CITY OF NEWPORT BEACH
100 Civic Center Drive
Newport Beach, California 92660
949 644-3001 | 949 644-3020 FAX
newportbeachca.gov

August 30, 2017

Mr. Ed Curtis, P.E., CFM
Risk Analysis Branch
FEMA Region IX
1111 Broadway, Suite 1200
Oakland, CA 94607

Re: Letter of Appeal for Revision of the Preliminary FIRM and BFE for the City of Newport Beach
Community No.: 060227
Case No.: 12-09-1324S
Docket No. FEMA-B-1673

Dear Mr. Curtis:

Upon reviewing the Preliminary Flood Insurance Rate Map (FIRM) and Flood Insurance Study (FIS) for the City of Newport Beach, we have identified major issues and concerns with the data and methods used to establish the Base Flood Elevations (BFEs) and corresponding flood zones for the City of Newport Beach. The City of Newport Beach appeals FEMA's analysis for the proposed FIRM, based on our finding that FEMA's analysis conducted for the AE zone is scientifically incorrect and the VE zone is technically incorrect. Two hundred and sixty private owners and lessees of real property within the City of Newport Beach have submitted an appeal to the City. As reflected in my written decision filed herewith, in my opinion, I decided that the evidence presented in support of the City's appeal is sufficient to justify an appeal on behalf of all such private owners and lessees by the City in its own name.

On April 12, 2017, we submitted our comment letter to FEMA to request that the Preliminary FIRM and BFEs be revised. In the comment letter, we provided additional data not used in the FIS and proposed the use of a scientifically and technically accurate method for both data analyses and flood mapping to support our request for map revision. Since submitting the comment letter, we met with you and your staff members on June 15, 2017, to answer your questions regarding our additional data and analyses. At the meeting, you also made suggestions on how we could improve our analyses and provide additional documentation to support our request for map revision. Based on your suggestions, we have conducted additional analyses and included additional documentation on our previously presented analyses from our earlier comment letter. In this appeal, we will present scientific and technical data and analyses supporting our appeal to revise the BFEs and Preliminary FIRM for the City of Newport Beach.

NEWPORT BAY AND HARBOR (AE ZONE)

For the AE Zone the City requests revisions of the flood boundaries. We identified the following major issues with the mapping of the flood boundary that we found to be scientifically incorrect:

(1) The topographic data used in mapping the flood zone did not incorporate the seawall elevations of Newport Bay, especially those along Newport Peninsula and the Balboa Islands.

(2) The use of the "bathtub" model to map the flood extent.

Following the FEMA guidelines (FEMA 2009), we are providing the following data and new analysis—based on a more scientific and accurate method--to support our request for revision to the flood boundaries shown in the Preliminary FIRM for the AE Zone within the City of Newport Beach.

Additional Data - Surveyed Seawall Data

Within the Newport Bay and Harbor, most of the bayside shorelines along the Newport Peninsula and the entire Balboa Islands are protected from flooding by seawalls. Figure 1 shows the locations where seawall survey data were available and should be considered in the mapping of the flood boundaries. As shown in the figure, seawall elevation data for the Balboa Islands were collected by a Licensed Civil Engineer in 2010, and seawall elevation data along the bayside shorelines were collected by a Licensed Surveyor in 2017. These data are provided in the DVDs that accompany this letter, under the folder titled "Seawall Data."

These survey data were used to define seawall elevations in the two-dimensional (2D) hydrodynamic model of the Newport Bay and Harbor, as described below.

Accurate Method for Mapping – 2D Hydrodynamic Modeling

The bathtub approach is scientifically incorrect in providing an accurate model for flood mapping. Researchers at the University of California, Irvine (UCI) have been studying urban coastal flooding for over ten years. In one of their studies, researchers compare the bathtub approach with the use of a 2D hydrodynamic model for flood mapping, using the City of Newport Beach as a test case (Gallien et al. 2011, attached). The study compares the results of these two methods with the observed flood extent caused by an extreme high tide (7.72 ft., NAVD) on January 10, 2005. Additionally, the study examines survey accuracies of seawall elevations used in flood mapping. Their major findings are: (i) the bathtub approach over-predicted the flood extents in Newport Bay, and (ii) it is important to include accurate survey data of the seawall elevations to be able to map urban flooding.

We believe that the use of 2D hydrodynamic modeling is critical for providing accurate flood mapping for the AE Zone of Newport Bay and Harbor. Hence, we used the FEMA-approved HEC-RAS model (version 5.0) to conduct flood modeling of the Newport Bay and Harbor. HEC-RAS version 5.0 includes 2D flood routing capabilities and allows a time-varying stage hydrograph thatcan be used to simulate tidal forcing at the ocean boundary. Figure 2a shows the HEC-RAS model domain for the Newport Bay and Harbor. In setting up the model, we started with the Newport Beach topographic data that was used in the Open Pacific Coast (OPC) Study and provided to us by Ms. Karin Ohman, and added the seawall elevation survey data to the model. Figure 2b provides an example of the model grid setup with seawall data. Specifically, the figure shows a zoomed view of the computational mesh, and the modeled seawall, which surrounds the corners of Balboa Island and Little Balboa Island.

For the HEC-RAS model, the effect of waves on flooding was not considered because the waves in the Newport Harbor are generally very small. Since the Harbor is sheltered by land, no significant ocean swell is expected to penetrate within, and the wave conditions in the harbor are likely to be governed by local wind waves instead. Figure 3 shows a wind rose developed based on available wind data from the nearby Balboa Pier (Station no. H0498) for the period from June 2004 through May 2008 (MesoWest 2017). As shown in the figure, the majority of the winds come from the southwest quadrant, while calm winds (speeds below 2 mph) were reported over 37% of time. Based on the wind data, the median wind speed for the given period was calculated to be 3 mph. Using this median wind speed, wind waves across three example fetches in the Harbor (shown in Figure 4) were estimated using the ACES program within the CEDAS (version 4.03) suite of programs developed by the U.S. Army Corps of Engineers (Veri-Tech, Inc. 2010). Table 1 presents the wave heights and corresponding fetch lengths resulting from this analysis, and shows that typical wind waves in Newport Harbor are expected to be less than or equal to 0.1 ft. in height.

Table 1.

Fetch Lengths and Wind Wave Heights

Fetch No.[1]	Approximate Length of Fetch (ft.)	Estimated Wave Height (ft.)
1	2,250	≤0.1
2	1,350	≤0.1
3	950	≤0.1

1. Refer to Figure 4 for a map showing the fetch numbers and locations

HEC-RAS Model Validation

The HEC-RAS Model setup for Newport Bay was validated based on an extreme flood event that was observed on January 10, 2005, and documented in the UCI study (Gallien et al. 2011). During this flood event, the high tide was recorded as peaking at 7.73 ft., NAVD. To conduct model validation, a 24-hour tide (shown in Figure 5) recorded during this extreme flood event was downloaded from the NOAA website (NOAA 2017) and applied as the ocean boundary condition. In Figure 6, the result of the HEC-RAS model run is compared with the flood extent that was documented by Gallien et al. (2011), and based on 85 digital photos that cover the Newport Bay area and on eyewitness accounts. The figure shows that the flood extents predicted by the HEC-RAS Model match reasonably well with the observed flooded areas. The main discrepancy between the HEC-RAS Model validation results and the observed flood area consists of a small area along West Balboa Boulevard, from approximately 12th to 16th Street. In this area, field observations showed ponding, while HEC-RAS Model results did not. Since the field observations also showed this flooded area as being isolated and without visible connectivity to harbor waters, it is likely that the observed flooding in this area was due to ponding from rain or backflow from a storm drain(s) that was not closed in time to prevent floodwater intrusion.

Flood Extent Predicted for the AE Zone Using 2D Hydrodynamic Modeling

To map the AE Zone in Newport Bay, a 24-hour simulation was conducted using a 24-hour synthetic tide (Figure 7), specified as a time-varying stage hydrograph at the ocean boundary of the model domain. As shown in Figure 7, the tide has a peak at 7.88 ft., NAVD, which is consistent with the 1% still water elevation (SWEL) determined for Newport Bay in the OPC study (IDS#4, Table A-2). The synthetic tide was generated based on the ten highest tides recorded at the Port of Los Angeles (NOAA Station No. 9410660) during the last 10 years (2007 - 2017). Peak water levels for the ten highest tides during this time frame are presented in Table 2 below.

Table 2.

Peak Tidal Water Levels at Port of Los Angeles for 2007-2017

No.	Date Time[1]	Water Level (ft., NAVD88)[1]
1	11/25/2015 7:54	7.613
2	12/13/2012 8:24	7.528
3	11/26/2015 8:54	7.521
4	11/24/2015 7:06	7.380
5	12/13/2008 8:30	7.347
6	7/31/2008 20:54	7.315
7	12/14/2012 8:36	7.295
8	11/27/2015 9:00	7.272
9	7/2/2008 21:36	7.269
10	12/12/2012 7:42	7.242

1. Values based on 6-minute data from the tide gage station located at the Port of Los Angeles
Source: NOAA 2017

For each of the ten highest tides, a 24-hour time series was extracted from the observed data. The ten resulting time series were aligned at their peak tide values. To generate the synthetic tide, sine curves were fitted to the ten observed tidal series. The best fit for the synthetic tide series was achieved by optimizing the sine functions' amplitudes, frequencies, and phases to minimize the residuals between the synthetic tidal series and all ten observed tides. Next, the resulting best-fit series was adjusted so that its peak MHHW value matched the 1% TWL at Newport Bay from the OPC Study (7.88 ft., NAVD88). This was achieved by first computing the difference between the peak MHHW value and the 1% TWL, and then adding this difference to each of the values within the best-fit series. Figure 8 shows a comparison of the finalized synthetic tidal series and preliminary best-fit tidal series based on the ten highest observed tides.

