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Feasibility Study Hampton Beach New Pier

Hampton, New Hampshire

Submitted to:

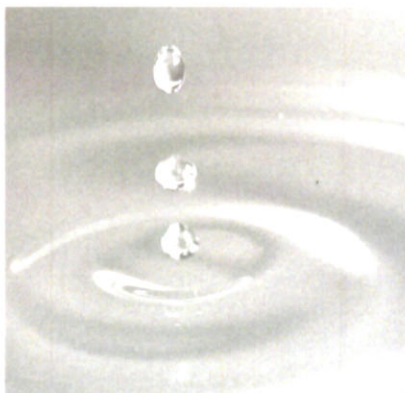
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Executive Summary

The New Hampshire State Legislature has commissioned a Feasibility Study that evaluates various options for a new public pier on Hampton Beach, south of Boars Head in the Town of Hampton, New Hampshire. Currently, there is no pier on Hampton Beach. The New Hampshire Department of Natural and Cultural Resources (DNCR) is administering the project funding and the project is being led by the Hampton Beach Area Commission (HBAC). HBAC has organized a Pier Advisory Committee (PAC) to provide input to GEI Consultants Inc. (GEI) who is undertaking the Feasibility Study.

The primary purpose of the study is to consider the feasibility of constructing a new pier on Hampton Beach for general public, ADA, mobility impaired and elderly access to the water over the beach, and to provide for passive recreational uses (fishing, viewing, etc.)

The proposed locations for the pier considered three primary areas along Hampton Beach.

- Area 1 - The north end of Hampton Beach, from the area just south of Boars Head to the NH Marine Memorial, where Ocean Boulevard (Route 1A) transitions from two-way travel to one-way routes including Ashworth Avenue (southbound) in addition to Ocean Boulevard (northbound).
- Area 2 - The middle of Hampton Beach, from the NH Marine Memorial south to Hampton Beach State Park.
- Area 3- The area of Hampton Beach in front of Hampton Beach State Park to the United State Army Corps of Engineers stone jetty and the Hampton River.

(See Appendix B – 02 – Pier Location Map)

The Feasibility Study was informed by a variety of readily available existing site conditions data, concurrent infrastructure and environmental planning studies, implementation initiatives, input from PAC, and technical assessment by GEI. The project background technical assessment information was used to develop alternative implementation options for a new pier at Hampton Beach. This assessment is described in the Feasibility Study report and includes supporting base mapping, conceptual plans, and implementation cost estimates. Comparison of the alternatives developed include review of advantages and disadvantages of pier types, locations, operations and maintenance needs, regulatory impacts, and concept level implementation costs. The alternatives were presented to the PAC for prioritization of preferred options for consideration moving forward.

In addition to the PAC input regarding a new pier on Hampton Beach, there was input from some of the PAC members questioning the need for a new pier at Hampton Beach. Some members of the PAC also suggested the potential to locate a new pier on Town's Bicentennial Park property at the north end of North Beach. This input from the PAC was received by GEI as part of this Feasibility Study, however, these options were not assessed further as they are outside of the State Legislature's Feasibility Study scope of work.

The Feasibility Study for a new pier on Hampton Beach is an initial step in the planning and implementation process.

Continued implementation of a new pier at Hampton Beach will require further discussion regarding ownership/partnership interests and responsibilities to move the project forward through planning, funding, design development and permitting, construction and long operations / maintenance. This process is anticipated to take several years and involve various levels of participation from the State Legislature, State Agencies (DNCR, State Parks, Port Authority, DOT, DES), the Hampton Beach Area Commission, The Hampton Village District, Rockingham County, the Town of Hampton and other individual / group stakeholder interests.



Fig. 1 – Portion of 01 – Overview Map

1. Project Background

During June of 2022, State Senate Bill 346-FN-A was passed, directing the HBAC to study the feasibility and impact of building a pier south of Boars Head on State Lands at Hampton Beach in the Town of Hampton, NH. This Feasibility Study is an initial planning step that reviews opportunities and constraints associated with constructing a public pier at Hampton Beach, based on high level discussions about the possibilities of providing this public asset.



Views from South and North Ends of the Hampton Beach Study Area

1.1 Pier Advisory Committee

This Feasibility Study was assisted with guidance and input from the Pier Advisory Committee (PAC). The PAC represented a diverse group of local, regional, and state stakeholder interests at Hampton Beach. The following is a list of all PAC members and their respective roles / interests in the project:

Pier Advisory Committee Member	Role / Interest
Bob Preston	PAC Chair / HBAC Chamber of Commerce Representative / Business Owner / Resident
Alex Loiseau	Hampton Beach Village District / HBAC Village District Representative / Hampton Planning Board / Resident
John Nyhan	Hampton Area Chamber of Commerce
Susan Whicher	Mobility Restricted / Resident

Pier Advisory Committee Member	Role / Interest
Gordon Whicher	Resident
Skip Windemiller	Resident / Business Owner / Hotel Owner / Real Estate (Prior Master Plan Committees, Betterment Committees & HBAC)
Bob Ladd	Hampton Beach Village District / Town Budget Committee
Jim O'Loughlin	Resident
Dave Hobbs	Hampton Police Chief
Keith Lassard	Resident / Hampton Planning Board
Ben Moore	Resident / Hampton Historical Society Trustee
Breanna O'Brien	Hampton Conservation Coordinator
Mike McMahon	Hampton Fire Chief
Tobey Reynolds	NH DOT Project Manager - Ocean Boulevard Project
Meggan Hodgson	Vice Chair of NH Fish & Game Commission Representing Rockingham County
Rene Boudreau	Hampton Recreation Director
Joseph Desmarais	Recreational Fisherman / Mobility Impaired
Geno Marconi	NH Port Authority Director
Patrick Murphy	NH State Beach Patrol, Ocean Lifeguards Chief
Meredith Collins	NH State Parks, Seacoast Region Supervisor
Pat Collins	Resident
Steve LaBranche	Hampton Beach Village District / Resident / CHAT Member (Coastal Hazards Adaptation Team)
Richard Roy	Resident / Business Owner

1.2 Project Approach

To assist in the technical assessment of constructing a new pier on Hampton Beach, GEI's project approach included the following:

- Review of Existing Site Information.
- Facilitation of a Kickoff Meeting with the PAC.
- On-site Inspections.
- Data Research and Assembly of Base Mapping Materials.
- Development of Written Design Basis Findings and Recommendations.
- Development of Conceptual New Pier Design Options.
- Development of Planning Level Implementation Cost Estimates.

During the development of the Feasibility Study, GEI's assessment identified and prioritized options for a new pier on Hampton Beach, with support from the PAC that focused on the following six (6) primary design considerations:

- Pier Use (Needs and Capacity).
- Pier Location (Orientation and Alignment).
- Pier Access (Shore, Beach, and Water).
- Pier Type (Materials, Costs, Life Expectancy, and Operations and Maintenance).
- Site Improvements (Grading, Utilities, Restrooms, and Parking).
- Environmental (Regulations, Physical Conditions, and Potential Coastal Risks).

This Feasibility Study is intended to provide technical information to help the project partners identify prioritize goals to move forward with implementation of a new pier on Hampton Beach.

GEI's Feasibility Study approach focused on proposed alternatives that assessed the feasibility of providing new pier access to the coast for the entire community, and for all physical abilities, while taking into account the vulnerability of the existing Hampton Beach coastal landscape and infrastructure.

2. Existing Site Description

Hampton Beach is an approximate 8,000-foot-long public beach in Hampton, New Hampshire located along Ocean Boulevard, between Boars Head and the Hampton River. Hampton Beach is part of the New Hampshire State Parks system and is open to the public year-round, with seasonal recreation opportunities including swimming, fishing, and camping at Hampton Beach State Park on the southern end of the beach. The beach varies in width from 100 to 300 feet during high tide, to over 500 feet during low tide.

Hampton Beach consists of two distinct areas. The southern end of Hampton Beach includes the Hampton Beach State Park Campground with sand dunes in between and the Hampton River with bordering stone jetty. The middle and northern beach includes mixed use commercial and residential development and Ocean Boulevard abutting, a sidewalk, seawall and State operated facilities (Bathing facilities locker rooms, restrooms, park store, first aid, visitor's center information, a playground, parking, shade shelters, the NH Marine Memorial and other site amenities.

Some of the main attractions of Hampton Beach include the Seashell Oceanfront Pavilion, hotels, restaurants, and events such as the Sand Sculpture Event, the Seafood Festival, and many other community activities including: fireworks; summer concerts; events at the nearby Casino Ballroom; and movie nights on the beach.

Hampton Beach is accessed from the State Park campground area by at-grade sand paths through the sand dunes. The rest of the Hampton Beach is accessed from twenty-five (25) points between Ocean Boulevard, beach side parking, sidewalks, a seawall and the beach. These access points are mostly concrete staircases, with five (5) locations having ADA accessible ramp access to the beach.

In recent years, improvements have been made to the State's Hampton Beach facilities. In 2009, \$14.5 million was allocated to the redevelopment of the Hampton Beach State Park. Two new bathhouses and a new Seashell building complex were completed in 2012. The Seashell building complex includes public bathhouse facilities (both within the Seashell building and in a standalone building adjacent), shade shelters, ADA access to the beach, a performance pavilion, state park staff offices and conference space, and lifeguard equipment storage and staff operations space, and third floor observation of the entire beach,

The beach receives routine maintenance including grading the beach after the winter storms to prepare for the summer beach season. The grading reduces depressions in the sand from storms, reduces rip currents, removes artificial dunes, and levels the beach to restore ADA access from when the sand piles up on the ramps.

Life safety operations are provided by both the State Park lifeguards and the Town Police and Fire Departments.

The Town's emergency services operate a Polaris 6x6 all-terrain vehicle (ATV) and a Ford 550 Ambulance with an approximate load 6 to 7 tons. Ambulance access to the pier would be helpful, but the Town can perform rescues utilizing the smaller ATV if needed. The ATV is more likely to traverse the beach and has an approximate height of 7 feet. The Ambulance has an approximate height of 10 feet.

The State has four (4) beach rescue ATVs and two Sea-Doo jet skis. The beach rescue ATVs include:

- Two (2) Honda Rubicon TRX 500
- One (1) Honda Pioneer 1000
- One (1) Polaris Ranger Crew 1000

These ATVs with roof racks and loaded surfboards, have a maximum height of approximately 10 feet. The State would like to add a truck with equipment and lights and estimate that it would need 10 to 12 feet of vertical clearance.

A tractor with beach rake is also used by the State for routine beach grading maintenance.

A stone groin and rock outcrops are present at the north end of the beach, which gradually disappears as Ocean Boulevard curves eastward towards Boars Head and becomes a rocky shore.

In addition to intensive human use during the summer (upwards of 100,000 people on a given day), Piping Plovers, and Gray and Harbor Seals are present, mostly commonly found at the north and south ends of the beach.



Pier Location Area 1 (North End) Looking at East at Boars Head



Pier Location Area 1 (North End) Looking South



Pier Location Area 2 (Middle) Looking South



Pier Location Area 2 (Middle) Looking North Seashell



Pier Location Area 2 (Middle) Looking South From Seashell



Pier Location Area 2 (Middle) Looking North from State Park



Pier Location Area 3 (State Park) Looking South



Pier Location Area 3 (State Park) Looking North



Pier Location Area 3 (State Park) Looking East at Jetty Along Hampton River

2.1 Soil Properties

The existing soil strata at Hampton Beach which can be found along the beach consists of three main areas. The majority of the soil is classified as “Urban Land – Hoosic complex, 3 to 15 percent slopes.” The area in the middle of the beach around the Seashell building is classified as “Urban Land”. The area near the state park is classified as “Udorthents, smoothed.” The northern portion of the beach, intertidal zone and seabed, as well as the shoreline around Boars Head has large areas of shallow bedrock, large stone cobbles and ledge outcrops, as observed by GEI. The varying location of bedrock will impact the depth that piles can be driven and the potential need for rock sockets/anchors.

After additional planning and preferred pier location, type and geometry are selected to move forward with detailed design, it is recommended that a subsurface geotechnical investigation program be performed to document the existing local subsurface geotechnical conditions. The investigation will be necessary to identify depth to rock in which will influence design of the pier piles, as well as aid in making more refined design decisions on the pier placement and alignment at the preferred location.

(See Appendix B – Figure 8 – Soils and Surficial Geology Map)



Fig. 2 – Portion of 02 - Soils and Surficial Geology Map



Stone Groin and Ledge Outcrops at North End of Beach

2.2 Land Use Development / Town Zoning and Ordinances

The Hampton beach area is comprised of a mix of residential, commercial and governmental development. The State of New Hampshire owns and operates the State Park and Hampton Beach (including the seawall). NH DOT is responsible for Ocean Boulevard and Ashworth Avenue (Route 1A), Highland Avenue and Church Street (Route 101), as well as the Hampton River Bridge. The middle of the area long Hampton Beach is predominantly commercial / retail, with the surrounding areas comprised of a mix of single-family residences, condominiums, rental units and hotels.

(See Appendix B – Figure 7 – Land Use Map)



Examples of Existing Development Adjacent to Hampton Beach

The Town has a police station and municipal parking. The majority of the beach is located in the Town of Hampton zone BS, Business Seasonal. A small portion of the beach area from Haverhill Ave to Epping Ave is located in RB, Residence B. Lastly, the state campground is located in zone G, General. Construction of the pier within these zones would comply with town zoning and ordinances.

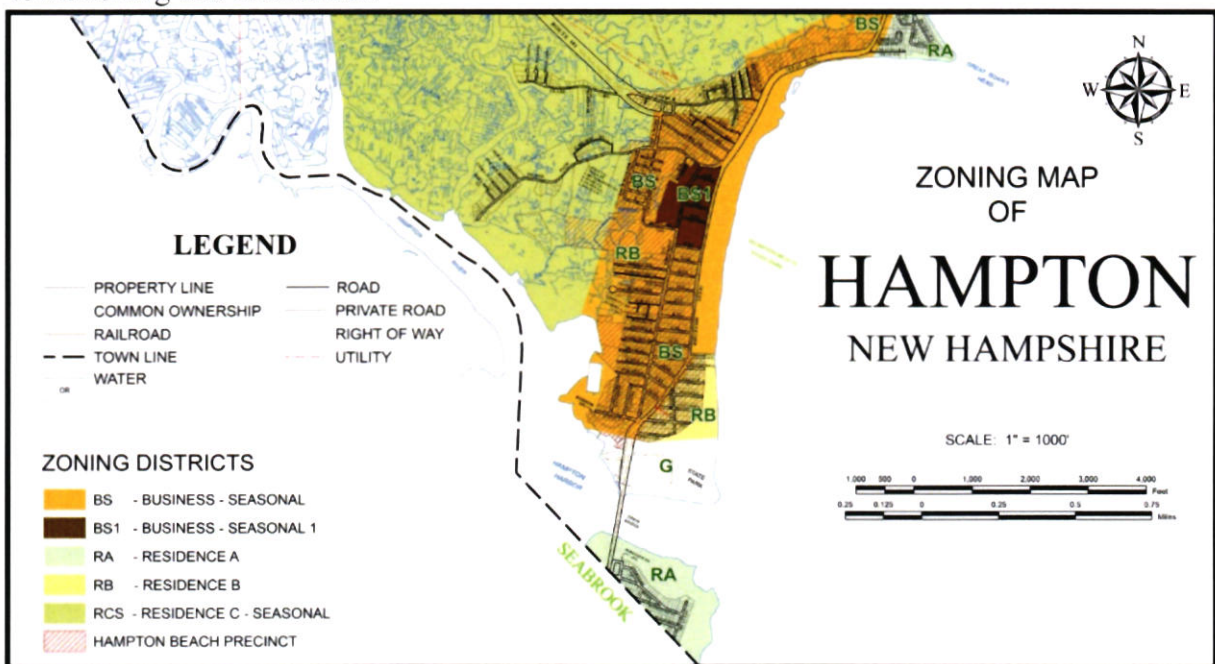


Fig. 3 – Portion of Town of Hampton Zoning Map

2.3 Site Surveys

The Feasibility Study was informed by the following sources of site survey information:

