 전략 파악.
- 가뭄 및 강수량이 많은 시기에 초목 관리와 지속 가능한 초목 관리 전략을 개선할 방법 수립.
- 승객들을 위해 대피소, 그늘막, 음용수 시설 등의 철도역 부대시설에 대한 개선사항 권장.

연구 지역은 Irvine의 Jeffrey Road에서 오렌지 카운티와 샌디에이고 카운티의 경계까지 약 25마일 구간이며, 오렌지 카운티의 모든 12개 Metrolink 역에 대한 평가도 포함됩니다. 오렌지 카운티의 철로는 화물운송과 함께 매일 약 4만 명의 승객이 이용하고 있습니다.

## 예약

2020년 11월에 완료될 예정인 본 연구에는 모든 과정에 일반인과 주요 이해 관계자가 참여합니다.

주요 기점	대략적인 타임 라인
프로젝트 개시	2019년 가을
이해 관계자 및 지역사회 홍보 및 지원	2019년 가을 - 2020년 여름
기술적 연구 및 평가	2020년 봄 - 가을
요약 및 권장사항 초안	2020년 가을
최종 기후 변화 계획	2020년 가을

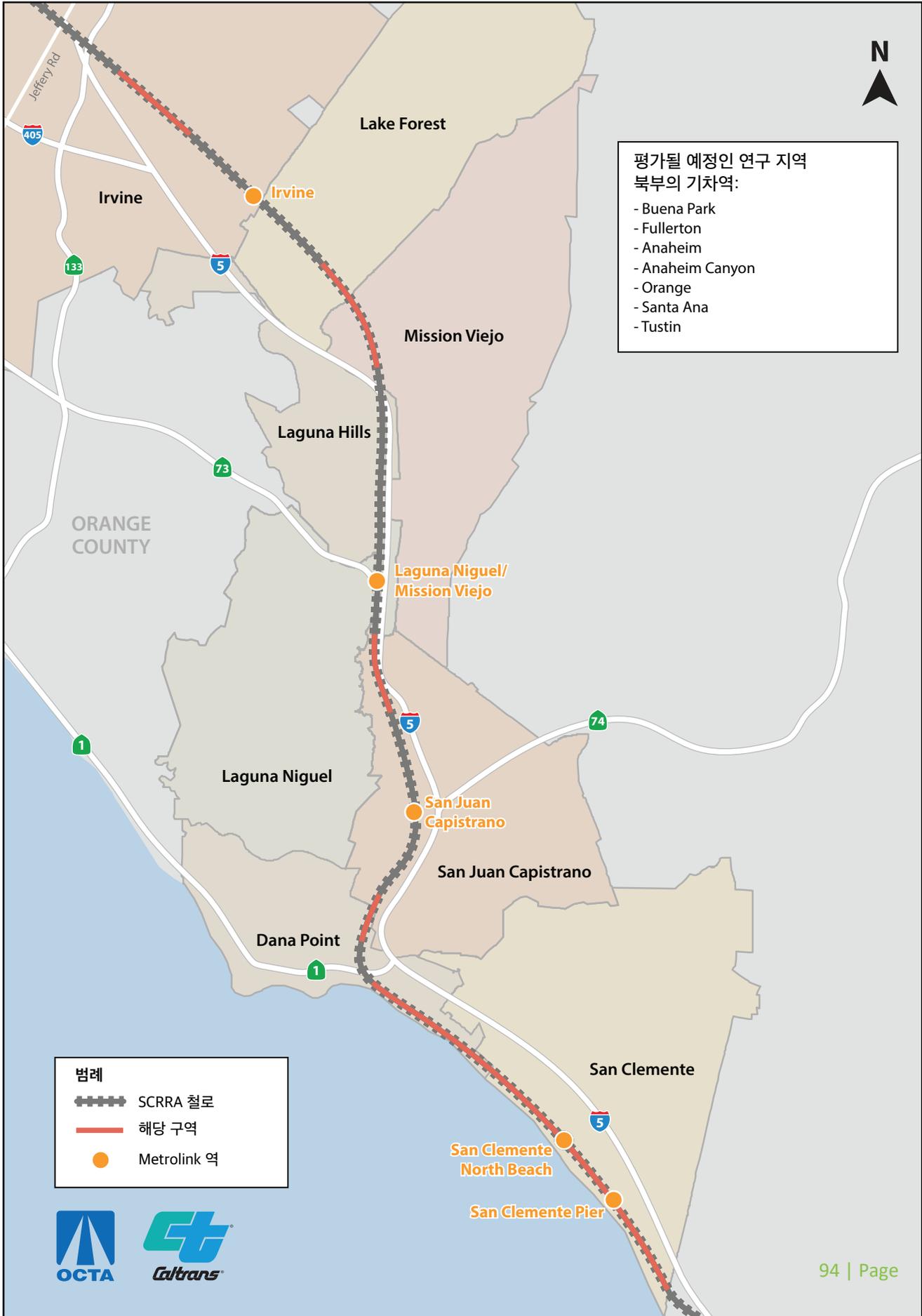
## 소식 받아보기

octa.net/railstudy를 방문하여 회원 가입을 하시면 예정된 미팅과 이벤트에 대한 정보를 수령하고 뉴스 업데이트를 수신할 수 있습니다.



Orange County Transportation Authority  
550 S. Main Street  
P.O. Box 14184  
Orange, CA 92863-1584  
(714) 560-OCTA  
www.octa.net

# 기후 변화에 대비한 OCTA 철도 기반시설의 대책 프로젝트 주변 지도



# ESTUDIO DEL INFRAESTRUCTURA FERROVIARIA

## PLAN DE DEFENSA CONTRA EL CAMBIO CLIMÁTICO



### DE UN VISTAZO

<b>GERENTE DE PROYECTO:</b>	Jason Lee (714) 560-5833 jlee1@octa.net
<b>CONTACTO CON LA COMUNIDAD:</b>	Marissa Espino (714) 560-5607 mespino@octa.net
<b>PÁGINAS WEB:</b>	octa.net/railstudy

Hoja informativa actualizada el 12/11/19.

### VISIÓN GENERAL

La autoridad de transporte del condado de Orange (OCTA, por sus siglas en inglés), en alianza con el departamento de transporte de estado de California (Caltrans) Distrito 12, está llevando a cabo un estudio sobre cómo el cambio climático afecta al corredor ferroviario de Condado de Orange. El estudio identificará oportunidades y los retos para mejorar servicio, operación e infraestructura para soportar mejor a los condiciones de clima severo. El estudio identificará medidas preventivas que pueden usarse en desarrollando estrategias a corto, mediano y largo plazo.

#### Objetivos del estudio incluyen:

- Identificar estrategias de implementación para reducir el riesgo para la infraestructura ferroviaria por deslizamientos de tierra, inundaciones, tormentas severas / eventos climáticos, marejada costera y aumento del nivel del mar;
- Desarrollar un mejor plan de gestión para la vegetación y una estrategia sostenible para la vegetación durante los períodos de sequía y alta precipitación; y
- Recomendar mejoras a los servicios en las estaciones de tren para pasajeros contra el clima, como refugios, sombreado natural y fuentes para beber.

Esta área de estudio es la sección aproximada de 25 millas del ferrocarril desde Jeffrey Road en Irvine a la frontera del condado de Orange / San Diego. El corredor ferroviario en el condado de Orange sirve sobre 40,000 pasajeros por día, junto con el tráfico de carga.

### PROGRAMA

El estudio, que se completará en noviembre de 2020, involucrará al público y partes interesadas a lo largo del proceso de estudio.

HITO	CRONOLOGÍA APROXIMADA
Inicio del Proyecto	Otoño de 2019
Alcance comunitario	Otoño de 2019 – Verano de 2020
Estudios Técnicos /Evaluación	Primavera - Otoño de 2020
Borrador de resúmenes y recomendaciones	Otoño de 2020
Plan Final de Cambio Climático	Otoño de 2020

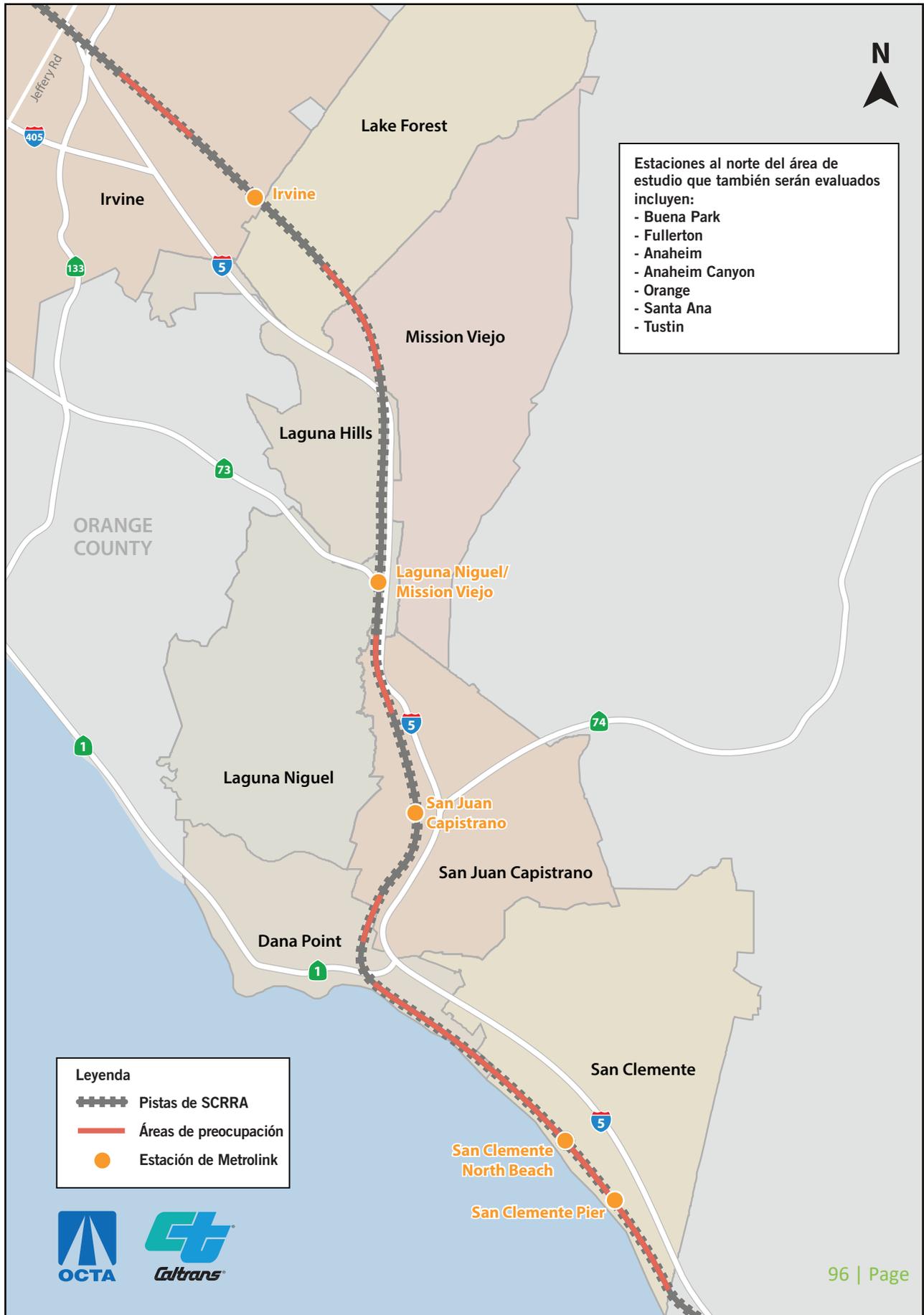
### MANTÉNGASE CONECTADO

Regístrese hoy para recibir información sobre las próximas reuniones y eventos y para recibir las actualizaciones, visitando [octa.net/railstudy](http://octa.net/railstudy).



Orange County Transportation Authority  
550 S. Main Street  
P.O. Box 14184  
Orange, CA 92863-1584  
(714) 560-OCTA  
[www.octa.net](http://www.octa.net)

Mapa de área del Proyecto de OCTA Defensa de Infraestructura Ferroviaria contra el Cambio Climático



# NGHIÊN CỨU CƠ SỞ HẠ TẦNG ĐƯỜNG SẮT

## KẾ HOẠCH BẢO VỆ CHỐNG LẠI BIẾN ĐỔI KHÍ HẬU



### TÓM TẮT NHANH

#### QUẢN LÝ DỰ ÁN:

Jason Lee  
(714) 560-5833  
jlee1@octa.net

#### TIẾP CẬN CỘNG ĐỒNG:

Marissa Espino  
(714) 560-5607  
mespino@octa.net

#### TRANG WEB:

octa.net/railstudy

Thông Tin Nhanh vào ngày 15 tháng 11 năm 2019

### TỔNG QUAN

Orange County Transportation Authority (OCTA, Cơ Quan Quản Lý Giao Thông Vận Tải Quận Cam), kết hợp với State of California Department of Transportation (Caltrans, Sở Giao Thông Vận Tải Tiểu Bang California) Quận 12, đang tiến hành nghiên cứu các tác động của biến đổi khí hậu đến hành lang đường sắt tại Quận Cam. Nghiên cứu sẽ xác định các cơ hội và thách thức để cải thiện dịch vụ, vận hành và cơ sở hạ tầng nhằm chống chịu tốt hơn với các điều kiện khí hậu khắc nghiệt. Nghiên cứu sẽ xác định những biện pháp phòng ngừa có thể được sử dụng để phát triển các chiến lược ngắn hạn, trung hạn và dài hạn.

#### Các mục tiêu của nghiên cứu bao gồm:

- Xác định các chiến lược có thể triển khai nhằm giảm thiểu rủi ro cho cơ sở hạ tầng đường sắt do dòng chảy bùn, ngập lụt, các sự kiện thời tiết/bão khắc nghiệt, nước biển dâng lên và mực nước biển dâng cao;
- Phát triển chiến lược quản lý cải thiện thảm thực vật và hệ thực vật bền vững cho các giai đoạn hạn hán và mưa tuyết nhiều; và
- Khuyến nghị cải thiện tiện nghi tại nhà ga đường sắt như nhà chờ có mái che, bóng râm tự nhiên và nước uống cho hành khách chống lại điều kiện thời tiết.

Nghiên cứu này được thực hiện trên đoạn đường ray khoảng 25 dặm từ Jeffrey Road ở Irvine đến ranh giới quận Cam/San Diego. Nghiên cứu cũng bao gồm việc đánh giá tất cả 12 Nhà Ga Metrolink tại Quận Cam. Hành lang đường sắt tại Quận Cam phục vụ khoảng 40,000 hành khách mỗi ngày, song song với vận chuyển hàng hóa.

### LỊCH TRÌNH

Nghiên cứu sẽ được hoàn thành vào tháng 11 năm 2020 và có sự tham gia của công chúng cũng như các bên liên quan quan trọng trong suốt quá trình nghiên cứu.

CÁC MỐC THỜI GIAN	MỐC THỜI GIAN GẦN ĐÚNG
Bắt Đầu Dự Án	Mùa Thu Năm 2019
Tiếp Cận Cộng Đồng và Các Bên Liên Quan	Mùa Thu Năm 2019-Mùa Hè Năm 2020
Nghiên Cứu và Đánh Giá Kỹ Thuật	Mùa Xuân-Mùa Thu Năm 2020
Soạn Thảo Tóm Tắt và Các Khuyến Nghị	Mùa Thu Năm 2020
Kế Hoạch Chống Lại Biến Đổi Khí Hậu Cuối Cùng	Mùa Thu Năm 2020

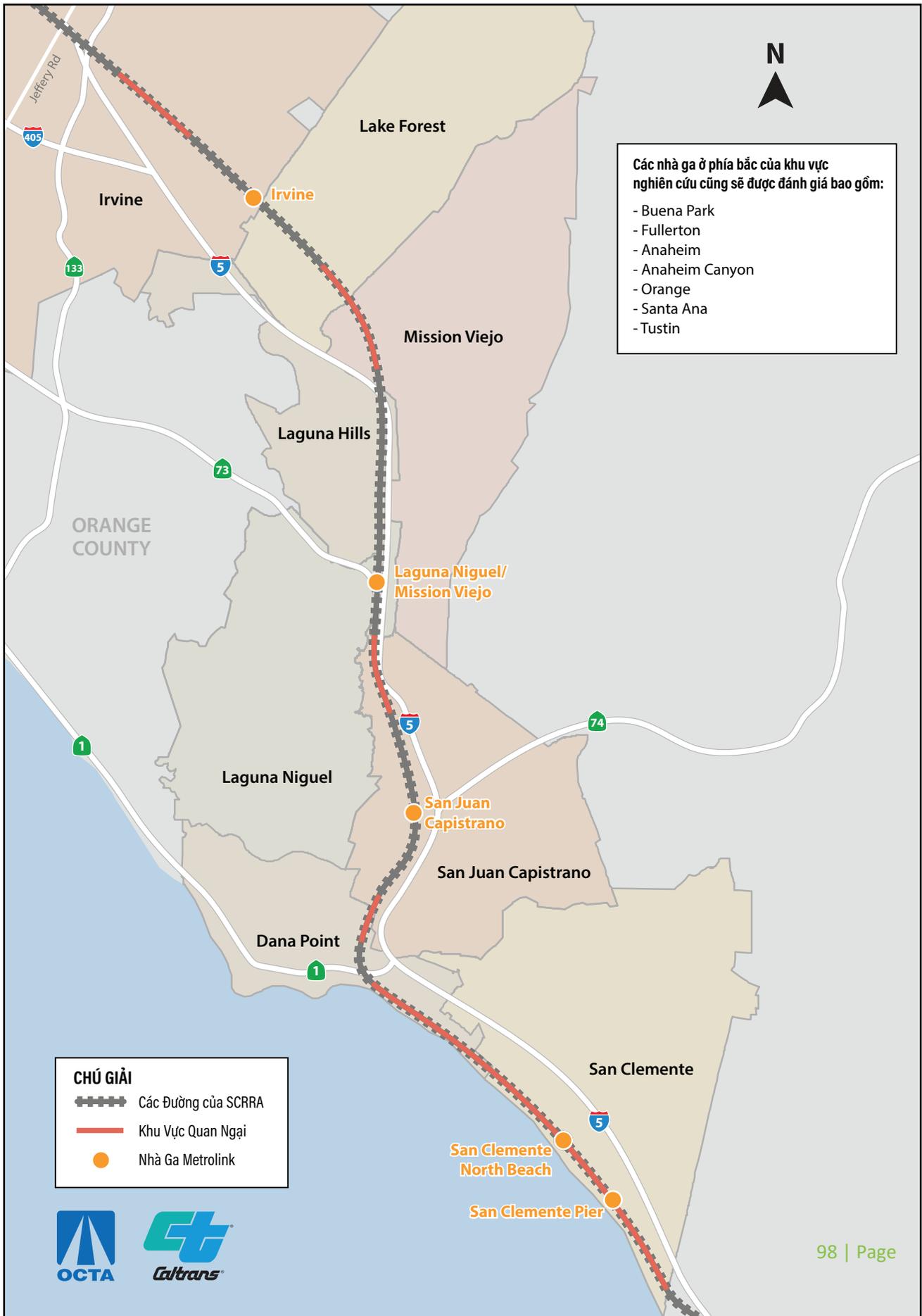
### GIỮ LIÊN LẠC

Đăng ký ngay hôm nay để nhận thông tin về các cuộc họp và sự kiện sắp tới cũng như nhận các tin tức cập nhật bằng cách truy cập [octa.net/railstudy](http://octa.net/railstudy).



Orange County Transportation Authority  
550 S. Main Street  
P.O. Box 14184  
Orange, CA 92863-1584  
(714) 560-OCTA  
[www.octa.net](http://www.octa.net)

# BẢN ĐỒ KHU VỰC DỰ ÁN BẢO VỆ CƠ SỞ HẠ TẦNG ĐƯỜNG SẮT CHỐNG LẠI BIẾN ĐỔI KHÍ HẬU CỦA OCTA



# Appendix F

---

## *Survey Card*



## Help us identify how we can improve amenity service along the rail corridor!

Take our survey for a chance to win a \$50 Amazon gift card

[ocrailsurvey.com](https://ocrailsurvey.com)

*For more information, please contact us at 714-560-5607*

## *¡Ayúdenos a identificar cómo podemos mejorar el servicio a lo largo del corredor de riel!*

*Participe en esta encuesta para tener la oportunidad de ganar una tarjeta de regalo de \$50 para Amazon*

[ocrailsurvey.com](https://ocrailsurvey.com)

*Para obtener más información, ponerse en contacto con nosotros al 714-560-5607*

# RAIL INFRASTRUCTURE STUDY

DEFENSE AGAINST CLIMATE CHANGE PLAN [OCTA.NET](https://OCTA.NET)



100 | Page



Help us identify how we can improve amenity service along the rail corridor!

Take a short survey at  
[ocrailsurvey.com](http://ocrailsurvey.com)

¡Ayúdenos a identificar cómo podemos mejorar el servicio de amenidades a lo largo del corredor de riel!

Tome una breve encuesta en  
[ocrailsurvey.com](http://ocrailsurvey.com)

101 | Page

# RAIL INFRASTRUCTURE STUDY

DEFENSE AGAINST CLIMATE CHANGE PLAN

Take the survey in English



---

---

Tome la encuesta en español



102 | Page



# Appendix G

---

*Tool Kit*

# RAIL INFRASTRUCTURE STUDY

## DEFENSE AGAINST CLIMATE CHANGE PLAN



Dear Stakeholder,

The Orange County Transportation Authority (OCTA), in partnership with the State of California Department of Transportation (Caltrans) District 12, is conducting a study about how climate change affects the Orange County rail corridor. The Rail Infrastructure Defense Against Climate Change study (Study) will identify challenges and opportunities to improve service, operations, and infrastructure to better withstand severe weather conditions. The Study also will provide recommendations on how to improve amenities at the 12 rail stations to help protect passengers against weather.