The boundary of the AE Zone was defined as the extent of flooding predicted by the HEC-RAS model. In Figure 9, we compared the flood zone areas that were predicted by the HEC-RAS model and the Preliminary FIRM. In the figure, the top panel (Figure 9a) shows the AE Zone that was mapped in the OPC study using the bathtub approach, while the bottom panel (Figure 9b) shows the AE Zone mapped using the HEC-RAS model. As shown in the figure, using a mapping approach that is based on the bathtub model results in a larger predicted flooding extent than does an approach based on the HEC-RAS model. This finding is consistent with the findings in Gallien et al. (2011). Since the bathtub approach substantially over-predicts inundated areas, we request that the Preliminary FIRM for the AE Zone be revised based on the accurate 2D model results, which have incorporated the seawall elevations along the shoreline.

The HEC-RAS model files are provided in the attached DVDs in the folder "HEC-RAS Model for Newport Bay."

NEWPORT COAST (VE ZONE)

The proposed BFE's for the VE Zone are technically incorrect. For the VE Zone that applies along the open coastline of the City of Newport Beach, we request revisions for both the BFEs and flood zone boundaries. We agree with the methodology used for this zone, but disagree with the select use of a few non-representative beach transects to calculate the BFEs, and propose an improved approach that uses existing beach slope data to calculate the BFEs. In addition, the City has a program, which has been active since the 1960s, for constructing beach berms along the Newport Peninsula as needed prior to high wave events to protect houses and public facilities from flooding. The policy for constructing winter beach berms when needed is written in both the City's Storm Action Plan (attached) and Local Coastal Plan. Hence, the beach berm program should be considered in the determination of the most likely winter profile and subsequent overtopping analysis. Details of the City's Beach Berm Program are provided in the attached document, entitled "Balboa Peninsula Flood Protection Program: Evolving Measures to Protect the Peninsula from Flooding Due to High Tides and Waves."

Base Flood Elevations (BFEs) for the VE Zone

BFEs along the open coast were defined by the 1% annual exceedance probability wave runup elevations, which were referred to as total water levels (TWLs) in the OPC Study. The 1% TWLs were determined by conducting wave runup analysis at representative transects of the foreshore beach slope and shoreline orientation for distinct shoreline reaches. The 1% TWLs calculated at each representative transect are rounded to the nearest whole foot to define the BFE for the corresponding shoreline reach. Figure 10 shows the transect locations along the shoreline that were used for wave runup analysis in the Newport Beach area. The *blue* lines represent the transects used for Newport Beach in the OPC study. The figure also shows the BFE Zones and the VE extents for each of the shoreline reaches, which were calculated based on the slopes of the corresponding transects. The OPC Study used only a few beach transects to represent the entire Newport Beach coast; this means that a single beach slope taken at each transect is being used to define an extended shoreline reach. We understand that for mapping purposes, it is reasonable to represent the shoreline with limited number of BFE zones. However, since there is significant variability in foreshore beach slope within shoreline reaches, it is technically accurate to use the average beach slope—instead of using only a single beach slope where the transect happens to be located—along each reach to calculate the corresponding BFE for that shoreline reach.

Also shown in Figure 10 are cross-shore transects taken at 200 ft. (61 m) intervals along the Newport Beach Coast. We used these transects to determine the average foreshore slope within each shoreline reach. Figure 11 compares the foreshore beach slopes of OPC transects 16 to 24 with slopes determined using the 200 ft. (61 m) transect spacing. The average beach slopes within each shoreline reach are also shown in Figure 11. The boundaries of shoreline reaches, which define changes in BFEs, are shown in the same figure as *black* dashed lines. The OPC foreshore beach slopes of transects 16, 17, 18, 20, 23 and 24 are generally larger than the average foreshore slopes in their respective reaches. Since the BFEs are assigned to an entire shoreline reach, and there is significant variability in transect slopes within reaches, the open coast BFEs in the Newport Beach area should be determined using the average transect slope within each shoreline reach.

Figure 12 compares BFEs calculated using the methods detailed in the OPC Study and based on the average reach slopes, with the BFEs that are reported in the OPC Study and calculated using a single beach slope taken at a transect. As shown in the figure and in Table 3, using the average reach slope in the BFE calculations results in lower BFEs for the shoreline reaches at transects 16, 17, 18, 20, and 23/24. For the shoreline reach at transect 22, use of the average slope resulted in a higher BFE. We request that the open coast BFEs be revised to reflect the values determined using average reach slopes, which are presented in Table 3 below.

Table 3.

Open coast BFEs for the Newport Beach area from the OPC Study, and revised BFEscalculated based on the average slope in each shoreline reach.

Transect/ Reach	BFE (ft., NAVD88)	
	OPC Study	Revised[1]
16	15	14
17	17	15
18	14	13
19	12	12
20	20	18
21	21	21
22	17	18
23/24	20	18

1. Calculated based on average beach slope

Flood Zone Delineation for VE Zone

In the OPC study, 1% TWLs were also used to determine the inland extent of the VE Zone. At the majority of the transects, the 1% TWLs overtopped the foreshore beach crest and inundated the foreshore. In these situations, backshore overtopping analysis was conducted using the beach profile extracted from the study terrain. Inundation extent was approximated by projecting the 1% TWL across the entire width of the beach to a "backshore feature." In the OPC documentation, a "backshore feature" was loosely defined as a backshore crest or beach transition point. Overtopping extent was then calculated at the selected backshore feature, using the 1% TWL calculated at the foreshore. The VE Zone was mapped to the inland limit of the calculated overtopping extent caused by the 1% TWL overtopping of the backshore feature. In the OPC documentation, the authors state that before overtopping analysis is performed, it is important to first estimate whether the beach profiles extracted from the study terrain exhibit beach profile conditions that exist just before the occurrence of an episodic winter storm (IDS#3, pg. 33). Due to the City's Beach Berm Program described in the "***Newport Coast (VE Zone)***" section above and detailed in City of Newport Beach (2017), the raw beach profile data extracted from the study terrain represents a condition that is highly unlikely to precede a large winter storm event. Figure 13 shows examples of beach berms constructed at various locations throughout Newport Beach. In a study to evaluate the properties of the beach berms used for flood prevention on Southern California beaches, Gallien (2015) documented the typical dimensions of the beach berm at Balboa Beach near Zone 21. Based on Gallien, the beach berm at this location has a crest at approximately 16 ft. (5 m), NAVD, and a foreshore slope of approximately 10 %.

Due to the nature of these berms, it is unlikely for such features to appear in elevation data sets. However, they are constructed in advance of large ocean swells, the inclusion of the berms in the beach profile represents a much more likely winter condition. The aerial photo (Figure 13a) illustrates the typical location of beach berms along the beach profile. The geometry and characteristics of these beach berms in the Newport Beach area have been reported by Gallien et al. (2015) and documented in Appendix M of City of Newport Beach (2017). As illustrated in Figure 14, these beach berms also showed up in LIDAR (Light Detection and Ranging) data surveyed from 1997 to 2016.

In the OPC Study, the erosion of beach profiles due to winter storms was considered in the determination of the most likely winter profile (MLWP) for some transects. The erosion method used for determining the MLWP predicts the change in beach profile as a result of common winter conditions. This method does not apply to the erosion of the temporary beach berms, because the berms are constructed immediately prior to large, forecasted wave events. Therefore, the temporary berms would be intact prior to a 1% annual chance event.

Thus, the overtopping analysis should include not only the revised TWLs from the preceding section, but also the temporary beach berms constructed to prevent flooding of houses. To incorporate the City's existing beach berming program in the backshore analysis, the likely locations of the constructed beach berms along the beach profiles were estimated based on aerial photographs of historical berms and information derived from consultations with City staff. Instead of using the semi-formal sea walls of private residences as the back-shore features for overtopping analysis, we used the approximate locations of the historical beach berms to define the location of backshore features. For consistency with the OPC Study methodology, and to account for the extensive erosion these berms would likely experience during a 1% annual chance storm, we assumed that these backshore features (the berms) failed from overtopping caused by the 1% TWL. We then used the Cox-Machemehl (1986) method (C-M method) to determine the inland extent of overtopping flow from the location of the failed beach berms. The inland extent of overtopping, determined using the C-M method, defined the landward extent of the VE Zones in our analysis. This approach is completely consistent with the OPC Study methodology; the only difference is that we used the approximate locations of the constructed beach berms to define the backshore feature location.

The following sections describe on a zone-by-zone basis how the revised 1% TWLs and inclusion of the temporary berms in the backshore analysis affect the VE Zone Extent.

Zone 16

In Zone 16, the preliminary 1% TWL overtops the foreshore beach crest and backshore beach profile. The VE Zone extent was therefore based on backshore overtopping analysis in the OPC Study. However, the revised 1% TWL in Zone 16 is not high enough to overtop the backshore dune. Since the revised 1% TWL does not overtop the dune, the revised VE Zone extent is defined as the intersection of the beach dune and 1% TWL. This is consistent with the OPC Study methodology, where in cases when a backshore feature is high enough not to be overtopped, "the TWL is projected to the base of that feature." Thus, in the revised Zone 16, backshore overtopping analysis was not conducted. Figure 15 shows the revised versus preliminary VE Zone extents. The change in VE Zone extent is based solely on the revised 1% TWL, which reflects the average foreshore beach slope of the shoreline at transect 16.

Zone 17

In Zone 17, both the revised and preliminary 1% TWLs overtop the foreshore beach crest and any backshore features. However, in the OPC Study, temporary beach berms were not considered in the transect profile, so the semi-formal seawall adjacent to private properties was selected as a backshore feature. In the revised analysis, the approximate location of temporary beach berms was used to define the location of the backshore feature. The location of beach berms was approximated based on information from Figure 13a and consultations with City staff. The absolute elevation of the berm crest was not required, because we assumed that the berm fails during the 1% event, and overtopping analysis is conducted using the bare earth elevation. Thus, in Zone 17, the revised VE Zone extent is based on selecting a different backshore feature for overtopping analysis. Figure 16 shows the revised versus preliminary VE Zone extents.

