# EXHIBIT 17
# FEMA and Coastal Viewshed Analysis

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Coastal Hazards and Sea Level Rise
Local Coastal Program Amendments

County of Ventura
Planning Commission Hearing
Case No. PL20-0039
Exhibit 17 - FEMA and Coastal Viewshed Analysis

## INTRODUCTION

The proposed Local Coastal Program (LCP) amendments for coastal hazards and sea level rise were presented for public review in Summer of 2024 (Exhibit 13) and were developed in coordination with staff representatives of California Coastal Commission (Commission staff). During these outreach and coordination efforts, County Planning Division staff (Planning staff) received requests for analysis of potential visual impacts that could result from proposed policies and development standards that would allow increases in the elevation of the first floor of principal structures when substantial redevelopment occurs within the Coastal Hazard Screening Areas. On many of the relatively small residential-zoned parcels near the shoreline, elevation is the predominant sea level rise adaptation strategy available as an alternative to increasing the amount of shoreline protective devices. Elevation would also protect principal structures from potential flooding that could occur behind the shoreline protective devices. This Exhibit analyzes whether the proposed policies and standards allowing more elevation could obstruct public views of the ocean and determined that the impacts would not be significant.

## BACKGROUND

The 2024 adopted California Coastal Commission Sea Level Rise Policy Guidance updated the sea level rise scenarios and integrated environmental justice principles. Generally, the guidance says that elevation is allowed when appropriated but there are tradeoffs that need to be considered. The following bullets summarize key excerpts from the guidance:

- Shoreline armoring or elevation techniques should be designed such that the visuals are subordinate to, and in character with, the surrounding visual resources of an area.
- In some cases, it may be appropriate to update height limitations to allow for elevation in response to sea level rise hazards. However, such decisions will require trade-offs and will need to strike a balance in terms of adapting to sea level rise and protecting visual resources and community character in line with the requirements of the Coastal Act.
- Identify all scenic views to and through the proposed project site from public vantage points such as overlooks, access locations, beaches, trails, the Coastal Trail, public roads, parks, and if possible, map these views and view lines in relation to the location and maximum allowable elevation of the proposed project.

The guidance describes that the scenic value of the coast is a resource of public importance. As noted in Section 30251 of the Coastal Act, development shall be sited and designed to: “Protect views to and along the ocean and scenic coastal areas, to minimize the alteration of natural landforms…and to restore and enhance visual quality in visually degraded areas.” As stated in Chapter 3 of the sea level rise guidance, some options to address rising sea levels, such as elevating structures or utilizing seawalls or bluff retention devices, have the potential to alter or degrade the visual character of an area. Certified LCPs should already have policies and standards to ensure scenic and visual resources are protected to the maximum extent feasible, but these may need to be updated to consider sea level rise hazards. The following adaptation options address some of the methods for protecting the scenic qualities of the coast and Planning staff added underlines for emphasis in the following bullets.

Goal: Protect views to and along the ocean and scenic coastal areas.

- G.1 Establish design standards to protect visual resources: Update and/or add design standards to ensure that adaptation measures protect visual resources while minimizing

hazards. Adaptation strategies such as shoreline armoring or elevation techniques should be designed such that the visuals are subordinate to, and in character with, the surrounding visual resources of an area.

- G.1b Maintain height limitations in scenic areas: Avoid modifications to height limits in scenic areas and provide for options to modify roof-lines or elevate the lowest flood elevation for flood protection in a manner that is consistent with scenic character. In some cases, it may be appropriate to update height limitations to allow for elevation in response to sea level rise hazards. However, such decisions will require trade-offs and will need to strike a balance in terms of adapting to sea level rise and protecting visual resources and community character in line with the requirements of the Coastal Act.

## SUMMARY OF APPLICABLE REGULATIONS

This section discusses the County and federal regulations applicable to establishing the first floor elevation.

*Coastal Zoning Ordinance*

Six of the eight Existing Communities located along the shoreline in the North, Central, and South Coast LCP Subareas generally contain small lot sizes and are primarily zoned Residential Beach (RB) and Residential Beach Harbor (RBH). The applicable development standards for principal structures in the RB and RBH zoned properties are listed below. Existing Communities of Solromar on the South Coast and Rincon Point on the North Coast are not zoned RB or RBH.[1]

The RB zone is defined in Coastal Zoning Ordinance (CZO) Section 8173-7 as providing "for the development and preservation of small-lot, beach oriented residential communities." The following are the most applicable CZO regulations for the RB zone:

- CZO Section 8175-2: The minimum lot size is 3,000 square feet.
- CZO Section 8175-2.1: The maximum percentage of building coverage is 65% in the Residential High Coastal Area Plan Designation.
- CZO Section 8175-2: The front setback is 10 feet.
- CZO Section 8175-2: The side setback is three feet for interior corner lots and five feet for reverse corner lots on the street side, while the rear setback is 14 feet.
- CZO Section 8175-2: The maximum height is 28 feet, with an allowance for A frame heights to be increased to 30 feet.

The RBH zone is defined in CZO Section 8173-8 as providing for "development and preservation of unique beach-oriented residential communities with small lot subdivision patterns." The following are the most applicable CZO regulations for the RBH zone:

- CZO Section 8175-2: The minimum lot size is 1,750 square feet.
- CZO Section 8175-2.1: The maximum percentage of building coverage is 65% in the Residential High Coastal Area Plan Designation.

[1] In Solromar, shoreline properties are zoned Coastal Residential Planned Development, Coastal Open Space, Coastal Two-Family Residential, or Coastal Rural Exclusive. Rincon Point is zoned Coastal One-Family Residential (CR-1).

- CZO Section 8175-2: The front setback is 20 feet.
- CZO Section 8175-2: The side setback is three feet for interior corner lots and five feet for reverse corner lots on the street side, while the rear setback is six feet.
- CZO Section 8175-2: The maximum height is 28 feet, with an allowance for A frame heights to be increased to 30 feet.