- Visual site inspection was performed by GEI during August 2022.
- Drone aerial survey was performed by GEI during September of 2022.
- 2018 topographic and bathymetric data was obtained from U.S. Army Corps of Engineers, National Oceanic and Atmospheric Administration and U.S. Geological Survey's Interagency Working Group-Ocean and Coastal Mapping efforts.
- Additional project area redevelopment plans were reviewed by GEI including:
 - NH DOT Ocean Boulevard
 - DNCR Hampton Beach Redevelopment Project

(See Appendix B – Figure 5 – Topography/Bathymetry Map)

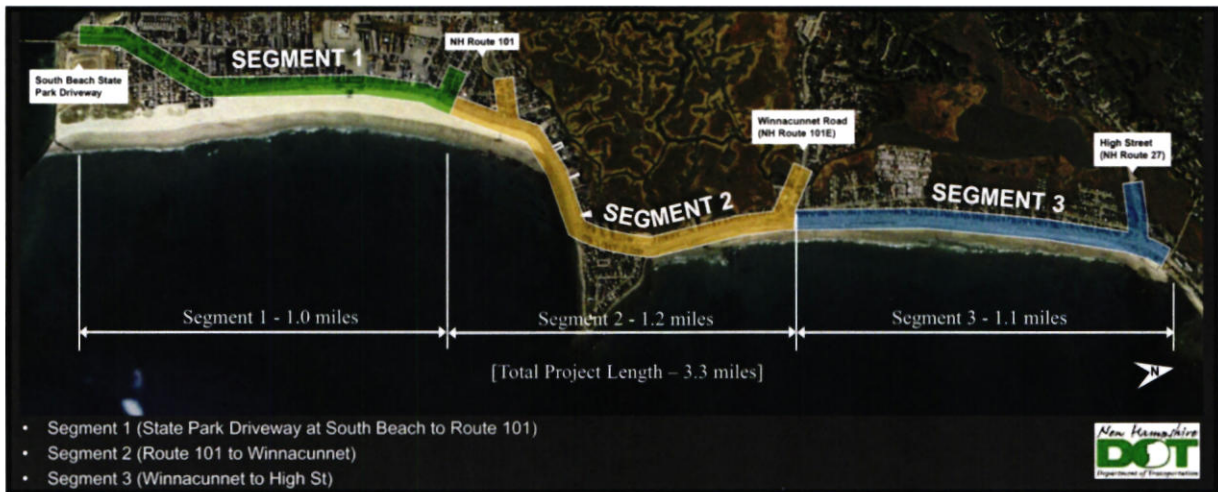


Fig. 4 – Portion of NH DOT Ocean Boulevard Concept Plan Dated May, 2022



GEI Site Visit with PAC and GEI Drone Survey

3. Wind and Wave Analysis

GEI performed a comprehensive wind and wave analysis for the proposed Hampton Beach Pier to estimate wave climate at the site. Nearshore significant wave heights were estimated by developing a Steady-State Spectral Wave (STWAVE) model for Hampton Beach to transform offshore wind and wave conditions to nearshore values. STWAVE is a model developed by the U.S. Army Corps of Engineers (USACE) to simulate depth-induced wave refraction and shoaling, diffraction, and wind-wave growth (USACE, 2011). The model development, boundary conditions, and results are discussed in the following subsection.

3.1 Water Levels and Currents

Water elevations for the site were obtained from NOAA Tidal Benchmark Station ID #8423898 in Fort Point, NH which is the closest active tidal station to Hampton Beach. The tidal datums are shown in **Error! Reference source not found.** and are relative to NAVD88 (ft) datum.

Table 1. Tidal Datums

Tidal Datum	Abbrev.	1983-2001 Tidal Epoch
		NAVD88 (ft)
Sea Level Rise (2120)	SLR 2120	23.90
Sea Level Rise (2070)	SLR 2070	21.50
Base Flood Elevation	BFE	18.00
Highest Observed Tide	HOT	7.38
Highest Astronomical Tide*	HAT*	6.53*
Mean Higher-High Water	MHHW	4.39
Mean High Water	MHW	3.97
North American Vertical Datum of 1988	NAVD88	0.00
Mean Sea Level	MSL	-0.31
Mean Low Water	MLW	-4.66
Mean Lower-Low Water	MLLW	-5.00

*Proposed for 5/19/2034. The present HAT values are based on the time period of 2000-2040

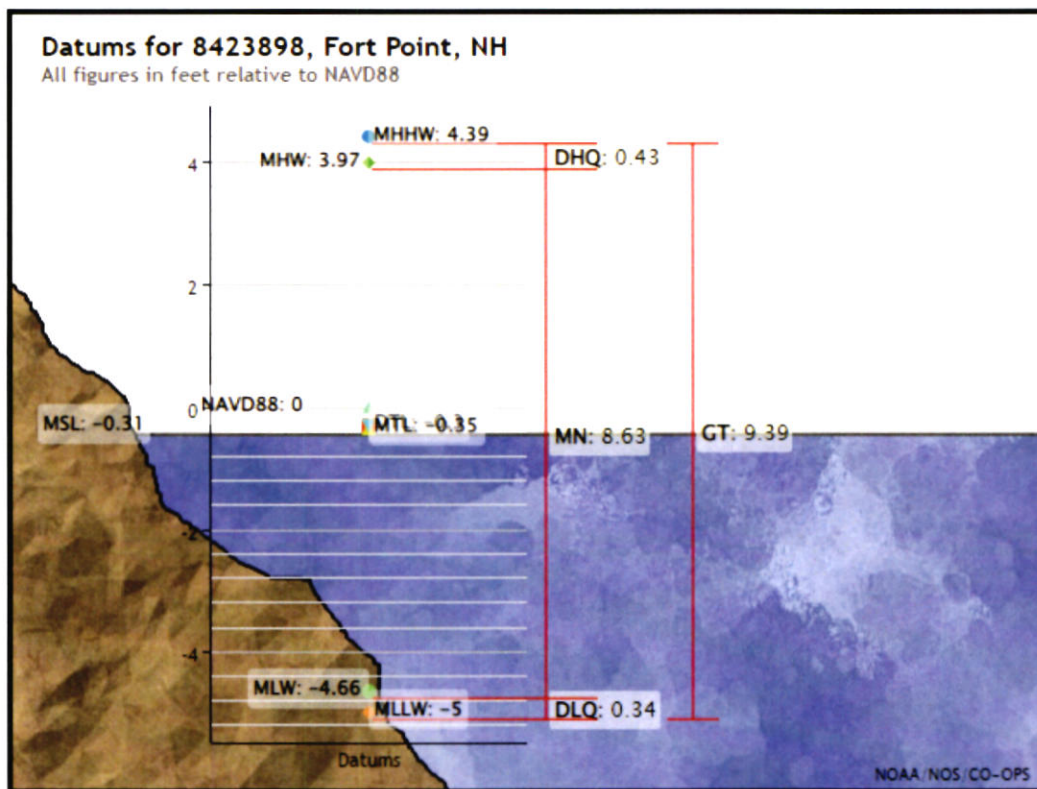


Fig. 5 – Tidal Datums Diagram from NOAA

No current station data was available at Hampton Beach State Park. Discussions with life safety personnel indicate that moderate rip currents can occur parallel to the shoreline. Due to this condition swimmers are requested to only swim chest deep.

The 1% annual chance (“100-yr”) stillwater level (SWEL), or the flood level not including the effects of waves, near Hampton Beach was taken from the Federal Emergency Management Agency (FEMA) Flood Insurance Study (FIS) for Rockingham County, New Hampshire (FEMA, 2021). The 100-yr SWEL was listed as 8.36 ft near the site.

Sea level rise estimates were taken from “Step 4” of the “NH Coastal Flood Risk Summary Part II: Guidance”. Estimated SWEL values for future timeframes given predicted sea level rise amounts are provided in Table 2 below.

Table 2. Stillwater Levels Adjusted for Sea Level Rise

Year	Present Day “100-yr” SWEL (ft)	RCP 4.5 RSLR (ft)	Future “100-yr” SWEL (ft)
2050	8.36	1.6	10.0
2070	8.36	2.5	10.9

Year	Present Day "100-yr" SWEL (ft)	RCP 4.5 RSLR (ft)	Future "100-yr" SWEL (ft)
2100	8.36	3.8	12.2
2120	8.36	4.9	13.3

Notes: RSLR: Relative Sea Level Rise
 RCP 4.5 taken from the New Hampshire Coastal Flood Risk Summary

3.1.1 Design Elevations

The proposed pier is located within AE and VE flood hazard zones on FEMA Flood Insurance Rate Maps (FIRM). (See Section 7 – Climate Change, Resiliency and Risk)

The equations used to calculate the relative sea level rise adjusted design flood elevation were taken from "Step 4" of the "NH Coastal Flood Risk Summary Part II: Guidance" (source). Shown below in Table , as part of "Step 2" of the guidance, the proposed pier would fall into a level 2 ASCE flood design class. This conclusion came from the structural characteristics having moderate sensitivity to inundation as well as the structural materials being designed to be flooded.

Table 3 on the following page shows the predicted design flood elevation adjusted with relative sea level rise in VE Zone (18) from FEMA Flood Insurance Rate Map for the worst-case scenario flood level along Hampton Beach. By 2070, the adjusted design flood elevation is approximately 21.5 feet and by 2120, the adjusted design flood elevation is approximately 23.9 feet (NAVD88).

Table 3. Relative Sea Level Rise Predictions in VE Zone (18) in NAVD88

VE Zone (18)				
Year	RCP 4.5 RSLR (ft)	BFE from FIRMette (ft)	Required Freeboard (ft)	RSLR adjusted DFE (ft)
2050	1.6	18	1	20.6
2070	2.5	18	1	21.5
2100	3.8	18	1	22.8
2120	4.9	18	1	23.9

RSLR: Relative Sea Level Rise
 RCP 4.5 can be found in the New Hampshire Coastal Flood Risk Summary (2020)
 BFE: Base Flood Elevation
 DFE: Design Flood Elevation

Table 4. Framework for Determining Project Tolerance for Flood Risk from the New Hampshire Coastal Flood Risk Summary (2020)

STEP 2 TABLE. FRAMEWORK FOR DETERMINING PROJECT TOLERANCE FOR FLOOD RISK.				
	HIGH TOLERANCE FOR FLOOD RISK	MEDIUM TOLERANCE FOR FLOOD RISK	LOW TOLERANCE FOR FLOOD RISK	VERY LOW TOLERANCE FOR FLOOD RISK
DESCRIPTION	Decision makers have a High tolerance for flood risk to the project	Decision makers have a Medium tolerance for flood risk to the project	Decision makers have a Low tolerance for flood risk to the project	Decision makers have a Very Low tolerance for flood risk to the project
POSSIBLE PROJECT CHARACTERISTICS <i>Tolerance for flood risk will depend on the mix and importance of these project characteristics.</i>	Low value or cost	Medium value or cost	High value or cost	Very high value or cost
	Easy or likely to adapt	Moderately easy or somewhat likely to adapt	Difficult or unlikely to adapt	Very difficult or very unlikely to adapt
	Little to no implications for public function and/or safety	Moderate implications for public function and/or safety	Substantial implications for public function and/or safety	Critical implications for public function and/or safety
	Low sensitivity to inundation	Moderate sensitivity to inundation	High sensitivity to inundation	Very high sensitivity to inundation
PROJECT EXAMPLES	PLANNING	Updating a local master plan Developing a capital improvement plan		
	REGULATORY	Updating a floodplain zoning ordinance Updating a subdivision site plan regulation Updating state alteration of terrain rules		
	SITE-SPECIFIC	Designing a walking path; Siting a temporary or accessory structure; Upgrading a minor storage facility	Replacing a local culvert; Constructing a residential, commercial, or industrial building	Maintaining a school; Siting a community center or recreational facility; Upgrading a wastewater treatment plant
CORRESPONDING ASCE 24-14^{14,15} FLOOD DESIGN CLASS	1	2	3	4
RECOMMENDED COASTAL FLOOD RISK PROJECTIONS	Lower magnitude, Higher probability	←————→		Higher magnitude, Lower probability

3.2 Wind Conditions

The wind climate data was based on the closest regional weather station located at PEASE Air Force Base in Newington, New Hampshire. The data was processed using cli-MATE, a software provided by the Midwestern Regional Climate Center (MRCC) and data from the Climate Data Access Portal (Cli-DAP) and is maintained by the NOAA Regional Climate Centers (RCCs). Data was also used from the Northeast Regional Climate Center using data from the Applied Climate Information System (ACIS). The Portsmouth/Pease AFB station has the closest and longest duration wind data to Hampton Beach, dating back to 1956.

A 16-point wind rose was created to summarize the direction that has the most significant wind speeds and percentage of occurrence for wind speed and directions. The data output is shown in “percentage” of observations. They are shown in MPH and are mean wind speeds based on hourly data. Winds come primarily from the west and west-northwest directions with an average speed of 10.4 MPH in the west-northwest direction and 9 MPH in the west direction. Wind direction is typically offshore however varies seasonally. During the winter months wind direction is from the northwest while the winds shift to a south-southwest direction during the summer months.

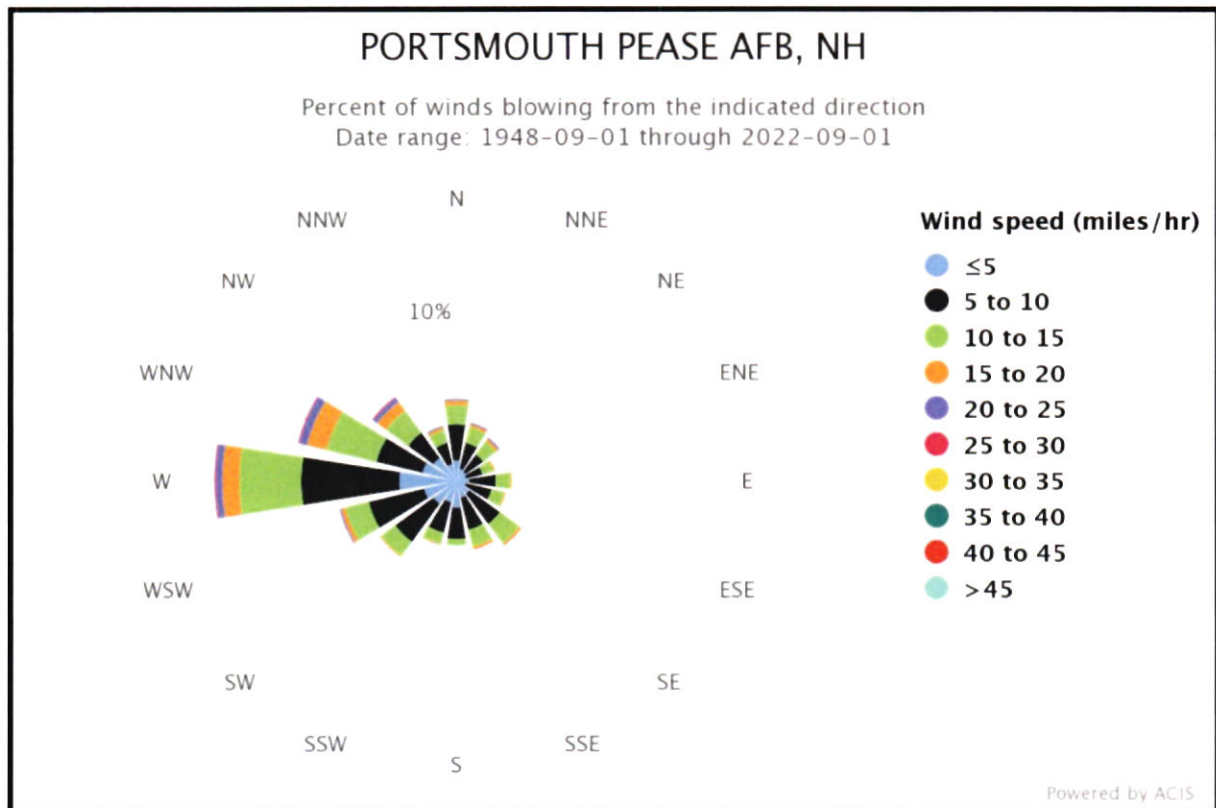


Fig. 6 – Wind Rose (Northeast Regional Climate Center)