As a key stakeholder, we are reaching out to you to offer optional methods for sharing project and community survey details with your community. These efforts are intended to complement the other public notification methods that OCTA is using to promote this project. Below are some *suggested options* on ways to share project and community survey details:

- 1. Distribute electronically via email:** Share the community survey ([OCrailsurvey.com](https://ocrailsurvey.com)) with your e-mail contacts. You can link to the survey [HERE](#).
- 2. Post to your website:** You can use the image provided in the email to post to your homepage. The image would then need to be linked to the following [LINK](#) for the project's webpage.
- 3. Social media posting:** Download our OCTA image [HERE](#), post it on your social media profiles (Facebook, Twitter, Instagram, etc.), and share the following link ([OCrailsurvey.com](https://ocrailsurvey.com)) on your post.
- 4. Newsletter Announcement:** Provide information regarding the project and community survey via your organization's newsletter.

Please see the next page for simple copy-and-paste-ready text you may use to share this information with your community.

If you have any questions, please contact Marissa Espino at [mespino@octa.net](mailto:mespino@octa.net) or at 714-560-5607. We thank you for your support and look forward to working with you in spreading the word about this project and capturing valuable survey results!

## ADDITIONAL INSTRUCTIONS

**1. Distribute electronically via email:**

A. You can use [this image](#) to share meeting information with your contacts/membership. Link the image to the following [LINK](#).

B. Or copy and paste the following text into the body of an email:

*The Orange County Transportation Authority (OCTA), in partnership with the State of California Department of Transportation (Caltrans) District 12, is conducting a study about how extreme weather affects the Orange County rail corridor. Share your thoughts on how to improve OC train stations by taking a quick community survey at [OCrailsurvey.com](http://OCrailsurvey.com). For more information, visit [www.octa.net/railstudy](http://www.octa.net/railstudy).*

**2. Post to your website:** You can use [this image](#) to post to your homepage. Link the image to the following [LINK \(OCrailsurvey.com\)](#).

**3. Social media posting:** Post this [LINK \(OCrailsurvey.com\)](#) on your social media page(s) or copy and paste the following text and [this image](#) into your social media accounts:

A. **Facebook:** @goOCTA and @CaltransOC are conducting a study about how extreme weather affects the Orange County rail corridor. Share your thoughts on how to improve OC train stations by taking a quick community survey at [OCrailsurvey.com](http://OCrailsurvey.com). For more information, visit [www.octa.net/railstudy](http://www.octa.net/railstudy).

B. **Twitter:** @goOCTA and @CaltransOC are conducting a study about how extreme weather affects the Orange County rail corridor. Tell us how to improve train station amenities at [OCrailsurvey.com](http://OCrailsurvey.com). For more information, visit [www.octa.net/railstudy](http://www.octa.net/railstudy).

C. **Instagram:** @goOCTA and @CaltransOC are conducting a study about how extreme weather affects the Orange County rail corridor. Share your thoughts on how to improve OC train stations by taking a quick community survey at [OCrailsurvey.com](http://OCrailsurvey.com). For more information visit [www.octa.net/railstudy](http://www.octa.net/railstudy).

**4. Newsletter Announcement:** Provide information regarding the project and the community survey via your organization's newsletter. Copy and paste the following text into the body of the newsletter:

*The Orange County Transportation Authority (OCTA), in partnership with the State of California Department of Transportation (Caltrans) District 12, is conducting a study about how extreme weather affects the Orange County rail corridor. Share your thoughts on how to improve OC train stations by taking a quick community survey at [OCrailsurvey.com](http://OCrailsurvey.com). For more information, visit [www.octa.net/railstudy](http://www.octa.net/railstudy).*

# Appendix H

---

## *Electronic Mail Notifications*



Español

**OCTA, in partnership with Caltrans, is conducting a study about how extreme weather affects the Orange County rail corridor.**

**Tell us how we can improve OC train stations.**

[Take the Short Survey Here](#)



107 | Page



METROLINK.

[Contactless Ticketing](#) | [Clean Commuting](#) | [How Full is My Train?](#)



Dear Metrolink Rider,

You have been selected to participate in a survey to improve station amenities at Orange County stations. Your feedback is valuable to the overall Metrolink train experience. The survey will take 5 minutes to complete.

The Orange County Transportation Authority (OCTA), in partnership with the State of California Department of Transportation (Caltrans) District 12, is conducting a study about how extreme weather effects the Orange County rail corridor. Information from this study will help OCTA identify opportunities and challenges to improve service.

108 | Page

[Take Survey »](#)

## Jason Jackson

**From:** OCTA Rail Infrastructure Study <mespino@octa.net>  
**Sent:** Thursday, November 05, 2020 2:01 PM  
**To:** Julie Diaz  
**Subject:** Thank you for your support and participation!



### RAIL INFRASTRUCTURE STUDY DEFENSE AGAINST CLIMATE CHANGE PLAN

#### Thank You!

This summer we asked for you to help develop the Rail Infrastructure Study Defense Against Climate Change Plan by sharing with us how train stations can be improved in Orange County to better withstand severe weather conditions. The Orange County Transportation Authority (OCTA) and the California Department of Transportation (Caltrans) District 12 thank you for your support and participation. Through the outreach process, the team was able to collect 1,341 surveys and 543 comments.

Congratulations to Metrolink rider Steve who frequents the Fullerton station for winning a \$50 Amazon gift card. You can view the results of the survey in [English](#) and [Spanish](#).

---

#### What's Next?

The purpose of this study is to learn how climate change affects the Orange County rail corridor and to identify preventative measures that can be used in developing short-term and long-term strategies. The study and recommendations will be completed in fall 2020.

#### Stay Connected

**PROJECT MANAGER:**

Jason Lee  
(714) 560-5833  
[jlee1@octa.net](mailto:jlee1@octa.net)

**WEBSITE:**

**COMMUNITY OUTREACH:**

Marissa Espino  
Community Relations Officer  
(714) 560-5607  
[mespino@octa.net](mailto:mespino@octa.net)

[octa.net/railstudy](http://octa.net/railstudy)



OCTA | 550 S. Main Street, Orange, CA 92868

[Unsubscribe jdiaz@arellanoassociates.com](mailto:jdiaz@arellanoassociates.com)

[Update Profile](#) | [About our service provider](#)

Sent by [mespino@octa.net](mailto:mespino@octa.net)

# Appendix I

---

## *Online Media Plan*



# Rail Infrastructure Study

## Plan B - Online Media Plan

August - September 2020



Media Type	Post Date	Cost Est.	Run Time	Image Idea	Post
Facebook EN/SP Ad #1	Mon 8/3 – Sun 8/9	\$400 EN/ \$150 SP	7 days	Project branding 	OCTA and Caltrans want to hear from you! Tell us how extreme weather affects your rail commute by taking a short survey at <a href="https://ocrailsurvey.com">ocrailsurvey.com</a> .
Facebook Post #1	Wed 8/5	No cost	1 time		Are you a Metrolink rider? Help us make amenity improvements to your station by sharing your opinions at <a href="https://ocrailsurvey.com">ocrailsurvey.com</a> . Visit <a href="https://octa.net/railstudy">octa.net/railstudy</a> for more information.
Geofencing Ad #1	Mon 8/10 – Sun 8/23	\$1,800	14 days	OCrailsurvey.com  <b>Take our survey!</b> Tell us how extreme weather affects rail travel in the OC.  	Take our survey for a chance to win a \$50 Amazon gift card!



## Rail Infrastructure Study

### Plan B - Online Media Plan

August - September 2020



Updated 9/10/20

Media Type	Post Date	Cost Est.	Run Time	Image Idea	Post
Facebook Post #2	Thurs 8/13	No cost	1 time		Summer heat wearing you down during your Metrolink commute? Help OCTA and Caltrans improve rail station amenities in the OC. Take our survey at <a href="https://ocrailsurvey.com">ocrailsurvey.com</a> for a chance to win a \$50 Amazon gift card. Visit <a href="https://octa.net/railstudy">octa.net/railstudy</a> .
Twitter Post #1	Thurs 8/13	No cost	1 day		Getting some fresh air? While you're basking in the sun, let OCTA and Caltrans know how heat is affecting your rail commute at <a href="https://ocrailsurvey.com">ocrailsurvey.com</a> . You could win a \$50 Amazon gift card!
Facebook EN/SPA Ad #2	Mon 8/17 – Sun 8/23	\$400 EN/ \$150 SP	7 days		OCTA and Caltrans want to make your Metrolink trip more enjoyable. Let them know how by taking our survey at <a href="https://ocrailsurvey.com">ocrailsurvey.com</a> and enter for a chance to win a \$50 Amazon gift card.



## Rail Infrastructure Study

### Plan B - Online Media Plan

August - September 2020



Updated 9/10/20

Media Type	Post Date	Cost Est.	Run Time	Image Idea	Post
Facebook Post #3	Wed 8/26	No cost	1 time		Take the OCTA and Caltrans survey at <a href="https://ocrailsurvey.com">ocrailsurvey.com</a> to let us know how wind, heat and rain affect your rail commute. You might win a \$50 Amazon gift card! Learn more at <a href="https://octa.net/railstudy">octa.net/railstudy</a> .
Facebook EN/SPA Ad #3	Mon 8/31- Sun 9/6	\$400 EN/ \$150	7 days		OCTA and Caltrans are making amenity improvements to your rail station but need your help! Take our survey at <a href="https://ocrailsurvey.com">ocrailsurvey.com</a> for a chance to win a \$50 Amazon gift card.
Twitter Post #2	Thurs 9/3	No cost	1 day		Are you riding a train this Labor Day weekend? Let OCTA and Caltrans know how to make your journey more enjoyable. Visit <a href="https://ocrailsurvey.com">ocrailsurvey.com</a> . You might win a \$50 Amazon gift card!



# Rail Infrastructure Study

## Plan B - Online Media Plan

August - September 2020



Updated 9/10/20

Media Type	Post Date	Cost Est.	Run Time	Image Idea	Post
Geofencing Eng/Spa Ad #2	Mon 9/14- Sun 9/27	\$750 Eng/ \$750 Spa	14 days		Take our survey for a chance to win a \$50 Amazon gift card!
Facebook SPA only Ad #4	Mon 9/14- Sun 9/20	\$300	7 days		<p>To be translated: <i>Help us make your rail station better! The survey is offered in Spanish.</i></p> <p>Tag: <i>You could win a \$50 Amazon gift card!</i></p>



## Rail Infrastructure Study

### Plan B - Online Media Plan

August - September 2020



Updated 9/10/20

Media Type	Post Date	Cost Est.	Run Time	Image Idea	Post
Facebook Post #4	Mon 9/28	No cost	1 time		<p>Last chance to share your thoughts! Letting OCTA and Caltrans know how rain, wind and heat is affecting your rail commute at <a href="http://ocrailsurvey.com">ocrailsurvey.com</a>. Participants will be entered into a raffle to win a \$50 Amazon gift card. For more, visit <a href="http://octa.net/railstudy">octa.net/railstudy</a>.</p>

Total cost: \$5,250

# Appendix J

---

## *Social Media Posts*

Facebook Posts

Twitter Posts



OCTA



Published by Stephanie Espinoza [?] · August 5 · 🌐

Are you a Metrolink rider? Help us make amenity improvements to your station by sharing your opinions at [ocrailsurvey.com](http://ocrailsurvey.com). Visit [octa.net/railstudy](http://octa.net/railstudy) for more information.



🍀 **Get More Likes, Comments and Shares**

When you boost this post, you'll show it to more people.

675

People Reached

31

Engagements

**Boost Post**

118 | Page

👍 Glenn Fredman, Bengali F. Gonzalez and 12 others

4 Shares

👍 Like

💬 Comment

➦ Share





OCTA



Published by Stephanie Espinoza [?] · August 18 · 🌐

Summer heat wearing you down during your Metrolink commute? Take our survey at [ocrailsurvey.com](http://ocrailsurvey.com) to help OCTA and Caltrans improve rail station amenities in the OC. Visit [octa.net/railstudy](http://octa.net/railstudy) for more information.



✔ **Get More Likes, Comments and Shares**

When you boost this post, you'll show it to more people.

449

People Reached

21

Engagements

**Boost Post**

119 | Page

👤 Darrell Johnson, Mauricio Zenteno and 7 others

2 Comments

👍 Like

💬 Comment

➦ Share





OCTA

Published by Stephanie Espinoza [?] · August 27 · 🌐



Take the OCTA and Caltrans survey at [ocrailsurvey.com](https://ocrailsurvey.com) to let us know how wind, heat and rain affect your rail commute. You might win a \$50 Amazon gift card! To learn more, visit [octa.net/railstudy](https://octa.net/railstudy).



✔ **Get More Likes, Comments and Shares**

When you boost this post, you'll show it to more people.

**363**  
People Reached

**12**  
Engagements

**Boost Post**

120 | Page

👤 Roger Rios, Mauricio Zenteno and 3 others

1 Share

👍 Like

💬 Comment

➦ Share





OCTA



Published by Stephanie Espinoza [?] · September 28 · 🌐

Last chance to share your thoughts! Let OCTA and Caltrans know how rain, wind and heat is affecting your rail commute at [ocrailsurvey.com](http://ocrailsurvey.com). Participants will be entered into a raffle to win a \$50 Amazon gift card. For more, visit [octa.net/railstudy](http://octa.net/railstudy).



🍀 **Get More Likes, Comments and Shares**

When you boost this post, you'll show it to more people.

385

People Reached

23

Engagements

**Boost Post**

121 | Page

👍 Ayin Kapara, Ming Yau and 7 others

2 Shares

👍 Like

💬 Comment

➦ Share





OCTA @goOCTA · Aug 13

Heading outside for some fresh air? While you're basking in the sun, take our short survey and let OCTA and Caltrans know how heat is affecting your rail commute at [ocrailsurvey.com](http://ocrailsurvey.com)



122 | Page





OCTA @goOCTA · Sep 3

Are you riding the train this Labor Day weekend? Let OCTA and Caltrans know how we can make your journey more enjoyable by visiting [ocrailsurvey.com](http://ocrailsurvey.com).



123 | Page



# Appendix K

---

## *Facebook Advertisements*



OCTA

Sponsored ·



OCTA & Caltrans want to hear from you! Tell us how extreme weather affects your rail commute by taking a short survey.



OCRAILSURVEY.COM

Help us improve your rail station experience!

LEARN MORE

125 | Page



Like



Comment



Share



OCTA

Sponsored ·

OCTA & Caltrans want to hear from you! Tell us how extreme weather affects your rail commute by taking a short survey.



OCRAILSURVEY.COM

**Help us improve your rail station experience**

126 | Page

[Learn More](#)

Take our survey to help improve station amenities in OC.

Like

Comment

Share



OCTA

Sponsored ·



¡OCTA y Caltrans quieren escuchar de ti!  
Díganos cómo el clima extremo afecta su viaje  
en el tren haciendo una breve encuesta.



OCRAILSURVEY.COM

¡Ayúdanos a mejorar tu  
experiencia en la estació...

[LEARN MORE](#)

127 | Page



Like



Comment



Share



OCTA

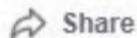
Sponsored ·

¡OCTA y Caltrans quieren escuchar de ti! Díganos cómo el clima extremo afecta su viaje en el tren haciendo una breve encuesta.



OCRRAILSURVEY.COM

¡Ayúdanos a mejorar tu experiencia en la [128](#) | [Page](#) [Learn More](#)





OCTA

Sponsored · 



OCTA and Caltrans want to make your Metrolink trip more enjoyable. Let them know how by taking our survey at [ocrailsurvey.com](http://ocrailsurvey.com).



[OCRAILSURVEY.COM](http://OCRAILSURVEY.COM)

**Help us improve your rail station experience!**

[LEARN MORE](#)

129 | Page



Like



Comment



Share



OCTA

Sponsored ·

OCTA and Caltrans want to make your Metrolink trip more enjoyable. Let them know how by taking our survey at [ocrailsurvey.com](http://ocrailsurvey.com).



[OCRAILSURVEY.COM](http://OCRAILSURVEY.COM)

**Help us improve your rail station experience!** [130 | Page](#) [Learn More](#)

Take our survey to help improve station amenities in OC.

Like

Comment

Share



OCTA

Sponsored ·



OCTA y Caltrans quieren que su viaje en Metrolink sea más agradable. Hágales saber respondiendo a nuestra encuesta en [ocrailsurvey.com](http://ocrailsurvey.com).



[OCRAILSURVEY.COM](http://OCRAILSURVEY.COM)

¡Ayúdanos a mejorar tu experiencia en la estación d...

[LEARN MORE](#)

131 | Page



Like



Comment



Share



OCTA

Sponsored ·

OCTA y Caltrans quieren que su viaje en Metrolink sea más agradable. Hágalos saber respondiendo a nuestra encuesta en [ocrailsurvey.com](http://ocrailsurvey.com).



[OCRAILSURVEY.COM](http://OCRAILSURVEY.COM)

¡Ayúdanos a mejorar tu experiencia en la estación de tren!

[Link](#) [Page](#)

[Learn More](#)

Like

Comment

Share



OCTA

Sponsored ·



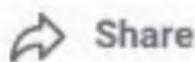
OCTA and Caltrans are making amenity improvements to your rail station but need your help! Take our survey at [ocrailsurvey.com](https://ocrailsurvey.com).



[OCRAILSURVEY.COM](https://ocrailsurvey.com)

**Win a \$50 Amazon gift card!** [EARN MORE](#)

Help us improve your rail station ...





OCTA

Sponsored



OCTA and Caltrans are making amenity improvements to your rail station but need your help! Take our survey at [ocrailsurvey.com](http://ocrailsurvey.com). See Less



[OCRAILSURVEY.COM](http://OCRAILSURVEY.COM)

134 | Page

**Win a \$50 Amazon gift card!**

Help us improve your rail station experience!

[Learn More >](#)



OCTA

Sponsored ·



OCTA y Caltrans están haciendo mejoras en las comodidades de su estación de tren, ¡pero necesitan su ayuda! Participa en nuestra encuesta en [ocrailsurvey.com](https://ocrailsurvey.com).



[OCRAILSURVEY.COM](https://ocrailsurvey.com)

¡Gana una tarjeta de regalo de Amazon de \$50!

139 | Page

[LEARN MORE](#)



Like



Comment



Share



OCTA

Sponsored



OCTA y Caltrans están haciendo mejoras en las comodidades de su estación de tren, ¡pero necesitan su ayuda! Participa en nuestra encuesta en [ocrailsurvey.com](https://ocrailsurvey.com). See Less



[OCRAILSURVEY.COM](https://ocrailsurvey.com)

136 | Page

¡Gana una tarjeta de regalo de Amazon de \$50!

Participa en nuestra encuesta para ayudar a mejorar l...

[Learn More >](#)



OCTA

Sponsored ·



¡Ayúdanos a mejorar tu estación de tren! La encuesta está disponible en español.



OCRAILSURVEY.COM

¡Podrías ganar una tarjeta de regalo de Amazon de \$50!

[LEARN MORE](#)

137 | Page



Like



Comment



Share



OCTA

Sponsored · 🌐

¡Ayúdanos a mejorar tu estación de tren! La encuesta está disponible en español.

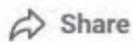


OCRAILSURVEY.COM

¡Podrías ganar una tarjeta de regalo de Amazon de \$50!

138 | Page

[Learn More](#)



# Appendix L

---

## *Geofencing Advertisements*

Geofencing Map Methodology  
Graphics

# TRANSMITTAL

**DATE:** August 12, 2020  
**TO:** OCTA  
**FROM:** Stacey Falcioni, Arellano Associates  
**SUBJECT:** Rail Infrastructure Station Boundary Selection Methodology  
**TRANSMITTED VIA:** Email

The geofencing boundaries of the Orange County Metrolink sections were selected based on a list of requirements and with a couple of different issues in mind. It was the goal to capture as many potential riders as possible while not underutilizing the impressions that were budgeted in the geofencing campaign with individuals that would likely not ride public transportation.