Zone 18

In Zone 18 of the OPC Study, both the preliminary and revised 1% TWLs overtop the foreshore and backshore features. In our analysis, however, we used two backshore features for Zone 18—the temporary beach berm from the BFE zone boundary to 24th street, and the seawall protecting the West Ocean Front parking lot from 24th street to the Newport Beach pier. The location of the temporary beach berms was again estimated based on information from Figure 13a and consultations with City staff. Though the seawall protecting the West Ocean Front parking lot is an observable crest in the OPC Study topographic data, the private seawall was selected as the backshore feature for all of Zone 18 in the OPC Study. The revised VE Zone extent shown in Figure 17 is different from the preliminary VE Zone extent due to the difference in backshore feature locations.

Zone 19

In Zone 19, our revised 1% TWL is not significantly different from that used in the OPC Study, and the BFEs are the same when rounded to the nearest whole foot (Table 1). At Zone 19, overtopping of the foreshore crest is not predicted using the preliminary or revised 1% TWL, so backshore analysis is not applicable. We are not requesting revisions to the VE Zone extent in Zone 19.

Zone 20

In Zone 20, both the revised and preliminary 1% TWL overtop the foreshore and any backshore features in the beach profile at transect 20. In the OPC Study, the backshore features appear to be the private seawall between sand dunes, and the base of the sand dunes elsewhere within the shoreline reach. In our analysis, we used information from Figure 13a and consultations with City staff to estimate the location of temporary beach berms in Zone 20. The beach berms were again selected as the backshore feature in Zone 20. Figure 18 shows the revised versus preliminary VE Zone extent for Zone 20.

Zone 21

The OPC Study documentation lists a parking lot as the backshore feature in Zone 21 (Table 12, IDS#3). However, it is clear that the backshore feature used for overtopping analysis in the OPC Study is actually a temporary berm *adjacent* to the parking lot. Indeed, in the shoreline reach corresponding to transect 21, the OPC Study topographic data happens to include one of Newport Beach's temporary berms. Since overtopping analysis appears to be conducted from the base of this beach berm, and our revised 1% TWL results in the same BFE when rounded to the nearest whole foot (Table 1), we are not requesting revisions to the VE Zone extent in Zone 21.

Zone 22

In Zone 22, our calculated 1% TWL is higher than the 1% TWL determined from the OPC Study. In this case, our 1% TWL causes overtopping of the foreshore crest and any apparent backshore features. Therefore, we conducted backshore overtopping analysis in Zone 22; whereas this did not appear to be conducted in the OPC study. Again, we used the approximate location of beach berms to define the backshore feature location. Figure 19 shows the revised versus preliminary VE Zone extent, with the revised results of this study extending slightly further inland compared with the OPC Study results.

Zone 23/24

In Zone 23/24, which includes two different transects, the preliminary 1% TWLs overtop the foreshore beach crests and backshore features. However, the revised 1% TWLs do not overtop the backshore dunes in the beach profiles for either transect 23 or 24. This is because the average transect slope within this combined shoreline reach is significantly lower than the transect slopes determined directly at transects 23 and 24 (Figure 11). Since the revised 1% TWLs do not overtop the dunes, the revised VE zone extent is defined as the intersection of the 1% TWLs and the beach dunes. The revised versus preliminary VE Zone extents are compared in Figure 20.

Table 4 compares the data used in the OPC Study for backshore overtopping analysis, with the data used in our study. In summary, we request that the revised BFEs and VE Zones be incorporated in the FIRMs so that 1) the existing beach berming program is accounted for in the flood zone delineation, and 2) the variability in foreshore beach slope is more rigorously accounted for.

Table 4.

Backshore analysis parameters used in the OPC Study compared to proposed parameters used in this Study. Requested changes are given at the last row of the table

Transect/ Reach	1% TWL (ft., NAVD88)	Backshore Feature	Backshore Crest Elevation (ft., NAVD88)	Runup Exceedance (ft.)	Bore Propagation (ft., VE zone limit)
OPC Study Backshore Overtopping Parameters					
16	14.50	Seawall (removed)	14.03	0.48	9.32
17	16.50	Seawall (removed)	14.70	1.85	18.47
18	13.50	Seawall (removed)	11.15	2.37	20.64
20	20.20	Seawall (removed)	11.87	8.32	42.14
22	17.00	Beach-Structure Transition	13.13	3.89	27.66
23	19.50	Backshore Dune	16.60	2.88	25.09
24	20.00	Seawall (removed)	16.87	3.14	24.10
Revised Backshore Overtopping Parameters					
16	13.64	Backshore Dune	14.34	-0.74	N/A
17	14.83	Temporary Berm (removed)	14.16	0.67	10.68
18	13.04	Temporary Berm/ Seawall (removed)	11.34	1.71	16.74
20	17.79	Temporary Berm (removed)	9.94	7.85	38.36
22	18.39	Temporary Berm (removed)	14.96	3.43	24.68
23	18.35	Backshore Dune	19.49	-1.14	NA
24	18.68	Backshore Dune	19.12	-0.44	NA
Requested Changes	Calculate 1% TWL using average foreshore beach slope in respective shoreline reaches.	Use the location of temporary beach berms as backshore features for consistency with Newport Beach's berming program.	N/A	N/A	N/A

N/A = not applicable

CLOSURE

Thank you for providing the opportunity for the City of Newport Beach to review the draft proposed Flood Insurance Rate Maps (FIRMs) and accompanied technical studies for Orange County. We would also want to thank Ms. Karin Ohman who has been very helpful to provide us with the data used for the City of Newport Beach in the studies. Upon review of the BFEs and preliminary FIRM and after conducting our own technical analyses using additional data, we request the following revisions of the BFEs and FIRMs:

1. Revise the FIRM for the AE zone to the proposed revised flood map shown in Figure 9b that was developed based on 2D hydrodynamic modeling, a scientifically accurate method. The FEMA method and assumptions (Bathtub model) are scientifically incorrect.

2. For the VE Zone, revise the BFEs to those shown Table 3. The proposed revised BFEs were developed based on an accurate use of the available beach slope data. In addition, revise the preliminary FIRM for Zone 16, 17, 18, 20, 22, and 23/24 to the proposed revised VE zone extents shown in Figures 15 to 20.

Sincerely,

Carol Jacobs (for)

Dave Kiff
City Manager
City of Newport Beach

c: Rick Sacbibit, Chief, Engineering Services Branch

Attachments:

Exhibits – Figures 1-20
Beach Berm Program
Comment Letter of April 12, 2017
City Manager's Written Opinion to Consolidate all Appeals & Private Property Appeal Forms
Map of Private Property Appeals and City Owned Property
Declarations of Surveyors
Supporting Documents (DVD)

REFERENCES

City of Newport Beach, 2015. Storm Action Plan. Municipal Operations Department, Nov. 16, 2015.

City of Newport Beach, 2017. Beach Berm Program – Balboa Peninsula Flood Protection Program: Evolving Measures to Protect the Peninsula from Flooding Due to High Tides and Waves. Prepared by City of Newport Beach, July 2017

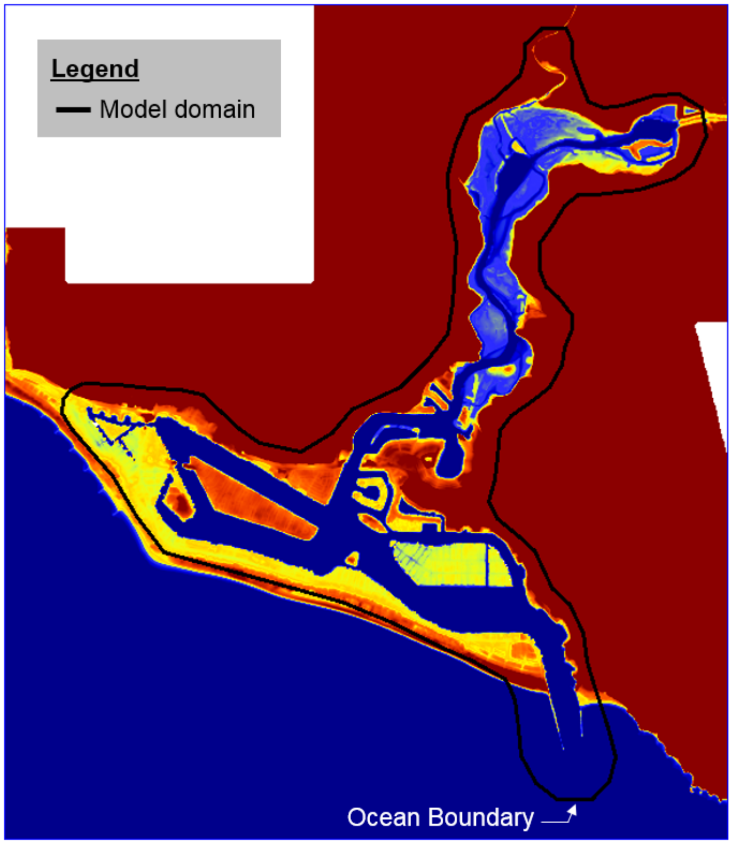
Cox, J.C. and J. Machemehl, 1986. Overland Bore Propagation due to an Overtopping Wave. Journal of Waterway, Port, Coastal and Ocean Engineering. Vol. 112, pp. 161-163.

FEMA, 2009. Appeals, Revisions, and Amendments to National Flood Insurance Program Maps – A Guide for Community Officials. December 2009.

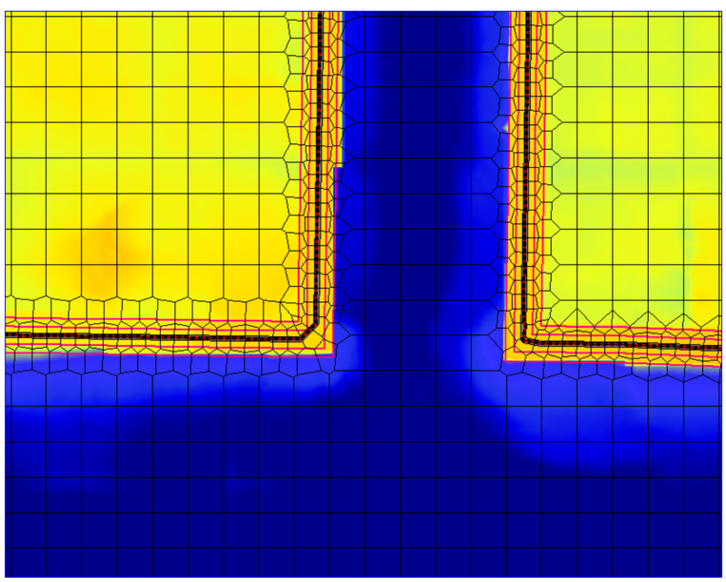
Gallien T.W., J. E. Schubert, and B. F. Sanders, 2011. Predicting tidal flooding or urbanized embayments: a modeling framework and data requirements. Coastal Engineering 58 (2011), 567-577.