Table 5. Wind Frequency Table “Counts”(cli-MATE)

PORTSMOUTH PEASE AFB, NH Wind Frequency Table (percent)												
Wind Direction (compass)	≤5	5 to 10	10 to 15	15 to 20	20 to 25	25 to 30	30 to 35	35 to 40	40 to 45	>45	All speeds	Average speed
NNE	0.8	1.7	1.0	0.2	0.1	0.0	0.0	0.0	0.0	0.0	3.8	8.8
NE	0.7	1.4	1.0	0.2	0.1	0.0	0.0	0.0	0.0	0.0	3.4	9.4
ENE	0.6	1.1	0.7	0.1	0.0	0.0	0.0	0.0	0.0	0.0	2.6	8.7
E	0.8	1.7	0.9	0.1	0.0	0.0	0.0	0.0	0.0	0.0	3.5	8.1
ESE	0.6	1.7	0.8	0.1	0.0	0.0	0.0	0.0	0.0	0.0	3.2	8.2
SE	1.0	2.4	1.5	0.2	0.0	0.0	0.0	0.0	0.0	0.0	5.2	8.7
SSE	1.1	2.1	1.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	4.5	8.3
S	1.7	2.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.2	6.3
SSW	1.4	2.0	0.7	0.1	0.0	0.0	0.0	0.0	0.0	0.0	4.2	7.1
SW	1.8	3.0	1.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	6.1	7.3
WSW	2.1	3.6	1.5	0.3	0.1	0.0	0.0	0.0	0.0	0.0	7.5	7.7
W	3.6	6.2	3.9	1.1	0.4	0.1	0.0	0.0	0.0	0.0	15.2	9.0
WNW	2.2	3.0	3.2	1.3	0.5	0.1	0.0	0.0	0.0	0.0	10.3	10.4
NW	1.8	2.0	1.7	0.7	0.3	0.1	0.0	0.0	0.0	0.0	6.6	9.6
NNW	1.1	1.4	0.8	0.2	0.1	0.0	0.0	0.0	0.0	0.0	3.7	8.4
N	1.3	2.3	1.2	0.3	0.1	0.0	0.0	0.0	0.0	0.0	5.2	8.4
Vrb	3.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.9	3.7
Calm	-	-	-	-	-	-	-	-	-	-	6.8	-

Based on a total of 225,168 hourly observations; 423,528 missing.
 Date range: 1948-09-01 through 2022-09-01.
 Wind speed bins (miles/hr) include values greater than the lower end of the interval range and less than or equal to the upper end.

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Table 6. Wind Frequency Table “Percent” (Northeast Regional Climate Center)

PORTSMOUTH PEASE AFB (NH) - Wind Frequency Table (counts)																	
Latitude : 43.0833			Start Date : Apr. 1, 1956			Sub Interval Windows											
Longitude : -70.8167			End Date : Sep. 1, 2022			Start End											
Elevation : 100 ft.			# of Days : 24260 of 24260			Date Jan. 1 Dec. 31											
Element : Mean Wind Speed			# obs : poss : 534222 of 582240			Hour 0 23											
(Greater than or equal to initial interval value and Less than ending interval value.)																	
Range (mph)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Total
1.3 - 5	7612	4782	4376	3623	4716	3680	5806	6890	9430	7361	10794	13020	21161	11569	9877	7012	131709
5 - 10	11667	8634	7263	5372	7842	7472	11423	10521	9631	8946	15012	17403	29834	15834	11735	8341	186930
10 - 15	6189	5374	5272	3470	4058	3359	6440	5673	2662	3388	6217	7274	18563	15779	11155	4972	109845
15 - 20	1526	1338	1319	888	601	336	912	1190	356	529	772	1375	5650	6895	5043	1545	30275
20 - 25	318	354	445	324	176	87	184	267	72	85	117	348	1861	2455	1796	485	9374
25 - 30	65	90	156	119	91	46	66	68	22	13	34	84	530	651	479	110	2624
30 - 35	5	6	32	22	10	10	12	4	1	0	2	12	45	66	50	12	289
35 - 40	0	2	5	1	1	3	2	4	0	0	1	6	7	2	1	1	35
40 -	0	1	2	0	1	0	1	0	0	0	1	1	0	3	0	0	10
Total	27382	20581	18870	13819	17496	14993	24846	24617	22174	20322	32949	39518	77650	53259	40137	22478	471091
Calm (<1.3)																	63131
Ave Speed	8.2	8.8	9.1	8.8	8.1	7.9	8.3	8.1	6.5	7.1	7.3	7.5	8.8	10.3	10.1	8.4	7.5

Midwestern Regional Climate Center cli-MATE: MRCC Application Tools Environment Generated at: 9/1/2022 11:27:49 AM CDT

3.2.1 Extremal Wind Analysis

An extremal wind analysis was undertaken to determine 1% annual chance wind velocities near the site. Wind data for this analysis was taken from the USACE Wave Information

Study (WIS) Station ST63045 (USACE, 2019). The 1% annual chance wind velocity was calculated using 39 years' worth of "Online" data, from 1980 to 2019, from USACE WIS Station ST63045. Extreme values were estimated using a Peaks-Over Threshold (POT) analysis, as described by Goda (2000). The POT analysis combines three theoretical extreme value probability distribution functions used to fit the sample of data: the Fisher Tippet Type I (Gumbel) distribution, the Fisher Tippet Type II (Frechet) distribution, and the Weibull distribution. The distribution with the highest correlation was used for the results. Wind velocity data from ST63045 was ranked and filtered to have only one event per 48-hr period to reject duplicate storms as outlined in Melby et al. (2012). A threshold value of 38 mph (17 m/s) was used for the analysis to capture significant extreme events and to optimize curve fitting (FEMA, 2016). The Weibull distribution had the highest correlation of best-fit, r^2 , value of 0.984, for a 1% annual chance wind speed of 59.1 mph.

A wind rose was generated for this site based on the 39 years' worth of available data. The data is in meters per second (m/s) and shows the wind direction generally from the west, but primarily ranging from the south-southwest to northwest.

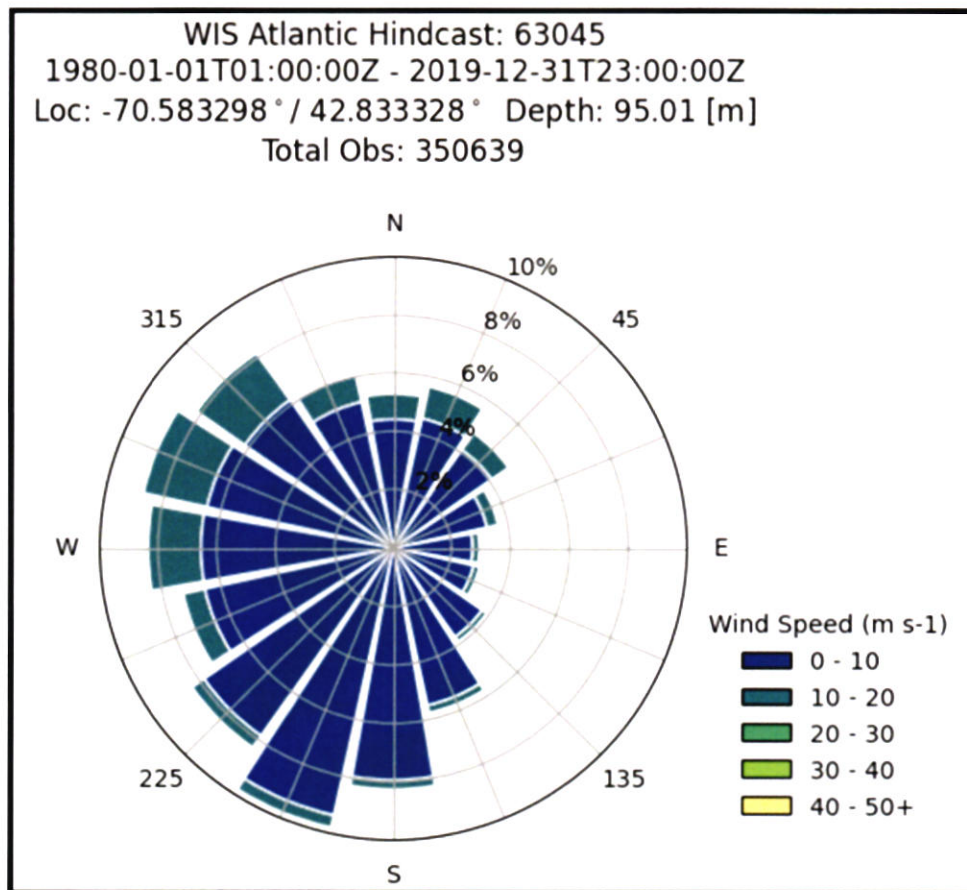


Fig. 7 – Wind Rose (WIS Station ST63045)

The structure would be designed to sustain 113 mph (50.5 m/s) winds based on ASCE 7 design hazard and exposure considerations for the proposed pier locations.

3.3 Nearshore Wave Parameters

Nearshore wave parameters, such as significant wave heights and wave periods, were estimated using a STWAVE model to propagate offshore wind and wave parameters to nearshore conditions. An extremal analysis for wave parameters, similar to the extremal analysis performed for wind velocities, was undertaken to estimate offshore wave heights and wave periods. This is described in the following section.

3.3.1 Extremal Wave Analysis

The 1% annual chance offshore wave height and wave period were calculated using 39 years' worth of "Online" data, from 1980 to 2019, from the USACE WIS Station ST63045 (USACE, 2019). Extreme values were estimated using a Peaks-Over Threshold (POT) analysis, as described by Goda (2000). The POT analysis combines three theoretical extreme value probability distribution functions used to fit the sample of data: the Fisher Tippet Type I (Gumbel) distribution, the Fisher Tippet Type II (Frechet) distribution, and the Weibull distribution. The distribution with the highest correlation was used for the results. Wave height and wave period data from ST63045 was ranked and filtered to have only one event per 48-hr period to reject duplicate storms as outlined in Melby et al. (2012). Threshold value of 11 ft and 11 s for wave height and period, respectively, were used for the analysis to capture significant extreme events and to optimize curve fitting (FEMA, 2016). The Weibull distribution had the highest correlation of best-fit, r^2 , for wave height with a value of 0.962 for a 1% annual chance wave height of 25.3 ft. The Fisher-Tippet Type II had the highest correlation of best-fit, r^2 , for wave period with a value of 0.981 for a 1% annual chance wave period of 16.4 s.

A wave rose for WIS Station ST63045 was generated for the 39 years' worth of data available. The wave rose indicates that the predominant wave direction is east-southeast. The wave rose is shown in Fig 8.

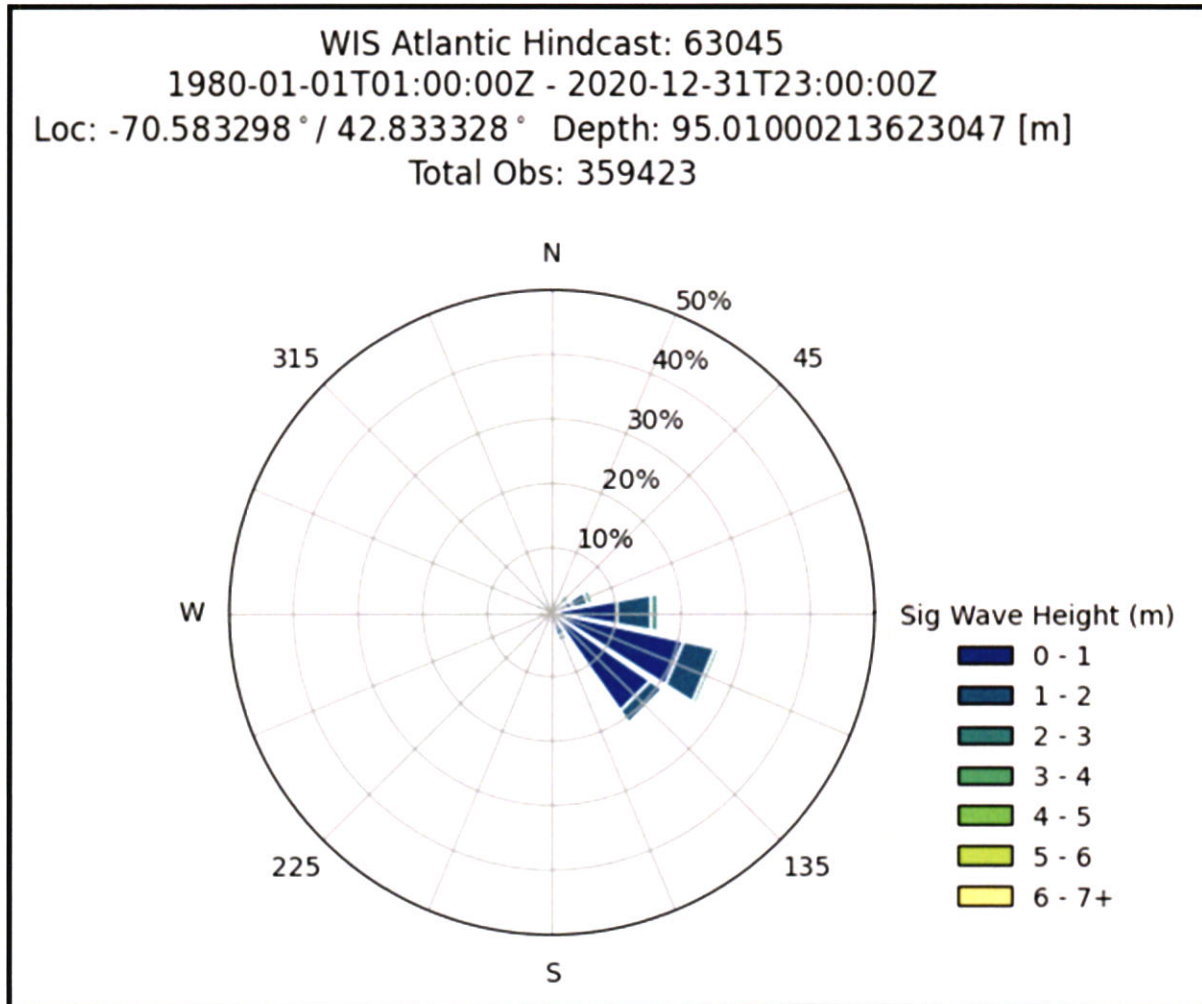


Fig. 8 – WIS Wave Rose ST63045

3.3.2 Model Bathymetry and Topography Data

Bathymetry and topography data for the model domain was downloaded from the National Oceanic and Atmospheric Administration (NOAA) National Centers for Environmental Information (NCEI) Bathymetric Data Viewer (NOAA, 2022a) and NOAA Digital Coast Coastal Topobathy Lidar websites (NOAA, 2022b). Data was referenced to NAVD88 in ft.

3.3.3 STWAVE Model Setup

A coastal analysis of the 1% annual chance wave conditions at Hampton Beach was performed using STWAVE Version 6.0 (USACE, 2011). STWAVE is available within the Aquaveo Surface-water Modeling System (SMS) program (Aquaveo, 2018). SMS Version 12.3 was used for this study. The STWAVE model simulated the propagation of offshore

waves and a given wind condition to nearshore wave heights and wave periods by taking into consideration depth-induced wave refraction and shoaling, wave breaking, and diffraction.

The STWAVE model simulated wind and waves propagating from the southeast, which represents shore-normal storm conditions for a conservative evaluation of nearshore wave conditions. The STWAVE model was comprised of two grids: a parent grid with 30.0 m x 30.0 m cell sizes, and a nested grid with 5.0 m x 5.0 m cell sizes. The parent grid extended approximately 8.5 miles offshore to the approximate location of WIS station ST63045. The nested grid extended approximately 1.3 miles offshore from the site. The Figure below shows the STWAVE model grid boundaries and orientation for the parent and nested grids.