When creating the boundaries, the issues kept in mind were as follows:

- Entire station area
- Bus stop locations
- Metrolink parking
- Tourist attractions
- Avoiding nearby areas that attract many drive-only individuals (ie. Angel Stadium and FivePoint Ampitheatre)

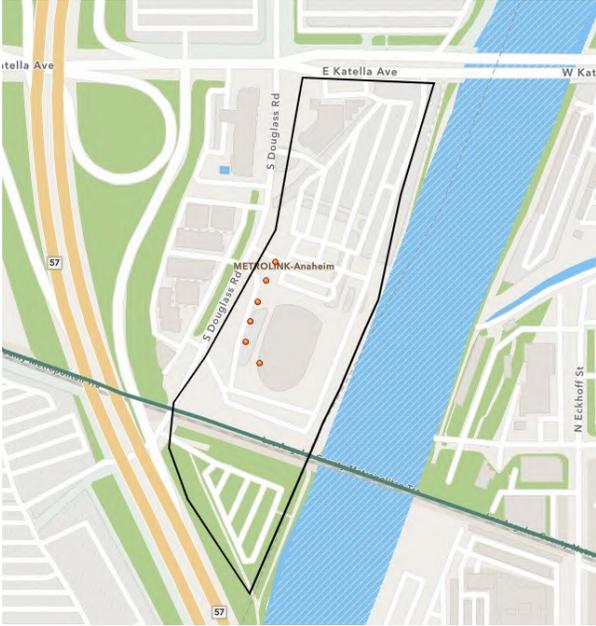
**Buena Park Station**



**Fullerton Station**



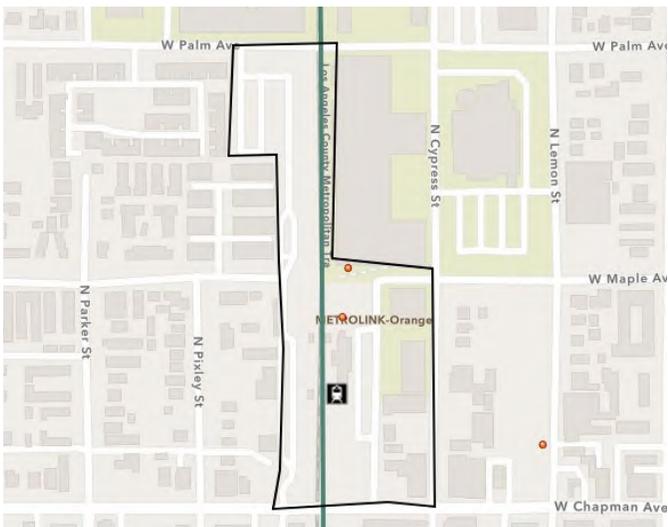
**Anaheim Regional Transportation  
Intermodal Center (ARTIC)**



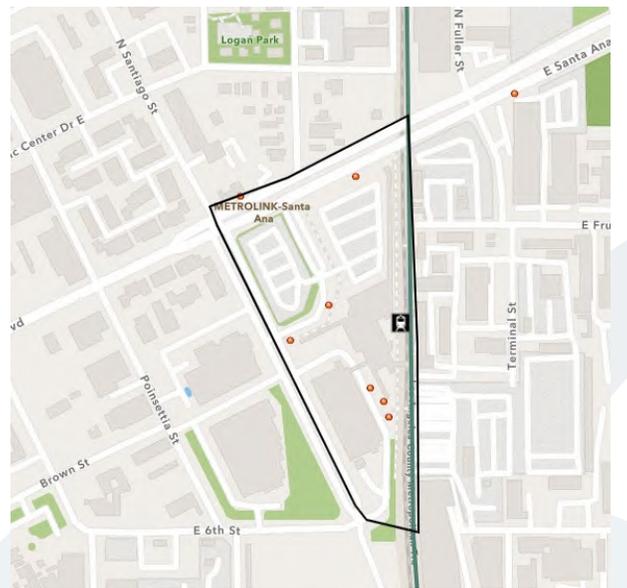
**Anaheim Canyon Station**



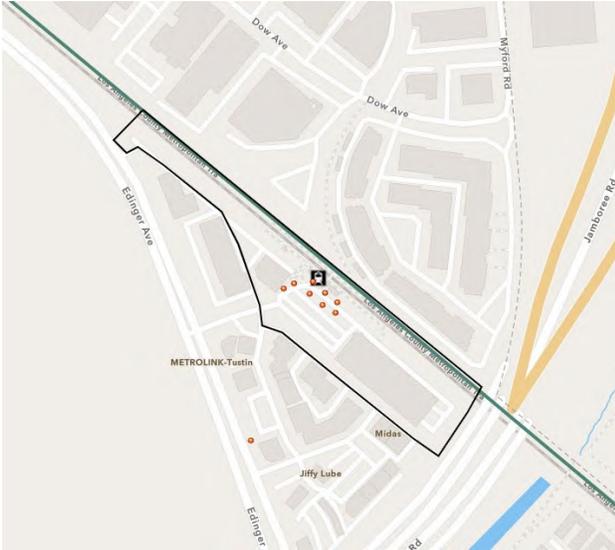
**Orange Station**



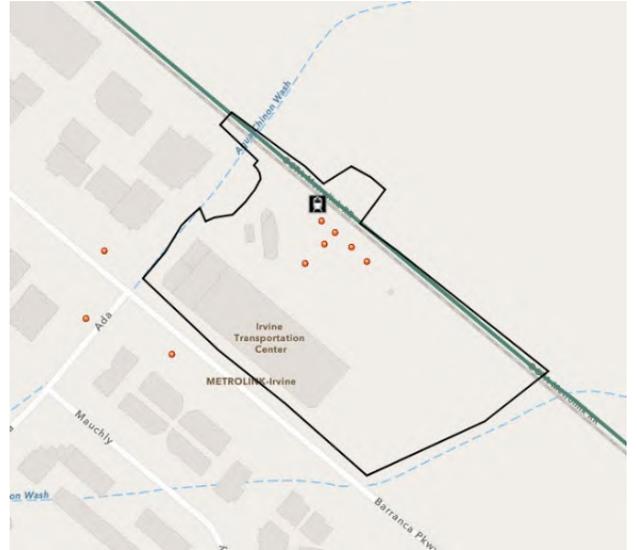
**Santa Ana Station**



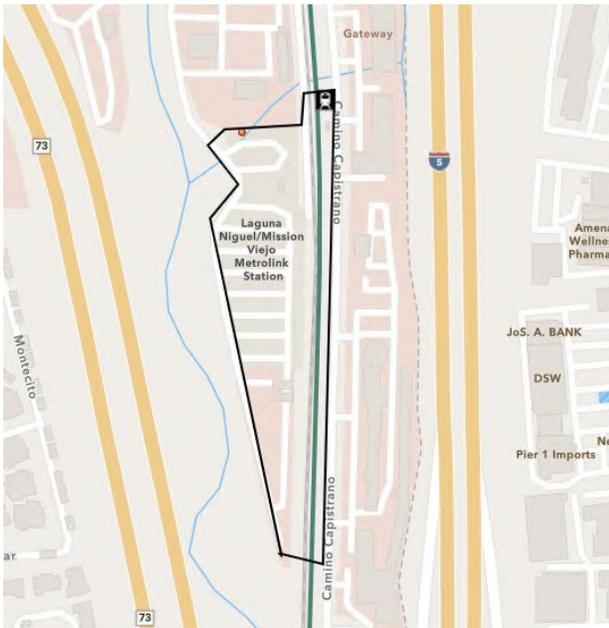
### Tustin Station



### Irvine Station



### Laguna Niguel Station



### San Juan Capistrano Station



### San Clemente (North) Station



### San Clemente (South) Station



# Creative

## August – September 2020

OCTA Caltrans



# Appendix M

---

## *OCTA Blog and Other Media*

OCTA Press Release  
On the Move Blog Post  
On the Move Newsletter



## **Public Input Needed for O.C. Rail Study on Climate Change**

*Online survey seeks suggestions to improve shelters and amenities at Orange County's 12 rail stations*

ORANGE – How could climate change and severe weather potentially affect Orange County's passenger rail service?

That's the question the Orange County Transportation Authority, in partnership with Caltrans District 12, is exploring in an ongoing study.

The study, known as the Rail Infrastructure Defense Against Climate Change study, will identify both the challenges and opportunities to improve service, operations, and infrastructure along Orange County's rail corridor and ways to better withstand severe weather conditions.

As part of that study, the public is invited to participate in a short online survey that will help provide recommendations for improving Orange County's 12 rail stations. In particular, it will explore how to better shield passengers from the effects of heat, rain, wind and other extreme weather conditions.

The survey, which is 13 questions long, takes only a few minutes to fill out. To access the survey, please visit [www.ocrailsurvey.com](http://www.ocrailsurvey.com) between now and the end of September.

146 | Page

The overall study is looking at an approximately 25-mile section of Orange County railway that runs from Irvine to the Orange County border with San Diego County. Much of that rail line runs near the coast.

The survey, which is 13 questions long, takes only a few minutes to fill out. To access the survey, please visit [www.ocrailsurvey.com](http://www.ocrailsurvey.com) between now and the end of September.

The overall study is looking at an approximately 25-mile section of Orange County railway that runs from Irvine to the Orange County border with San Diego County. Much of that rail line runs near the coast.

The study will help identify strategies for reducing the risk to the rail line from flooding, mudslides, coastal surge and sea-level rise, among other potential climate-related conditions.

It will also develop a plan for enhancing the management of vegetation near the rail line to better withstand periods of intense drought or heavy rains.

Improved shelter structures, natural shading and other amenities at rail stations will also be considered in the study.

For more information, visit [www.octa.net/railstudy](http://www.octa.net/railstudy).



## Help OCTA Improve the Orange County Rail Corridor

Thursday, August 20, 2020



OCTA, in partnership with Caltrans, is conducting a study about how extreme weather affects the Orange County rail corridor.

The Rail Infrastructure Defense Against Climate Change study will identify challenges and opportunities to improve service, operations, and infrastructure to better withstand severe weather conditions. The study also will provide recommendations on how to improve amenities at 12 rail stations to help protect passengers against weather.

This study area is the approximate 25-mile section of railway from Jeffrey Road in Irvine to the Orange/San Diego county border. It will also include evaluation of all 12 Metrolink stations in Orange County. Prior to reduced ridership as a result of the COVID-19 pandemic, the rail corridor in Orange County served about 40,000 passengers per day, along with freight traffic.

Share your thoughts on how to improve OC train stations by taking a quick community survey [here](#). For more information about the survey, visit [here](#).



To help ensure health and safety, passengers are required to wear face coverings while waiting for and riding OC Bus. This is a requirement on public transit statewide as California aims to help reduce the spread of coronavirus (COVID-19). To date, OCTA has handed out more than 11,000 face coverings onboard select OC Bus routes and is working with community partners and social-service agencies to provide thousands more to passengers who need them. In addition, face coverings are being distributed upon request at the OCTA Store. The Federal Transit Administration donated 60,000 reusable, cloth face coverings that will be distributed to passengers to help reduce the spread of COVID-19.



**Darrell E. Johnson**  
Chief Executive Officer

[Find recent Board Actions here](#)

## About OCTA



### **OCTA Board Commends Essential Workers**

The board adopted a resolution applauding the efforts of OCTA employees and essential workers and supporting all necessary precautionary measures to fight COVID-19.



### **Annual Rating Agency Meetings Go Virtual**

OCTA recently met with rating agencies and financial institutions as part of its active investor relations program.



### **OCTA Shares Transportation Industry Insights with Students**

CEO Darrell E. Johnson, Deputy CEO and Chief Operating Officer Jennifer L. Bergener and several staff members discussed OCTA's management success during COVID-19 with students from the WTS academy.



## Natural Habitat Returns on Nearly 300 Acres in Orange County Foothills

Working in partnership with the Irvine Ranch Conservancy and OC Parks, OCTA helped complete the restoration of nearly 300 acres of natural habitat in the foothills of Orange County.

## Freeways & Streets



## Wednesday Webinars Focus on I-5 South County Improvements

An innovative series of webinars is helping stakeholders and Orange County residents stay up to speed on the I-5 South County Improvements Project.

## Bus



### **OCTA's Face Covering Distribution Strategy: It Takes A Village**

As part of its proactive response to the pandemic, OCTA is distributing face coverings through a variety of channels to help reduce the spread of COVID-19.

## **Rail**



### **Help OCTA Improve the Orange County Rail Corridor**

OCTA, in partnership with Caltrans, is conducting a study about how extreme weather affects the Orange County rail corridor.



### **Stay Safe on the Tracks: No Photos!**

There are so many gorgeous and interesting spots to take photos throughout Southern California. Taking photos on active rail lines is not worth the risk.

# Rideshare & Active



## **OCTA Welcomes Its First All-Electric Vanpool Vehicle**

Traveling roundtrip each workday from Riverside County to Seal Beach, the all-electric Tesla Model X SUV is part of OCTA's goal of providing a balanced and sustainable transportation system for Orange County.



Copyright © 2020 Orange County Transportation Authority  
550 S. Main Street. PO Box 14184  
Orange, CA, 92863-1584, USA  
Click [here](#) to update your preferences or opt-out

# Appendix N

---

## *Survey*

Typeform English Survey  
Typeform Spanish Survey  
Typeform English Survey Report  
Typeform Spanish Survey Report  
Combined Survey Data Results



Conteste la encuesta en español: <https://survey.typeform.com/to/drdhaqX4>

The Orange County Transportation Authority (OCTA), in partnership with the State of California Department of Transportation (Caltrans) District 12, is conducting a study about how extreme weather affects the Orange County rail corridor. The study will identify opportunities and challenges to improve service.

The purpose of this survey is to receive valuable feedback on how to improve OC train stations. If you would like more information on this project, please visit [www.octa.net/railstudy](http://www.octa.net/railstudy).

Please complete this survey for a chance to win a \$50 Amazon gift card. For Sweepstakes Official Rules, click [here](#).

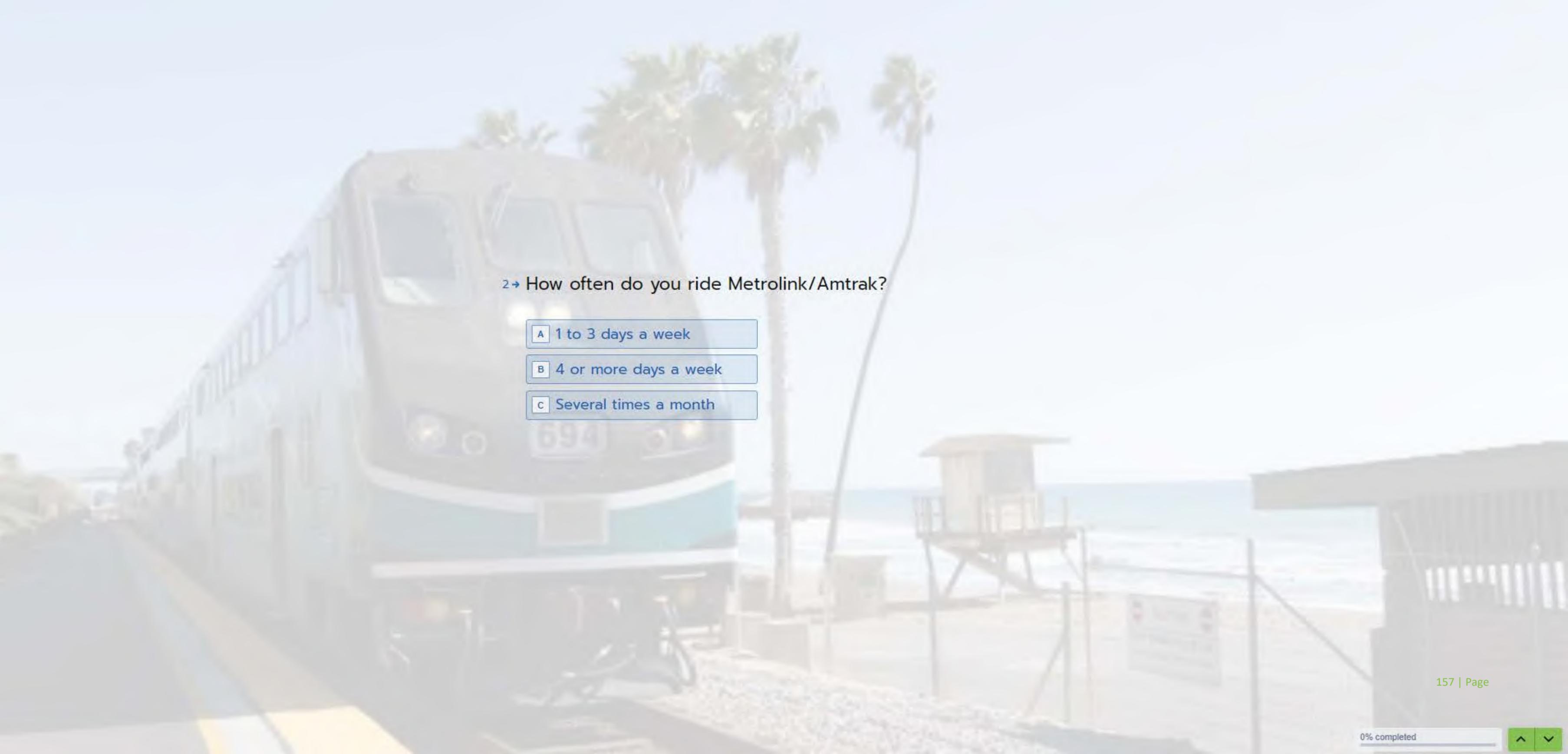
Start

press Enter ↵

1→ Which Metrolink/Amtrak stations do you use?

Choose as many as you like

- A Anaheim Regional Transportation Intermodal Center (ARTIC)
- B Anaheim Canyon
- C Buena Park
- D Fullerton
- E Irvine
- F Laguna Niguel/Mission Viejo
- G Orange
- H Santa Ana
- I San Clemente North Beach
- J San Clemente Pier
- K San Juan Capistrano
- L Tustin
- M I don't regularly use one of these stations
- N Other

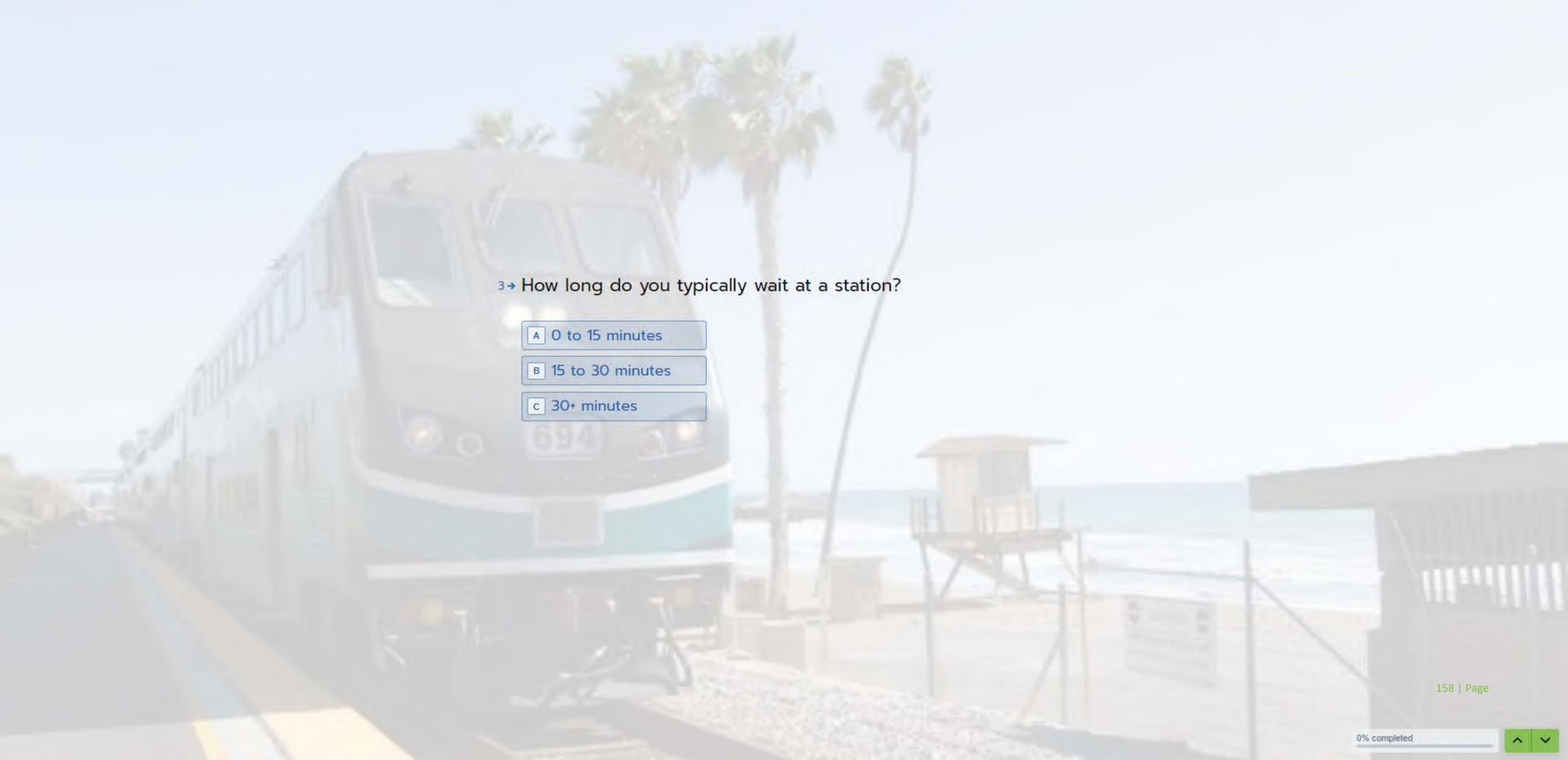


2→ How often do you ride Metrolink/Amtrak?

A 1 to 3 days a week

B 4 or more days a week

C Several times a month

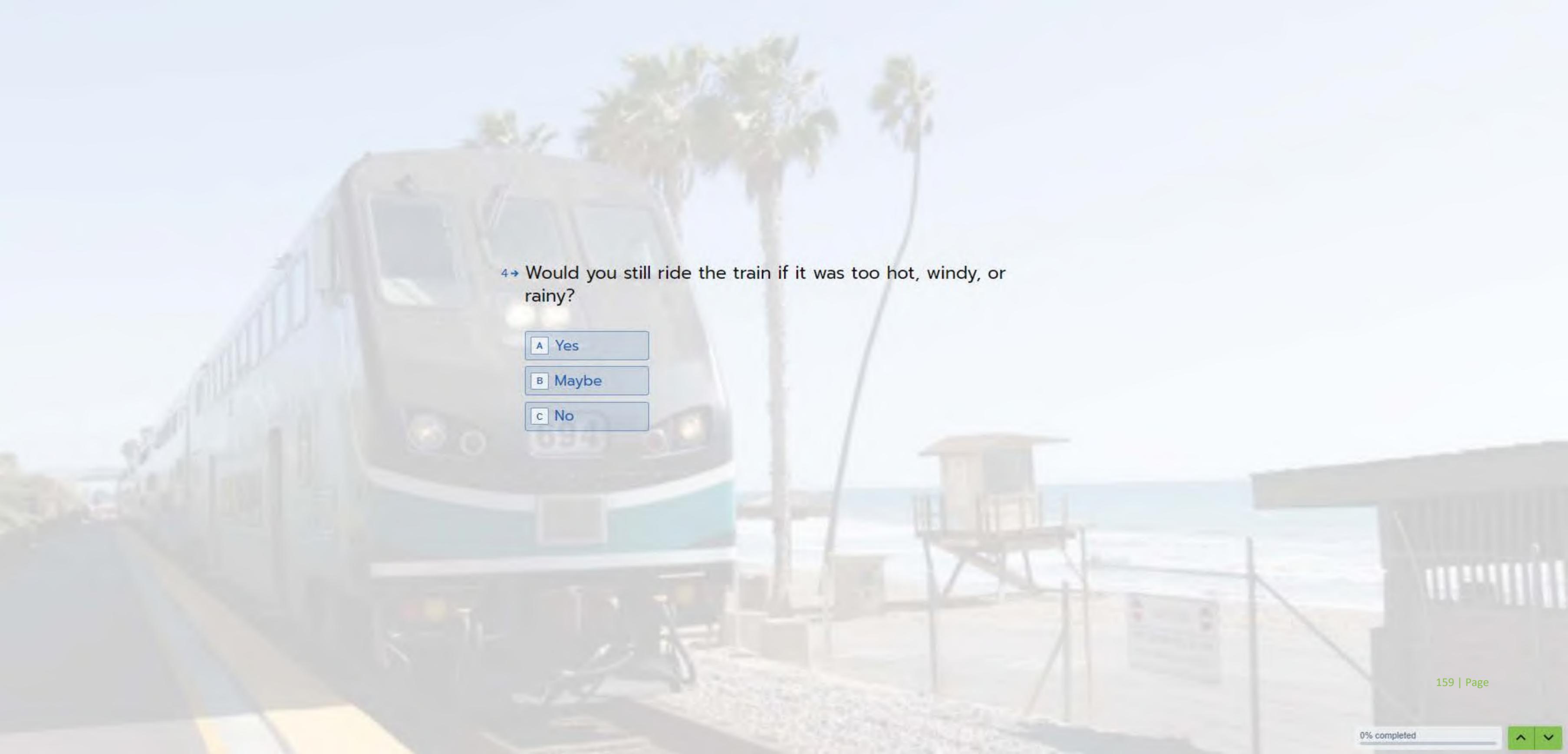


3 → How long do you typically wait at a station?