The standards listed above would not be changed as a result of the proposed amendments. Instead, when new development or substantial redevelopment is proposed within a Coastal Hazard Screening Area, the base point at which height is measured would be updated to include the elevation required to be resilient to the amount of sea level rise that is projected for the expected life of development, as demonstrated through a Coastal Hazards Analysis Report. Generally, for new residential, commercial, and industrial development, the proposed amendments would require design for about 6.6 feet of sea level rise along the North Coast and Central Coast Subareas, and 6.8 feet of sea level rise along the South Coast Subarea.

*Federal Emergency Management Agency Flood Zones*

Along the North and South Coast Subareas, the Federal Emergency Management Agency (FEMA) has evaluated shoreline areas that have historically been affected by floods, designated coastal high hazard areas, and mapped these flood zones (FEMA flood zones). In 2021, FEMA updated its maps, resulting in an elevation increase across the unincorporated shoreline area of about nine feet on average. Within these shoreline FEMA defined "VE" zones, "substantial improvement" is required to be designed with the first habitable/finished floor elevated. The "base flood elevation" is the height of the flood water that can reasonably be expected during a 1% annual chance storm. Development in these FEMA flood zones is required by the County's Floodplain Management Ordinance to be designed with the first habitable/finished floor to be at least 12 inches above the FEMA base flood elevation. This amount is known as "freeboard". An example image of a map with the FEMA "VE" flood zones overlapping (light blue color) onto RB zone parcels is shown to the right. The proposed amendments would increase this amount of freeboard to 18 inches. In the Central Coast Subarea communities of Hollywood Beach and Silver Strand, the FEMA flood zones only cover the beaches and do not include developed areas.


**Figure 1**. FEMA VE Flood Zones in County GIS

## VIEWSHED ANALYSIS

Based on a review of public viewsheds to the ocean that could be affected by proposed LCP amendments to increase elevation as substantial redevelopment occurs, some shoreline communities were determined to not have the potential for public viewsheds of the ocean to be affected due to factors described in Appendix A below. The remaining communities were analyzed to estimate by how much the proposed amendments, or existing FEMA flood zone requirements,

could affect public viewsheds of the ocean as more properties are redeveloped in Faria Beach, Solimar, Seacliff, and Solromar.[2]

Residential RB zoned parcels were selected for the analysis that had recently undergone redevelopment and had useful site plan and coastal hazards analysis data (e.g., evaluations of wave uprush with sea level rise) that included both existing FEMA flood zone requirements and elevation that could result from the proposed sea level rise standards. The proposed County sea level rise policy and the existing FEMA required elevation were compared to determine whether the proposed sea level rise development standards or FEMA requirement would prevail, and result in a higher elevation requirement compared to existing FEMA flood zone requirements, which would result in a higher roof line for the new development.

The results of the analysis of FEMA flood zone requirements and elevation from the proposed sea level rise standards was then assessed by County staff who developed a visual simulation from public viewsheds, which was from various perspectives along Highway 101. Planning staff also coordinated with Public Works Agency staff to ensure that the correct data was used for the analysis of existing FEMA requirements and proposed sea level rise policy elevations.


**Figure 2**. Visual simulation showing the potential elevation of new development at Faria, as viewed from Highway 101. In this area, the existing FEMA requirements result in elevation about equal to or a few feet greater than the elevation that would be required by the proposed sea level rise amendments that would require design for about 6.6 feet of sea level rise[3]. Here, the red line depicts the elevation allowed by the existing FEMA requirements, which in this case lies above

[2] Certain North Coast communities are regulated by homeowners associations, where the shoreline residences are restricted to single story development to protect visual views for other residences located inland of the shoreline development. This analysis does not consider the homeowners association regulations and assumes that all properties could be designed to their allowable building heights under the CZO.

[3] For this analysis, structure height was approximated using a technique called “photogrammetry,” in which the dimensions of a three-dimensional object height are used to create a pixel to height ratio from which it is possible to approximate other dimensions in a two-dimensional picture. In this case, a 1 inch to 0.31 pixel ratio was used to draw a line in Figure 2 above, where updated FEMA flood requirement would limit buildable height to 34XX W Pacific Coast.

the blue water horizon line. Since existing FEMA requirements are the prevailing standard the proposed amendments would result in no additional visual impacts on ocean views.


**Figure 3**. Visual simulation showing the potential elevation of new development at Solimar, as viewed from Highway 101. In this area, the existing FEMA requirements result in elevation about equal to the elevation (less than one foot difference) that would be required by the proposed sea level rise amendments that would require design for about 6.6 feet of sea level rise. Since the elevation required by existing FEMA requirements is not significantly different than the elevation that would be required by the proposed amendments, the proposed amendments would not result additional visual impacts on public views of the ocean.


**Figure 4**. Visual simulation showing the potential elevation of new development at Seacliff, as viewed from Highway 101. In this area, the existing FEMA requirements result in elevation about three to four feet higher than that would be required by the proposed sea level rise amendments that would require design for about 6.6 feet of sea level rise[4]. Since existing FEMA requirements

[4] For this analysis, structure height was approximated using a technique called “photogrammetry,” in which the dimensions of a three-dimensional object height are used to create a pixel to height ratio from which it is possible to

are the prevailing standard, the proposed amendments would result in no additional visual impacts on public views of the ocean.