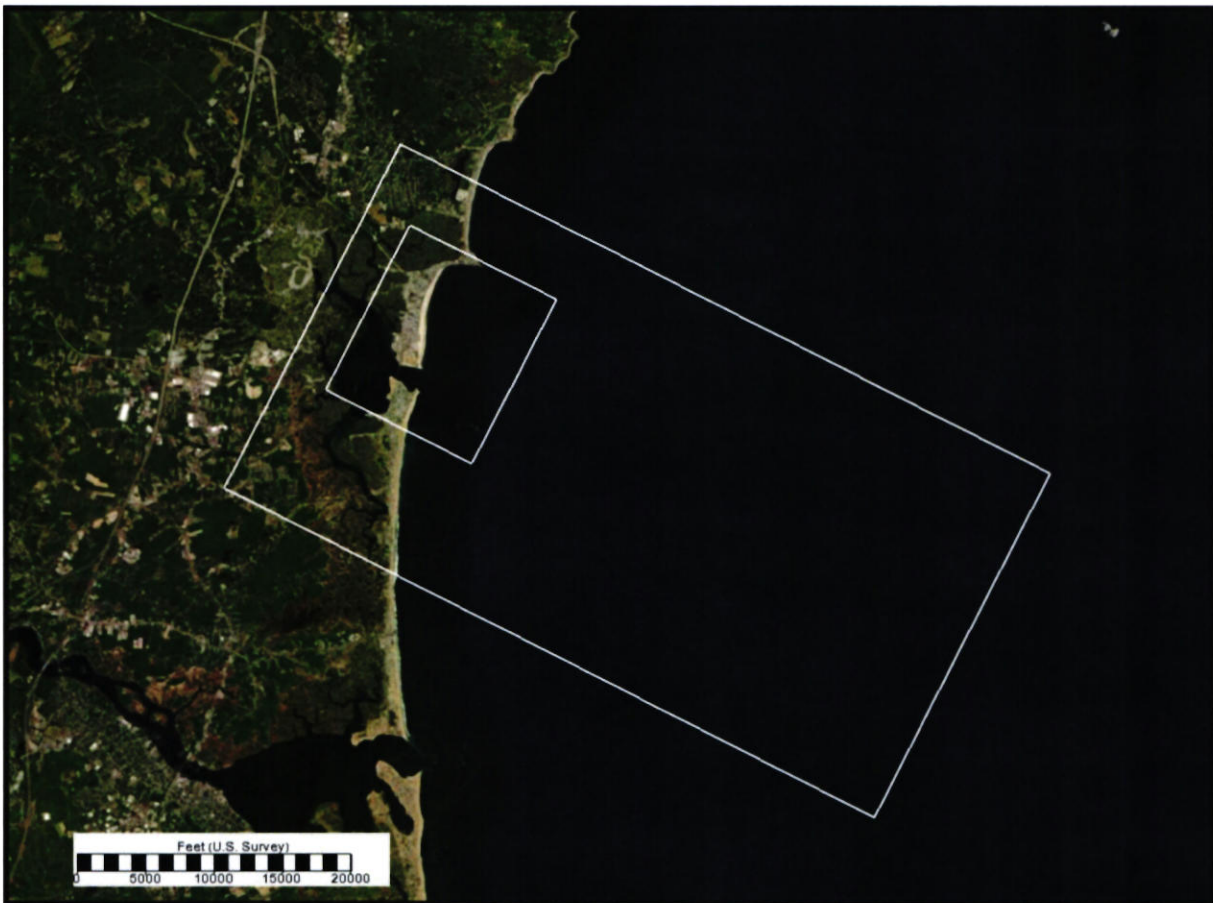


Fig. 9 – STWAVE Model Grid Boundaries & Orientations

The STWAVE model used a spectral boundary condition along the offshore boundary generated using the JONSWAP method by specifying a significant wave height and wave period. A significant wave height of 25.3 ft and wave period of 16.4 s, estimated using the extremal analysis, was used at the offshore boundary. The STWAVE model was run in half-plane mode with a bottom friction set to a JONSWAP constant of 0.0055. A wind field was applied along the long axis of the model grid to estimate conservative wind-wave development towards the shore. A wind speed of 59.1 mph was used in the model.

The model was run for two stillwater level (SWEL) conditions: the present-day SWEL of 8.36 ft and the estimated 2120 SWEL of 13.3 ft due to projected sea level rise amounts.

3.3.4 STWAVE Model Results

The model results suggest that 1% annual chance significant wave heights near the proposed pier locations during present-day sea level conditions range from 12.0 to 14.0 ft in Area 1, 12.0 to 14.0 ft in Area 2, and 9.0 to 10.0 ft in Area 3 shown in Figs. 10 to 12 below.

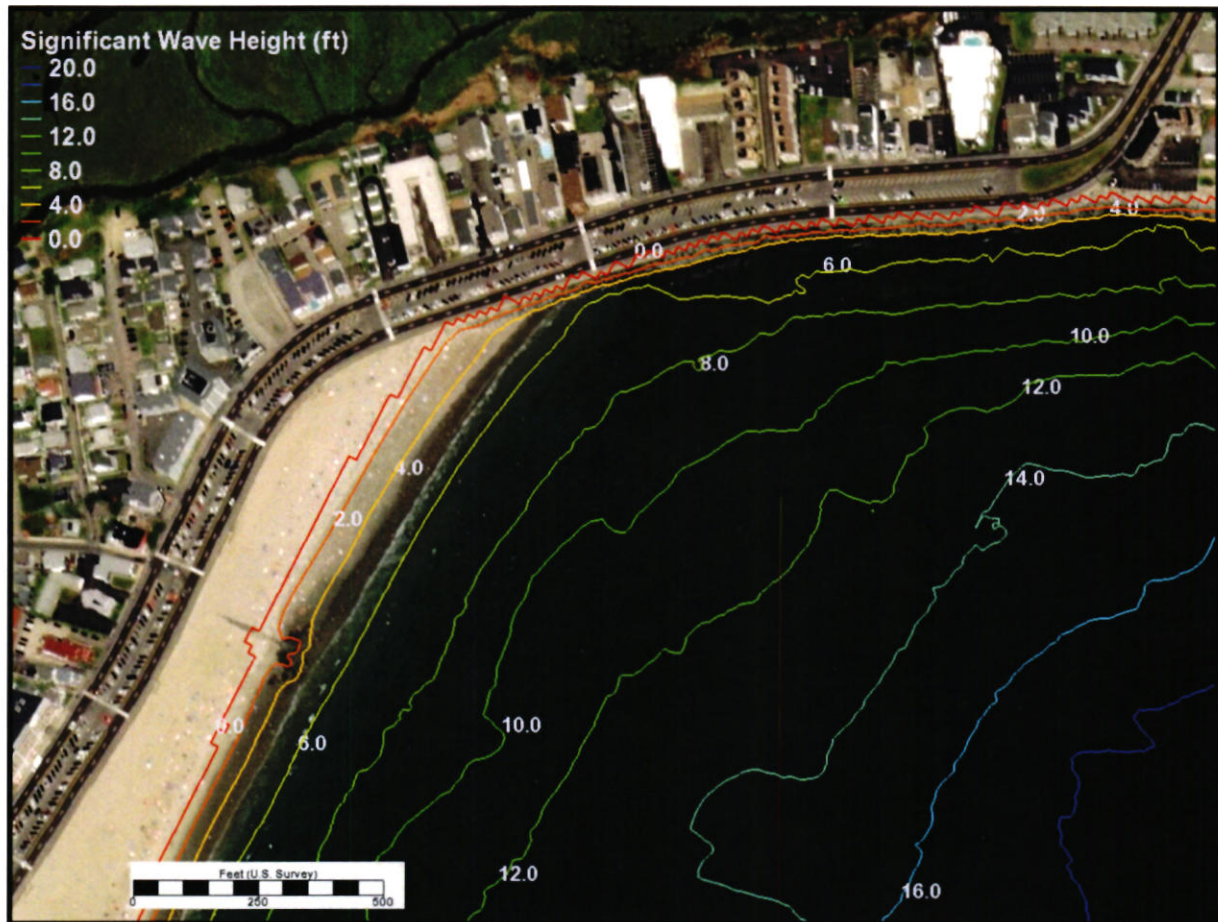


Fig. 10 – Area 1 Significant Wave Heights for Present-Day Sea Level Conditions (ft)

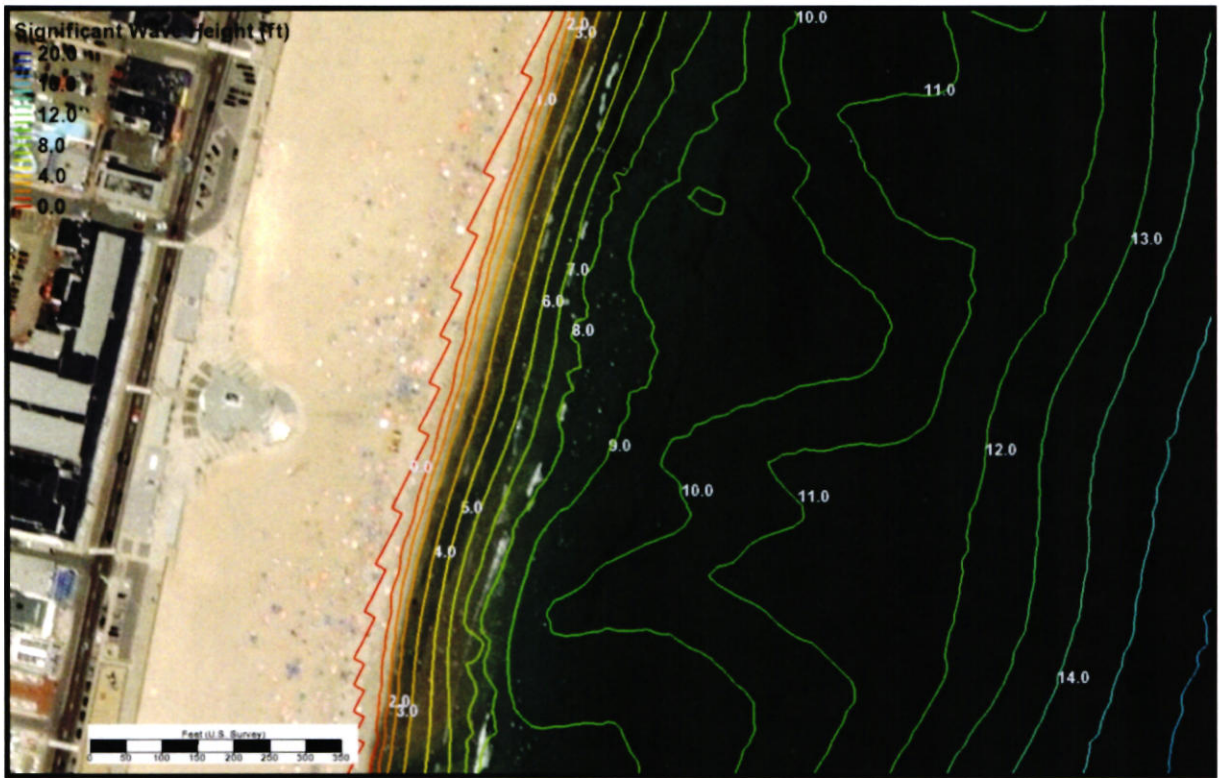


Fig. 12 – Area 2 Significant Wave Heights for Present-Day Sea Level Conditions (ft)

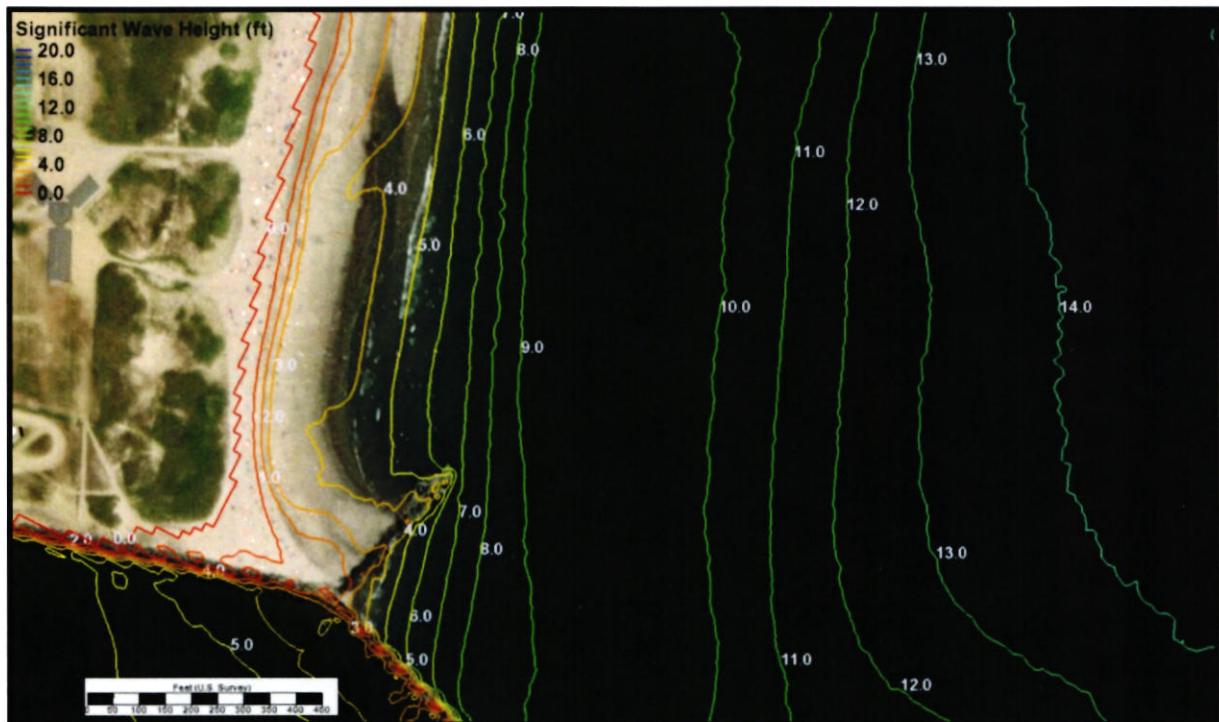


Fig. 12 – Area 3 Significant Wave Heights for Present-Day Sea Level Conditions (ft)

The model results suggest that 1% annual chance significant wave heights near the proposed pier locations during 2120 sea level conditions range from 15.0 to 16.0 ft in Area 1, 15.0 to 17.0 ft in Area 2, and 14.0 to 15.0 ft in Area 3 shown in Figs. 13 to 15 below.