Gallien T.W., W.C. O'Reilly, R.E. Flick, R.T. Guza, 2015. Geometric properties of anthropogenic flood control berms on southern California beaches. Ocean and Coastal Management 105 (2015) 35-47.

Figure 1. Sea Wall Survey Locations



(a) HEC-RAS Model Domain



(b) Zoomed view of the computational mesh near the Balboa Island sea wall

Figure 2. HEC-RAS Model Setup

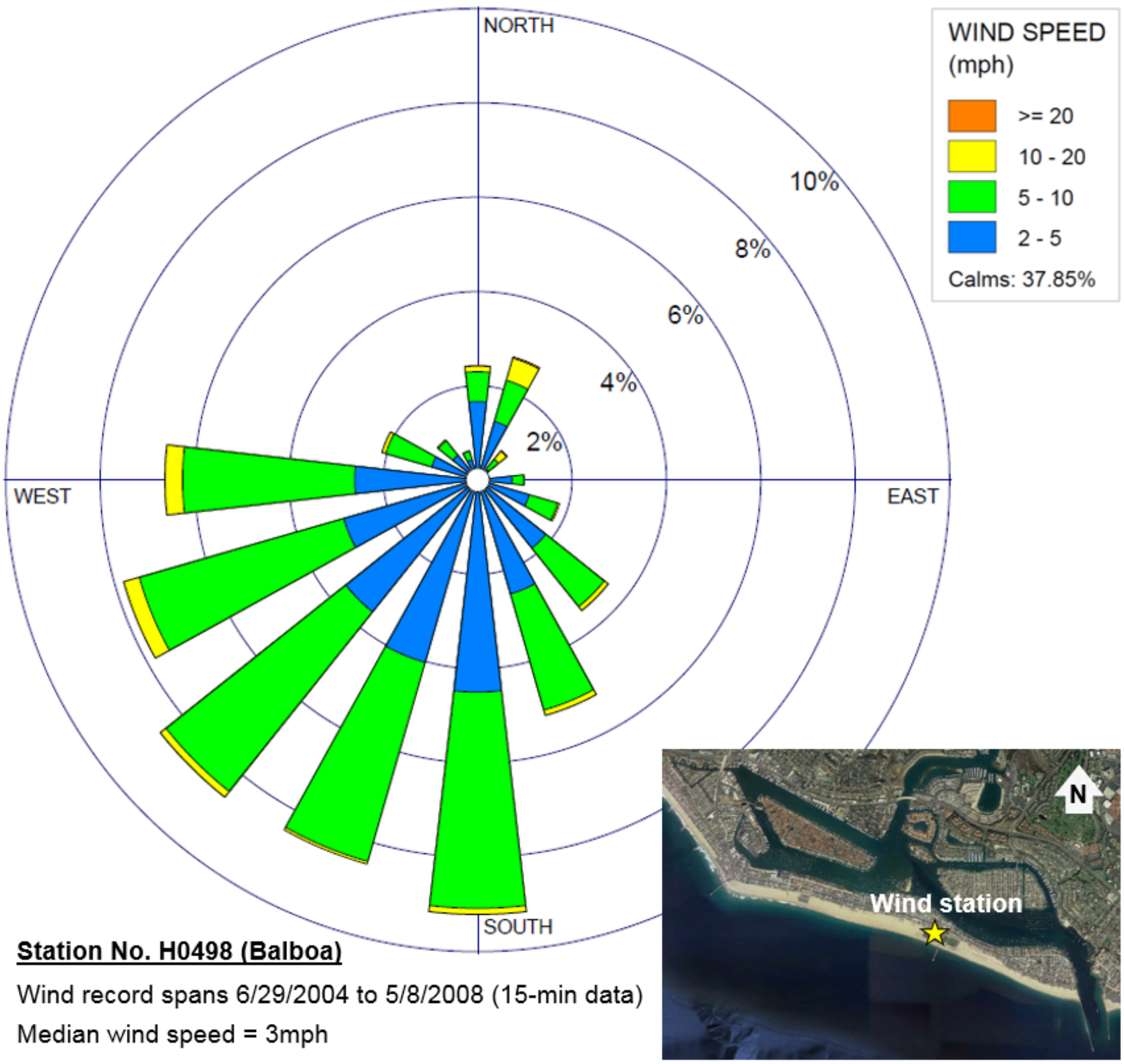


Figure 3. Wind Rose for Balboa Pier Wind Station

Figure 4. Example Wind Fetches at Newport Bay and Harbor

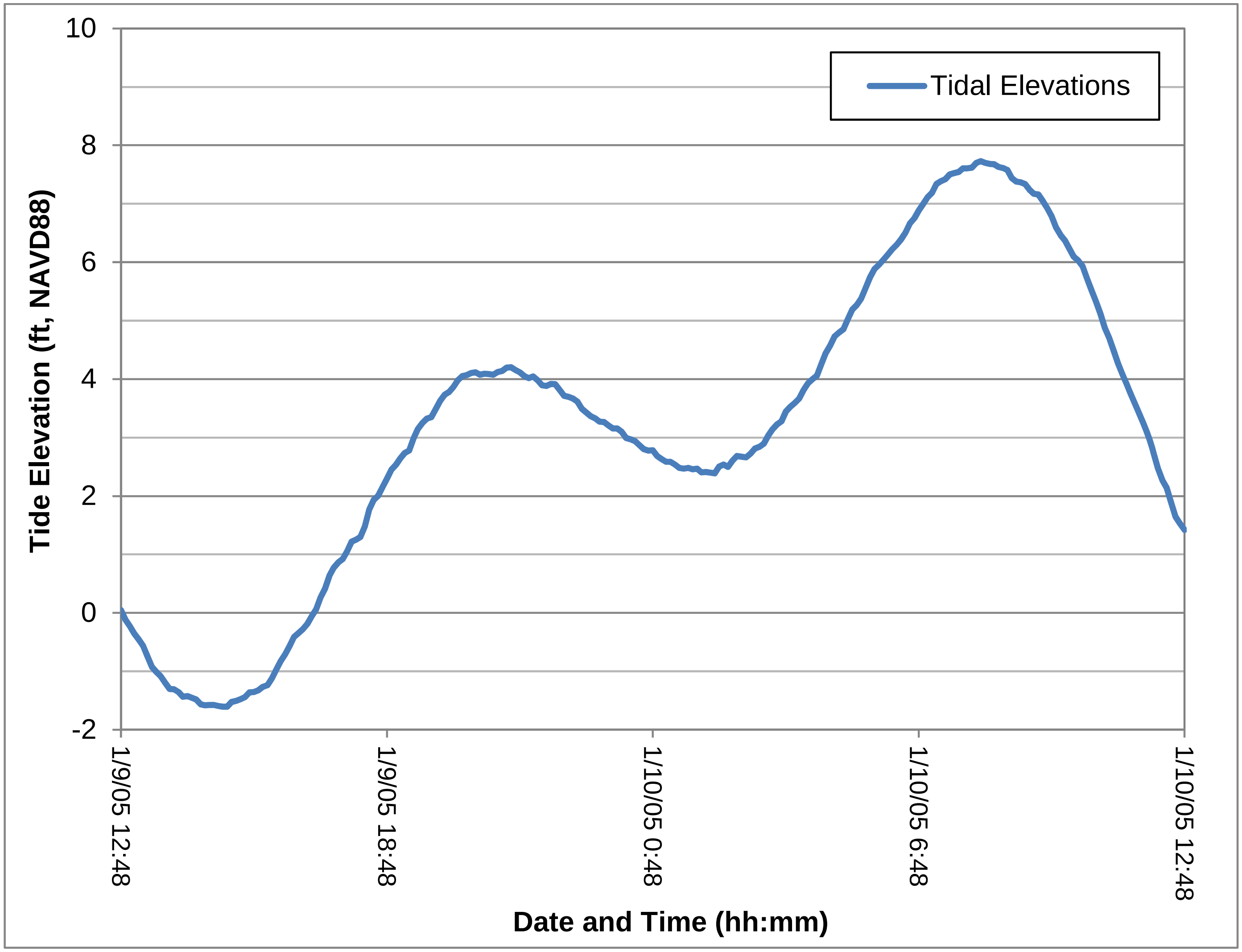
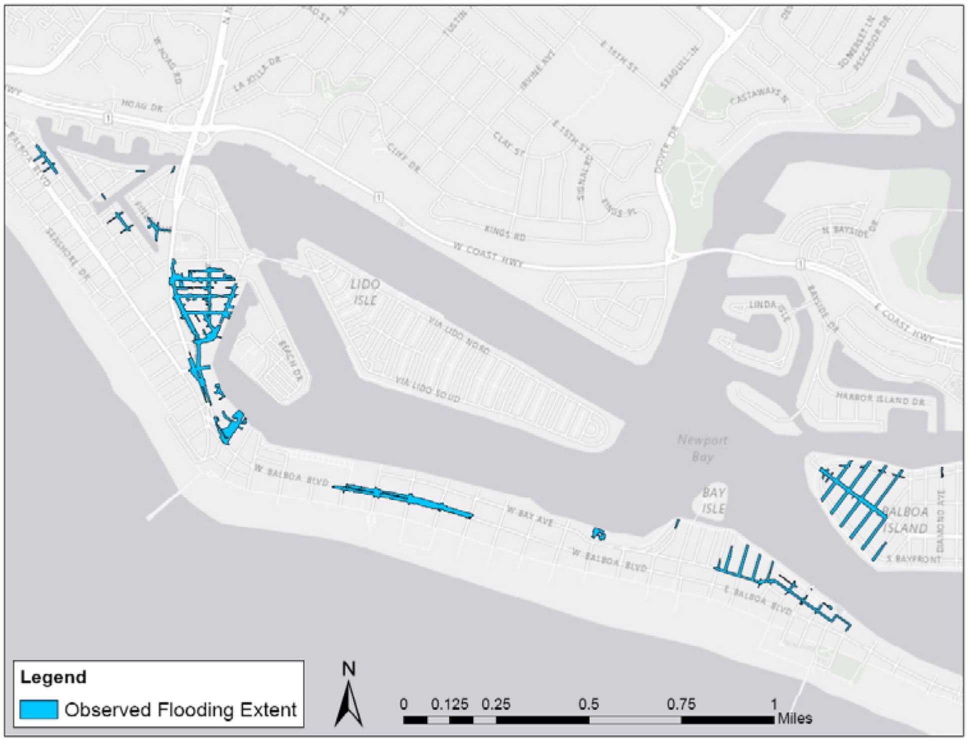