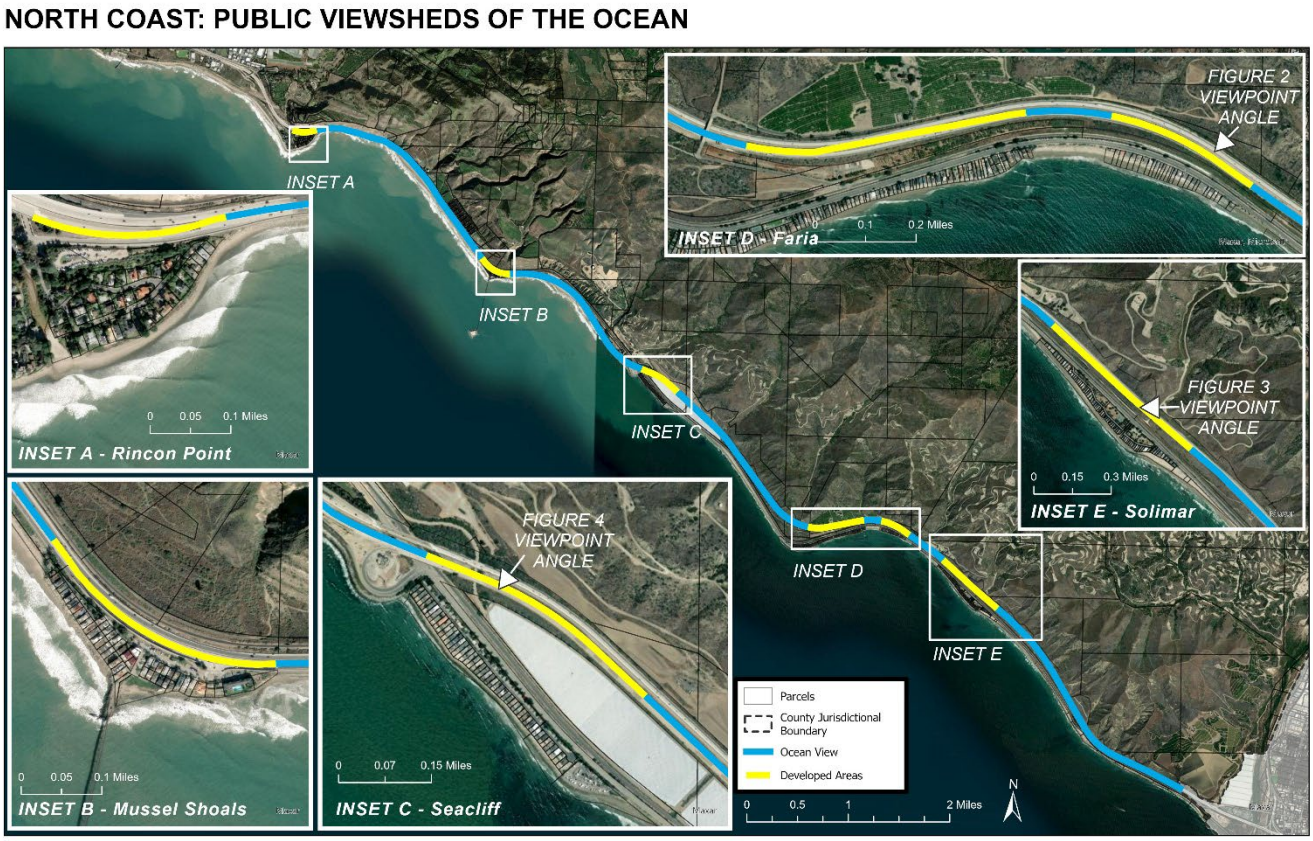


**Figure 5**. Map identifying stretches of Highway 101 in the North Coast Subarea where there are public views of the ocean. This map also identifies the areas where the visual simulations were prepared. See Table 1 below for analysis of this map pertaining to public views of the ocean.

approximate other dimensions in a two-dimensional picture. In this case, a 1 inch to 0.31 pixel ratio was used to draw a line in Figure 2 above, where updated FEMA flood requirement would limit buildable height to 34XX W Pacific Coast.

**SOUTH COAST: PUBLIC VIEWSHEDS OF THE OCEAN**


**Figure 6**. Map identifying stretches of Pacific Coast Highway in the South Coast Subarea where there are public views of the ocean. See Table 1 below for analysis of this map pertaining to public views of the ocean.

## SUMMARY OF ANALYSIS RESULTS

Seven recently redeveloped properties in the Existing Communities of Solimar, Faria, Seacliff and Solromar were designed with elevation for sea level rise and existing FEMA requirements. The data for the design of these structures was used to provide a real-life example to compare the proposed sea level rise amendments and existing FEMA flood zone requirements. The results were used for the visual simulations in Figures 2 through 4, the calculations are summarized in Appendix B, Tables B-1 and B-2, and the key results are listed in the bullets below:

- Overall, the existing FEMA flood zone was the prevailing requirement in determining the base flood elevation in five of the seven properties.
- The difference between FEMA flood zone requirements and the proposed sea level rise amendments was very close among four of the seven properties, with about one and a half feet or less difference in required elevation.
- In the Faria community, the FEMA requirements were the prevailing factor up to 3 feet based on data from two 2018[5] wave run up studies.

[5] When adjusted for the 2021 FEMA map base flood elevation.

- In the Seacliff Community, the FEMA requirements were the prevailing factor by about 3 to 4 feet based on data from two 2016[6] wave run up studies.
- In the Solimar community, the proposed amendments for a sea level rise elevation of 6.6 feet by year 2130 was the prevailing factor by about 1 foot or less based on data from a 2010[7] and 2022 wave run up studies.
- In the Solromar community, the FEMA requirements were the prevailing factor by about a foot based on data from a 2019 wave run up study.

Based on this analysis, Planning staff determined that either:

1) Existing FEMA requirements prevail and are sufficient to include the proposed sea level rise amendments without any changes to the existing development potential allowed by the existing CZO regulations; or,
2) Where the proposed sea level rise amendments would prevail, the difference in elevation above FEMA is about one foot and would not be significant because this difference would not be more noticeable along the most affected public viewsheds of the ocean, which is a far view from Highway 101 where automobile drivers are generally traveling over 65 miles per hour past these communities. The proposed design elevations for sea level rise also would not substantially impact the near views of the ocean along Pacific Coast Highway for the traveling pedestrians, bicyclists or automobiles because ocean views are already blocked by residential development in the Existing Communities.