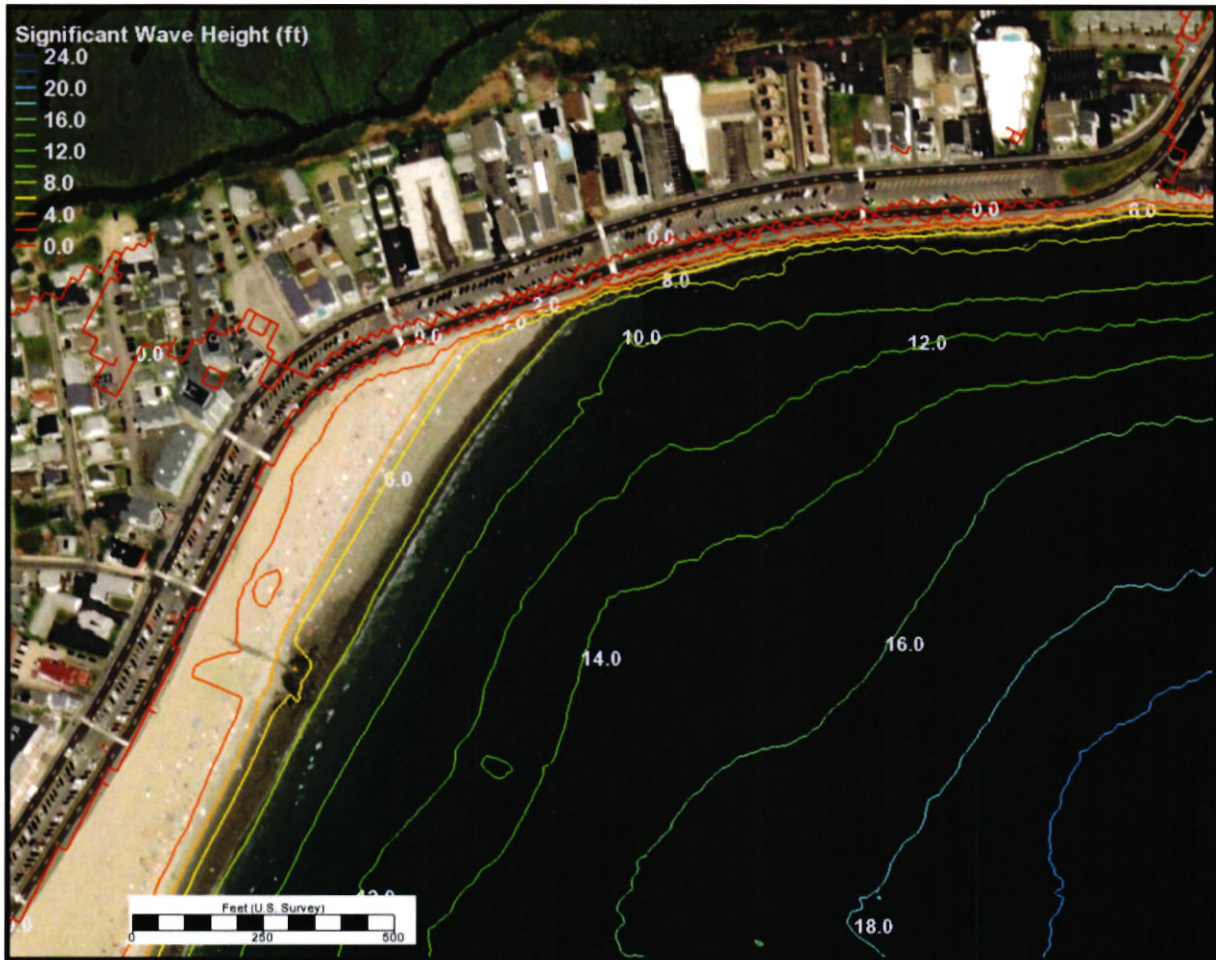


Fig. 13 – Area 1 Significant Wave Heights for 2120 Sea Level Conditions (ft)

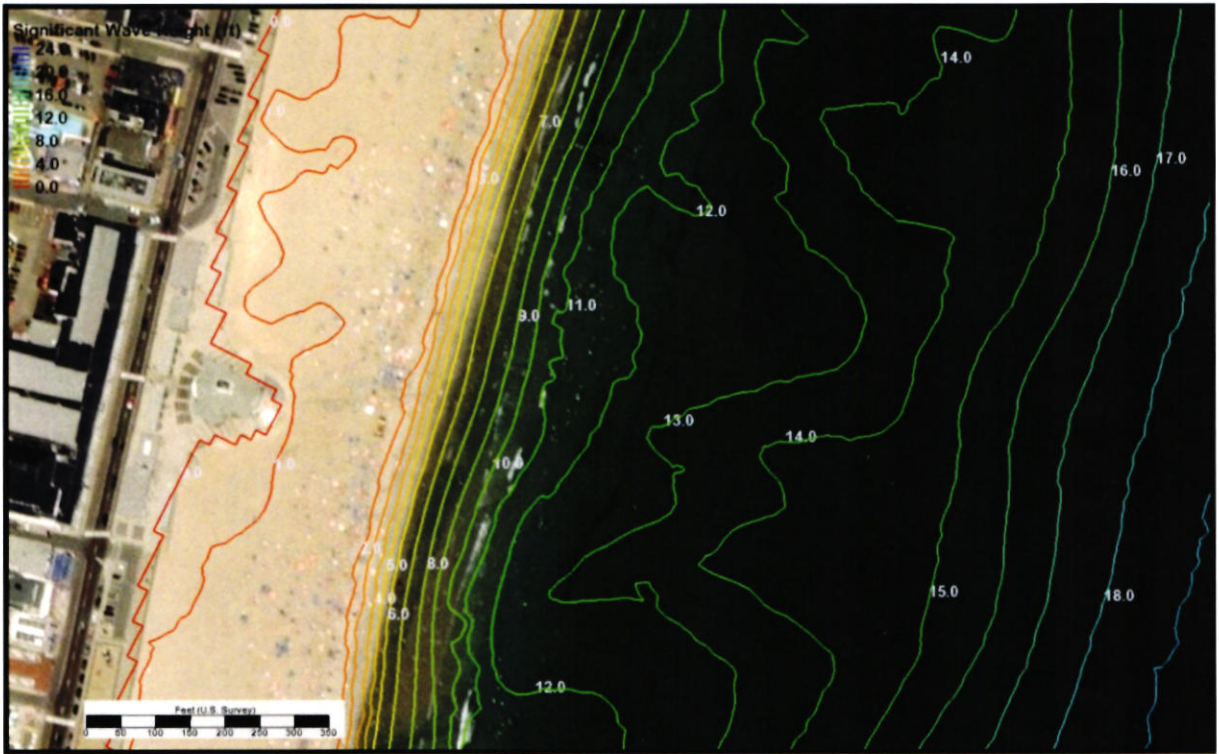


Fig. 15 – Area 2 Significant Wave Heights for 2120 Sea Level Conditions (ft)

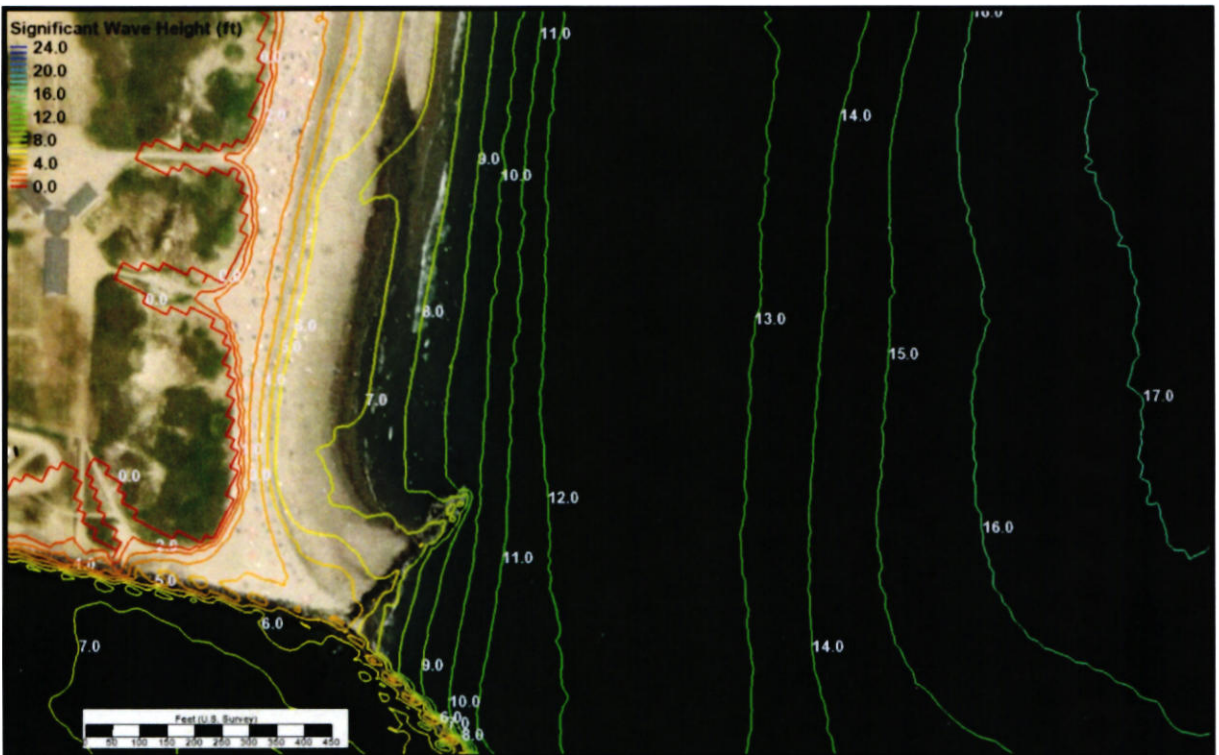


Fig. 15 – Area 3 Significant Wave Heights for 2120 Sea Level Conditions (ft)

Figs. 16 and 17 show the significant wave height model results for the nested grid for present day and 2120 sea level conditions.



Fig. 16 – STWAVE Significant Wave Height Results for Present-Day Sea Level Conditions (ft)

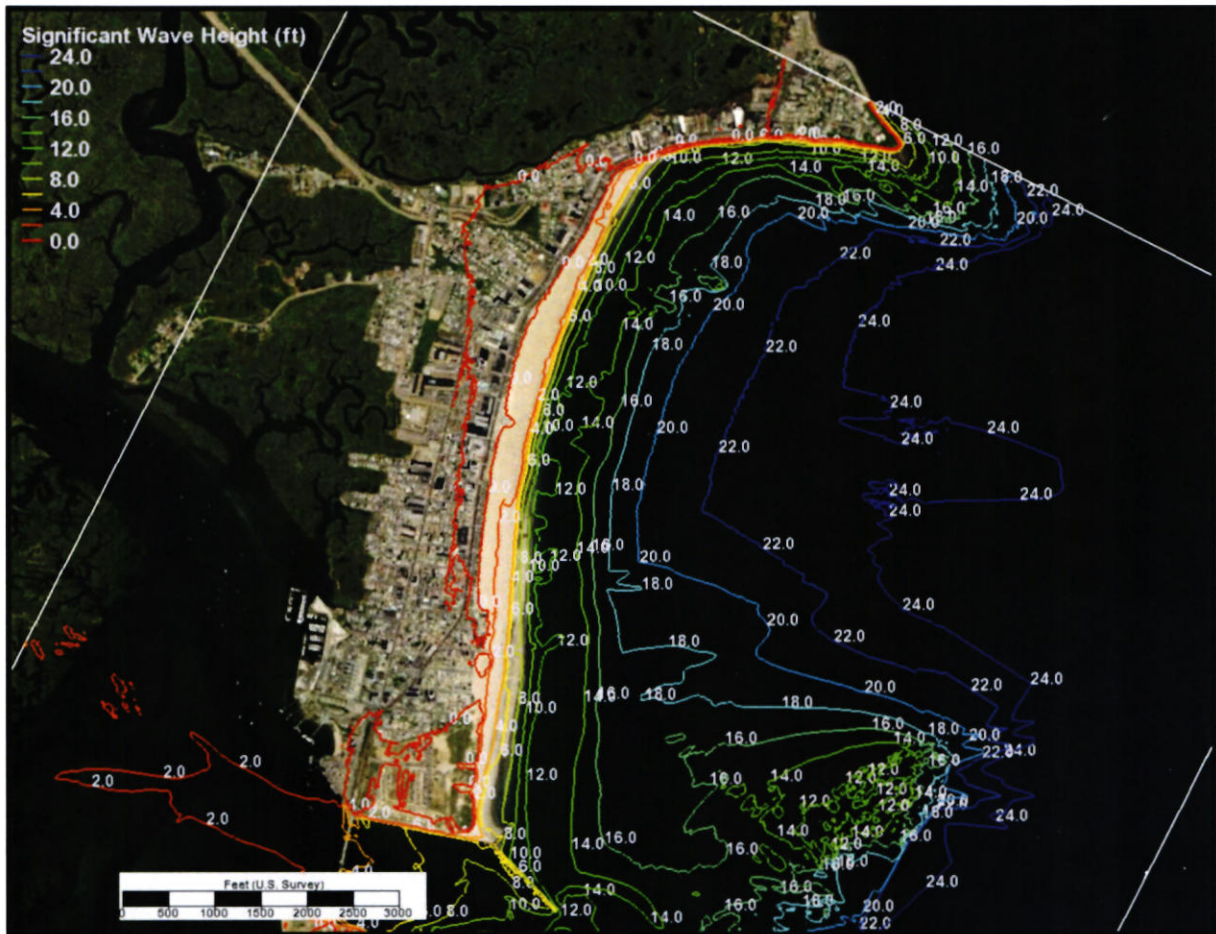


Fig. 17 – STWAVE Significant Wave Height Results for Projected 2120 Sea Level Conditions (ft)

The significant wave height and peak period both typically occur from the East-Southeast. Extremes waves in the Gulf of Maine are typically created by hurricanes and extra-tropical (Nor'easter) storm events. These extra-tropical storm events can also result in barometric pressure changes and wind setup resulting in a temporary rise in the ocean surface often referred to as storm surge.

4. Design Alternatives

The design alternatives were developed based on the site investigations, analysis of site conditions, market research and stakeholder input.

(See Appendix A – Pier Advisory Committee Input Summary)

Through the scope of work the following criteria were identified as priorities for the Hampton Beach New Pier Feasibility Study.

- ADA accessibility for enjoyment of the water.
- ADA accessibility to beach from the pier.
- The pier is intended for recreational uses.
- The pier should be as durable as practical and require minimal maintenance overtime (Typically a 50+ year design life).
- The pier should be designed to consider resiliency measures that reduce risk of potential increases in sea level rise and severity of storm surge.
- The pier should have as little impact on the beach as possible, for beach users, life safety operations and for environmental impacts (Piping plover nesting areas).

The Hampton Beach New Pier Feasibility Study consists of six (6) primary design consideration:

- Pier Use (Needs, Capacity and Configuration).
- Pier Location (Orientation and Alignment).
- Pier Access (Shore, Beach, and Water).
- Pier Type (Materials, Costs, Life Expectancy, and Operations and Maintenance).
- Site Improvements (Grading, Utilities, Restrooms and Parking).
- Environmental (Regulations, Physical Conditions and Potential Coastal Risks).

At the conclusion of the descriptions of the primary design decision components and their associated alternatives a decision matrix is provided to assist with comparison and prioritization of the pier design options.

4.1 Pier Use

4.1.1 Needs

Through stakeholder meetings and surveys with the PAC it was identified that potential uses of the pier included ADA accessibility over the beach and water, viewing, fishing, public gathering, passive recreation and access to the beach. A pier head or platform space to the side of the main pier walkway should be designed to be open and adaptable to the variety of user interests expressed by the PAC to-date, as well as in consideration of future uses that are yet to be identified. Some uses may conflict with beach uses, such as fishing and swimming. It is recommended that a no swim zone of at least 200 feet be considered around a pier used for fishing.

It was also desired that the pier be able to accommodate recreational boaters and/or potential cruise ship operations. Due to the exposed open ocean environment, a pier on Hampton Beach would be a suitable location for vessel berthing or transfer of personnel. Offshore mooring of vessels would likely require transfer of personnel to a more protected location such as at the Hampton State Pier within Hampton Harbor.

4.1.2 Capacity

It is desired that the pier accommodate up to 200 people at any given time. During public gatherings, there may be assembly on the pier for events such as watching fireworks and festivals. This is most likely to take place at a larger platform space, typically located at the end of the pier. Shapes and sizes of these spaces can vary. *(See Section 4.1.3 Configuration)* for examples. This pier head area could also accommodate passive activities and users such as for artists, photographers or exercise/fitness classes.

Fishing at the Hampton River jetty sees 5 to 10 fishermen typically and it is estimated that a similar level of interest would be seen at the pier.

Areas for seating and viewing should be dispersed for the entire length, and on both sides of the pier.

It is estimated that the pier would have an approximate live load capacity of 150 PSF to support pier users and emergency vehicles.



Pier Head Passive Use (Image from Internet)

4.1.3 Configuration

To create visual interest of the pier structure, and/or additional area for people to gather and use the pier, either at the offshore end of the pier or at side platforms over the water elsewhere, various pier shapes are offered for consideration. The pier head and/or side platform areas could be various shapes including an “L”, “T”, octagon, or rectangle. The overall shape of the pier could be a more traditional rectilinear structure, or a more modern curvilinear form. All of these options could meet the needs of a variety of pier users. As noted previously, the successful use of this space will be determined by adequate size and adaptability to accommodate current, and potential future user needs as of yet to be determined.