A 0 to 15 minutes

B 15 to 30 minutes

C 30+ minutes

A high-speed train is shown on a track that runs along a beach. In the background, there are several tall palm trees and a wooden lifeguard stand on a raised platform. The ocean is visible in the distance under a clear sky. The entire scene is overlaid with a semi-transparent white box containing a survey question and three answer options.

4→ Would you still ride the train if it was too hot, windy, or rainy?

A Yes

B Maybe

C No

5 → If train service was interrupted due to severe weather, how would you travel instead?

A Car

B Bus

C Rideshare Company (Uber/Lyft)

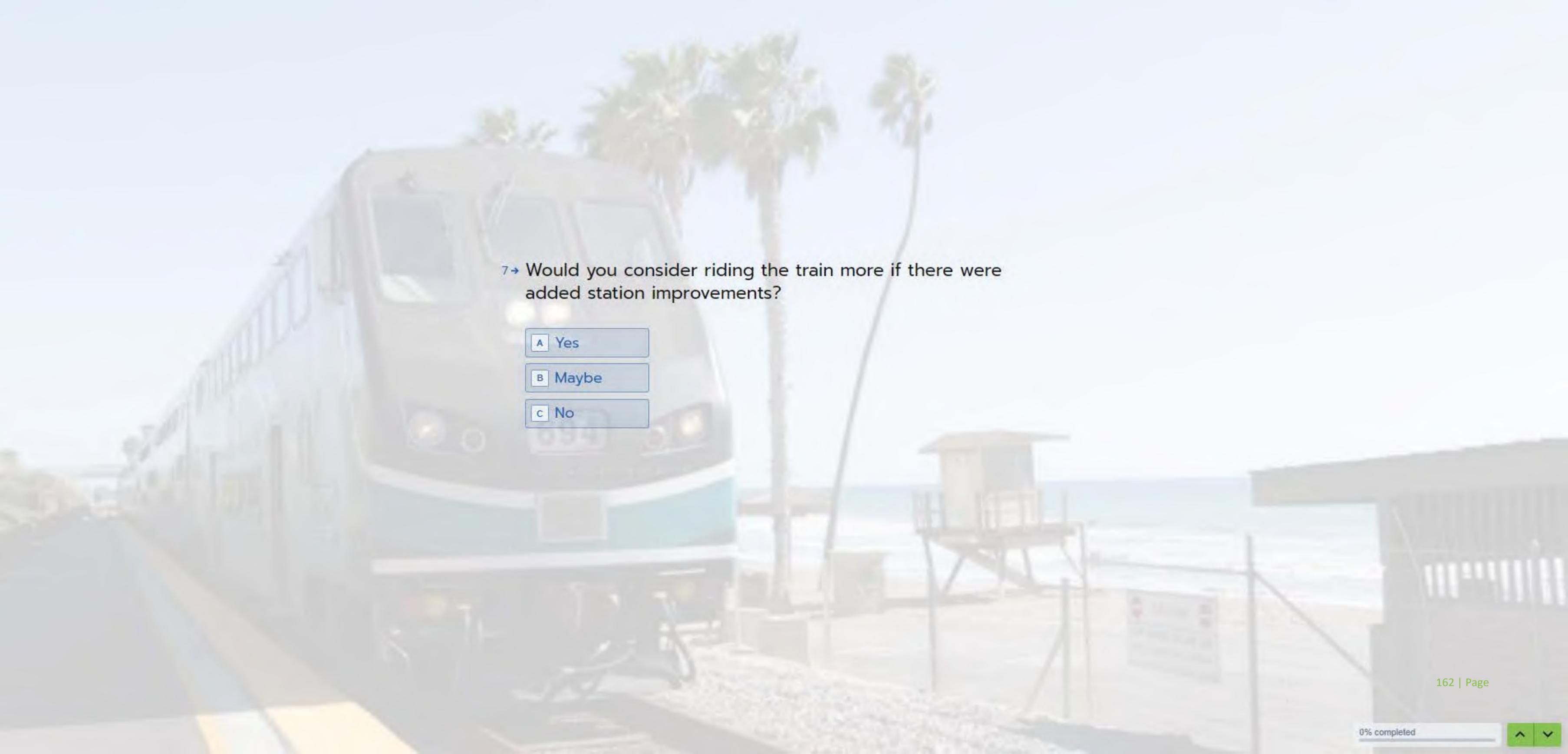
D Bike

E I would not make the trip

6 → What train station amenities would be most helpful during a very hot, windy, or rainy day?

Choose as many as you like

- A More shaded or covered areas
- B More water fountains
- C More seating
- D More accurate information about when my train will arrive (so I don't have to wait outside too long)
- E Water misters on platform
- F Fans on platform
- G Restrooms
- H Better information about safety precautions from harsh weather
- I Other

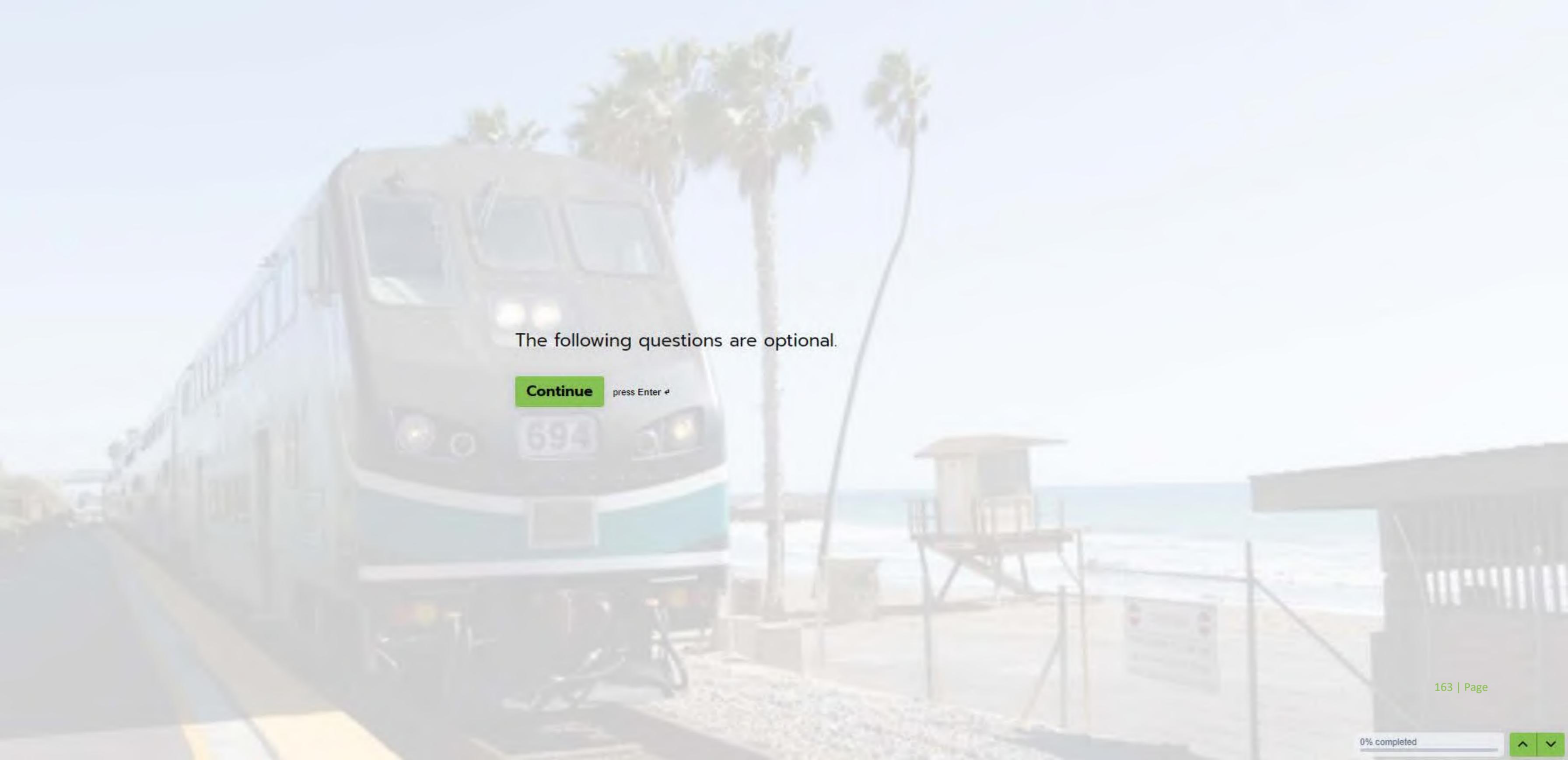


7→ Would you consider riding the train more if there were added station improvements?

A Yes

B Maybe

C No



The following questions are optional.

**Continue** press Enter ↵

8 → What is your age range?

- A Under 18
- B 18-24
- C 25-34
- D 35-44
- E 45-54
- F 55-64
- G 65 or older

9 → What race/ethnicity best describes you?

Choose as many as you like

- A American Indian or Alaska Native
- B Asian or Asian American
- C Black or African American
- D Hispanic or Latino
- E Native Hawaiian or other Pacific Islander
- F White or Caucasian
- G Another race
- H Prefer not to answer

10 → What is your annual household income?

A \$10,000 - \$24,999

B \$25,000 - \$49,999

C \$50,000 - \$74,999

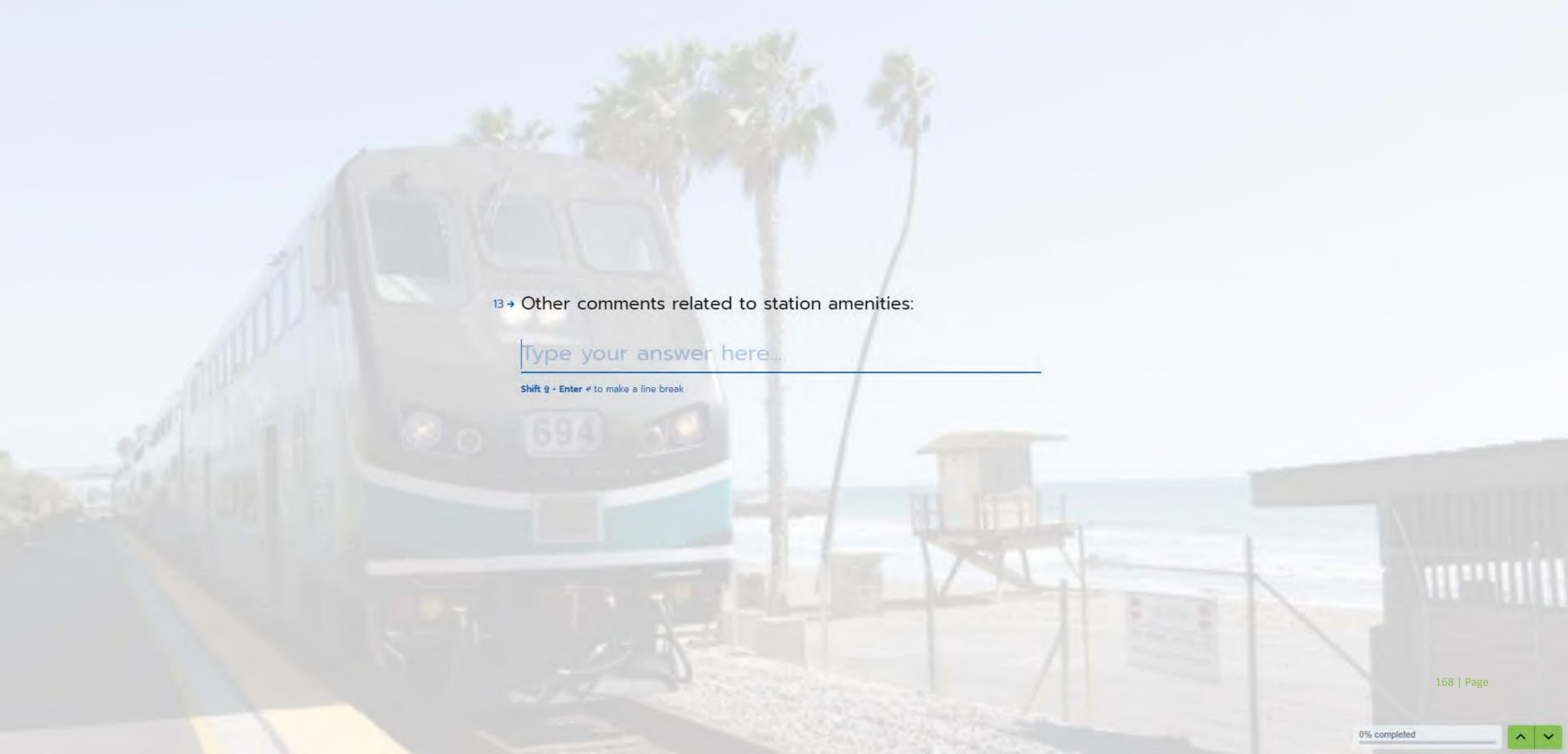
D \$75,000 - \$99,999

E \$100,000 - \$124,999

F \$125,000 or more

12 → Email address:

name@example.com



13 → Other comments related to station amenities:

Type your answer here...

Shift ↵ · Enter ↵ to make a line break



Thank you for your participation in the Rail Infrastructure Study. For more information please visit [octa.net/railstudy](http://octa.net/railstudy) or contact Marissa Espino at [mespino@octa.net](mailto:mespino@octa.net).





La Autoridad de Transporte del Condado de Orange (OCTA) en cooperación con el Distrito 12 del Departamento de Transporte de California (Caltrans) está conduciendo un estudio sobre cómo el clima extremo afecta el corredor ferroviario del Condado de Orange. El estudio identificará oportunidades y desafíos para mejorar el servicio.

El propósito de esta encuesta es recibir comentarios valiosos sobre cómo mejorar las estaciones de tren en el Condado de Orange. Si desea obtener más información sobre este proyecto, visite [www.octa.net/railstudy](http://www.octa.net/railstudy).

Por favor complete esta encuesta para tener la oportunidad de ganar una tarjeta de regalo de Amazon de \$50. Para las reglas oficiales del sorteo, [haga clic aquí](#).

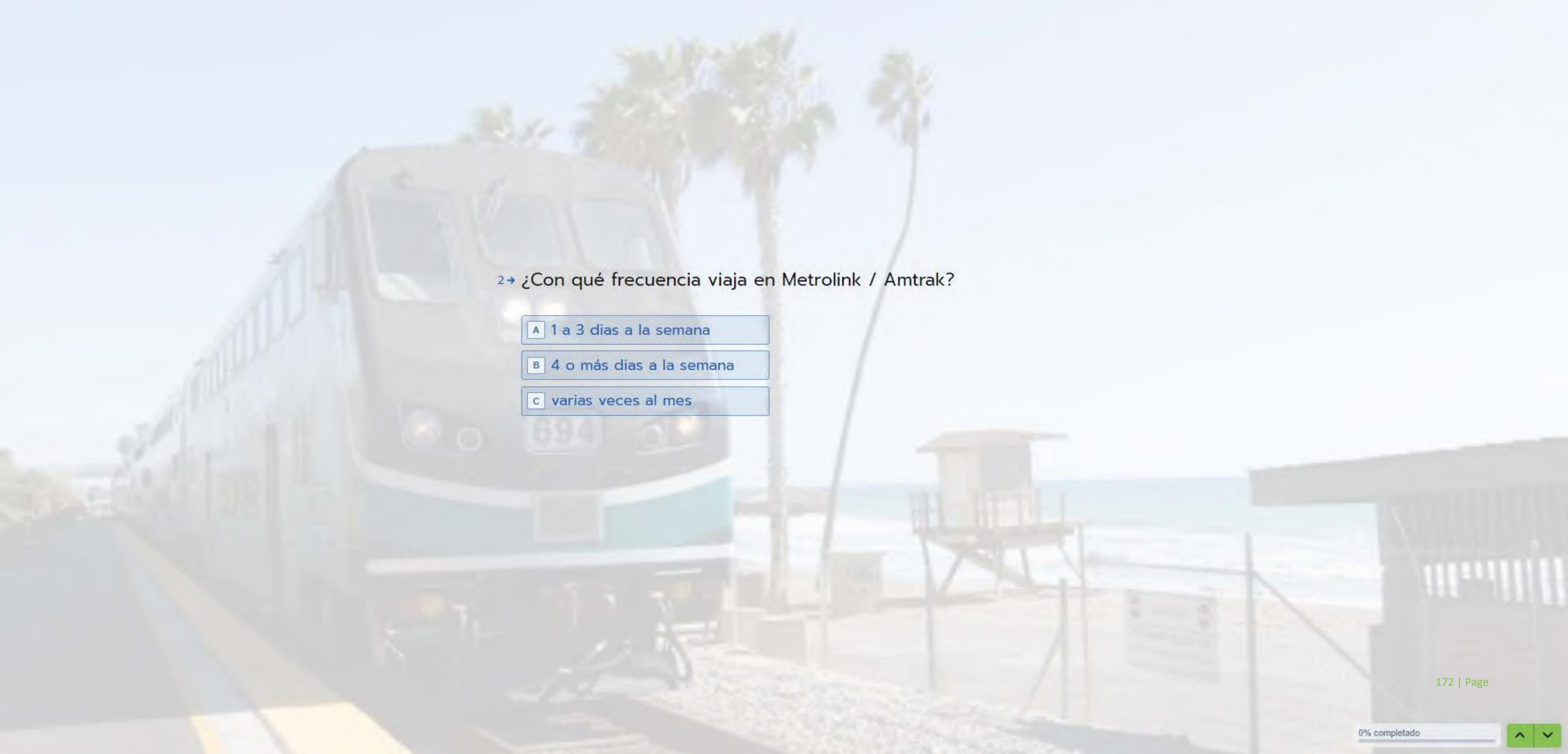
**Comenzar**

pulsa Enter ↵

1→ ¿Cual estación de Metrolink / Amtrak utiliza?

Elige tantas opciones como desees

- A Anaheim Regional Transportation Intermodal Center (ARTIC)
- B Anaheim Canyon
- C Buena Park
- D Fullerton
- E Irvine
- F Laguna Niguel/Mission Viejo
- G Orange
- H Santa Ana
- I San Clemente North Beach
- J San Clemente Pier
- K San Juan Capistrano
- L Tustin
- M No uso regularmente una de estas estaciones
- N Otro

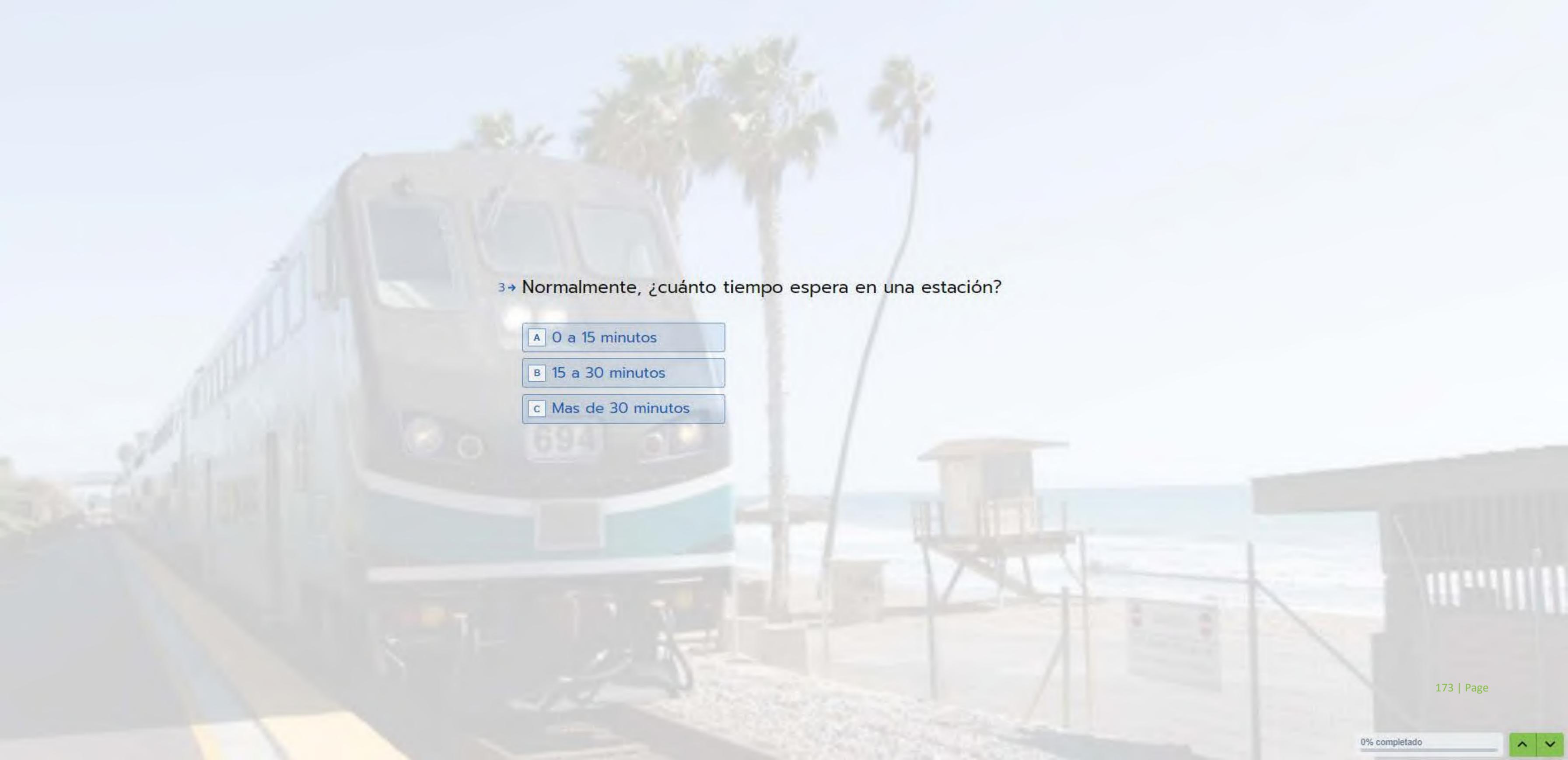


2→ ¿Con qué frecuencia viaja en Metrolink / Amtrak?