Furthermore, the undeveloped coastline areas outside of these Existing Communities remain available for unobstructed public ocean views today and would be unchanged by the proposed sea level rise amendments. A detailed assessment of ocean views from Highway 101 is summarized below:

Table 1: Ocean Views From the Highways

| Coastal Subarea | Ocean Views Along the Highways (miles) | Development Along the Highways (miles) | Percentage of Public Ocean Views Along the Highways |
|---|---|---|---|
| North Coast | 8.96 | 2.60 | 77.5% |
| South Coast | 6.96 | 0.56 | 92.6% |
| Both North & South Coasts | 15.92 | 3.16 | 83.4% |

To determine the miles of ocean views, staff measured the length along highways and assumed Existing Communities would at least partially obstruct public views of the ocean, and therefore the length of Existing Communities on the shoreline is summarized in the table above as "Development Along the Highway." All other areas generally provided some ocean views, although some topographical contours and plants may limit public views of the ocean in undeveloped areas.

See the appendices below for analysis of Existing Communities where public viewsheds of the ocean would not be affected by the proposed amendments (Appendix A) and the data and

[6] When adjusted for the 2021 FEMA map base flood elevation.
[7] When adjusted for the 2021 FEMA map base flood elevation.

calculations for the comparison of the proposed sea level rise amendments and FEMA flood zone requirements (Appendix B).

## APPENDIX A – COMMUNITIES WITHOUT SIGNIFICANT PUBLIC VIEWSHEDS OF THE OCEAN

Existing Communities that do not have public viewsheds of the ocean were excluded from the viewshed analysis. Below are the reasons for excluding certain communities in the North and Central Coast Subareas, with examples. See Appendix B for an analysis of the South Coast Subarea.

*North Coast Communities*

Two Existing Communities along the North Coast Subarea were excluded from the viewshed analysis; Mussel Shoals and Rincon Point have existing development and vegetation that significantly obstruct public views of the ocean.

### Mussel Shoals

Mussel Shoals was not analyzed for far view public viewsheds of the ocean because a sound wall currently blocks the public view of the ocean from Highway 101. The following image from Google Street View from July 2023 facing west depicts that the ocean cannot be seen and therefore increases in building elevation would not affect ocean views from this segment of the highway.


**Figure A-1**. Google Street View Image from July 2023 along California Highway 101 facing Mussel Shoals shows a sound wall blocking the public view.

On the other side of the wall, the proposed development standards are unlikely to have a substantial impact on the public ocean near views, since single-story homes already block the public view. See Figure A-2 below.


**Figure A-2**. Google Street View Image from May 2019 along West Pacific Coast Highway in Mussel Shoals shows no near view public ocean viewsheds above an existing single-story residence.

Another reason why Mussel Shoals was not included in the FEMA analysis is because only seven homes along the southern portion of the shore are in the FEMA flood zones. Most of the residences are developed outside of the FEMA flood zones and only the proposed sea level rise regulations would apply to increasing the elevation of these residences.

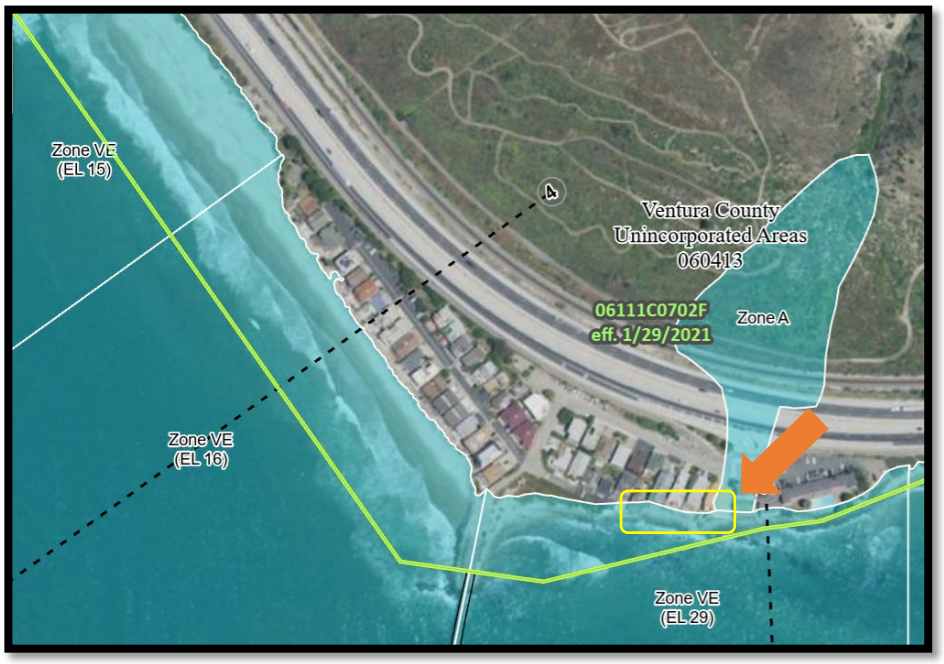


**Figure A-3**. FEMA flood map for Mussel Shoals.

### Rincon Point

Rincon Point was not analyzed for public viewsheds of the ocean because a beach parking lot and vegetation already obscure far views of the ocean from Highway 101. The two images below show Rincon Point is already obscured by existing vegetation and development.


Along Highway 101 facing the Rincon Beach parking lot.

**Figure A-4**. Google Street View Image from August 2023 along West Pacific Coast Highway facing west towards Rincon Point shows a beach parking lot and vegetation obstructing far views of the ocean.


**Figure A-5**. Google Street View Image from August 2023 along Highway 101 facing north towards Rincon Point shows the ocean and development mostly hidden by vegetation.

*Central Coast Communities*

The Central Coast Existing Communities of Hollywood Beach and Silver Strand are primarily zoned RBH with a few commercial parcels. Both Hollywood Beach and Silver Strand have residences that abut the sandy beach. FEMA flood zones stop at the beach and do not include the RBH zoned properties.