“L” Shaped Pier (Image from Internet)



Curvilinear Piers (Images from Internet)

See Section 5 – Comparable Pier Research for additional pier configuration examples.

4.2 Pier Location

The proposed locations for the pier considered three primary areas along Hampton Beach. The location of a pier in each of these areas will have varying levels opportunities and constraints on Hampton Beach. The pier would be located within the NH State Park property limits and not require any additional permanent property to be purchased. Temporary considerations will need to be taken into account for construction which are described.



Fig. 18 – Portion of 03 – Pier Locations Map

- Area 1 - The north end of Hampton Beach, from the area just south of Boars Head to the NH Marine Memorial, where Ocean Boulevard (Route 1A) transitions from two-way travel to one-way routes including Ashworth Avenue (southbound) in addition to Ocean Boulevard (northbound). Siting a pier in this area should consider:
 - Significant distance from public restroom facilities and the retail core, located within Area 2, especially for pedestrians. A pier in this area might be well served with a new restroom facility located close to the pier.
 - This area is in close proximity to rocky shore and seabed with potential benefit for fishing, while at the same time potentially impacting areas of importance to marine flora and fauna. (Seals and Piping Plovers).
 - It could be potentially hazardous from a swimmer safety perspective being in close proximity to exposed rock cobbles and outcrops, especially if people dive off the pier.

- While not immediately adjacent to the seawall and beach, there is a fair amount of public parking between the north and south bound lanes of Ocean Boulevard (Rte 1A).
- There are no specific parking spaces dedicated for the handicapped. A pier in this area should consider dedicated handicap parking spaces adjacent to the pier.
- A pier at the north end, especially if located over the rocky shore, would have minimal to no impact directly over the beach.
- If located along the portion of Ocean Boulevard that curves towards Boars Head, it could be shorter in construction to achieve the length to water depths desired, while having less visual impact across Hampton Beach.
- A pier located off of this portion of Ocean Boulevard would have some or all of the pier exposed to wave runup the side of the structure, which is not desirable. A pier at this location should have a curve or “L” shaped alignment so that the head of the pier is facing directly into oncoming waves.
- The north end of Hampton Beach has become increasingly more residential and a pier in this area might encourage more visitors to frequent the north end of the beach, potentially increasing demand for commercial activities.
- On the other hand, the quieter condition of this more residential area might be more compatible with the desired passive recreation uses for the pier (fishing and viewing). Careful thought on promoting the pier and providing accommodations for a variety of potential users will need further planning and prioritization.
- A pier in this location located over the sand beach would have moderate access under the pier.
- The seawall is 3 feet above the sidewalk where Ocean Boulevard curves towards Boars Head. Connecting a pier at the top of the wall in this area will require lengthy transition ramps with railings on either side of the pier to transition to the existing sidewalk.
- This area is currently subject to waves overtopping the seawall and the pier would experience the same conditions at the interface with the shoreline.
- The top of the seawall over the beach in this area has an elevation difference of approximate 8 feet, requiring a lengthy transition ramp for ADA access from the pier to the beach.

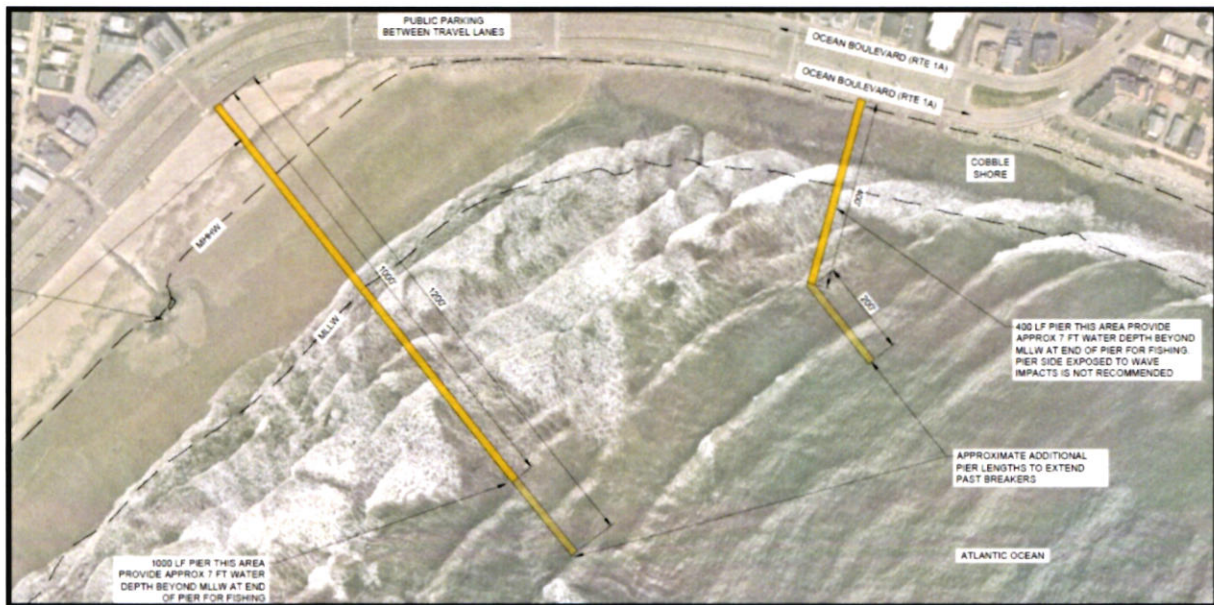


Fig. 19 – Portion of Area 1 (North End) Proposed Pier Location Options Concept Plan

- Area 2 - The middle of Hampton Beach, from the NH Marine Memorial south to Hampton Beach State Park. Siting a pier in this area should consider:
 - A pier in the middle is in closer proximity to the entirety of Hampton beach, versus location of a pier at either end of the beach.
 - A pier in the middle would have the most visual and physical impact to the beach, where the beach width is much greater than the north or south ends, and the top of the seawall is lower than at the north end, starting the pier connection to the shore at a lower elevation and requiring a longer ramped portion of the pier to get to the desired deck design elevation.
 - The top of the seawall over the beach in this area has an elevation difference of approximate 4 feet which would require a shorter transition ramp for ADA access from the pier to the beach.
 - Close proximity to existing public restrooms and parking adjacent to the seawall, including designated handicap parking spaces.
 - Location in the heart of Hampton Beach visitor activities and shopping areas. Hampton Beach is already a very popular destination for beach goers and a pier may have little benefit as an additional visitor attraction in consideration of the beach area that it displaces.

- There is more space for beach maintenance and life safety equipment and operations to access the beach from underneath the pier.
- A pier in the middle of the beach would have the least impacts to environmentally sensitive areas which are located at the north and south ends of the beach
- A pier in the middle of the beach would be the least desirable area to fish from and potentially have the most conflict between fishing and swimming activities.
- A pier in the middle of the beach would be in close proximity to life safety operations headquartered at the Seashell.

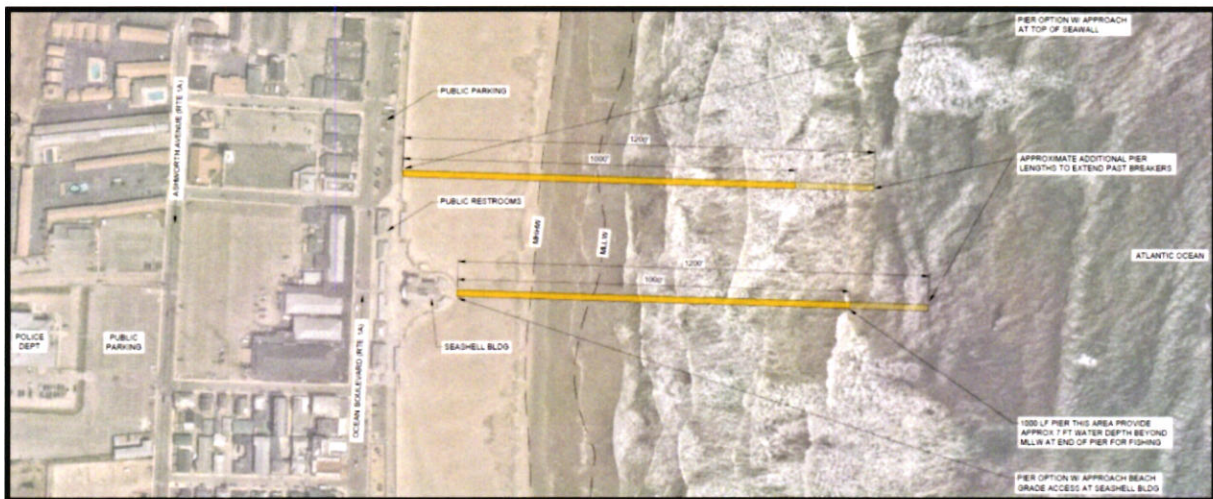


Fig. 20 – Portion of Area 2 (Middle) Proposed Pier Location Options Concept Plan

- Area 3- The area of Hampton Beach in front of Hampton Beach State Park to the United State Army Corps of Engineers stone jetty and the Hampton River. Siting a pier in this area should consider:
 - Close to parking and public restrooms, however these are designated for visitors to Hampton Beach State Park.
 - A pier in this area could be accessed from the rest of the beach in Areas 1 and 2, but it would be at some distance and over the sand beach.
 - A pier in this location would need to start at beach grade, as it would be challenging, and likely prohibited from starting at a higher elevation off of the coastal sand dunes.

- A pier would have a fairly lengthy ramped portion of the pier to reach the desired deck design elevation
- Minimal access underneath the pier.
- Environmental impacts to flora and fauna (Piping Plovers and Sand Dunes).
- Moderate fishing interest, with a likelihood of continued interest to fish in the nearby Hampton River.
- Potential life safety issues regarding swimming around the pier, and diving off the pier, in close proximity to the stone jetty and ledge outcrops in the intertidal zone.
- The pier would have minimal visual impact to abutting properties.
- Lack of visibility behind the dunes, especially when the State Park is closed in the off season could create public safety / security issues.

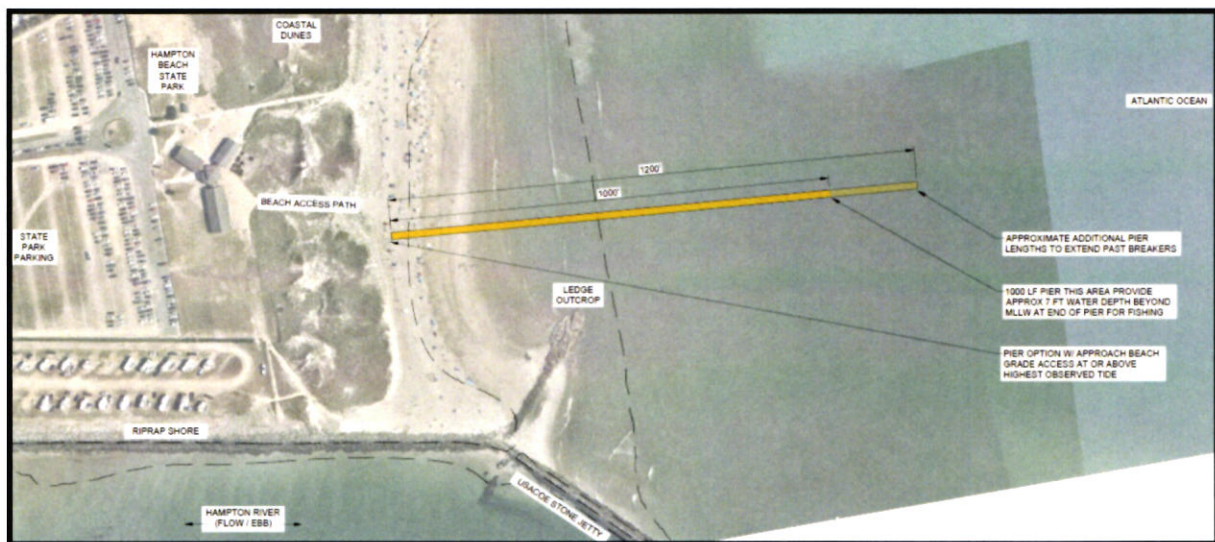


Fig. 21 – Portion of Area 3 (State Park) Proposed Pier Location Options Concept Plan

If the structure were to be built today for sea level rise design flood elevation in 2120, that structure would need a deck elevation of 24.2 feet. This would require a minimum 120-foot long ramped pier section at (1 on 12 slope), plus minimum 60 inch landings every 30 feet to meet ADA standards for a pier connecting to the top of the seawall. For a pier starting at grade with the beach, a minimum 195-foot long ramped pier section is anticipated to meet ADA standards.

See also (*Appendix C – Conceptual Design Figures*) and (*Section 4.7 Decision Matrix*)

It is recommended that the pier be oriented perpendicular to the typical waves so that the least area is exposed, reducing environmental loading and potential for debris impact on the structure. At the northern end of the beach an angled “L” shaped alternative is presented that limits impacts to the beach and reduces the length of structure needed to extend past the wave break.



Angled Pier with Concrete Deck (GEI Project Example)

4.3 Pier Access

4.3.1 Shore

The pier could be accessed from shore either by a connection to the seawall along Ocean Boulevard or at beach grade. Access from the water for boating is not recommended as stated previously in this report. Access to the water for swimming is not recommended based on life safety concerns and due to the potential negative interaction with pier fishing. Emergency access to the water from the pier might be accommodated by gated ladders as desired by the Town and or State emergency service providers.

Access to the pier from the top of the seawall would require an ADA accessible ramp from the top of the seawall to the existing sidewalk grade. Most of the seawall is approximately 8-inches above the adjacent sidewalk grade, with the exception of the wall at the north end of the study area where Ocean Boulevard curves east towards Boars Head. In this area the top of the seawall is approximately 3 feet above the adjacent sidewalk. This area would either require an opening in the seawall so that the pier can tie into the existing sidewalk grades, or

construction of an approximate 40-ft length ADA accessible ramp from the sidewalk to the top of the seawall on both sides of the pier. It was noted by the PAC that water currently overtops the seawall during winter storms, and an opening in the existing seawall would not be desirable.



Seawall At Middle of Beach

Seawall At North End Near Boars Head

An alternative option to tying into the Seawall at its current location, would be to provide a new bumped out area like the semicircular gathering areas at the Seashell and the NH Marine Memorial. This added space, at grade with the existing sidewalk and with a perimeter wall matching or exceeding the height of the adjacent seawall, could potentially accommodate restrooms, shade structures, seating, public gathering space, and parking and drop off space immediately adjacent to the pier takeoff from shore. Such an improvement might be most desirable at the north end of Hampton Beach, were many of those facilities are not in close proximity to the potential pier location.



Bumpout Area at the NH Marine Memorial Protruding into the Beach Area

At the north end of the beach, the existing seawall is reportedly in poor structural condition, showing visible evidence of spalling and cracking at the base of the wall. NH DOT has expressed concerns regarding the condition of the wall adjacent to Ocean Boulevard (Rte 1A). This wall is owned by the State Parks and Recreation Department will require their approval to repair. Regardless of either pier access option at the seawall, it is recommended that the seawall be repaired as necessary prior to construction of a pier in this location.

4.3.2 Beach

Currently, at the northern and southern ends of Hampton Beach State Park, there are limited ADA accessible routes to the beach. A new pier could provide ramped access to and from the beach where it connects to the top of the seawall. In other locations, the pier would be at-grade with the beach. Ramps could be constructed on either side of the pier to provide ADA access, as well as vehicular access for life safety and maintenance vehicles to and from the pier in locations where there is limited clearance underneath the proposed pier. The ramps would need to be a minimum length of 120 feet for a pier located at the north end of the beach, where the change in grade from the beach to the top of the seawall is approximately 8 feet. The ramps could be 80 feet or shorter at locations in the middle area of the beach, where the existing seawall is generally 4 feet above beach grade or less.