A 1 a 3 días a la semana

B 4 o más días a la semana

C varias veces al mes

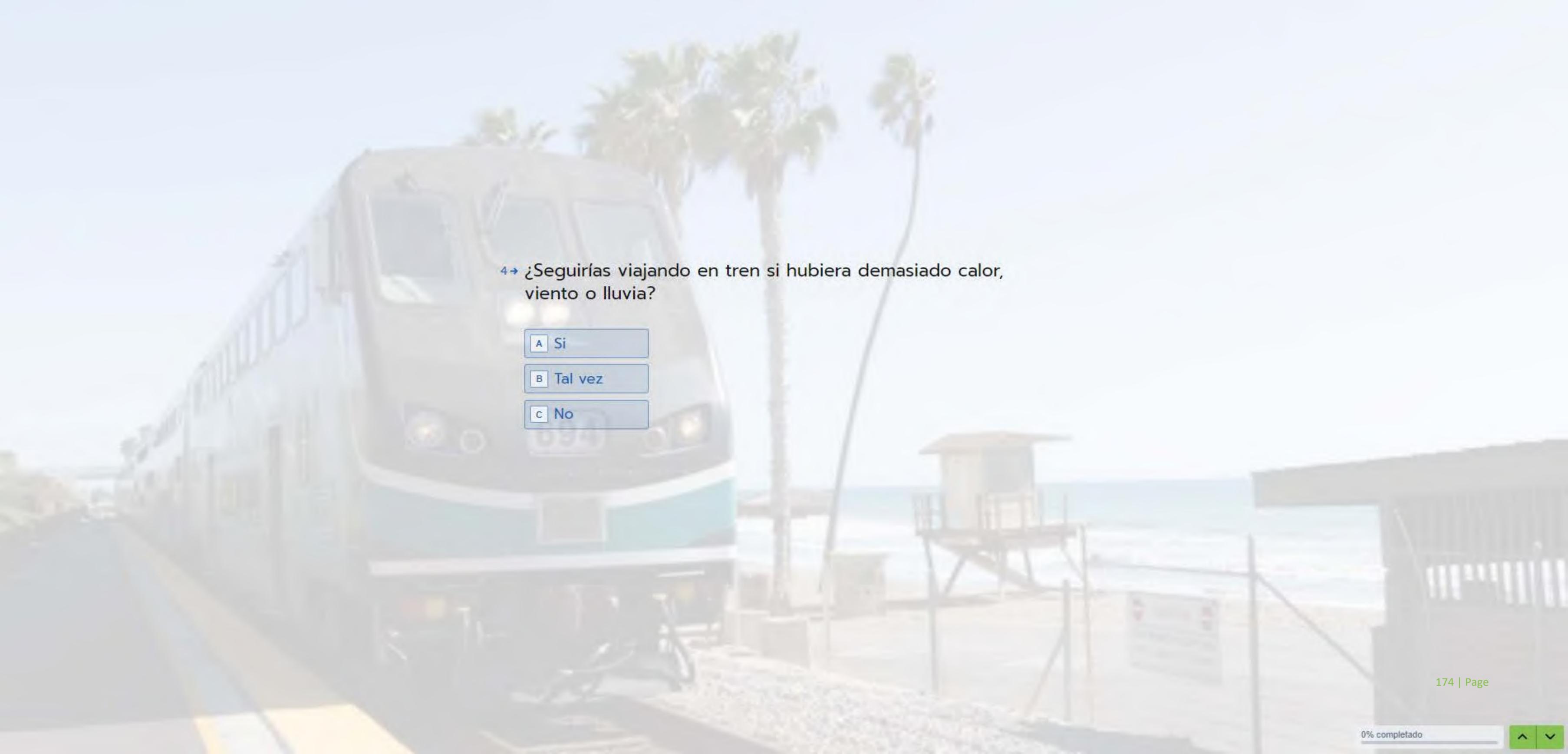


3 → Normalmente, ¿cuánto tiempo espera en una estación?

A 0 a 15 minutos

B 15 a 30 minutos

C Mas de 30 minutos



4→ ¿Seguirías viajando en tren si hubiera demasiado calor, viento o lluvia?

A Si

B Tal vez

C No

5 → Si el servicio del tren se interrumpiera debido a clima severo, ¿cómo viajarías en su lugar?

A Vehículo

B Autobus

C compañía de viaje compartido (Uber/Lyft)

D Bicicleta

E no haría el viaje

6 → ¿Qué servicios de la estación de tren serían más útiles durante un día muy caluroso, ventoso o lluvioso?

Elige tantas opciones como desees

A áreas más sombreadas o cubiertas

B Más fuentes de agua

C Más asientos

D Información más precisa sobre cuándo llegará mi tren (para que no tenga que esperar mucho tiempo afuera)

E Rociadores de agua en la plataforma

F Abanicos en la plataforma

G Baños

H Mejor información sobre precauciones de seguridad contra la clima severo

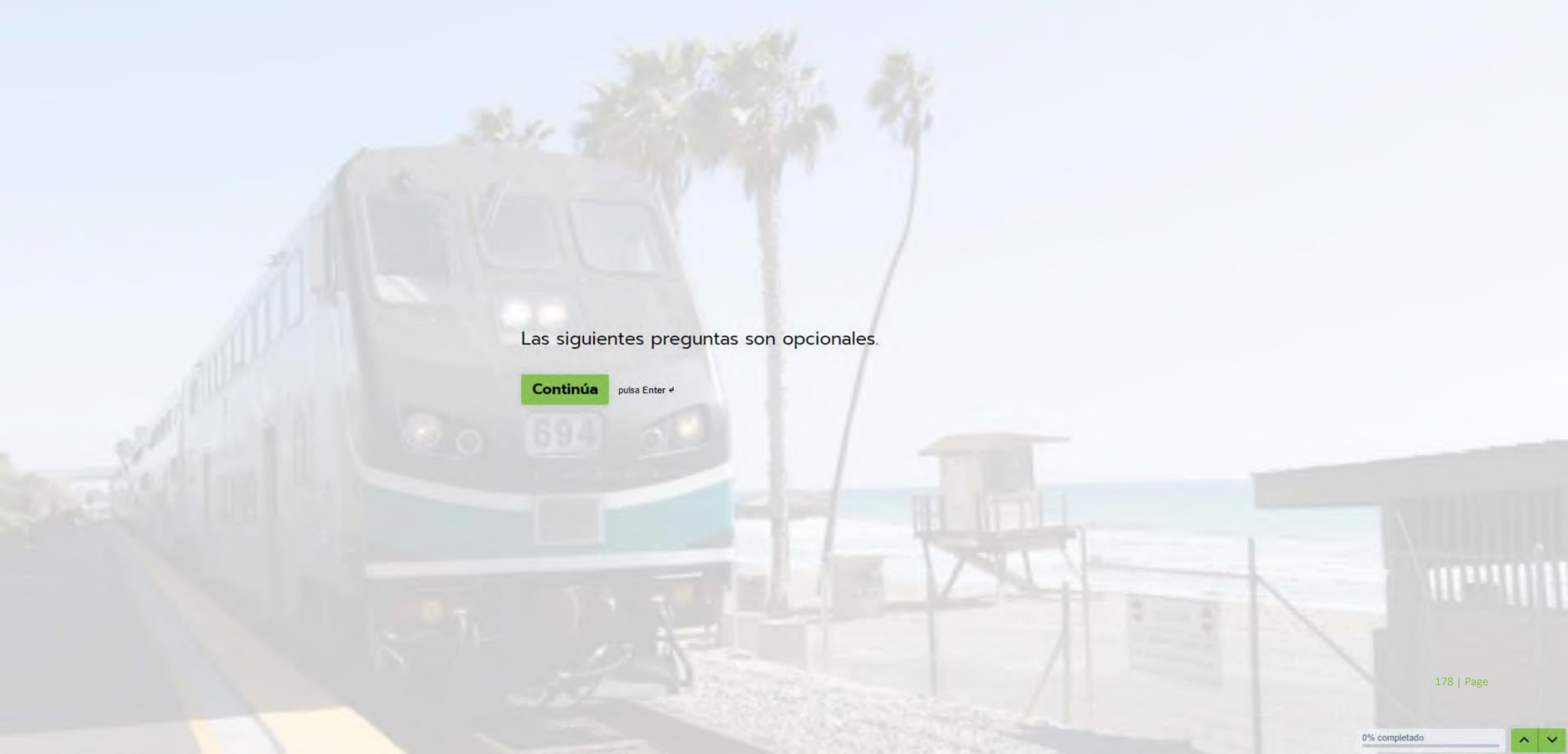
I Otro

7 → ¿Consideraría viajar más en el tren si hubiera mejoras adicionales en la estación?

A Si

B Tal vez

C No



Las siguientes preguntas son opcionales.

**Continúa** pulsa Enter ↵

8 → ¿Cuál es tu rango de edad?

A Menos de 18 años

B 18-24

C 25-34

D 35-44

E 45-54

F 55-64

G 65 o mayor

9 → ¿Qué raza / etnia te describe mejor?

Elige tantas opciones como desees

A Nativo estadounidense o Nativo de Alaska

B Asiático o asiático americano

C Afroamericano

D Hispano/latino

E Nativo de Hawái u otra isla del Pacífico

F Blanco/caucásico

G Otra raza

H prefiero no contestar

10 → ¿Cuál es su ingreso anual del hogar?

A \$10,000 - \$24,999

B \$25,000 - \$49,999

C \$50,000 - \$74,999

D \$75,000 - \$99,999

E \$100,000 - \$124,999

F \$125,000 o más



11 → ¿En qué código postal vive?

Escribe aquí tu respuesta...

12 → Correo electrónico

|nombre@ejemplo.com



13 → Otros comentarios relacionados con las comodidades de la estación:

Escribe aquí tu respuesta...

Pulsa **Shift** + **Enter** para añadir un párrafo



Gracias por su participación en el Estudio de Infraestructura Ferroviaria. Para obtener más información, visite [octa.net/railstudy](http://octa.net/railstudy) o comuníquese con Marissa Espino en [mespino@octa.net](mailto:mespino@octa.net).

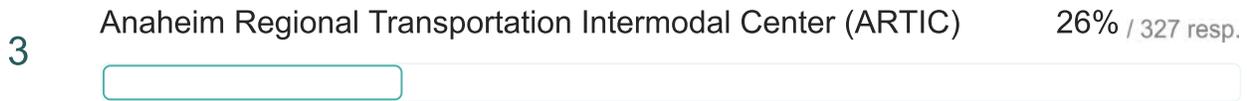


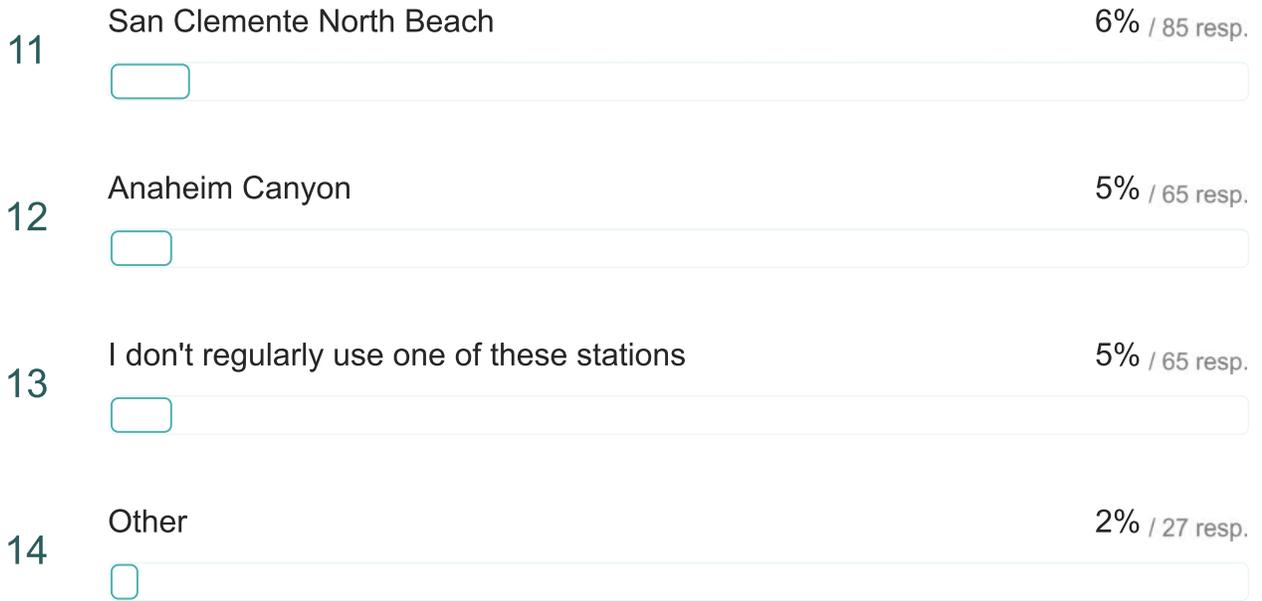
# OC Rail Infrastructure Survey

1,265 responses

Which Metrolink/Amtrak stations do you use?

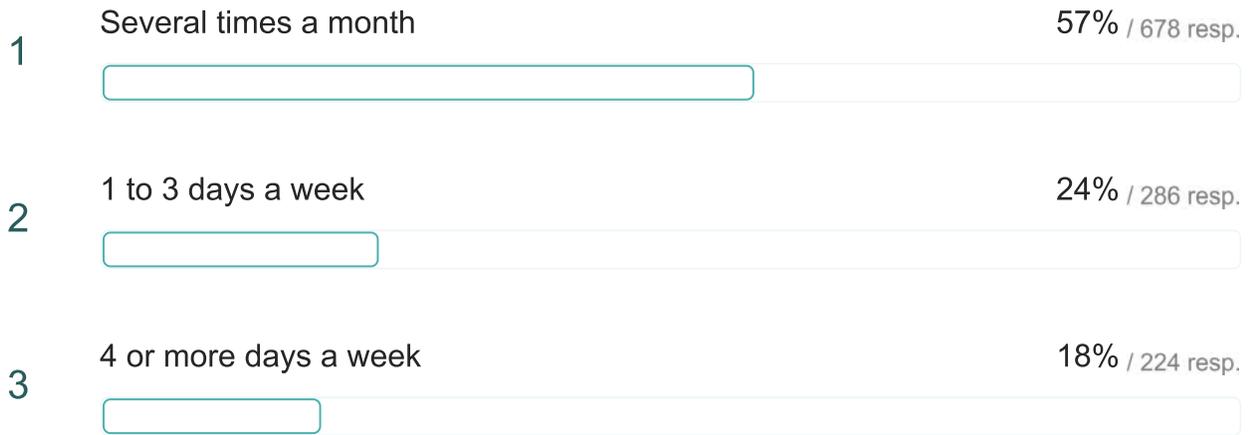
1K out of 1K answered





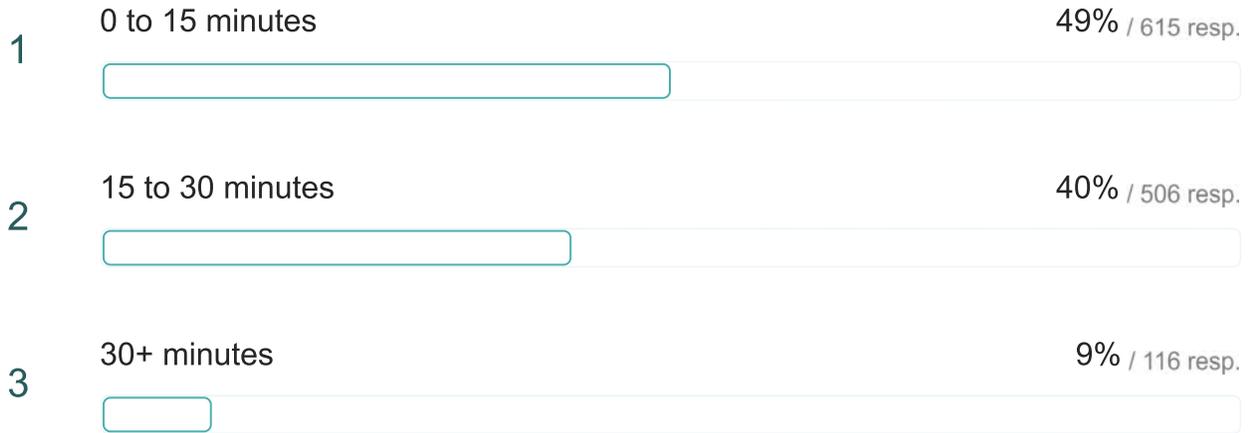
How often do you ride Metrolink/Amtrak?

1K out of 1K answered



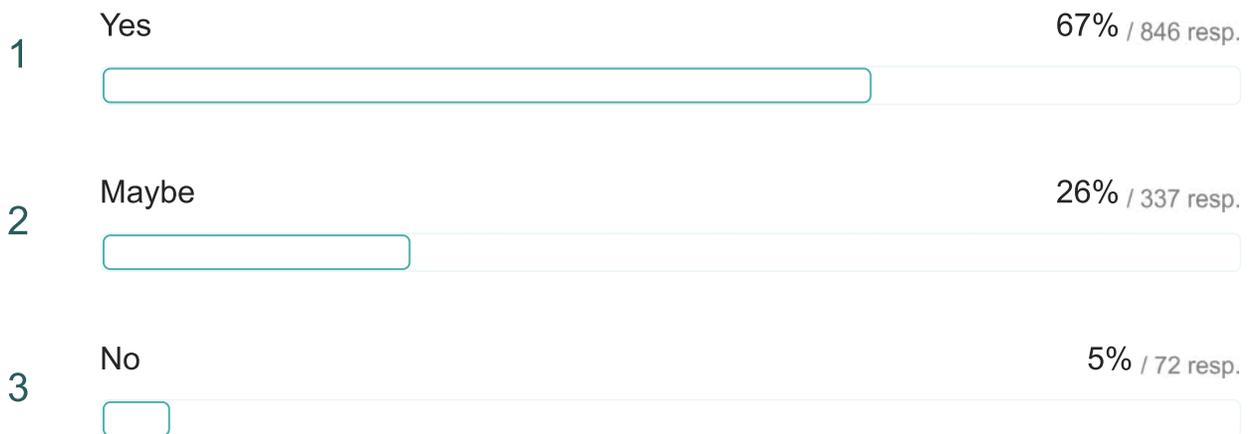
How long do you typically wait at a station?

1K out of 1K answered



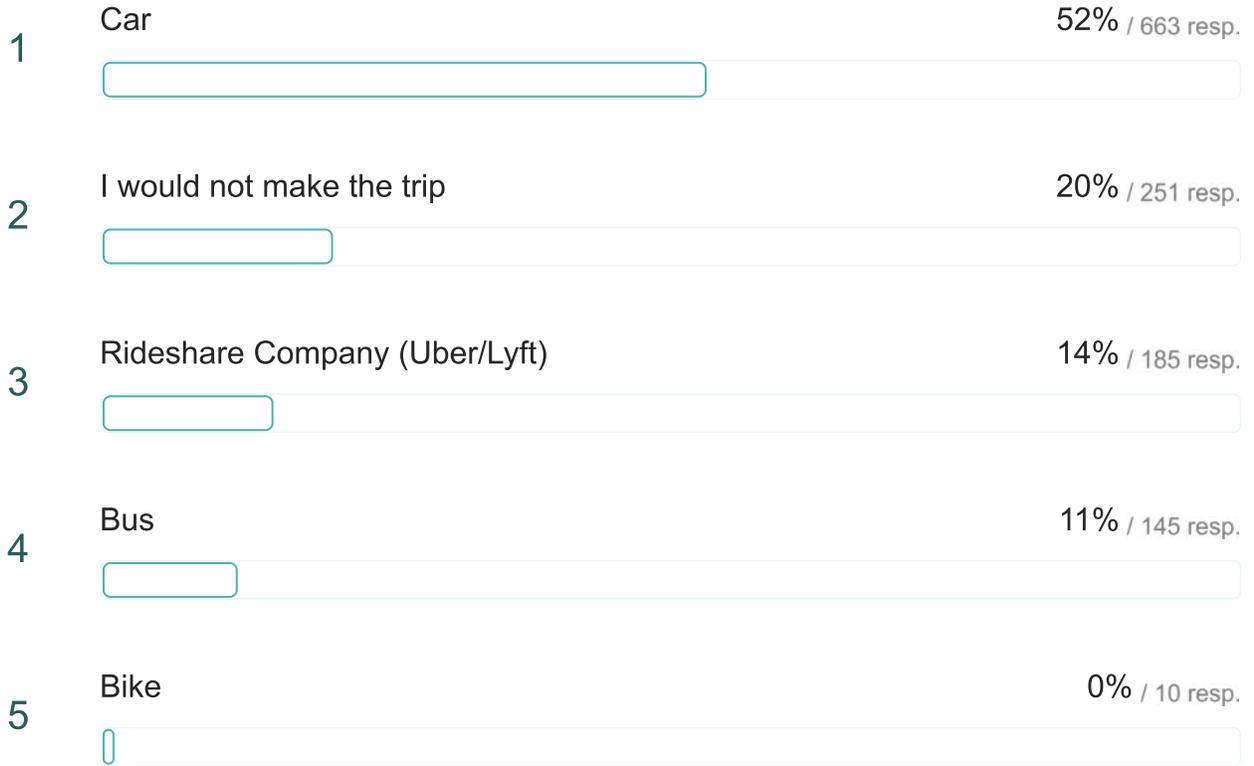
Would you still ride the train if it was too hot, windy, or rainy?