The proposed sea level rise policies and standards for elevation would not have a significant impact on the public viewsheds of the ocean in Hollywood Beach and Silver Strand since the land profile is generally flat and existing near views of the ocean are already limited by existing development.

A street view analysis of the Central Coast communities indicated that the existing residences already block the public near view and additional height increases would not result in a significant impact on the public viewsheds of the ocean.

**Hollywood Beach**

The first two images below show street views in Hollywood Beach from Los Robles Street and Las Palmas Street respectively, facing west towards the ocean. In both images, there is a public beach access point at the end of these streets between the existing residences. Due to the flat topography, the existing structures already significantly block the near views of the ocean from public viewsheds and this would not change if these structures are redeveloped.

The following two photos show three residential structures facing Ocean Drive (3233, 3225, and 3217 Ocean Drive). The first image shows the structures in 2018 and the second image shows that the structures were redeveloped by 2022. During redevelopment, the building heights were increased but there were no public near views of the ocean due to the flat topography and wide beaches. These residences were approved under the existing development standards.

The following two images illustrate public access points in Hollywood Beach surrounded by residential development (RBH). The development on either side of the public access points already block the public near view of the ocean.


**Figure A-6**. Google Street View Image from November 2022 along Los Robles Avenue facing west towards 3381 Ocean Avenue.


**Figure A-7**. Google Street View Image from November 2022 along Las Palmas Street facing west towards 3461 Ocean Avenue.

The two images below are intended to compare three residences that were redeveloped between 2018 and 2022 according to current development standards. No additional public near views of the ocean were blocked by the redevelopment.


**Figure A-8**. Google Street View Image from November 2018 along Ocean Drive facing west towards the ocean.

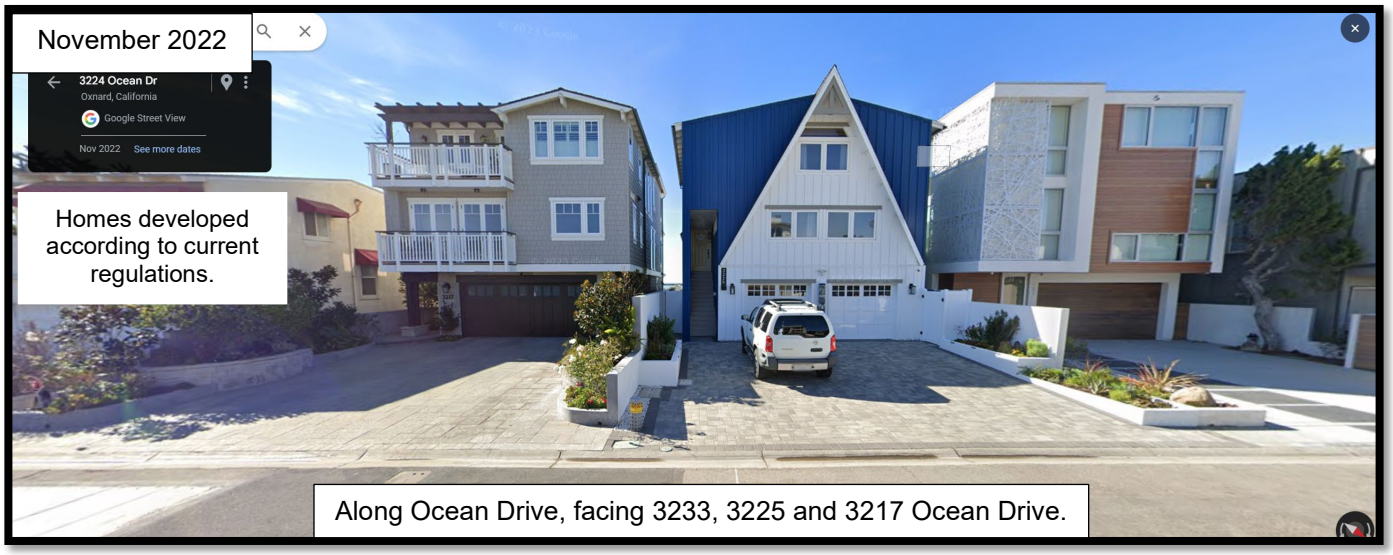


**Figure A-9**. Google Street View Image from November 2022 along Ocean Drive facing west towards the ocean. All three homes have been redeveloped according to current development standards.

## Silver Strand

In Silver Strand, beach access and public viewsheds of the ocean would not be affected if development was elevated in accordance with the proposed amendments for sea level rise. Nearly the entire public near view of the ocean is currently obstructed by the first row of houses and the sandy beach area beyond the houses. Because the land profile is relatively flat, this effect is universal in this neighborhood. The public viewsheds in these neighborhoods are generally along corridors due to easements for beach access, and existing buildings limit other, more panoramic near views of the ocean. In the two photos below, the identified home was redeveloped according to current development standards with a second story. Since the public near view was already blocked by the original residence, there was no impact to public viewsheds of the ocean. The beach path continues to provide a small sliver of ocean view regardless of adjacent building heights/elevations.