While beach access underneath the pier will be obstructed horizontally, both by pier support piles as well as pile bracing if a timber pier is constructed, as well as vertically, depending on the variations in beach grade and the elevation of the ramped section of the pier to get to the desired design deck elevation of 24.2 feet. To accommodate under pier passage the pile foundations would need to be spaced approximately of 15 feet on center and have a clear vertical distance to the lowest surface of the pier of approximately 12 feet to provide an adequate distance to accommodate the various emergency service and maintenance vehicles traveling on the beach as well as potential life safety vehicles and regular beachgoers walking under the pier. The by-pass under pier transit location would need to be located inshore of the intertidal area due to restrictions that limit equipment from operating within this zone. Depending on the specific pier location the area above the intertidal zone varies from 100-300 feet to the seawall or beach dunes.

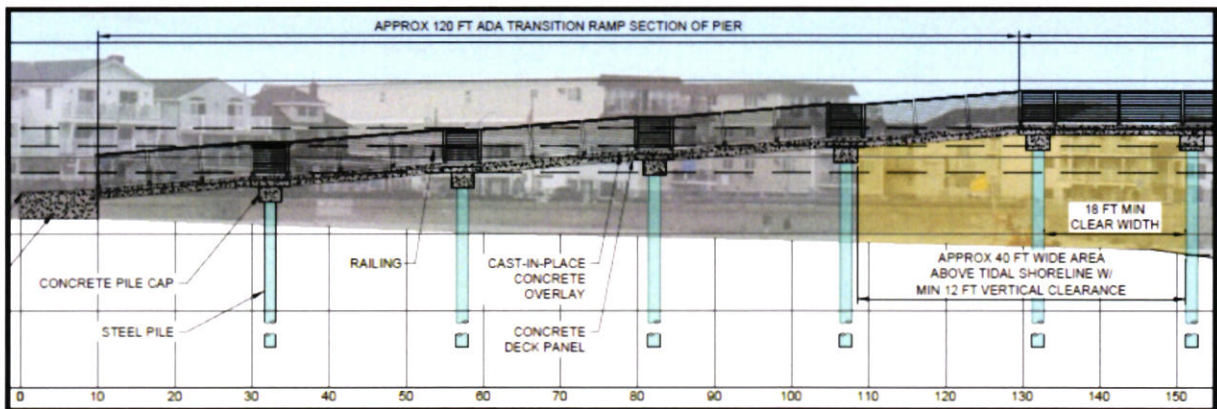


Fig. 22 – Proposed Precast Concrete Pier Profile Off Seawall

See (Appendix C – Conceptual Design Figures) for additional details.

4.4 Pier Type

When deciding on the pier constructability there are many considerations that need to be made about material types, service life, and initial and overall operational costs. The following discussion focuses on possible pier construction methods and materials. Three primary pier types are presented: concrete pier, hybrid pier, and timber pier.

A concrete pier would likely consist of concrete or steel pile foundations with concrete pile caps and a concrete deck. This option would likely have the highest initial constructability cost while also providing the longest expected design life (50+ years anticipated) with minimal required maintenance. Concrete structures can often have service lives of over 100 years with continued maintenance.

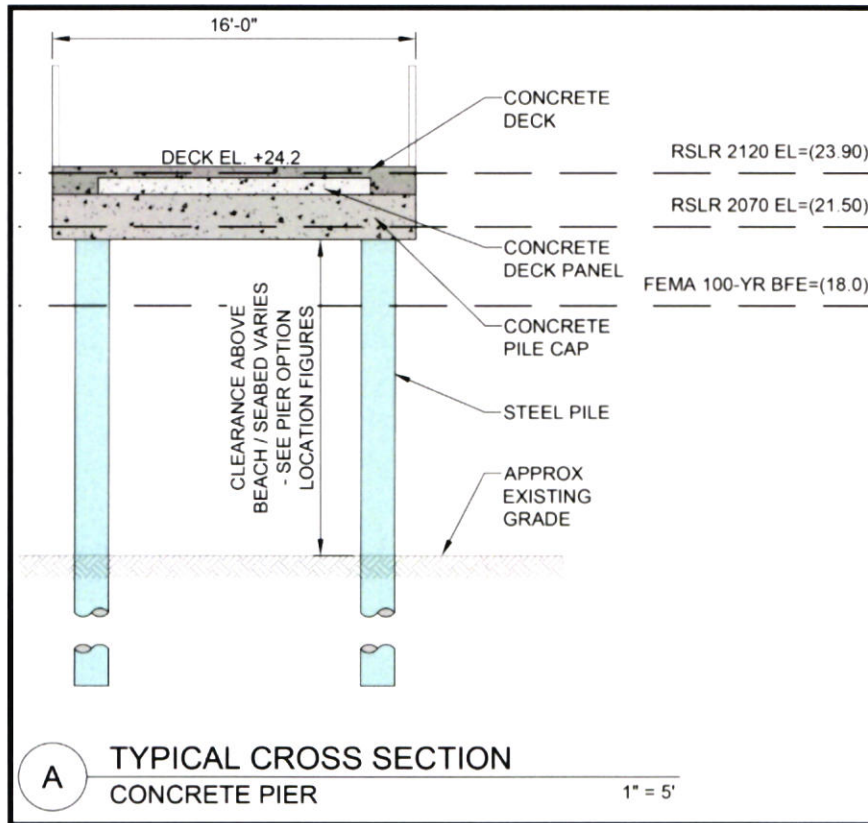


Fig. 23 – Proposed Precast Concrete Pier Conceptual Cross Section

A hybrid pier would likely be similar in construction to a concrete pier with the exception of having a timber deck that would provide a less industrial appearance and be slightly less expensive for initial construction. The design life of a hybrid pier would be 50+ years for the substructure and pile caps while the timber decking would be approximately 25 years. The

timber decking will likely require more routine maintenance and therefore have slightly increased overall service life cost than a concrete pier.

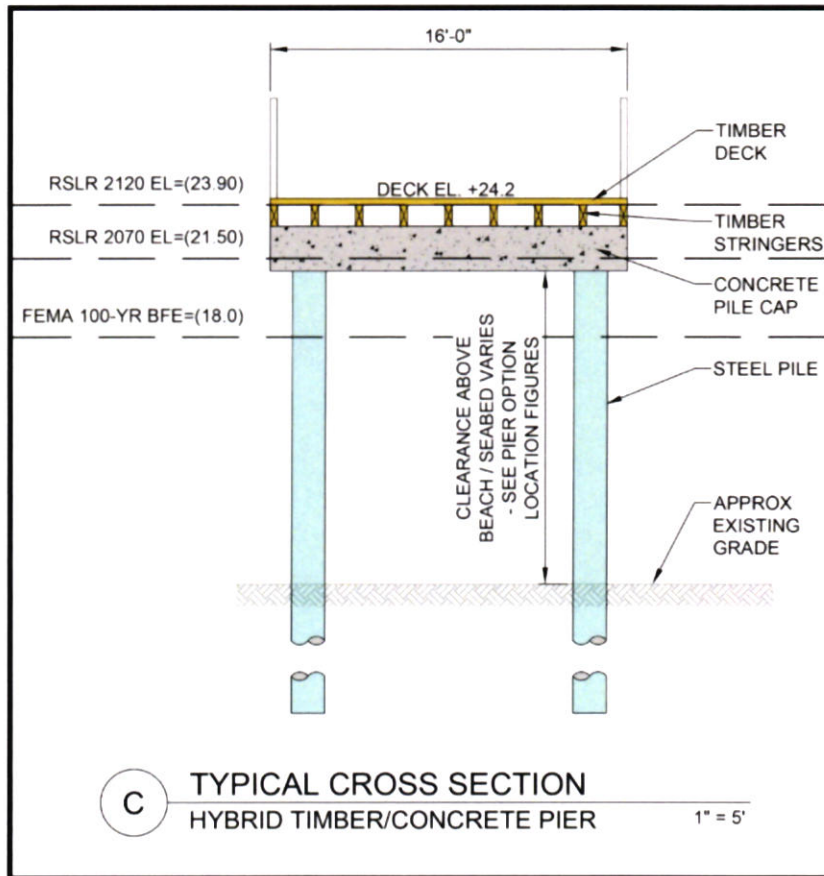


Fig. 24 – Proposed Hybrid Precast Concrete & Timber Pier Conceptual Cross Section

A timber pier would consist of timber pile foundations with timber pile caps, stingers, and decking. A timber pier would likely have the least initial construction cost but require more routine maintenance and have a shorter anticipated design life, typically on the order of 25 years. Timber will require preservative treatments for exposure in the saltwater marine environment. Alternative timber materials such as IPE or greenheart piles may have extended design life compared to treated southern yellow pine timber with the ability to increase design life of elements to up to 50 years. Additionally, a timber pier will require fire protection if it exceeds 5,000 SF in area.

It should be noted that the State of New Hampshire Division of Ports and Harbors has been replacing their existing timber facilities with more durable materials. They have noted that nearby facilities in Hampton and Rye New Hampshire both have seen marine borer activity requiring early replacement of elements.

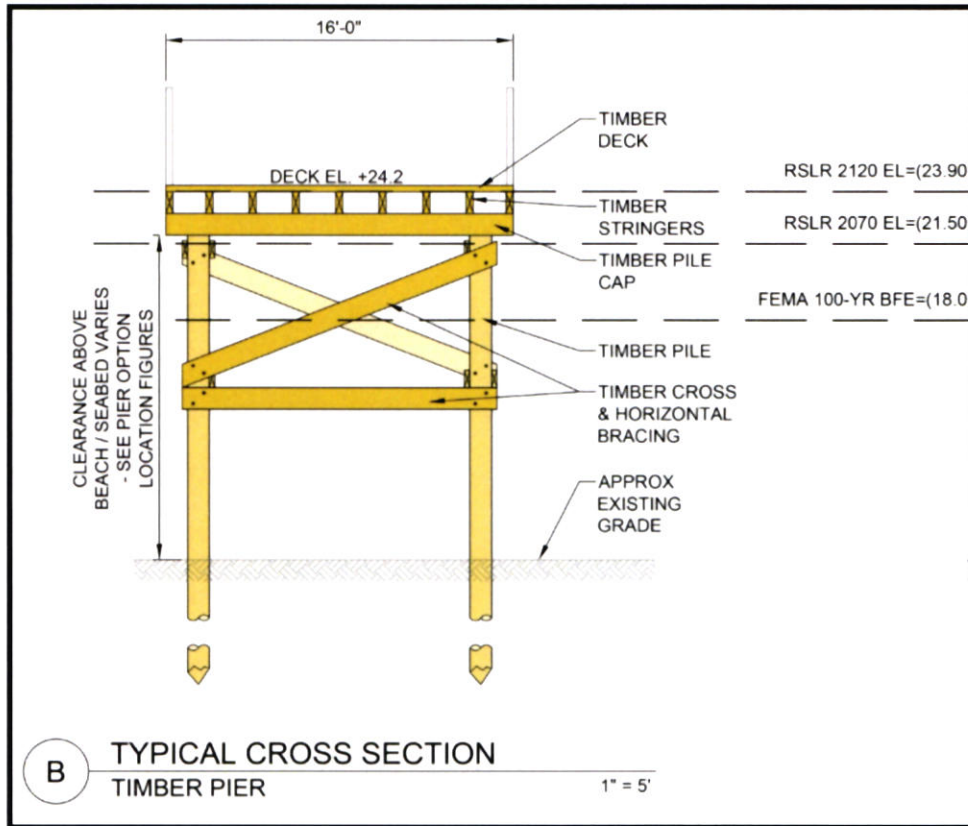


Fig. 25 – Proposed Timber Pier Conceptual Cross Section

The design life of a structure is dependent on the durability of the materials and quality of the construction. It can often be extended through routine maintenance and repairs. Depending on the condition of the structure the structure can often have a continued service life however may require some load restrictions and anticipated increased maintenance costs.

It should be noted that the specific means and methods of construction are unknown at this time, as a contractor has yet to be selected. The project will be a state capital project and must follow public procurement laws. As such, the following discussion provides a description of possible installation methodologies understanding local construction practices, environment, and regulatory processes.

4.4.1 Substructure

Pier foundations would likely consist of piles due to their relatively low impact and cost effectiveness as opposed to a solid fill structure. Piles are often constructed of timber, steel, or concrete with decisions on pile types being selected based on the bent spacing, capacity, and number of piles, properties of the soil, variations in pile lengths, availability of materials, durability, and installation equipment all being important considerations. The piles are typically driven into the ground using vibration or impact hammers to install the pile to the designed depth or resistance.

Timber piles generally have the shortest design life expectancy due to marine borer deterioration, decay, and damage however also generally are the lowest cost. Timber piles typically have span limitations of 10 to 15 feet due to capacity requirements and are limited in size to approximately 65 feet in length 14-inch diameter although larger sizes are possible. These piles typically have a 25-year design life expectancy for treated Southern Yellow Pine or 35 to 50 years for greenheart piles. It should be noted that timber piles may not be feasible if shallow bedrock is encountered as they would not achieve minimum required embedment depths to resist lateral and uplift loading.

Steel or concrete piles provide greater capacity, length, and site options. Often resulting in a reduced quantity of piles required. The spans between piles can typically be 20 feet or greater utilizing these pile types.

Steel piles can be driven open ended with less displacement of soil material or closed ended displacing and compacting the soil around the pile. The small cross-sectional area of steel piles can make them easy to drive for installation. They also allow for flexibility in varying site conditions with ability to add or cut off sections of the pile to achieve the required height. One disadvantage of steel piles is corrosion in the marine environment. Coatings or jackets are often applied to the exterior of the piles to help protect against corrosion however require routine maintenance to reapply the protective coatings every 8 to 10 years.

Concrete piles are less frequently utilized within the northeast due to variability of site conditions and freeze-thaw interaction however concrete piles do provide greater corrosion protection than steel piles.

Depending on the geotechnical properties of the site the foundations shallow bedrock has potential to dictate the need for utilize rock sockets. The piles would be anchored into the bedrock by coring into the rock and grouting the annular space between the pile and rock to provide lateral and uplift capacity. Based on the observed ledge outcroppings at the northern end of the beach it is anticipated that rock socketed piles would be required if a pier were to be sited within this portion of the site.

4.4.2 Superstructure

The superstructure of the pier will consist of the pile caps and stringers supporting the deck and be supported by the pile foundations. The superstructure components could also be constructed of timber steel, concrete, or a combination thereof depending on material preferences, load capacity, span length, constructability, and cost.

Concrete superstructures are often utilized for modern day pier construction due to their durability, constructability, and service life in the marine environment. Precast concrete elements can be constructed offsite in controlled environments and then mobilized reducing the overall length of time required for onsite construction.

Timber superstructure elements have historically been utilized in pier construction due to their availability, flexibility to change, and cost effectiveness. In general, the construction of timber superstructure requires more material and increased onsite construction time over precast elements but require reduced equipment size due to their relatively light weight. They are less expensive compared to other materials. Timber elements will require more regular routine maintenance to replace deteriorated boards and loose connections. The life expectancy of timber deck elements exposed to the weather is typically 15 to 25 years.

4.4.3 Decking and Railing

The pier deck may consist of timber, concrete, or a combination thereof. Due to the limited loading required for the pier both options are viable.

Timber decking provides a softer more natural feel than concrete and typically is more cost efficient however will require more routine maintenance.

Concrete deck elements would likely have a greater initial cost but reduced maintenance and potentially reduced onsite construction time if precast concrete elements were utilized.

The pier will require curbs and railings to protect the pier edges. Varying heights of the railing will be required with railings extending 42 inches above the deck surface typical and 34 inches above the deck surface at periodic points to allow ADA accessible viewing over the rails.

4.5 Site Improvements

In support of a new pier, a variety of site improvements should be considered to provide adequate access to the pier from the seawall, and/or from the beach. Some of these onshore facilities could be accommodated by locating the pier adjacent to areas along the Beach that currently provide them (i.e. near the Seashell which has dedicated handicap parking, bike racks, shade shelters, restrooms, etc.) At other locations, these amenities might be physically added near the new pier, or addressed by designation and enforcement, such as for parking and provision of Handicap and pier user parking spaces. All site improvements should be located in consideration of walking distance to the pier, given the pier itself will be of significant length, and the goals to have the pier be ADA accessible and intended for a variety of passive recreational uses.