Figure 5. Validation Tide (Actual Data) Applied at the Ocean Boundary of HEC-RAS Model



(a) Observed flooding extent (Gallien et al., 2011)

(b) Predicted flooding extent - HEC-RAS Model Validation results

Figure 6. Comparison of Observed Flooding Extent with HEC-RAS Model Predicted Flooding Extent

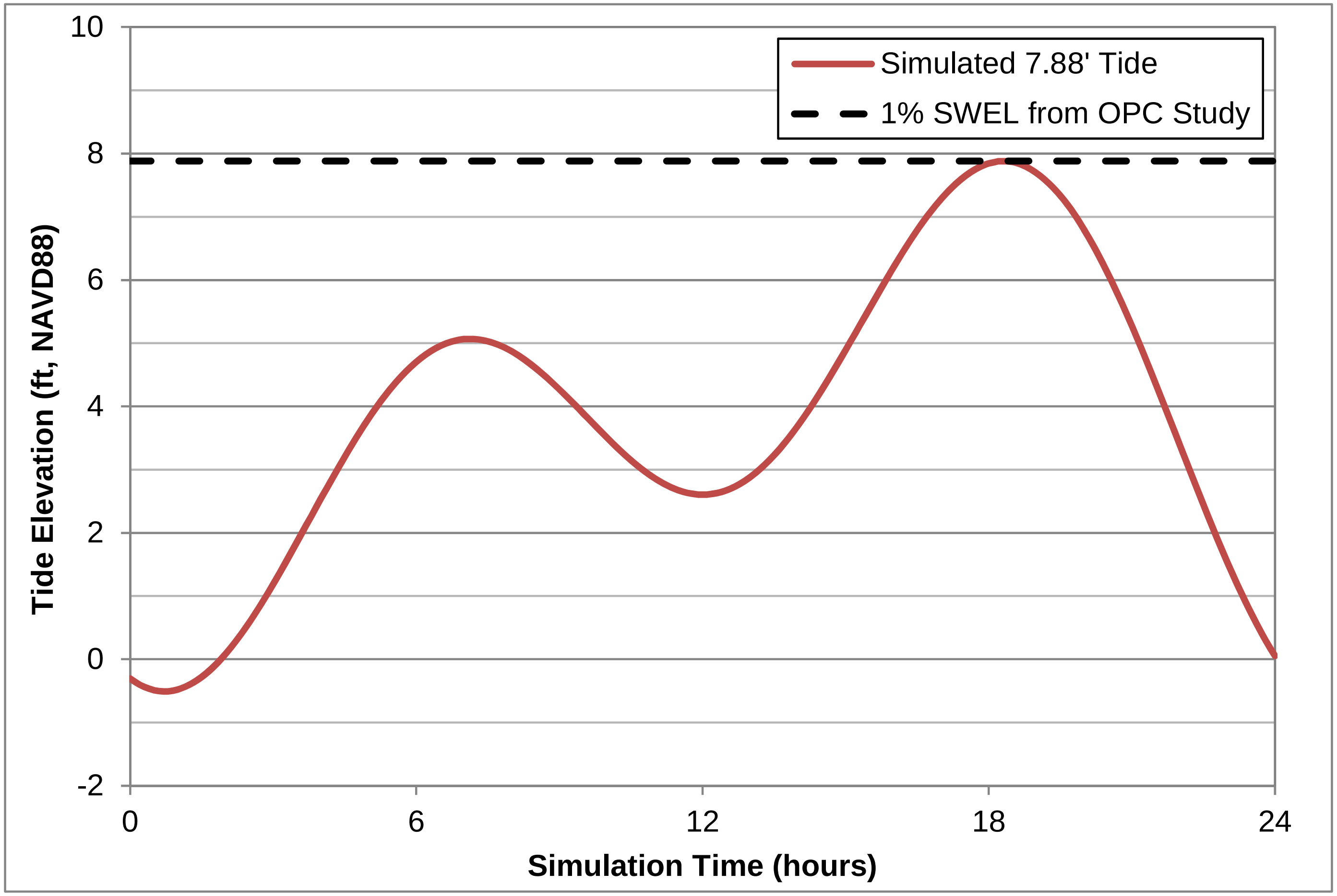


Figure 7. Simulated Tide Applied at the Ocean Boundary of HEC-RAS Model

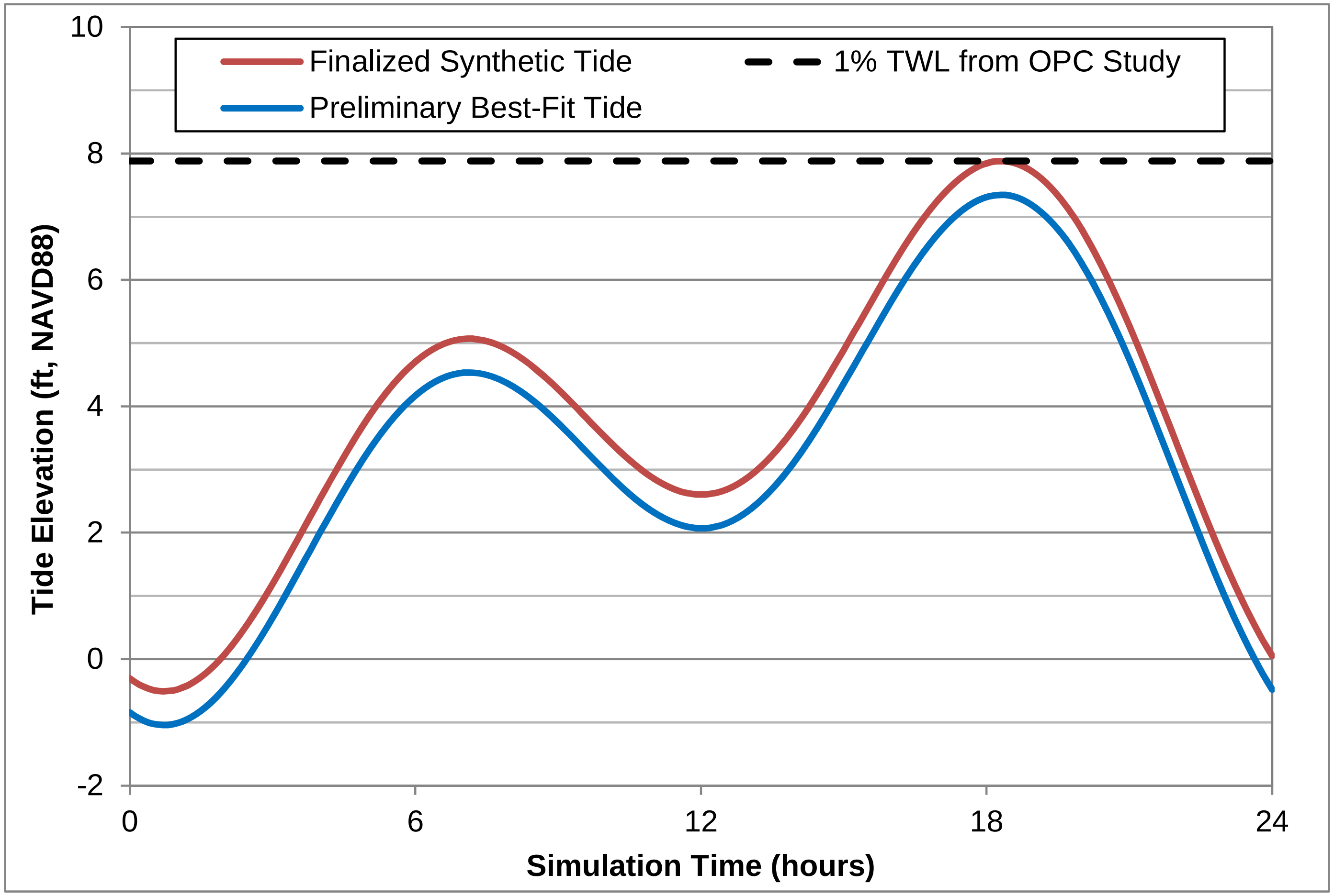


Figure 8. Finalized and Preliminary 24-Hour Synthetic Tide - Based on the Ten Highest Observed Tides near Newport Beach

(a) Preliminary FIRM AE Zone

(b) Proposed revised flood zone

Figure 9. Comparison of Preliminary FIRM AE Zone with the Proposed Revised Flood Zone