1K out of 1K answered



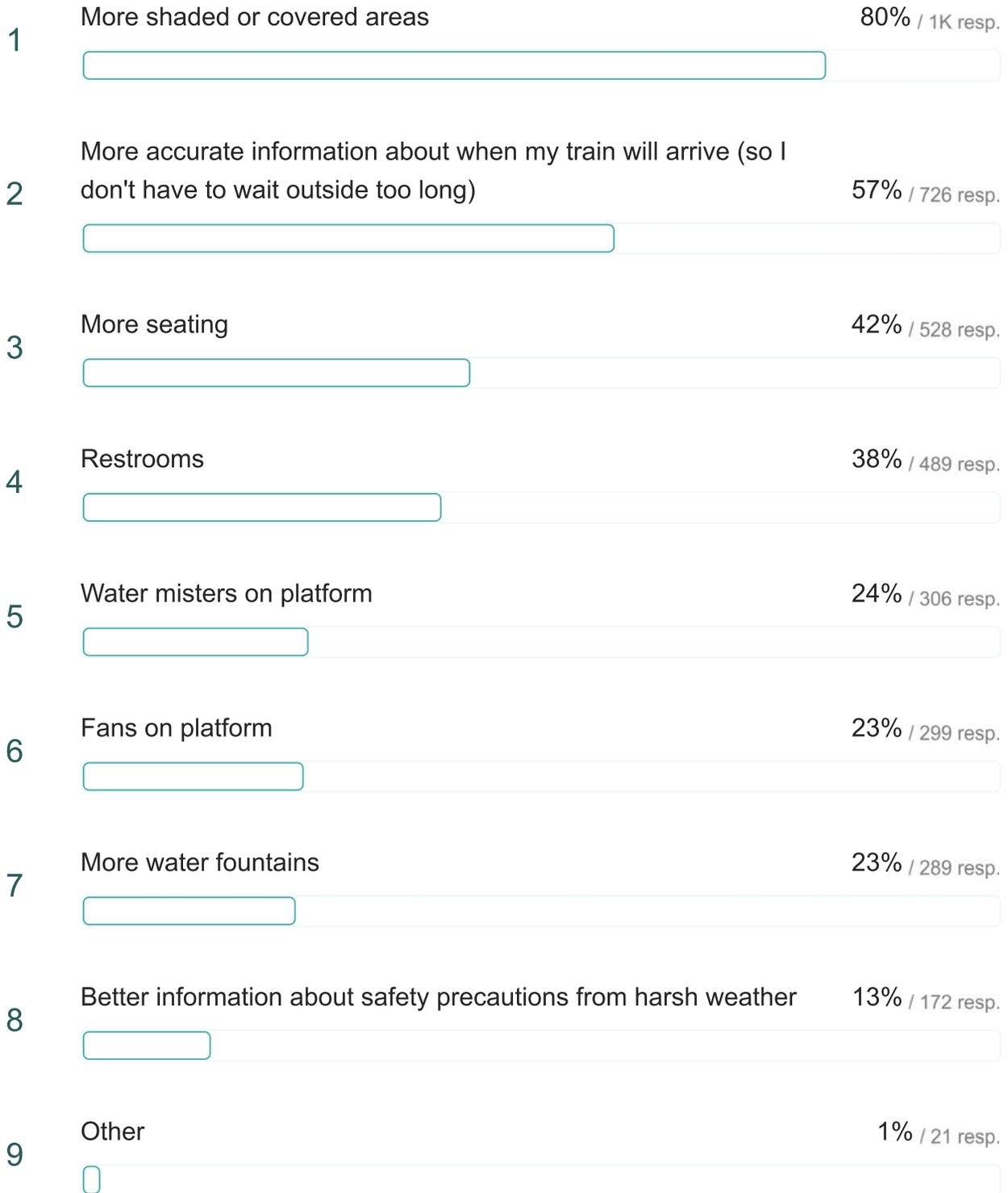
If train service was interrupted due to severe weather, how would you travel instead?

1K out of 1K answered



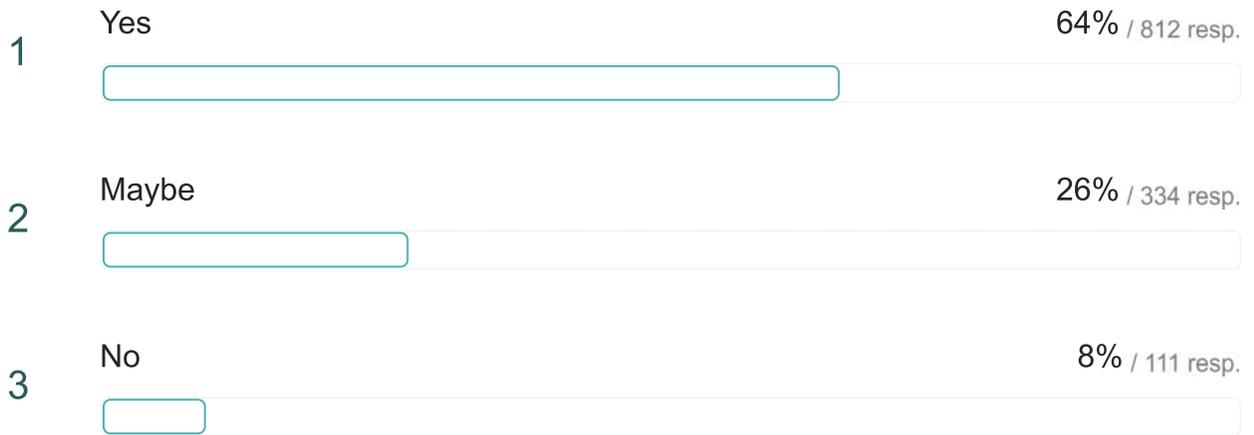
What train station amenities would be most helpful during a very hot, windy, or rainy day?

1K out of 1K answered



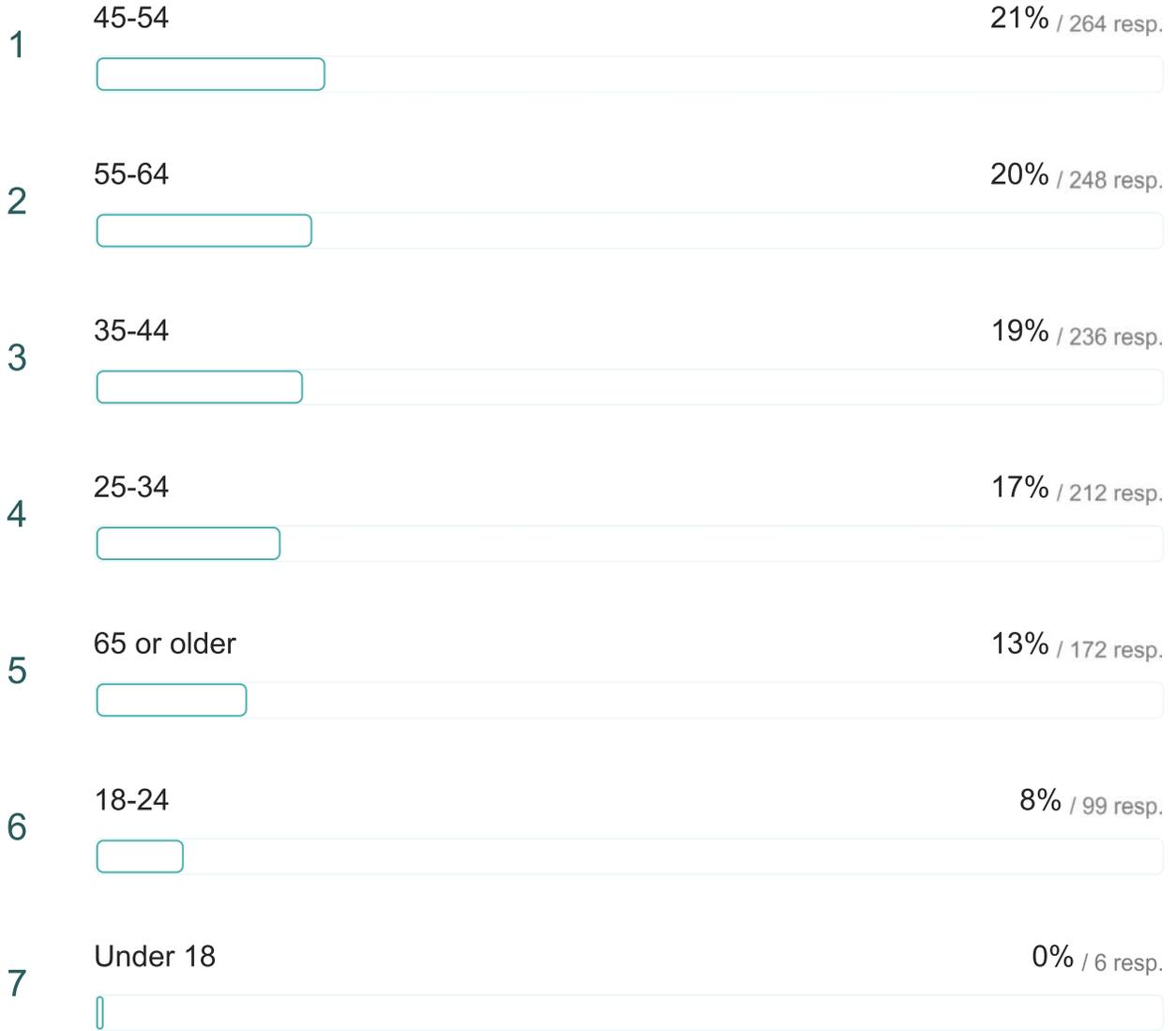
Would you consider riding the train more if there were added station improvements?

1K out of 1K answered



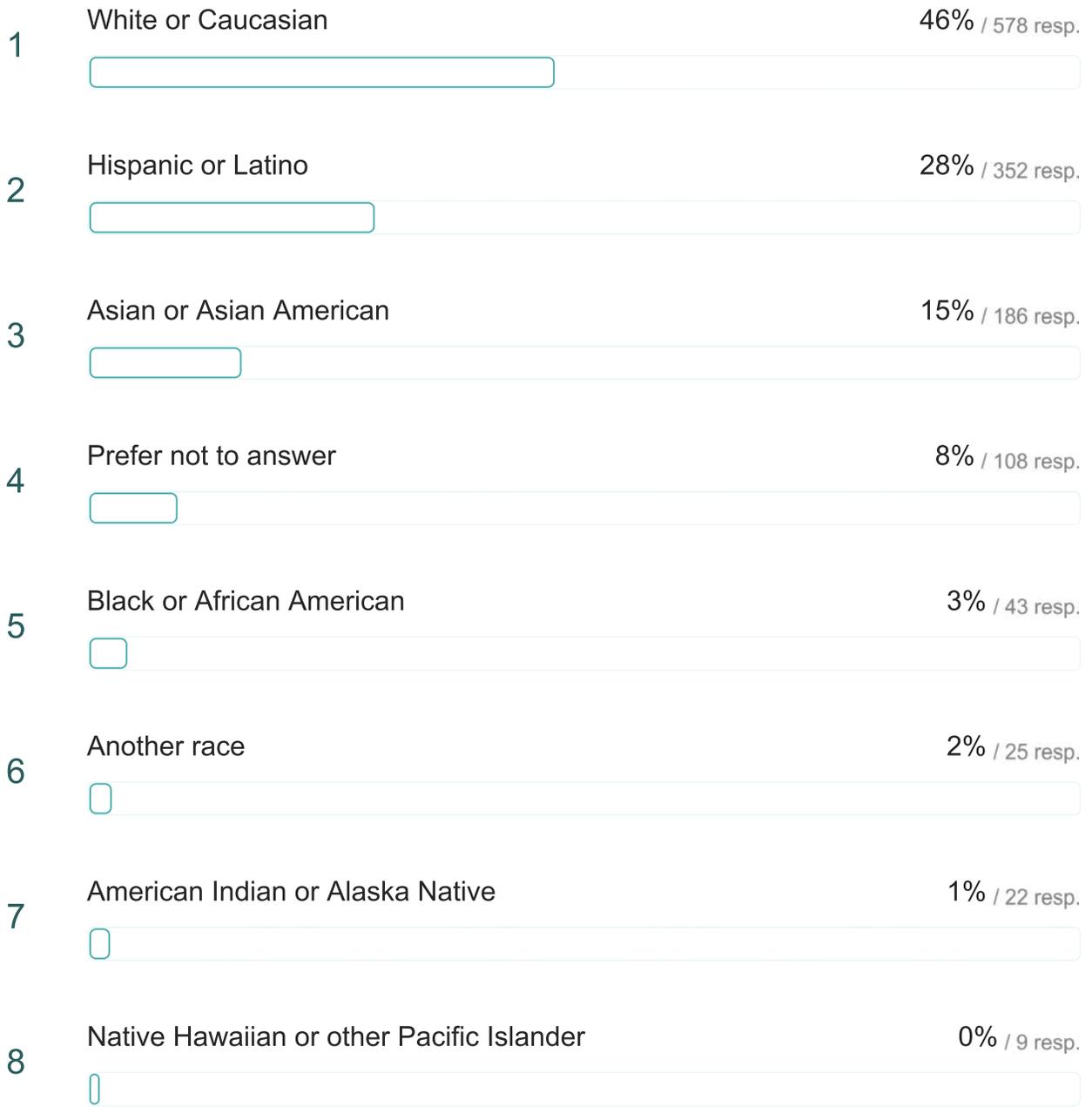
What is your age range?

1K out of 1K answered



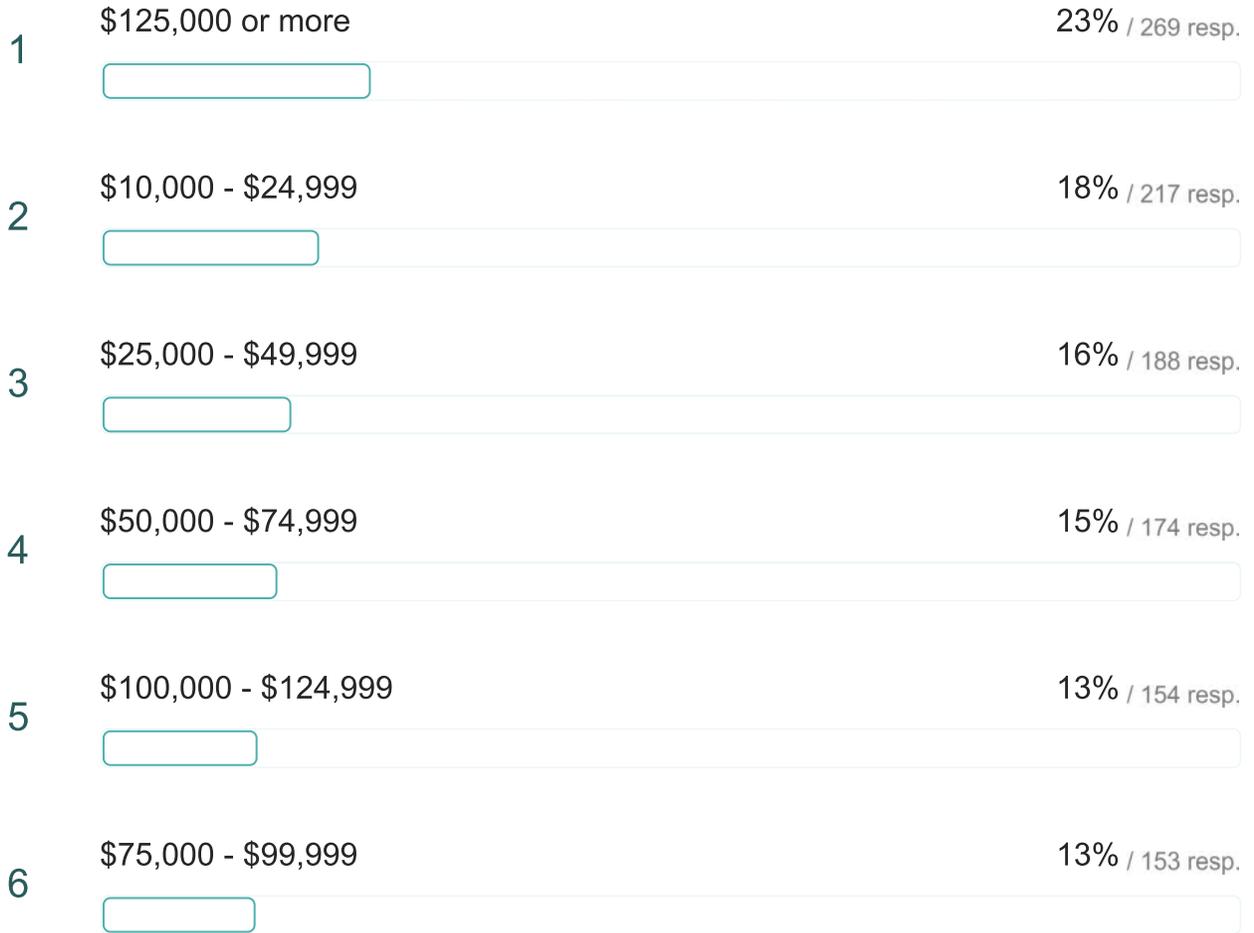
What race/ethnicity best describes you?

1K out of 1K answered



What is your annual household income?

1K out of 1K answered

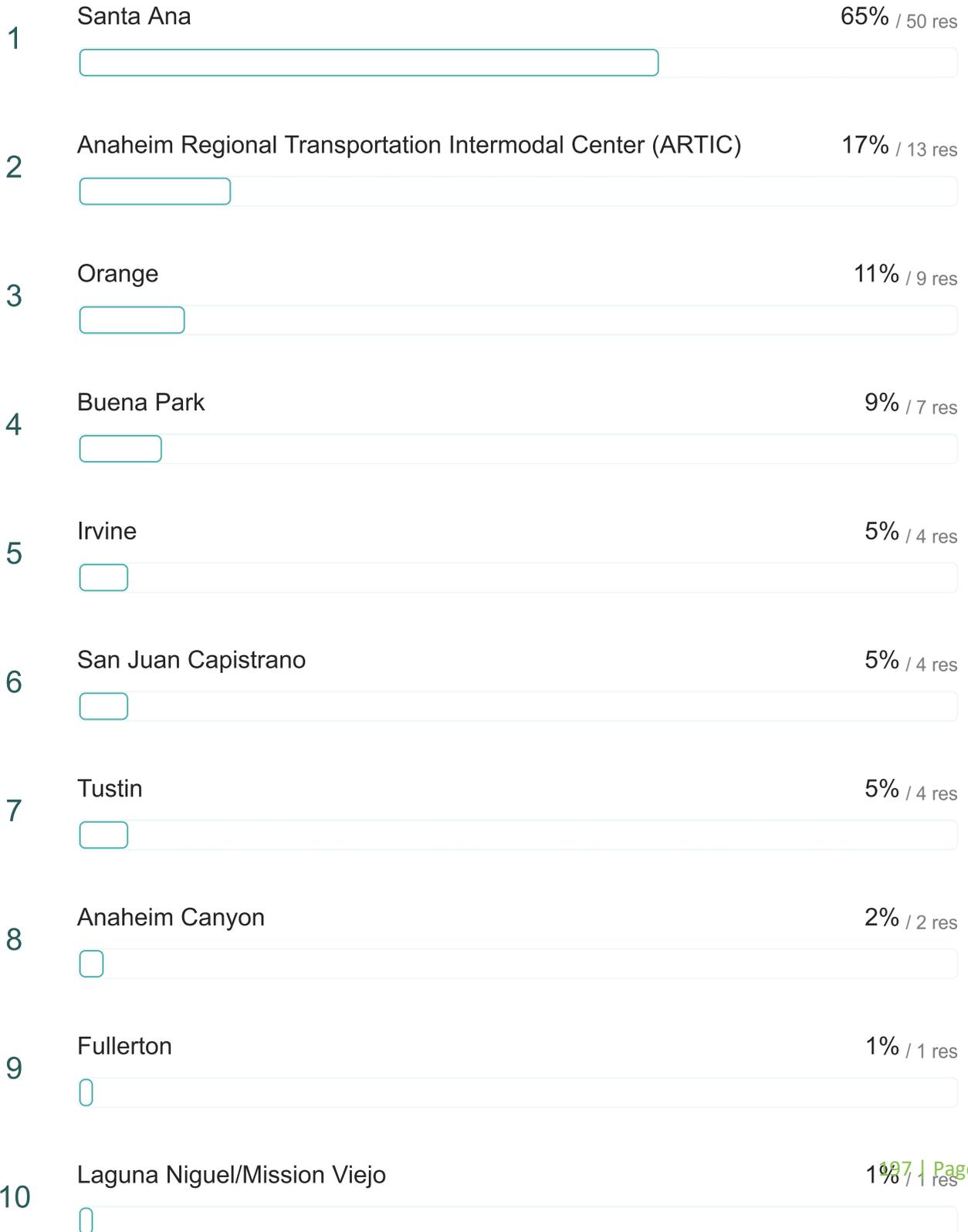


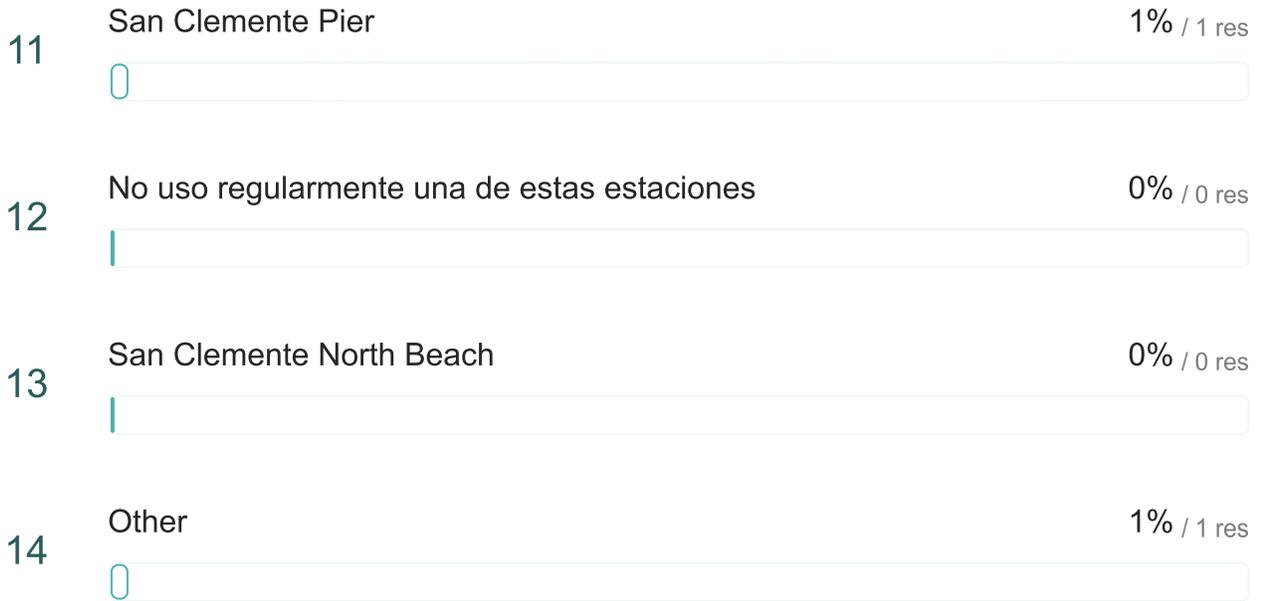
# OC Rail Infrastructure Survey Spanish

76 respuestas

¿Cual estación de Metrolink / Amtrak utiliza?