**Figure A-10**. Google Street View Image from May 2019 along Oxnard Avenue, facing westward towards 1125 Ocean Drive.

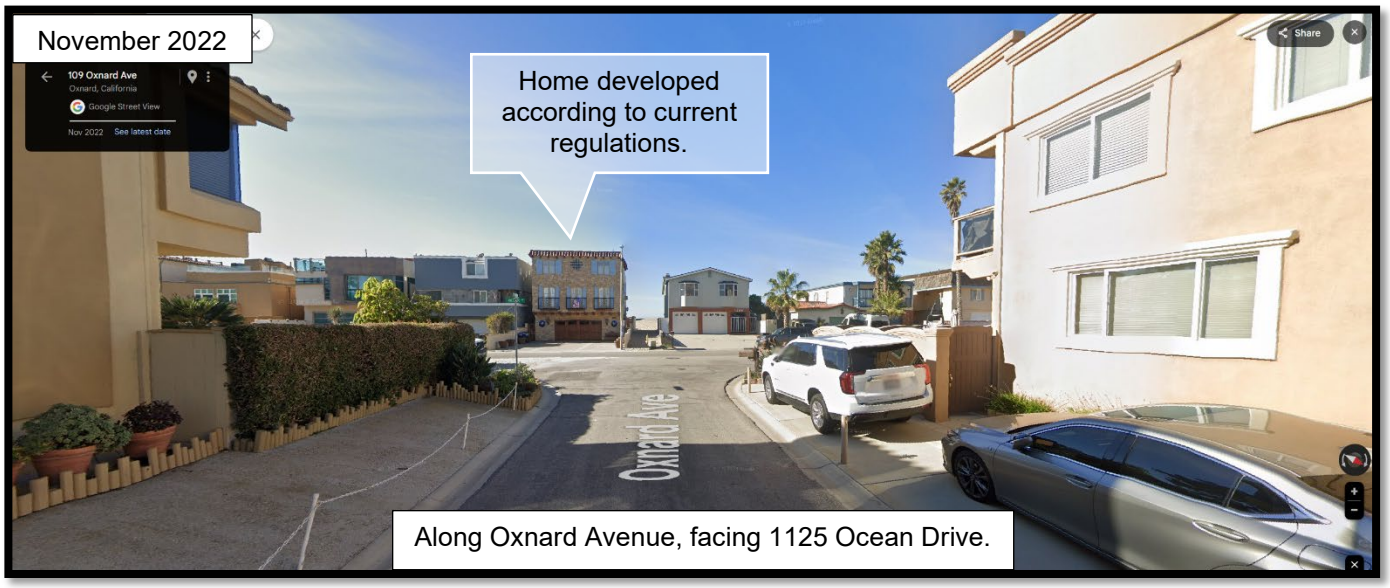


**Figure A-11**. Google Street View Image from November 2022 along Oxnard Avenue, facing westwards toward 1125 Ocean Drive.

Below are two photos illustrating that current building height standards already obstruct near views of the ocean. This Ocean Drive residence was previously treated as a public access point when it was private property in 2019 and then it was redeveloped by 2022. These images demonstrate that development in accordance with existing zoning already obstructs ocean near views of the ocean and that additional building elevation would not affect public viewsheds of the ocean.


**Figure A-12**. Google Street View Image from May 2019 along Ocean Drive, facing 2516 Ocean Drive as a vacant lot.


**Figure A-13**. Google Street View Image from November 2022 along Ocean Drive, facing 2516 Ocean Drive as a residence.

## APPENDIX B – DATA AND CALCULATIONS

As shown in the tables below, data for the design of seven recently redeveloped structures was used to provide a real-life example to compare the elevations that would result from the proposed sea level rise amendments and existing FEMA flood zone requirements. The projected maximum elevation of a residence under the proposed amendments is in Column K for the proposed sea level rise amendments, and Column L for the existing FEMA requirements. Column M identifies which regulation is higher--either the calculation in Colmn K for sea level rise or Column L for FEMA.

**Table B-1**. Data Comparison of Existing FEMA Elevation Requirements and Proposed Sea Level Rise Elevation Standards in North Coast Communities – Faria (Pacific Coast Highway addresses), Solimar (Solimar Beach addresses) and Seacliff (Rincon Beach addresses)

| HEIGHT CALCULATION | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A | B | C | D | E | F | G | H | I | J | K | L | M |
| Address | Projected sea level rise max. ft (From study) | Wave uprush study projected maximum and 6.6 ft of assuming sea level rise (6.6 ft - B) | Wave uprush study at Finished Floor, already includes 1.5 ft of free board (From study) | Wave uprush assuming 6.6 ft of sea level rise (C + D) | Wave uprush still water (From Study) | Still water difference from PWA (7.83 ft - F) | FEMA Flood Map (2021) (BFE) | Road (Ground Elevation) | BFE - Road (H-I) | SLR=28 ft (building height) + wave uprush height (includes 7.83 ft still water) + 6.6 ft of slr - road (ground elevation) | FEMA height= 28 ft (building height) + 1.5 ft (freeboard)+ BFE - road (ground elevation) | Which is Higher |
| 34XX W Pacific Coast | 3.9 | 2.7 | 18.5 | 21.2 | 7.7 | 0.13 | 20 | 17 | 3 | 32.33 | 32.5 | FEMA |
| 36XX W Pacific coast | 4.75 | 1.85 | 17 | 18.85 | 7.7 | 0.13 | 19 | 20.63 | 0 | 26.35 | 29.5 | FEMA |
| 30XX Solimar Beach | 2 | 4.6 | 13.77 | 18.37 | 4.5 | 3.33 | 20 | 14.42 | 5.58 | 35.28 | 35.08 | SLR |
| 31XX Solimar Beach | 6 | 0.6 | 19.5 | 20.1 | 7.6 | 0.23 | 18 | 11 | 7 | 37.33 | 36.5 | SLR |
| 54XX Rincon Beach | 4.75 | 1.85 | 16 | 17.85 | 7.7 | 0.13 | 20 | 14 | 6 | 31.98 | 35.5 | FEMA |
| 54XX Rincon Beach | 4.75 | 1.85 | 15.5 | 17.35 | 7.7 | 0.13 | 20 | 12.5 | 7.5 | 32.98 | 37 | FEMA |