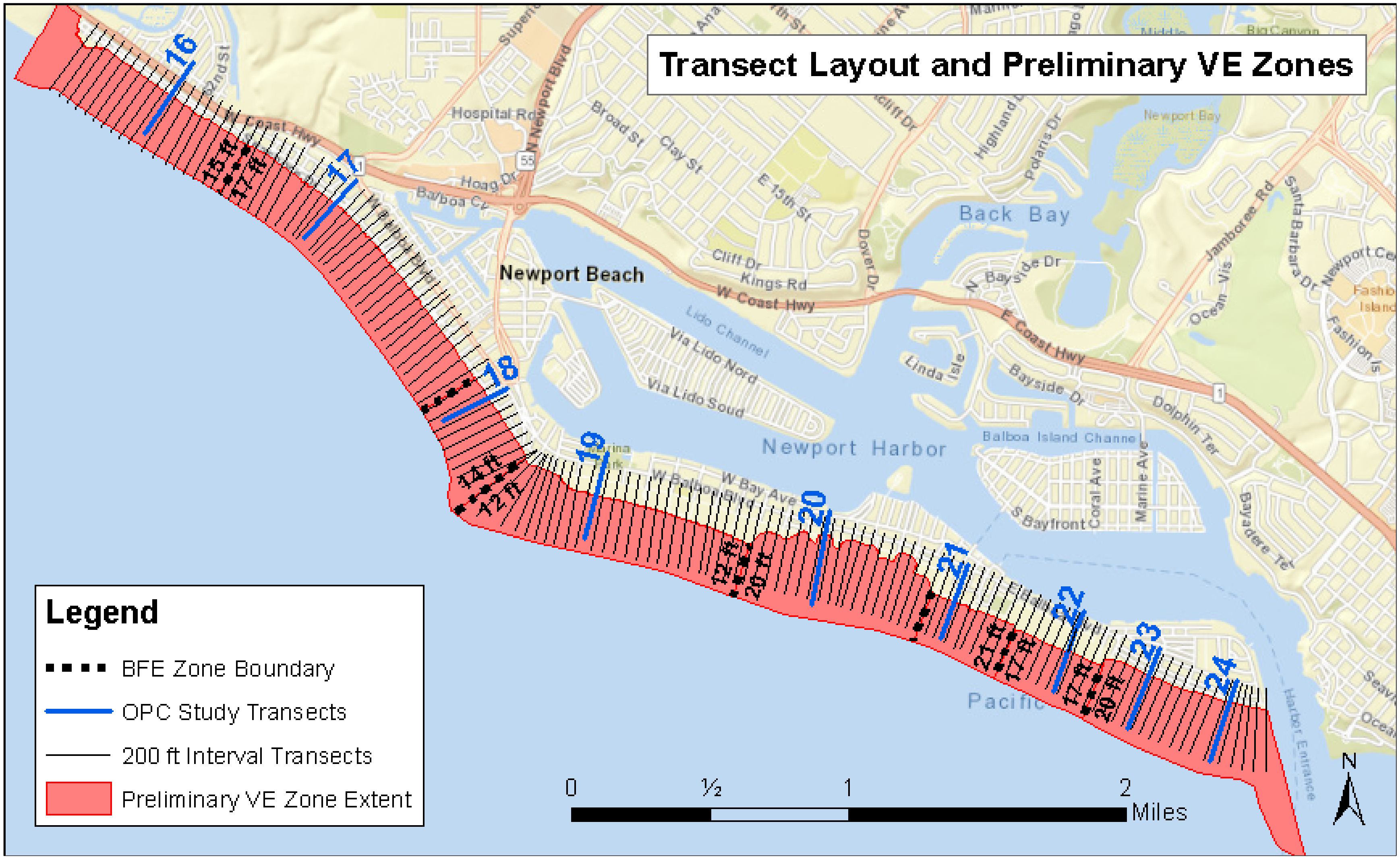


Figure 10. The Newport Beach transects and preliminary VE Zone extent. The blue lines and labels indicate the OPC Study Transects. The black, dashed lines show the BFE zone boundaries, or the transition between different BFEs defined by transects within the shoreline reach. Shoreline reaches are the areas between BFE zone boundaries. The BFEs, in feet NAVD88, are shown within their respective shoreline reaches. The fine, black lines show the 200ft interval transects, which are used to determine the average foreshore slope within each shoreline reach.

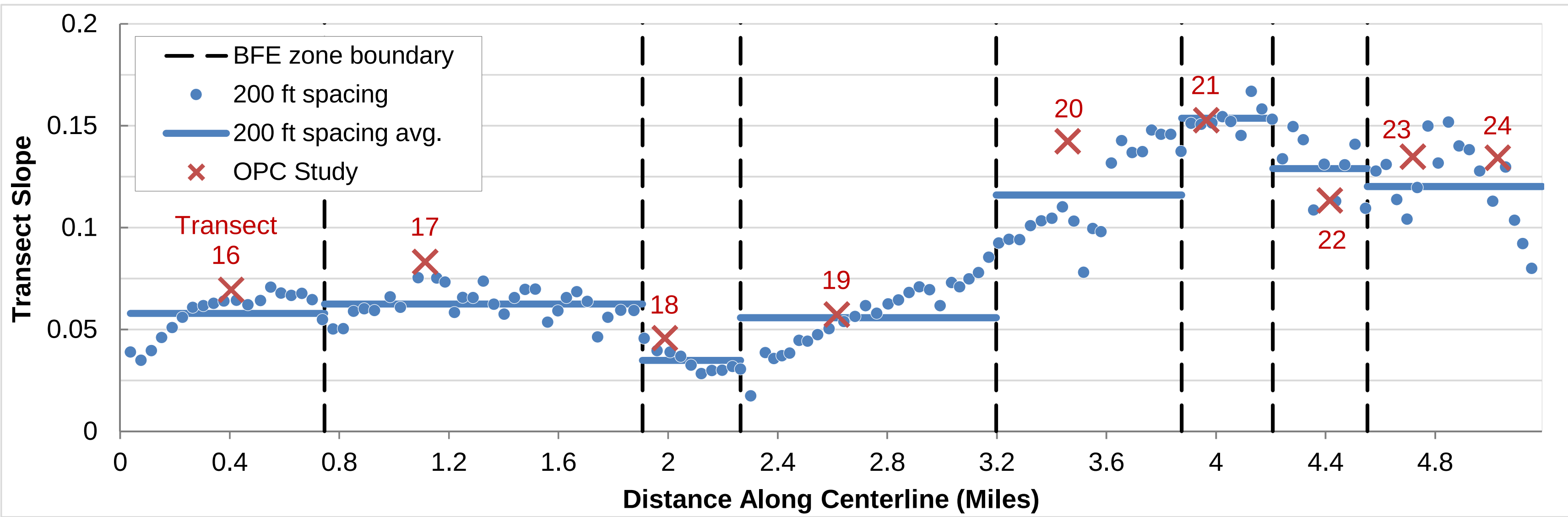


Figure 11. The foreshore slopes of the transects used in the OPC Study compared to the transect slopes calculated at 200 ft increments

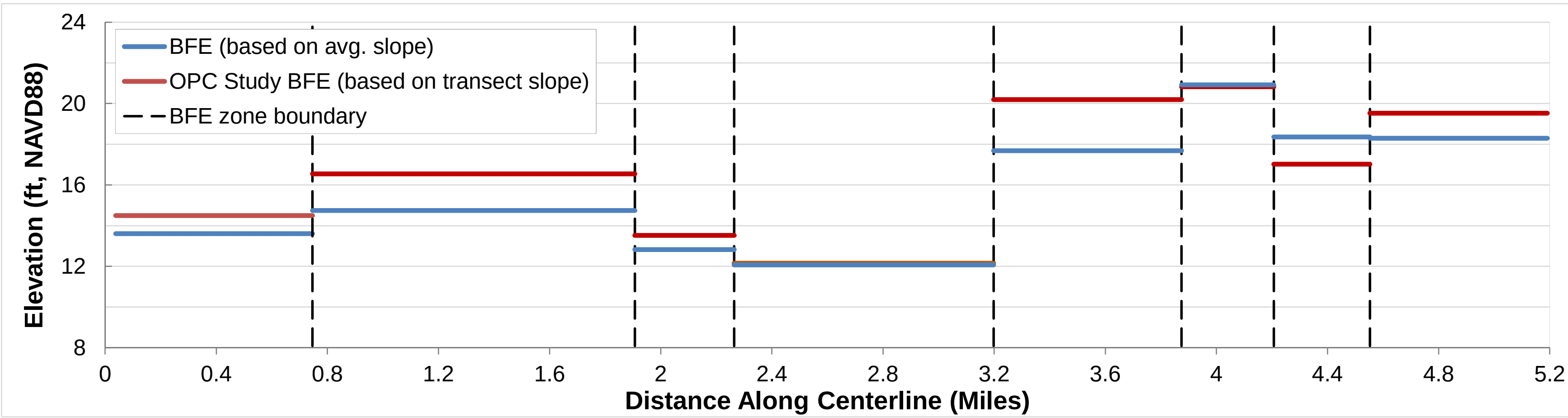
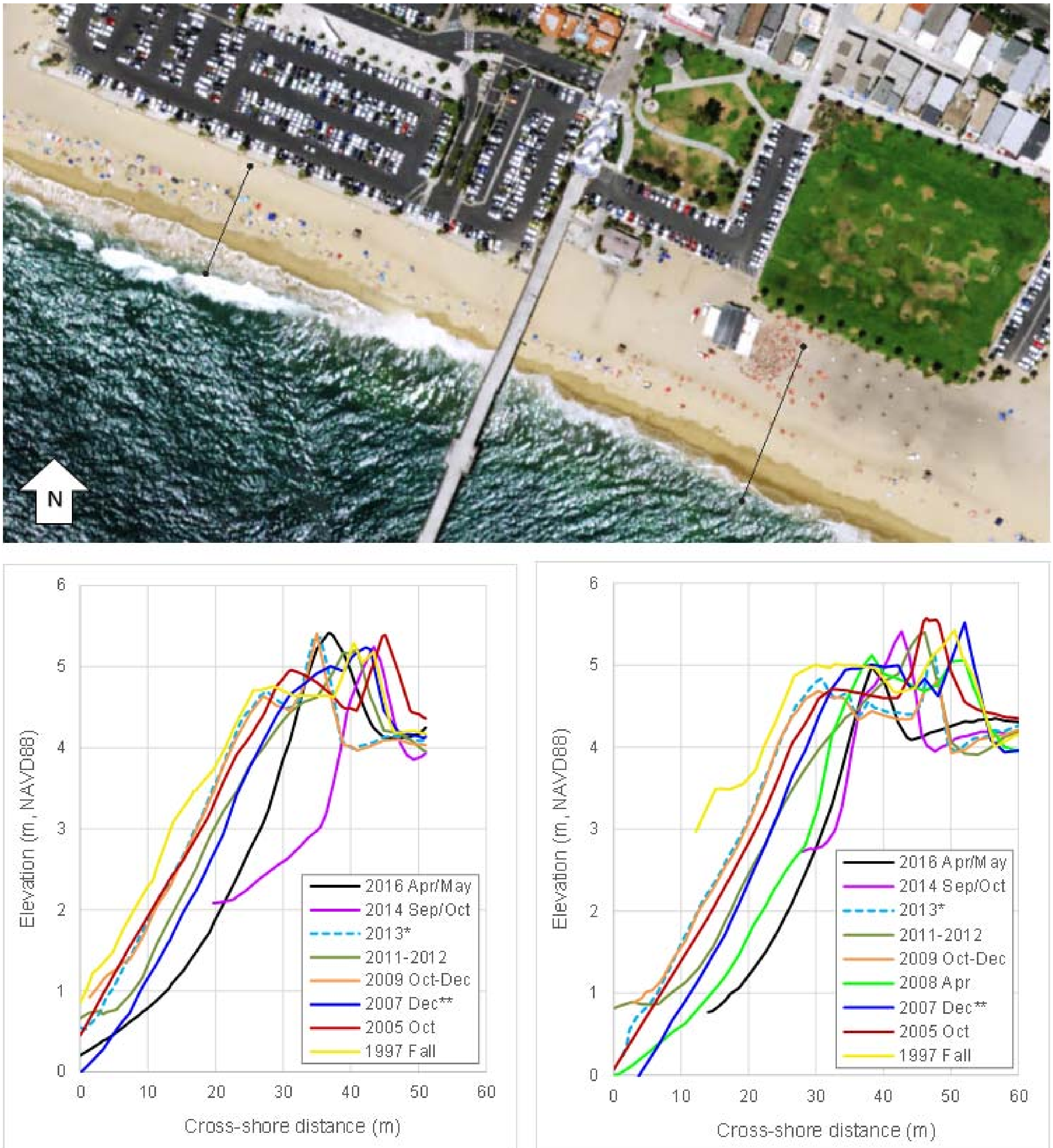