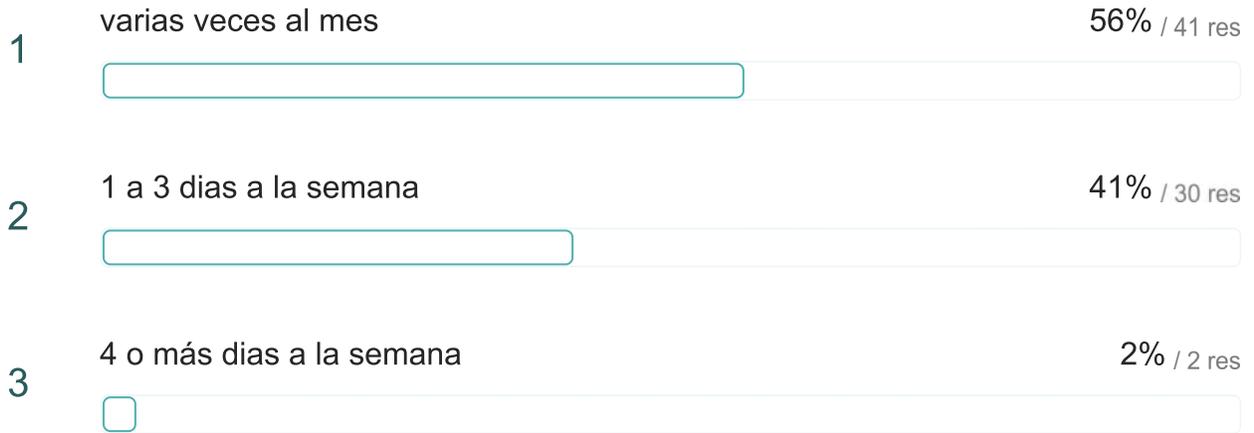
76 de 76 personas han respondido





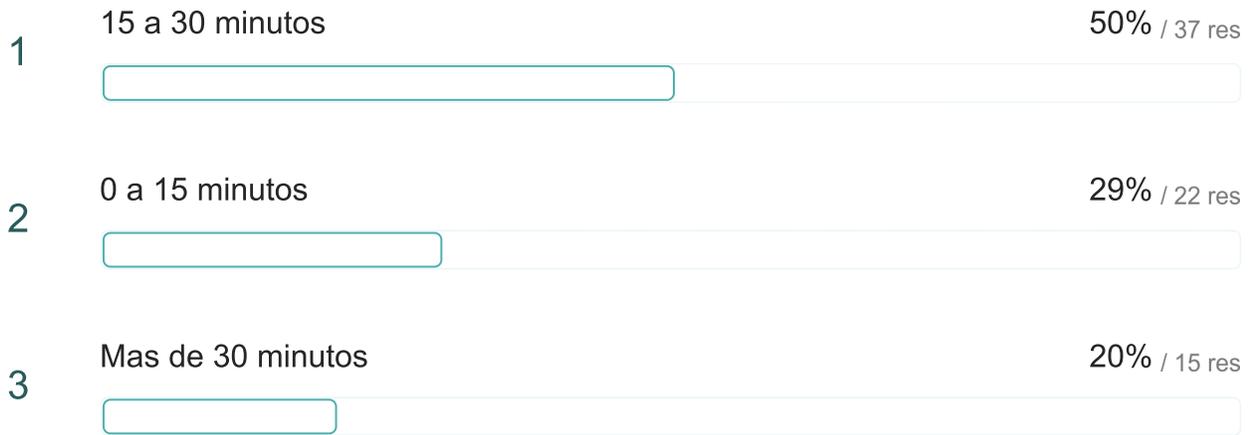
¿Con qué frecuencia viaja en Metrolink / Amtrak?

73 de 76 personas han respondido



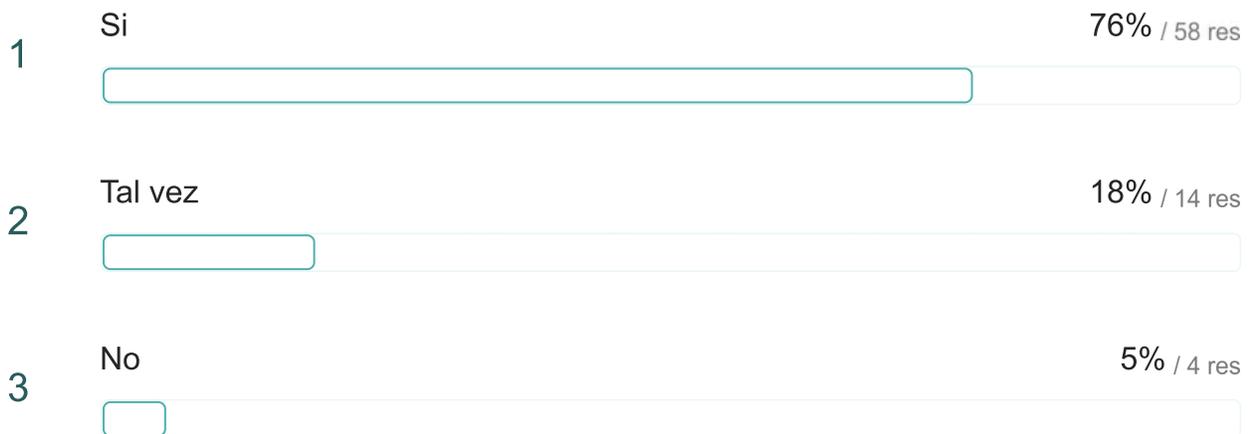
Normalmente, ¿cuánto tiempo espera en una estación?

74 de 76 personas han respondido



¿Seguirías viajando en tren si hubiera demasiado calor, viento o lluvia?

76 de 76 personas han respondido

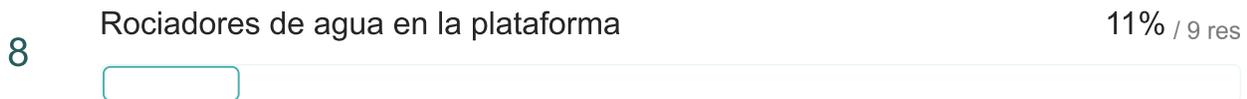
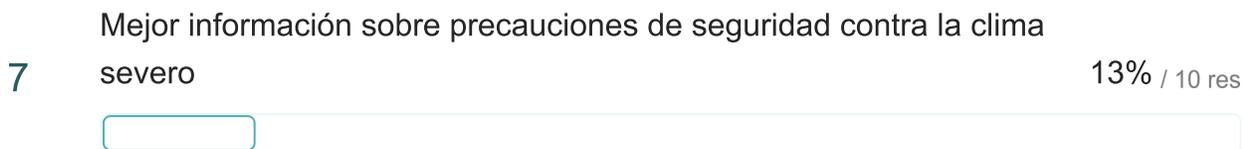
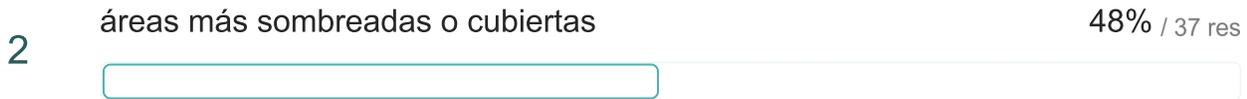
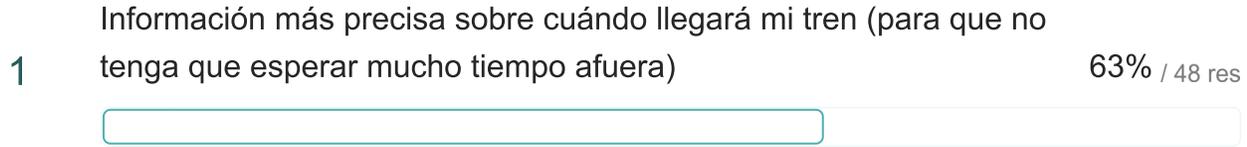


Si el servicio del tren se interrumpiera debido a clima severo, ¿cómo viajarías en su lugar?

75 de 76 personas han respondido

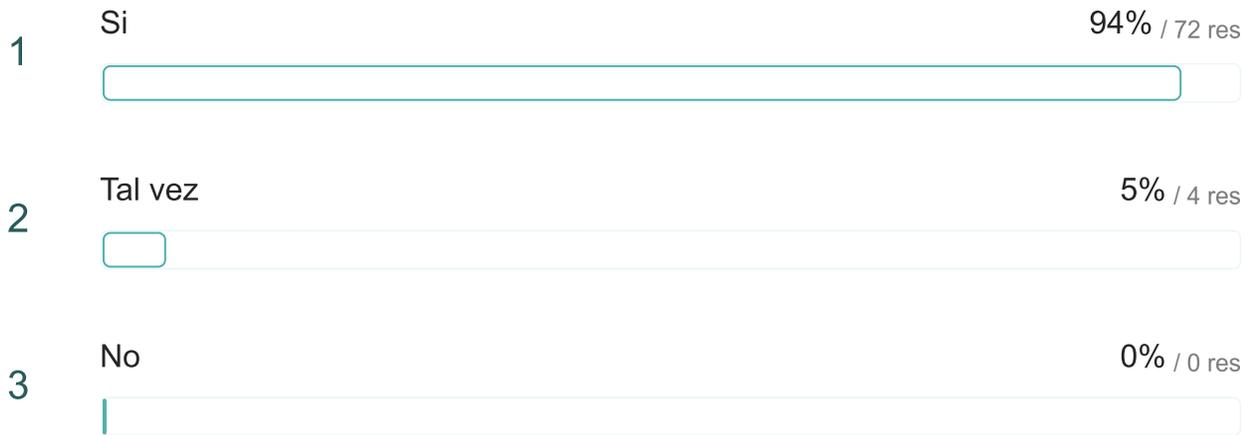


¿Qué servicios de la estación de tren serían más útiles durante un día muy caluroso, ventoso o lluvioso?  
76 de 76 personas han respondido



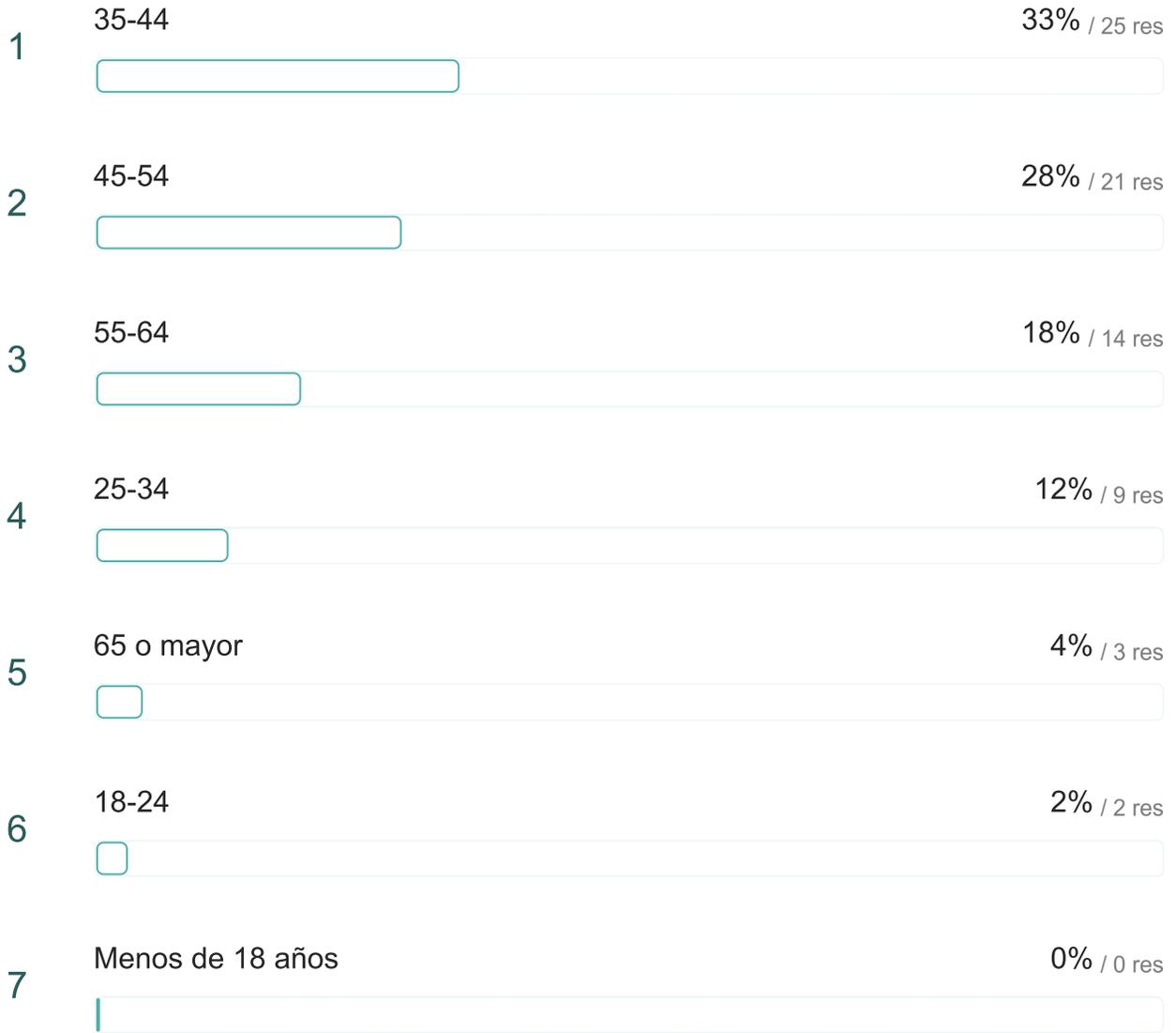
¿Consideraría viajar más en el tren si hubiera mejoras adicionales en la estación?

76 de 76 personas han respondido



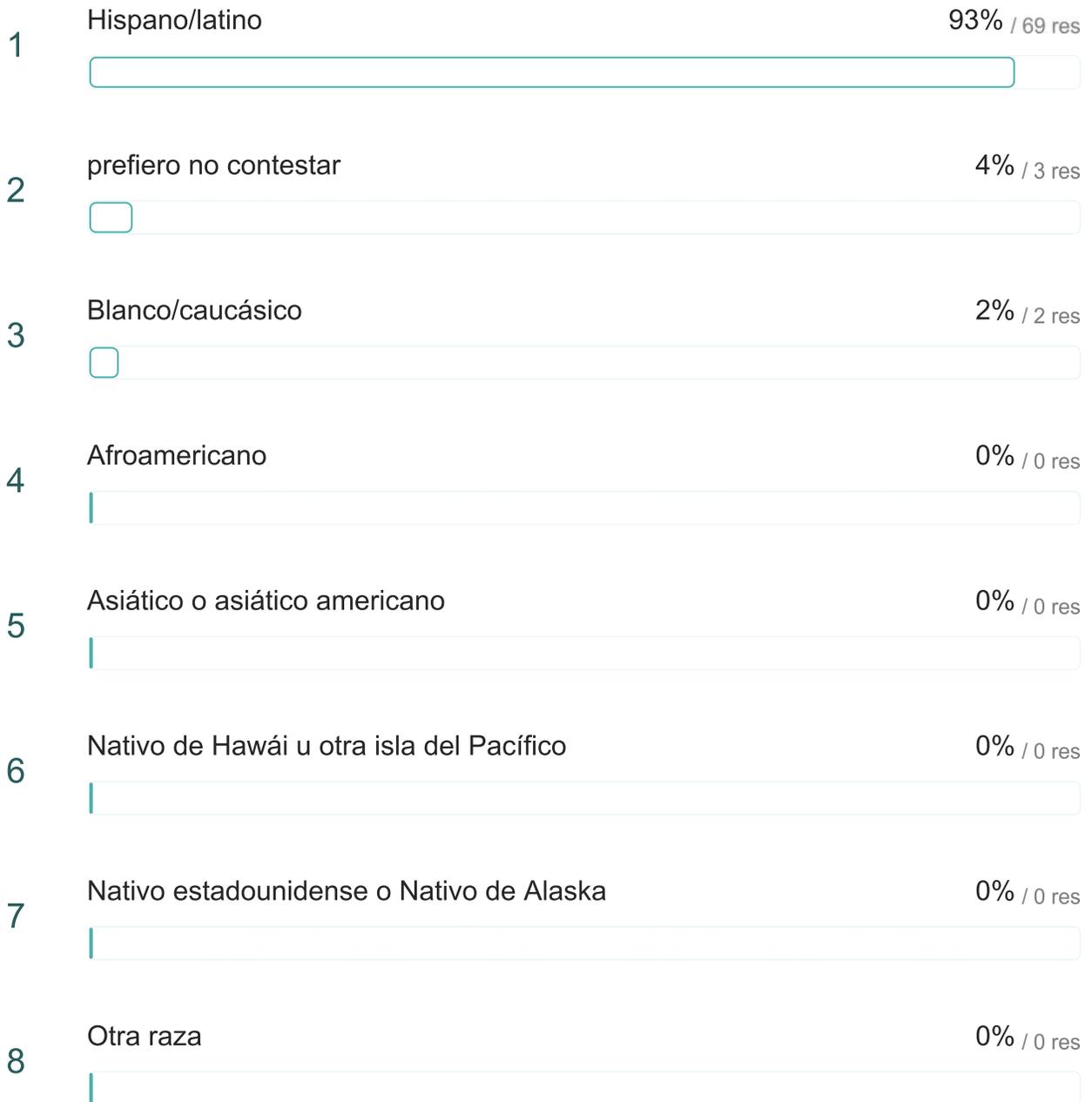
¿Cuál es tu rango de edad?