**Table B-2.** Data Comparision of Existing FEMA Elevation Requirements and Proposed Sea Level Rise Elevation Standards in the South Coast Community of Solromar

| HEIGHT CALCULATION | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A | B | C | D | E | F | G | H | I | J | K | L | M |
| Address | Projected sea level rise max. ft (From study) | Wave uprush study projected maximum and 6.8 ft of assuming sea level rise (6.8 ft - B) | Wave uprush study at Finished Floor, already includes 1.5 ft of free board (From study) | Wave uprush assuming 6.8 ft of sea level rise (C + D) | Wave uprush still water (From Study) | Still water difference from PWA (7.96 ft - F) | FEMA Flood Map (2021) (BFE) | Average Grade | BFE - Average Grade (H-I) | SLR=25 ft (building height) + wave uprush height (includes 7.96 ft still water) + 6.8 ft of slr - average grade | FEMA height= 25 ft (building height) + 1.5 ft (freeboard)+ BFE - average grade | Which is Higher |
| 11XXX Pacific Coast Highway | 4.3 | 2.5 | 17.66 | 20.16 | 7.8 | 0.16 | 20 | 15.875 | 4.125 | 29.445 | 30.625 | FEMA |

*The still water level in the South Coast is 7.96 feet instead of the 7.83 feet in North and Central Coast and sea level rise projection is 6.8 feet in South Coast rather than 6.6 feet in North and Central Coast.

The Existing Communities of Rincon Point, Mussel Shoals, Hollywood Beach, and Silver Strand were not evaluated in the above tables because Appendix A demonstrates there would be no public viewshed impacts from the proposed amendments in these communities.

*Variables in the Analysis*

The properties eligible for consideration in this analysis were limited by two factors:

- Only shoreline properties with development at least partially located within a FEMA flood zone were analyzed.
- The wave run up analysis needed to consider sea level rise. Wave run up studies are associated with discretionary permits and are necessary for establishing the first-floor elevation. The studies only started considering sea level rise around 2010.

Public Works uses the Santa Barbara tidal gauge for FEMA analysis in the North and Central Coast communities and the Santa Monica tidal gauge for South Coast communities.

**North Coast**

The intermediate-high sea level rise scenario for 2130 is 6.6 feet (see Santa Barbara Tidal Gauge, right). Variables in the Sea Level Rise Analysis:

- Sea level rise projected for 100 years;
- Still water level recommended by Public Works is 7.83 feet;
- Wave run up study – finished floor elevation[8];
- Average ground elevation;
- Building height of 28 feet; and,
- 18 inches of freeboard.

Variables in the FEMA Analysis:

- FEMA Base Flood Elevation;
- Average ground elevation;
- Building height of 28 feet; and,
- 18 inches of freeboard.

Table F-10. Sea Level Scenarios for Santa Barbara

| Projected SLR Amounts (in feet) | | | | | |
|---|---|---|---|---|---|
| | Low | Intermediate-Low | Intermediate | Intermediate-High | High |
| 2030 | 0.2 | 0.3 | 0.3 | 0.3 | 0.4 |
| 2040 | 0.3 | 0.4 | 0.4 | 0.5 | 0.6 |
| 2050 | 0.3 | 0.5 | 0.6 | 0.9 | 1.1 |
| 2060 | 0.4 | 0.6 | 0.9 | 1.4 | 1.8 |
| 2070 | 0.5 | 0.7 | 1.2 | 2.0 | 2.7 |
| 2080 | 0.5 | 0.9 | 1.6 | 2.8 | 3.8 |
| 2090 | 0.5 | 1.1 | 2.1 | 3.5 | 5.0 |
| 2100 | 0.6 | 1.2 | 2.8 | 4.5 | 6.3 |
| 2110 | 0.6 | 1.4 | 3.4 | 5.3 | 7.5 |
| 2120 | 0.7 | 1.5 | 4.0 | 6.0 | 8.6 |
| 2130 | 0.7 | 1.7 | 4.4 | 6.6 | 9.5 |
| 2140 | 0.7 | 1.9 | 4.9 | 7.1 | 10.4 |
| 2150 | 0.8 | 2.0 | 5.5 | 7.6 | 11.3 |

Median values of Sea Level Scenarios, in feet, for each decade from 2020 to 2150, with a baseline of 2000. All median scenario values incorporate the local estimate of vertical land motion. The red box highlights the three scenarios that the *State Sea Level Rise Guidance* (OPC 2024) and this guidance recommend for use in various planning and project contexts.

Figure B1. Projected sea level rise table for Santa Barbara Tidal Gauge.

*Method of Analysis*

The analysis assumed that the properties were developed according to the proposed development standards and that the tallest possible structure would be built. For both the sea level rise and FEMA analyses, the maximum allowed building height was 28 feet and for the freeboard allowance was 1.5 feet. The road was used as a reference point to calculate the height in reference to the ground as is currently allowed under the CZO.

[8] All references to elevation use NAVD88 datum reference.

The projected maximum elevation of a residence under the proposed amendments is in Table B-2 as the blue (FEMA) or purple (sea level rise) Column K and L.

*Sea Level Rise Model*

The sea level rise model used six variables to determine the maximum height of a potential building, starting with the finished floor elevation from the wave up rush studies to determine the initial elevation. Some wave uprush studies used a 1 foot "freeboard" so an additional 6 inches were added to the freeboard for a consistent freeboard elevation of 18 inches.

Then the numbers for sea level rise and the Still water were standardized. The wave run up studies noted the projected sea level rise and the Still water level used as part of the analysis. The difference between the wave run up studies and the 6.6 feet of sea level rise and the 7.83 feet of still water recommended by the Public Works Agency was added to the elevation calculation. For example, four out of the six wave run up studies used 4.75 feet of sea level rise and 7.7 feet of Still water. This resulted in an increase of 1.85 feet of sea level rise and 0.13 feet of Still water.

Finally, the wave up rush studies finished floor elevation was added to the difference in sea level rise, difference in Still water, and 28 feet of building height. The ground elevation was subtracted from this number. The sea level rise elevation analysis in the tables above follow the formulas below:

*Finished roof elevation = 28 feet of building height + Wave run up study finished floor elevation (includes freeboard) + difference required to meet 6.6 feet of sea level rise and 7.83 feet of still water – road*

*FEMA Model*

The FEMA model used four variables, starting with the FEMA flood zone to determine the initial elevation. Then the building height of 28 feet and 1.5 feet of freeboard was added to the FEMA flood zone elevation. The ground elevation was subtracted from this number.