Figure 12. BFE calculated using the average slope within each shoreline reach (*blue* line) compared to the BFE calculated in the OPC study (*red* line)

Figure 13. (a) Aerial photo of beach berms taken on February 2nd, 2016 between 8th and 12th Street. (b) Beach berm constructed on February 18th, 2017 between 42nd and 44th Street. (c) Berms constructed on August 31st, 2011 just south of Balboa Pier.



* Data collected between 2009 Oct and 2011 Aug, but dataset was named for 2013; these berms appear to have the same footprint but higher peaks/more distinct topography compared with those berms in 2009 Oct/Nov dataset

** Data collected Nov 24, 2007, but dataset was named for 2007 Dec

Figure 14. Beach Berms shown in Lidar Data (Cross-shore Transects measured from Ocean towards Land)

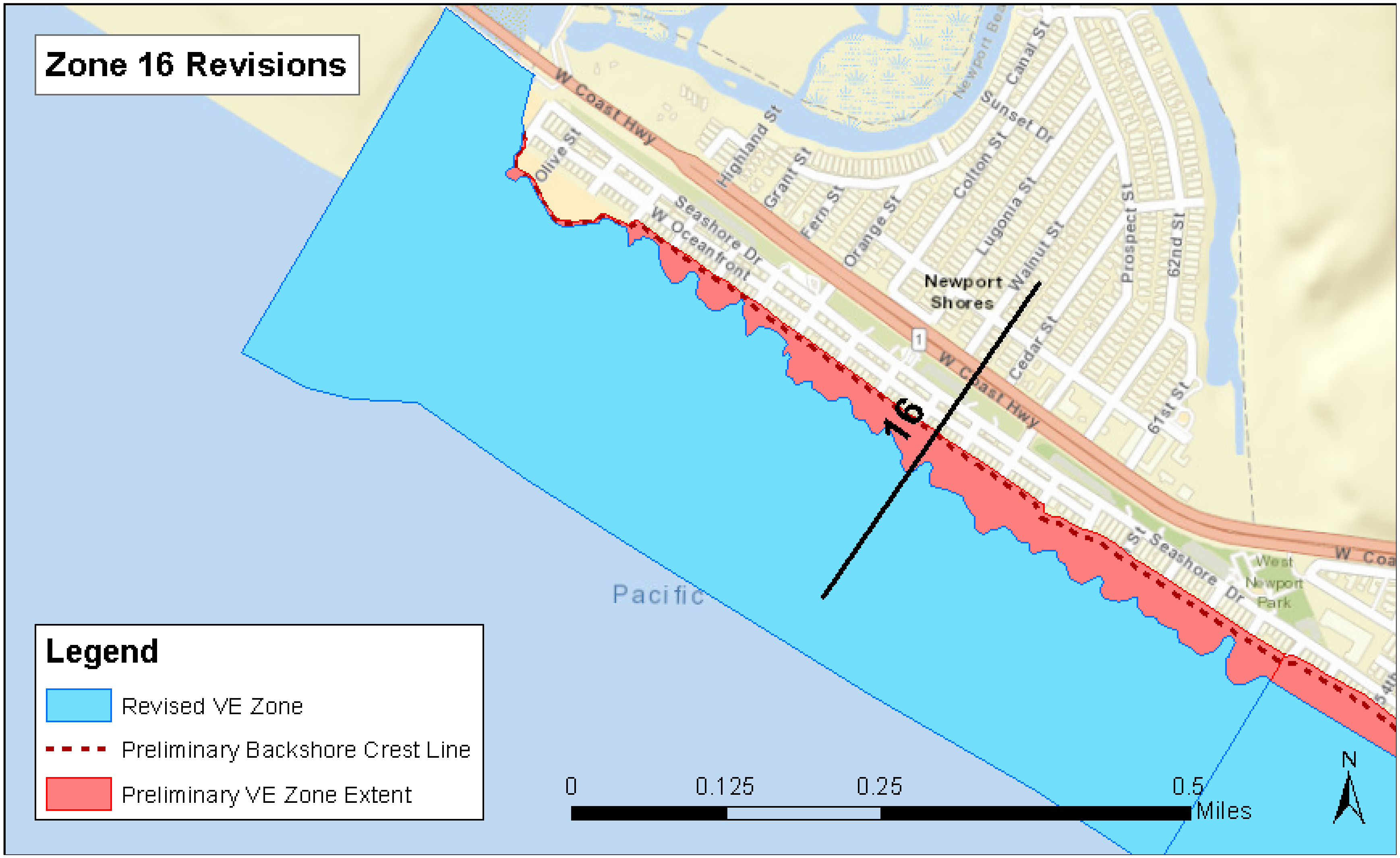


Figure 15. **Proposed Revised VE Zone Extent for Zone 16**

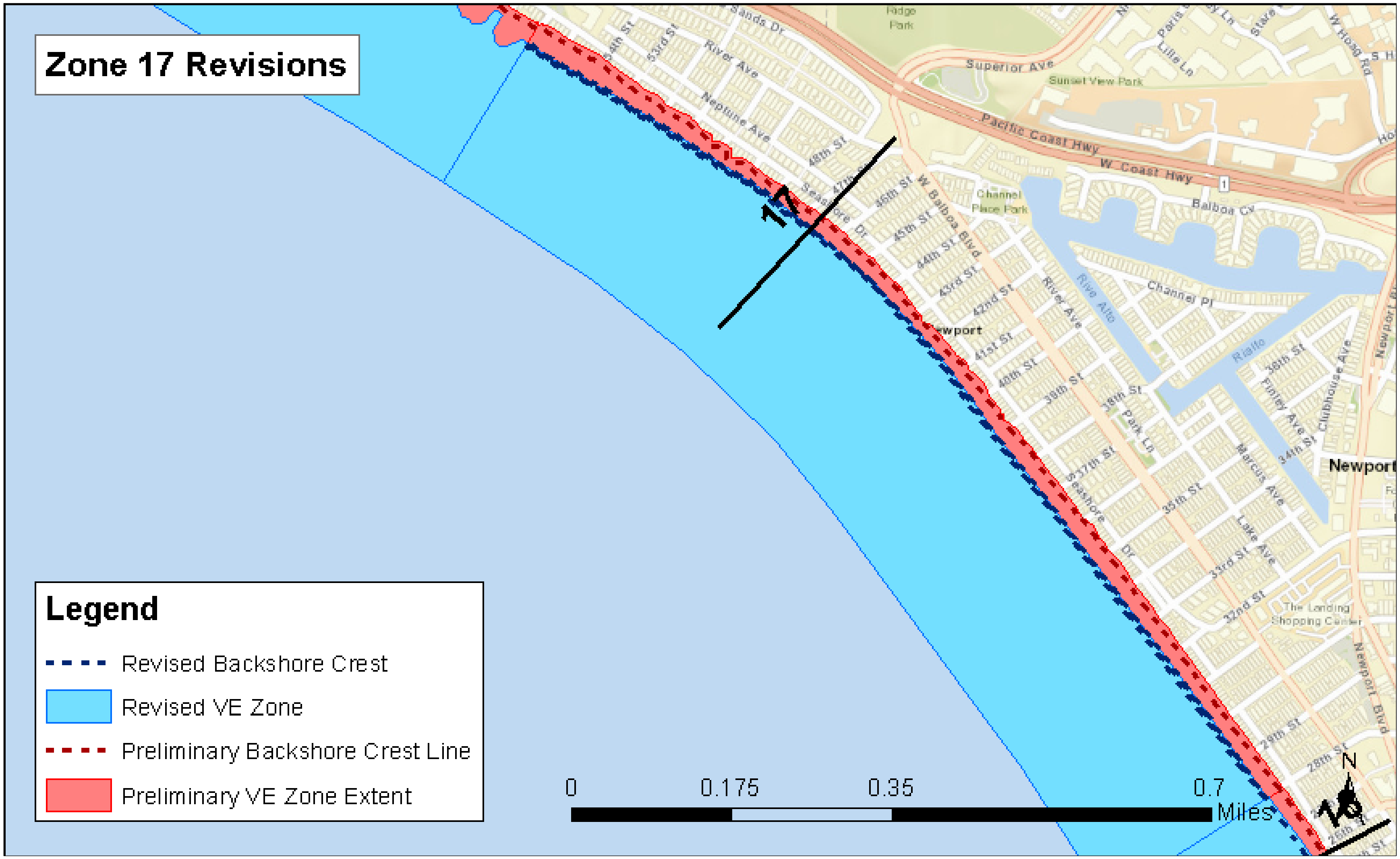


Figure 16. Proposed Revised VE Zone Extent for Zone 17

Figure 17. Proposed Revised VE Zone Extent for Zone 18

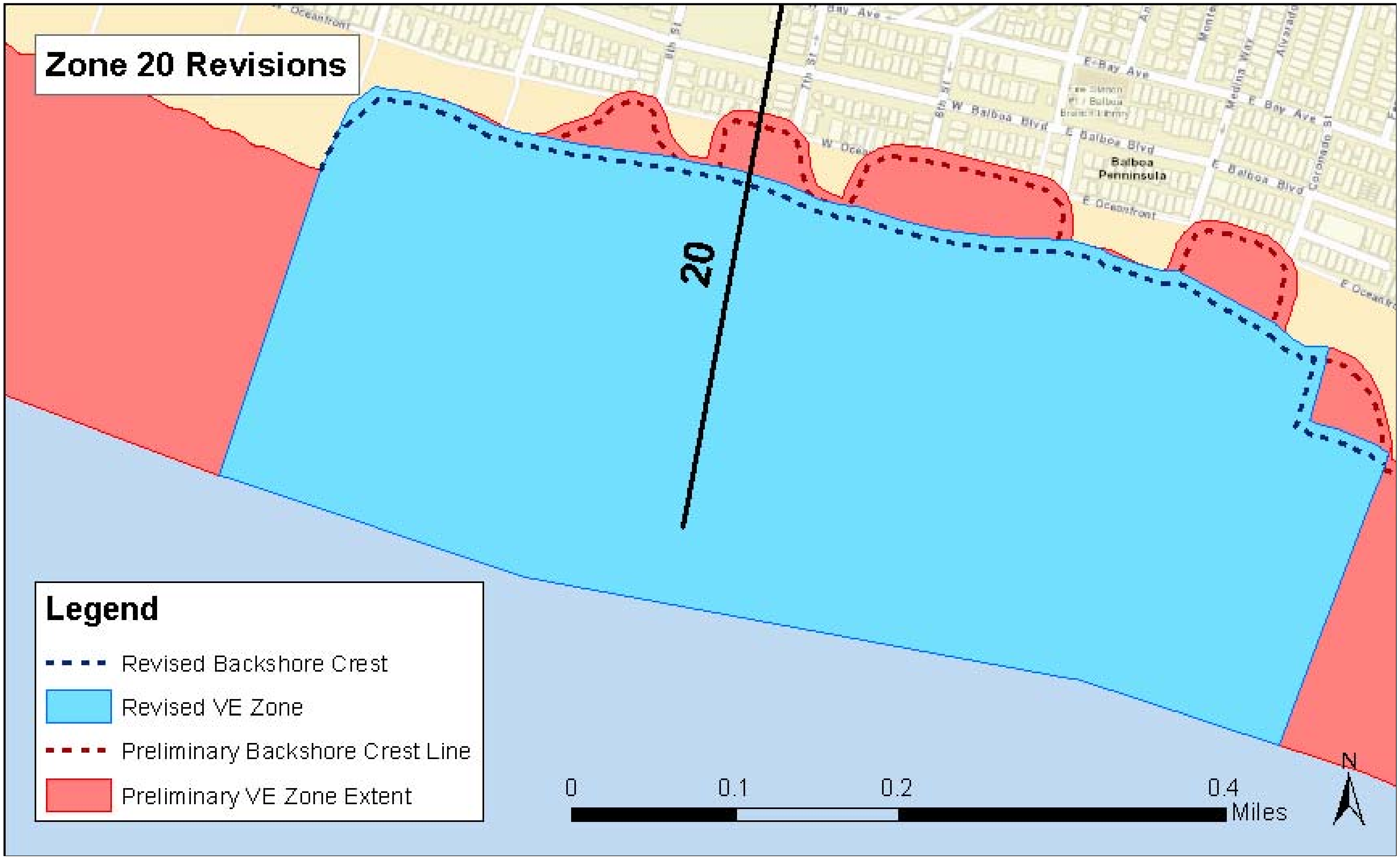


Figure 18. Proposed Revised VE Zone Extent for Zone 20

Figure 19. Proposed Revised VE Zone Extent for Zone 22

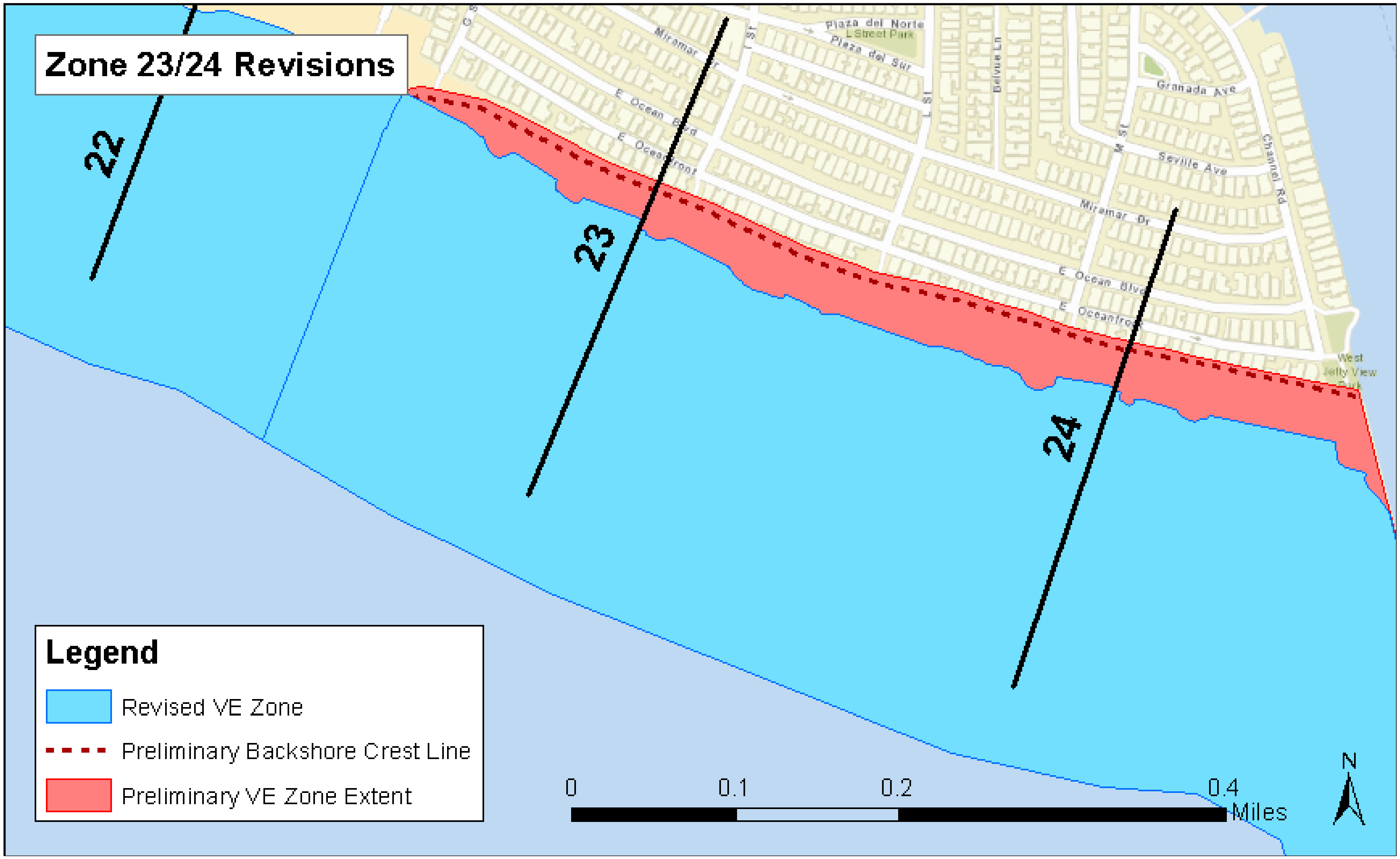


Figure 20. **Proposed Revised VE Zone Extent for Zone 23/24**

DECLARATION OF YING-KEUNG POON IN SUPPORT OF THE CITY OF NEWPORT BEACH'S APPEAL OF THE PROPOSED FLOOD ELEVATION DETERMINATIONS BY THE FEDERAL INSURANCE ADMINISTRATOR OF THE FEDERAL EMERGENCY MANAGEMENT AGENCY

I, Ying-Keung Poon, declare:

1. That I am a competent adult over the age of 18 years old, and I have personal knowledge of the following facts, except for those facts which I declare on information and belief, which I could and would competently testify to if called as a witness. I make this Declaration in support of the City of Newport Beach's ("City") appeal of the proposed flood elevation determinations by the Federal Insurance Administrator of the Federal Emergency Management Agency ("Appeal").

2. I am employed by Everest International Consultants, Inc. as a Vice President/Principal Engineer. I have worked in such capacity for eighteen years. I am a Registered Professional Engineer with the State of California (No. C56011) and have the following credentials: Doctor of Science from the Massachusetts Institute of Technology. In my capacity as Vice President/Principal Engineer for Everest International Consultants, Inc., I certify that I have submitted the following supporting alternate data and measurements to the City that was utilized as part of the Appeal, understand that such data will be submitted as part of the Appeal, and certify the correctness of the following data:

- Survey Data for the Seawall Elevations at the Balboa Islands at the City of Newport Beach

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

Executed on August 29, 2017 at City of Long Beach, California.

By:________________________
Name: Ying-Keung Poon
Title: Vice President/Principal Engineer

Figure 21.