74 de 76 personas han respondido



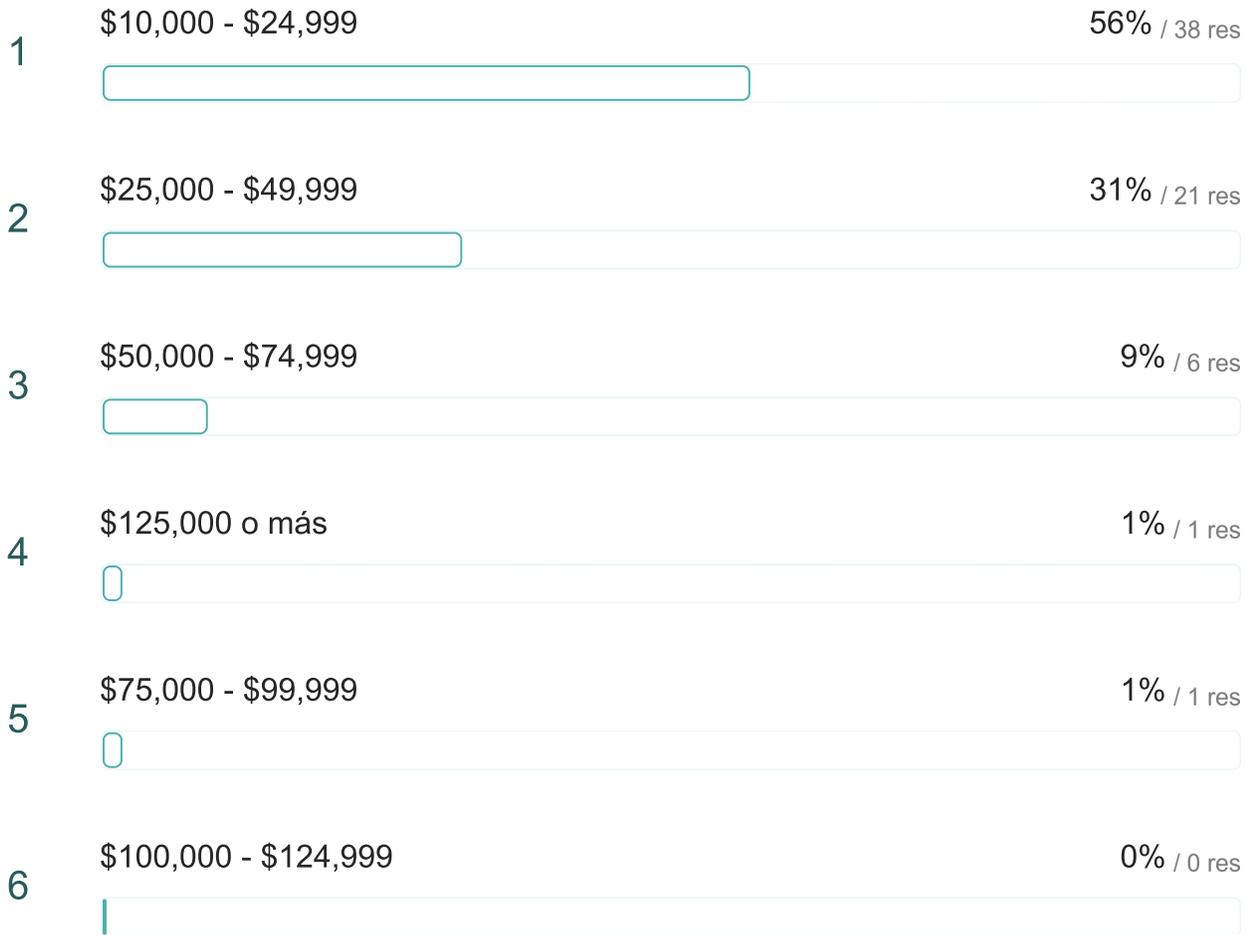
¿Qué raza / etnia te describe mejor?

74 de 76 personas han respondido



¿Cuál es su ingreso anual del hogar?

67 de 76 personas han respondido





















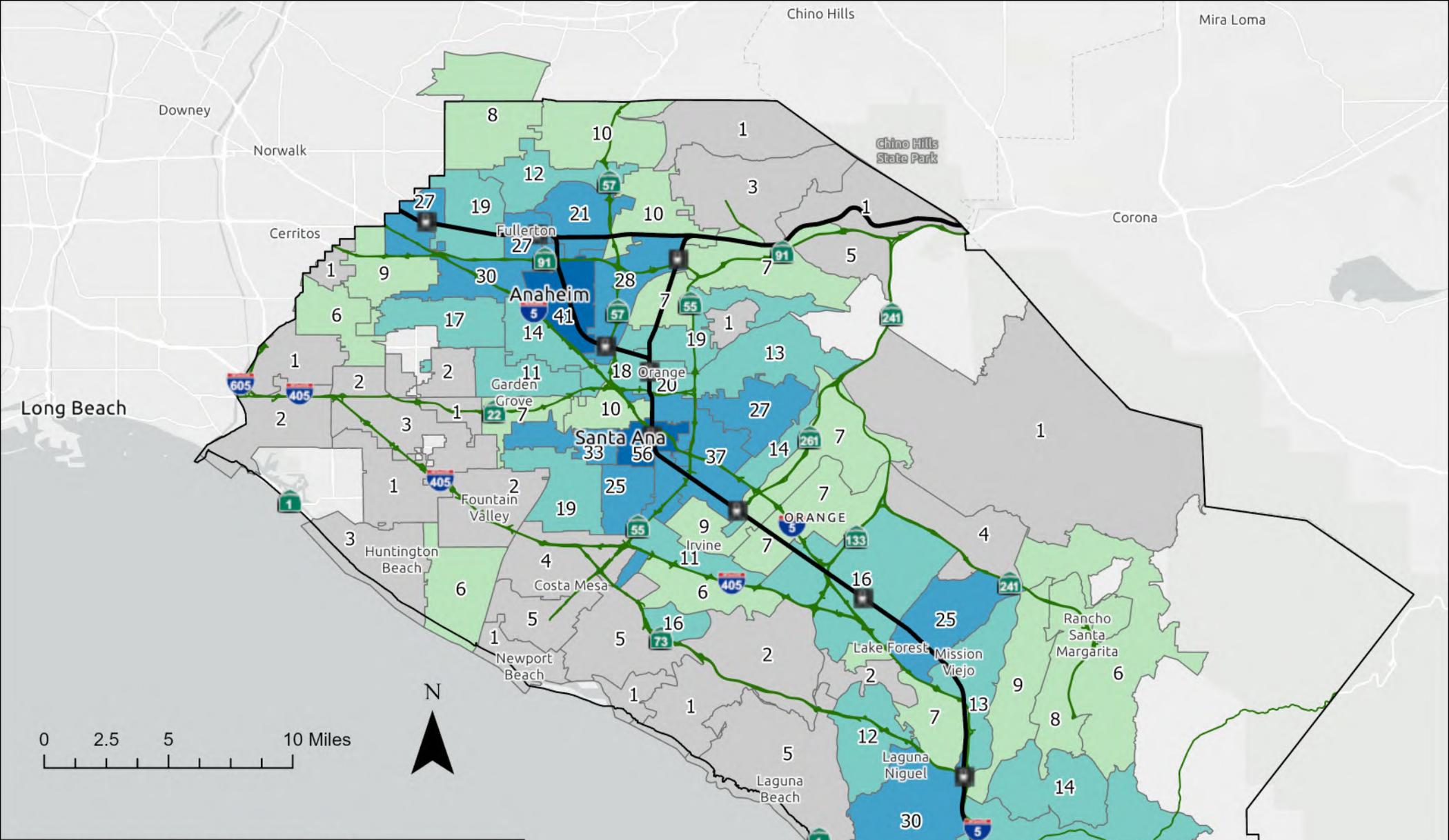


# Appendix O

---

## *Survey Respondent Geographic Distribution*

Survey Responses by Zip Code Map  
Surveys collected by City Zip Code



### Survey Responses by Zip Code

County	Zip Codes	Surveys	%
Orange	80	924	70.4%
Los Angeles	88	138	10.5%
Riverside	34	122	9.3%
San Bernardino	20	34	2.6%
San Diego	18	39	3.0%
Ventura	1	1	0.1%
Unknown	N/A	54	4.1%

— OC Rail Lines  
 — OC Freeways

Surveys Collected by City Zip Code

OC City/Place	OC Zip Code	Surveys	Total
Aliso Viejo	92656	12	12
Anaheim	92801	30	142
	92802	14	
	92804	17	
	92805	41	
	92806	28	
	92807	7	
	92808	5	
Brea	92821	10	11
	92823	1	
Buena Park	90620	9	36
	90621	27	
Costa Mesa	92626	4	9
	92627	5	
Coto de Caza	92679	6	6
Cypress	90630	6	6
Dana Point	92624	4	6
	92629	2	
Fountain Valley	92708	2	2
Fullerton	92831	21	79
	92832	27	
	92833	19	
	92835	12	
Garden Grove	92840	11	23
	92841	2	
	92843	7	
	92844	1	
	92845	2	
Huntington Beach	92646	6	10
	92647	1	
	92648	3	
	92649	0	

OC City/Place	OC Zip Code	Surveys	Total
Irvine	92602	7	74
	92603	2	
	92604	7	
	92606	9	
	92612	6	
	92614	11	
	92617	16	
	92618	16	
	92620	7	
La Habra	90631	8	8
La Palma	90623	1	1
Ladera Ranch	92694	14	9
Laguna Beach	92651	5	5
Laguna Hills	92653	7	7
Laguna Niguel	92677	30	12
Laguna Woods	92637	2	2
Lake Forest	92610	4	29
	92630	25	
Los Alamitos	90720	1	1
Midway City	92655	0	0
Mission Viejo	92691	13	22
	92692	9	
Newport Beach	92625	1	8
	92657	1	
	92660	5	
	92661	0	
	92662	0	
	92663	1	

OC City/Place	OC Zip Code	Surveys	Total
Orange	92865	7	77
	92866	20	
	92867	19	
	92868	18	
	92869	13	
Placentia	92870	10	10
Rancho Santa Margarita	92688	8	8
San Clemente	92672	16	27
	92673	11	
San Juan Capistrano	92675	20	20
Santa Ana	92701	56	170
	92703	33	
	92704	19	
	92705	27	
	92706	10	
Seal Beach	90740	2	2
	90743	0	
Silverado	92676	1	1
Stanton	90680	0	0
Sunset Beach	90742	0	1
Trabuco Canyon	92678	0	0
Tustin	92780	37	51
	92782	14	
Villa Park	92861	1	1
Westminster	92683	3	3
Yorba Linda	92886	3	4
	92887	1	

Unknown	N/A	54
---------	-----	----

# Appendix P

---

## *Infographics*

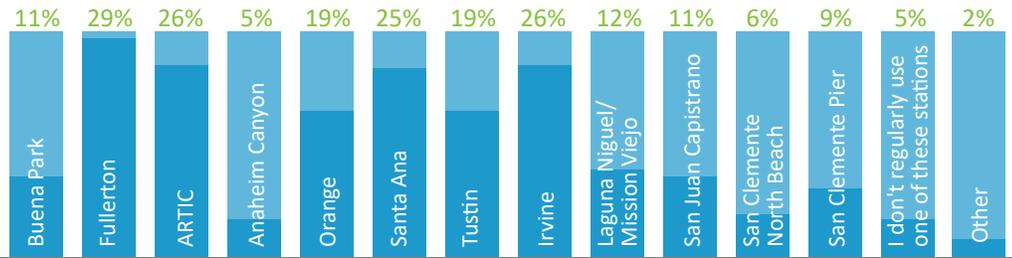
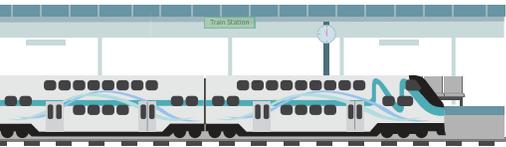
# RAIL INFRASTRUCTURE STUDY

## DEFENSE AGAINST CLIMATE CHANGE PLAN

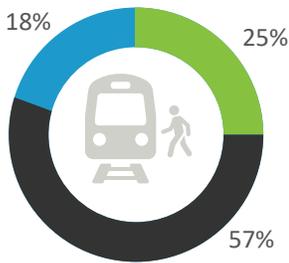
Outreach and Survey Results  
Fall 2020



### Which Metrolink/Amtrak stations do you use?

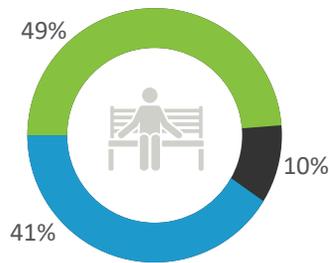


### How often do you ride?



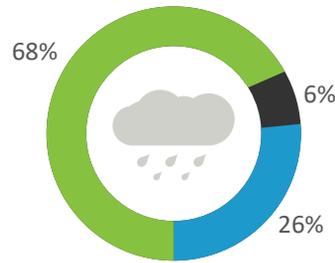
- 1 to 3 days a week
- 4 or more days a week
- Several times a month

### How long do you typically wait at a station?



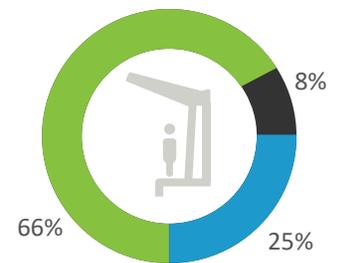
- 0 to 15 minutes
- 15 to 30 minutes
- 30+ minutes

### Would you still ride the train if it was too hot, windy, or rainy?



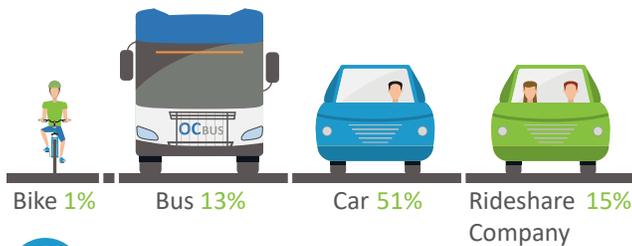
- Yes
- Maybe
- No

### Would you consider riding the train more if there were added station improvements?



- Yes
- Maybe
- No

### If train service was interrupted due to severe weather, how would you travel instead?



I would not make the trip 20%

### What train station amenities would be most helpful during a very hot, windy, or rainy day?

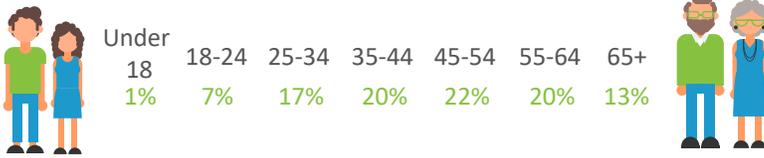


220 | Page  
14%

Other 2%



### What is your age range?



### What is your annual household income?

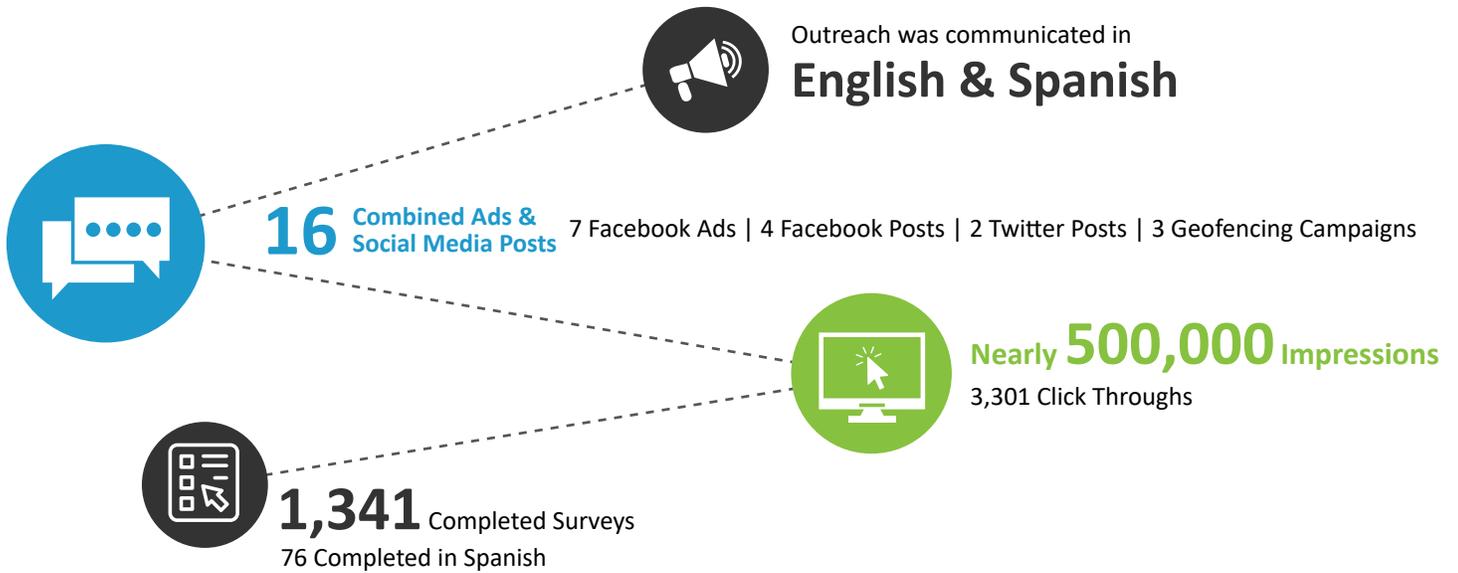


### What race/ethnicity best describes you?

- 42% White or Caucasian
- 30% Hispanic or Latino
- 13% Asian or Asian American
- 3% Black or African American
- 2% American Indian or Alaska Native
- 1% Native Hawaiian or other Pacific Islander
- 2% Another race
- 8% Prefer not to answer



### Digital Outreach Efforts



### STAY CONNECTED

#### Project Manager:

Jason Lee  
(714) 560-5833  
[Jlee1@octa.net](mailto:Jlee1@octa.net)

#### Community Outreach:

Marissa Espino  
(714) 560-5607  
[mespino@octa.net](mailto:mespino@octa.net)

#### Website:

[octa.net/railstudy](http://octa.net/railstudy)



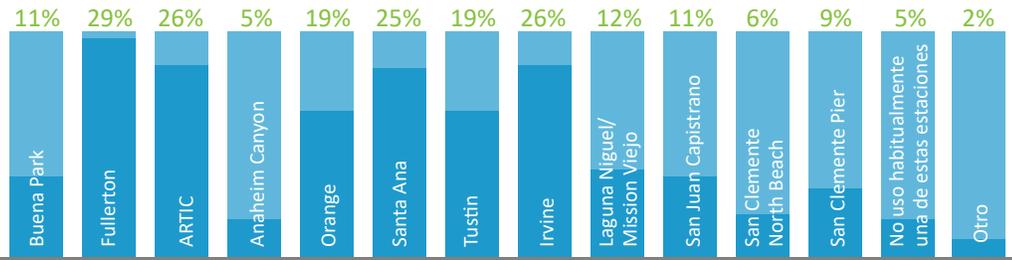
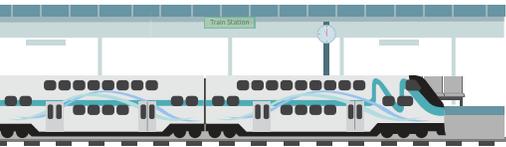
# ESTUDIO DE LA INFRAESTRUCTURA FERROVIARIA

PLAN DE DEFENSA CONTRA EL CAMBIO CLIMÁTICO

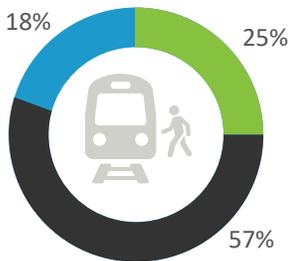
Resultados de Alcance y de la Encuesta  
Otoño 2020



## ¿Qué estaciones de Metrolink / Amtrak usa?

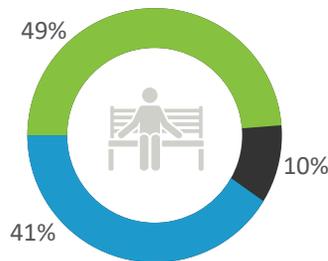


## ¿Con qué frecuencia viaja?



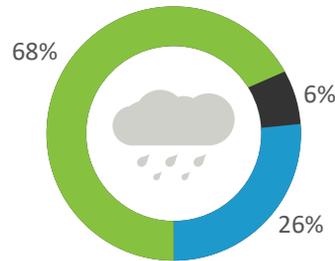
■ 1 a 3 días a la semana  
■ 4 o más días a la semana  
■ Varias veces al mes

## ¿Cuánto tiempo suele esperar en una estación?



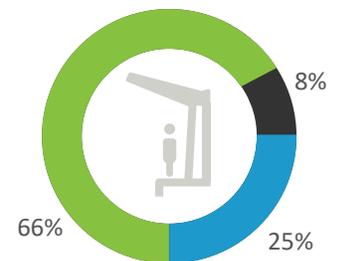
■ 0 a 15 minutos  
■ 15 a 30 minutos  
■ 30+ minutos

## ¿Seguiría viajando en tren si hiciera demasiado calor, viento o lluvia?



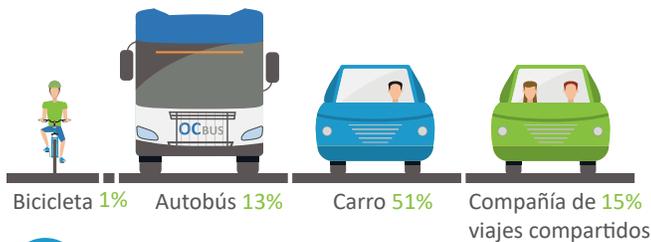
■ Si  
■ Tal vez  
■ No

## ¿Consideraría viajar más en tren si hubiera mejoras adicionales en la estación?



■ Si  
■ Tal vez  
■ No

## Si el servicio de tren se interrumpiera debido al mal clima, ¿cómo viajaría?



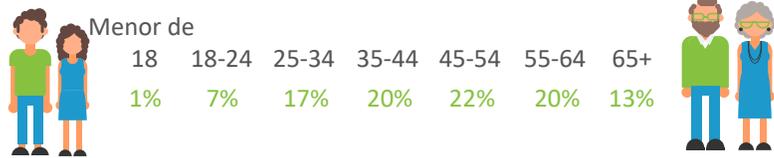
Yo no haría el viaje 20%

## ¿Qué servicios de la estación de tren serían más útiles durante un día muy caluroso, ventoso o lluvioso?

- Áreas más sombreadas o cubiertas 79%
- Información más precisa sobre cuándo llegará mi tren 58%
- Más asientos 41%
- Baños 38%
- Nebulizadores de agua en la plataforma 24%
- Fans en la plataforma 23%
- Más fuentes de agua 23%
- Mejor información sobre las precauciones de seguridad frente a las inclemencias del tiempo 14%



**Cuál es tu rango de edad?**



**¿Cual es su ingreso anual?**



**¿Qué raza / etnia lo describe mejor?**

- 42% Blanco o caucásico
- 30% Hispano o latino
- 13% Asiático o asiático americano
- 3% Negro o afroamericano
- 2% Indio americano o nativo de Alaska
- 1% Nativo hawaiano u otro isleño del Pacífico
- 2% Otra raza
- 8% Prefiero no responder



**Esfuerzos de alcance digital**



**MANTÉNGASE CONECTADO**

**Gerente de Proyecto:**

Jason Lee  
 (714) 560-5833  
[Jlee1@octa.net](mailto:Jlee1@octa.net)

**Alcance Comunitario:**

Marissa Espino  
 (714) 560-5607  
[mespino@octa.net](mailto:mespino@octa.net)

**Página web:**

[octa.net/railstudy](http://octa.net/railstudy)