For 3692 W Pacific Coast Highway in the Faria community, the road was higher than the FEMA base zone flood elevation. Since this would result in additional elevation beyond what FEMA would require, the difference between FEMA and the road elevation was null.

For 3006 Solimar Beach in the Solimar community, the datum for the wave up rush study was NGVD29; this was converted to NAVD88 in an online datum conversion tool by the National Oceanic and Atmospheric Administration.

The FEMA elevation analysis in the tables above follow the formula below:

*Finished roof elevation = 28 feet of building height + 1.5 feet of freeboard + FEMA base flood elevation – road*

## South Coast

In Solromar, shoreline properties are zoned Coastal Residential Planned Development, Coastal Open Space, Coastal Two-Family Residential, or Coastal Rural Exclusive. The development standards in these zones differ from the RB and RBH zones. Specially, there are larger lot sizes and the maximum height of the principal structure is 25 feet. The height is measured from the finished grade to the highest point of the roof.

Most development along the shoreline in Solromar pre-dates 2010, when wave uprush studies were required to include sea level rise in their analysis. These requirements resulted in only one suitable data point for Solromar, which was adjusted for the proposed amendments requiring design for 6.8 feet of sea level rise by year 2130 and current FEMA requirements. The analysis assumed that the maximum possible height of the structure is 25 feet, three feet lower than the 28 foot maximum height for the RB and RBH zones. The 18 inches of freeboard was also added to the sea level rise analysis and the FEMA analysis.

The intermediate-high sea level rise scenario for 2130 is 6.8 feet (see Santa Monica tidal gauge, right). Variables in the Sea Level Rise Analysis:

- Sea level rise projected for 100 years;
- Still water level recommended by Public Works is 7.96 feet;
- Wave run up study – finished floor elevation[9];
- Ground elevation[10];
- Building height of 25 feet; and,
- 18 inches of freeboard.

Variables in the FEMA Analysis:

- FEMA Base Flood Elevation;
- Average grade;
- Building height of 25 feet; and,
- 18 inches of freeboard.

Table F-11. Sea Level Scenarios for Santa Monica

| | Projected SLR Amounts (in feet) | | | | |
|---|---|---|---|---|---|
| | Low | Intermediate-Low | Intermediate | Intermediate-High | High |
| 2030 | 0.3 | 0.3 | 0.4 | 0.4 | 0.4 |
| 2040 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 |
| 2050 | 0.4 | 0.6 | 0.7 | 0.9 | 1.2 |
| 2060 | 0.5 | 0.7 | 1.0 | 1.5 | 1.9 |
| 2070 | 0.6 | 0.9 | 1.3 | 2.1 | 2.8 |
| 2080 | 0.6 | 1.0 | 1.7 | 2.9 | 3.9 |
| 2090 | 0.7 | 1.2 | 2.3 | 3.7 | 5.2 |
| 2100 | 0.8 | 1.4 | 2.9 | 4.6 | 6.4 |
| 2110 | 0.8 | 1.6 | 3.6 | 5.5 | 7.7 |
| 2120 | 0.9 | 1.8 | 4.2 | 6.2 | 8.8 |
| 2130 | 0.9 | 1.9 | 4.7 | 6.8 | 9.7 |
| 2140 | 1.0 | 2.1 | 5.2 | 7.3 | 10.6 |
| 2150 | 1.1 | 2.3 | 5.7 | 7.9 | 11.5 |

Median values of Sea Level Scenarios, in feet, for each decade from 2020 to 2150, with a baseline of 2000. All median scenario values incorporate the local estimate of vertical land motion. The red box highlights the three scenarios that the *State Sea Level Rise Guidance* (OPC 2024) and this guidance recommend for use in various planning and project contexts.

Figure B2. Projected sea level rise table for Santa Monica Tidal Gauge.

*Method of Analysis*

Two unchanging variables in both the sea level rise model and the FEMA model were the building height of 25 feet and the freeboard height of 18 inches. The ground elevation was used in both analyses to reflect the elevation profile of the local community as is currently allowed under the CZO. The excel spreadsheet with the calculations and final numbers are shown in Appendix B.

[9] All references to elevation use NAVD88 datum reference.

[10] The ground elevation was pulled from site plans or if not on site plans, County LiDAR data.

The projected maximum elevation of a residence under the proposed amendments is in Table B-2 as the blue (FEMA) or purple (sea level rise) Column K and L.

*Sea Level Rise Model*

As mentioned in the previous section, the sea level rise model used six variables to determine the maximum height of a potential building. The analysis started with the finished floor elevation from the wave up rush studies to determine the initial elevation. Some wave uprush studies used a 1 foot “freeboard” so an additional 6 inches were added to the freeboard for a consistent freeboard elevation of 18 inches.

Then the numbers for sea level rise and the Still water were standardized. The wave run up studies noted the projected sea level rise and the Still water level used as part of the analysis. The difference between the wave run up studies and the 6.8 feet of sea level rise and the 7.96 feet of still water recommended by the Public Works Agency was added to the elevation calculation.

Finally, the wave up rush finished floor elevation was added to the difference in sea level rise, difference in Still water, and 25 feet of building height. The ground elevation was subtracted from this number. The sea level rise analysis followed the below formula:

> *Finished roof elevation = 25 feet of building height + Wave run up study finished floor elevation (includes freeboard) + difference required to meet 6.8 feet of sea level rise and 7.96 feet of still water – average grade*

*FEMA Model*

Like the previous section, the FEMA model used four variables. The analysis started with the FEMA flood zone to determine the initial elevation. Then the building height of 25 feet and 1.5 feet of freeboard was added to the FEMA flood zone elevation. The average grade was subtracted from this number.

The FEMA analysis followed the below formula:

> *Finished roof elevation = 25 feet of building height + 1.5 feet of freeboard + FEMA base flood elevation – average grade*