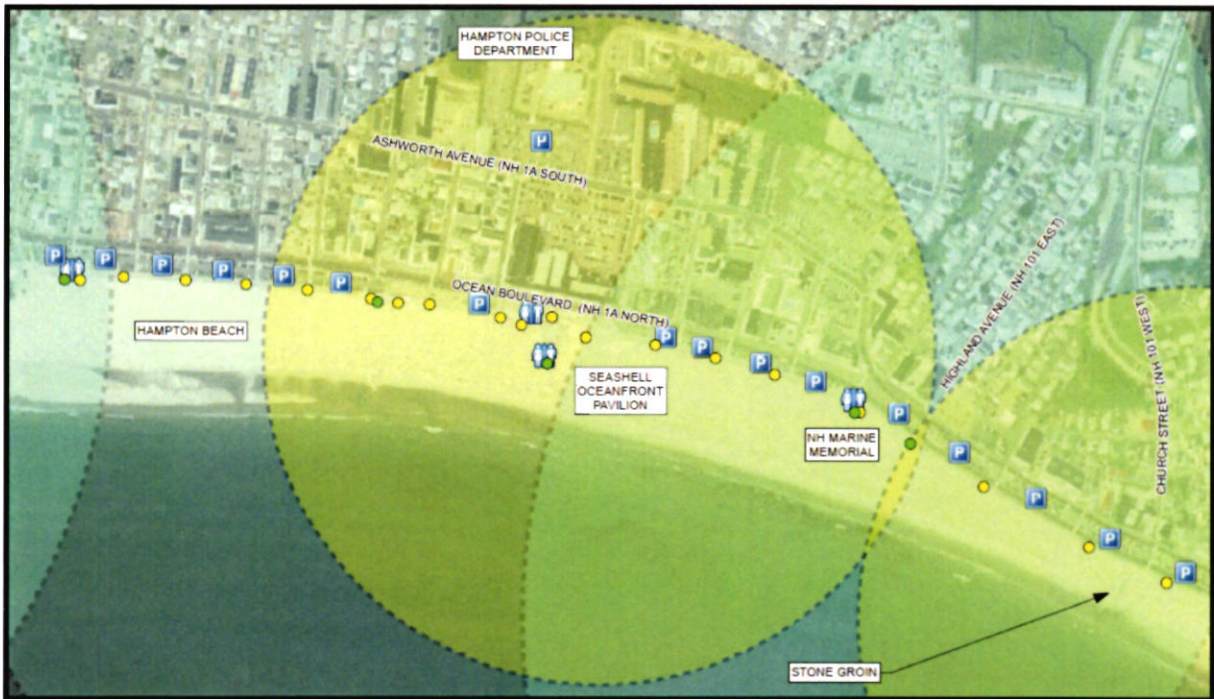


Fig. 26 – Portion of 06 – Site Accessibility Map

(See Appendix B – 06 – Site Accessibility Map)

4.5.1 Grading

In addition to the prior discussion of ADA access to the pier, and to the pier from the beach nourishment and grading may be required to meet desired finished grades. At a minimum, it is understood that the State regrades a significant amount of sand on average each year after winter storms deposit beach sand up against the seawall. Options to start the pier approach at beach grade should carefully consider the routine movement of sand and changes in elevation of the beach.

4.5.2 Appurtenances

To furnish the site and improve site functionality various appurtenances may want to be considered. These appurtenances could include benches placed along the shoreside interface and on the pier at dispersed locations providing a variety of resting and viewing opportunities, bicycle racks, shade structures, interactive signage, lighting, flag poles, life rings, ladders, trash receptacles, restrooms, fire protection, or other preferred appurtenance options. At this level of conceptual design and planning, costs for these items have been included in the estimates, and space for these features, in addition to pedestrian and vehicular access needs along the pier are generally accommodated. As the planning and design develops further, selection of pier appurtenances to support the prioritized pier uses, and to establish a pier aesthetic that is either unique to the pier structure, or in keeping with the recent State redevelopment project amenities will be decided in greater detail.



Examples of Pier Amenities (Images from Internet)



Examples of Existing Site Amenities at Hampton Beach

4.5.3 Parking

Public parking is readily available along Ocean Boulevard (Rte 1A) where it adjacent to the sidewalk and seawall. Parking is either immediately adjacent to the seawall where Ocean Boulevard is a single lane heading north, from N Street to Highland Avenue, or it is located in between the north and south bound lanes of Ocean Boulevard, from Highland Avenue to Boars Head. Public parking is also at the Town’s Police Department parking lot. Parking for Hampton Beach State Park is available for that facility’s visitors.



Existing Parking at State Park, Near the Seashell and at the North End

There is little space available to create new parking opportunities along Ocean Boulevard. If parking spaces are desired immediately adjacent to the pier, the pier would either need to be located between N Street Highland Avenue, or new parking spaces would need to be constructed along Ocean Avenue between Highland Avenue and Boars Head.

Adding parking spaces for a pier along the north end of Hampton Beach will require coordination and approvals from NH DOT and NH State Parks and Recreation. It is possible to provide on-street, parallel parking in this area either by adjusting the sidewalk, existing travel lane(s) and middle parking area, or by constructing a bumpout over the beach to accommodate new on-street parallel parking space while leaving the existing Ocean Boulevard travel lanes and middle parking area alone.

If parking is located immediately adjacent to the pier it should include a minimum of two (2) designated “Handicap Parking” spaces, with one of the spaces designated as “Van Accessible”. In addition to adding parking spaces adjacent to the pier, space could be provided for a drop off area, with would support a variety of pier user operational needs to load and unload passengers, materials and equipment.

If parking is maintained at its current locations along Ocean Boulevard, it is recommended that the nearest two (2) parking spaces be designated as “Handicap Parking” spaces, with one of the spaces designated as “Van Accessible”. Given the popularity of Hampton Beach and

limited parking on peak visitor days, enforcement of the dedicated Handicap Parking spaces may be required.

It may also be desired to dedicate some parking near the pier for “Pier Use Only”. This is a policy decision that needs further discussion with the project stakeholders responsible for owning, operating and maintaining the facility. Dedicated parking may require additional staff to monitor the spaces.

It is recommended that further evaluation of parking and ADA accessible parking be completed in coordination with current NH DOT Ocean Boulevard Improvements project.

4.5.4 Restrooms

Existing public restroom facilities are located at the State Park, and along Ocean Boulevard between N Street and the NH Marine Memorial. A pier located at Hampton Beach State Park or in the middle of the beach would have readily available access to these facilities. A pier located on the north end of the beach would be approximately one-quarter mile at a minimum away from the nearest restroom facility. If a pier is located on the north end of Hampton Beach, consideration should be given to adding a new facility near the pier. It could either be located on a bumpout area off the seawall, or within the median area between the divided Ocean Boulevard travel lanes, which would require displacement of parking spaces.

4.6 Environmental

Pier structures are impacted by a diverse assortment of physical environmental factors including: Lateral hydrostatic forces, vertical (buoyant) hydrostatic forces, hydrodynamic forces, surge forces, impact forces of flood-borne debris, breaking wave forces, localized scour, UV exposure, corrosion, sea level rise. All of these factors play into design and selection of material types for piers. By considering these environmental factors, more sustainable pier construction can be provided in the harsh marine environment thereby reducing overall life cycle costs and limiting potential risk of debris damage.

Other environmental factors that will need to be considered in terms of pier location include:

- Visual impacts of the pier from the perspective of abutting properties, and from those using the beach; and
- Physical impacts of the pier to the site (accessibility under the pier), and to flora and fauna habitat (Piping plovers and seal haul out areas)
- Potential risk of pier debris impacting adjacent and nearby properties or adjacent properties impacting the pier.

More detailed discussions regarding environmental regulations, and coastal climate risks are discussed in further detail in *Section 6 – Regulatory Impact Review and Section 7 – Climate Change, Resiliency and Risk*.



Seasonally Cordoned Piping Plover Nesting Area on Beach



Seals Near North End of Beach

5. Comparable Pier Research

A new pier at Hampton Beach for public access and with a variety of potential uses is fairly unique to New Hampshire, and New England of late. Given the anticipated range of user needs, as well as those responsible for operating and maintaining the pier and lack of familiarity with such a coastal structure in the area, GEI reached out to several pier facility operators with public piers at locations piers from Maine to Florida. The following piers were chosen for comparison. Varying levels of operator input were received for each pier.

5.1 Old Orchard Beach Pier, Maine

The Old Orchard Beach Pier is located in Old Orchard Beach Maine and was most recently rebuilt in 1980. The pier is privately owned and has souvenir shops, food vendors, and restaurants. The pier is 500 ft long and 28 ft wide and is constructed with timber. Although the pier is not public or built for fishing, this pier was included as it is a popular tourist attraction in New England.



Old Orchard Beach Pier (Image from Internet)

5.2 Oak Bluffs Pier, Massachusetts

The Oak Bluffs pier is public and was constructed in Oak Bluffs Massachusetts in 2014 after the community vocalized a need for a fishing pier. The pier is 317 ft long, 12 ft wide and is “L” shaped. The pier is a hybrid pier with steel piles, concrete pile cap, and timber decking. The project was estimated to cost \$1 million in 2014.



*Oak Bluffs Pier
(Image from Internet - GEI Project)*

5.3 Rocky Point Pier, Rhode Island

The Rocky Point fishing pier was finished in 2020 for \$1.8 million in Warwick, Rhode Island. It is a public fishing pier located on the Rocky Point State Park. The pier is 280 ft long and has a “T” shape to allow for more space to fish from in the deeper water. Majority of the pier was constructed using timber.

GEI Consultants was able to successfully contact someone from the State who was part of the planning process of the pier. Some comments that were brought up about the pier include:

- The pier is not rated for vehicles.
- There are no swimming signs posted, but people still jump off the structure.
- The new structure has already experienced some damage due to improper use of the structure such as people riding bikes into the handrails and damaging grid railing “baluster.”



Rocky Point Fishing Pier (Image from Internet)

5.4 Ventnor City Fishing Pier, New Jersey

Ventnor City fishing pier is located in Ventnor City in New Jersey. The pier is owned by the town and is partially open 24/7 to the public and the rest of the pier is gated for paid fishing access. The pier is longest ocean fishing pier in New Jersey at 1000 ft long, has various widths, and is constructed out of timber. According to the town, the original pier was built in

1914, rebuilt after a fire 1940, and rebuilt again after a storm in 1963. The current pier underwent a nine-month renovation in 2007 for \$3.2 million. In June of 2020, the fishing pier reopened after a \$520,000 project was completed to add a pier house which includes bathrooms, a concession stand, and an office for the pier master.

With the pier being open 24/7, a news article cited in July 2021 that Ventnor introduced an ordinance to ban overnight sleeping or camping on the pier and that one must be actively fishing at night. (<https://www.downbeach.com/2021/07/13/ventnor-approves-6-5-million-bond-ordinance-employee-promotions-bans-sleeping-on-the-pier/>)

GEI was able to contact the city about safety and general questions about the pier. The following outlines the responses:

- Access is available under the pier for ATV's and SUV's which are used by the lifeguards.
- Beach equipment, such as a front-end loader and beach rakes, work with the tides and during high tide have to access each side of the pier from the street versus going under the pier during low tide.
- The pier extends from the boardwalk which allows access from the street for safety personnel.
- Regarding incorrect usage of the pier, the pier has a gate halfway out on the pier which limits access only to those with a fishing permit (key).
 - They also have a Pier Master who works at the pier to monitor fishing and for sale of the key.
- Swimming and surfing are restricted withing 200 feet of the pier which limits interactions with fishermen.
- The pier is a great asset for Ventnor and the surrounding area and is very popular year-round especially when fish are running along the coast.
- There is a gate at the pier house which is used to restrict access during severe weather.
- Ventnor opens the pier during fireworks for 4th of July celebrations and has a special event called "Pier Night" which has been very successful.

- When asked if the town would change anything about the pier, the response was that they would consider adding a concession stand to the pier.



Ventnor City Fishing Pier (Image from Internet)

5.5 Jennette's Pier, North Carolina

Jennette's pier is located in Nags Head North Carolina. Construction on the pier commenced in 2009 for \$25 million and the pier was opened in May of 2011. The pier is privately owned by the North Carolina Aquariums. It is approximately 980 ft from the end of the pier to the aquarium building and 200 ft to the parking lot. The most narrow part of the pier is about 23 feet and the widest part is at the end of the pier and is approximately 62 feet. The pier is constructed of hybrid materials with concrete piles, concrete pile caps, and timber decking.



Jennette's Pier (Image from Internet)

5.6 Navarre Beach Fishing Pier, Florida

The Navarre Beach fishing pier is located in Navarre, Santa Rosa County, Florida. The pier construction started in 2009 and was completed with a cost of nearly \$9 million in 2010. The pier is the longest fishing pier in the Gulf of Mexico at 1545 ft long about 22 feet wide and has an octagon shape at the end of the pier. The pier sits on 150 square concrete piles and the octagonal area is 3,800 square feet. The pier is also a hybrid pier with concrete piles, concrete pile caps, and breakaway timber decking.

In 2020 the pier received new decking for \$1.2 million. The new decking is weather resistant and bolted to the pier with six bolts per plank. There are over 800 breakaway panel which can detach during extreme wave action and helps preserve the integrity of the structure which can reduce repair costs. The pier also has seven potable water spigots, 16 handicap accessible fishing railing locations, and nesting turtle friendly lighting.



Navarre Beach Fishing Pier (Image from Internet)

5.7 Jacksonville Beach Fishing Pier, Florida

Jacksonville Fishing Pier is located in Jacksonville Beach Florida. The pier was rebuilt after Hurricane Matthew destroyed the prior pier in 2016. Construction on the pier began in late 2019 and was completed in 2022 for approximately \$10 million. It is approximately 1300 linear feet long extending from the beach. The rebuilt pier was raised 8 feet and had larger precast piles utilized to provide greater resiliency. The pier is constructed of hybrid materials with precast concrete piles, pile caps, beams, and timber decking and railing.



Jacksonville Beach Pier (Image from Internet - Credit: EMT)

6. Regulatory Impact Review

It is anticipated that the following regulatory permits and approvals may be required from The Town of Hampton, the State of New Hampshire, and the Federal Government for the proposed pier.

6.1 Town Permits

6.1.1 *Town of Hampton – Wetland Conservation District Zoning Ordinances*

The Town of Hampton has established a Wetland Conservation District (WCD) (Section 2.3 of the 2022 Zoning Ordinance and Building Codes of the Town of Hampton, NH) which has jurisdiction over proposed projects in the Atlantic Ocean and Hampton Harbor. The WCD Ordinance also applies a Buffer with extends fifty feet (50 ft.) from the tidal wetland.

An Application for a Wetlands Permit – WCD will need to be filed with the Hampton Planning Board. The Conservation Commission’s role in the review of the application is to provide its recommendations to the Planning Board within 40 days of the date on which the application is filed. Any Wetlands Permit is valid for two years from the date of issuance. If the work is initiated during that time, but not completed, the owners may apply for a two-year extension.

The applicant must demonstrate the proposed pier project is consistent with the Town of Hampton Zoning Ordinance for the Wetland Permit. Under 2.3.3 Permitted Uses different types of structures on tidal wetlands specifies that they must be constructed as to permit the unobstructed flow of the tide, preserve natural vegetation and contour of the tidal wetland.

6.2 The State of New Hampshire Permits

6.2.1 *Standard Dredge and Fill Wetlands Permit Application*

A wetland permit application will need to be filed with the New Hampshire Department of Environmental Services Wetland Bureau (NHDES) to permit the pier because the proposed pier falls under the jurisdiction of RSA 482-A; Env-Wt 100-900). Applications are reviewed within 50 days from the issuance of an Administrative Completeness Notice. The State Wetland Permit is valid for five years with the opportunity for one extension of five years.

NHDES recommends conducting a pre-application meeting or telephone call to discuss if the project will be considered a minor or major project, and to discuss the information to be

submitted to support the application. The New Hampshire Natural Heritage Bureau will need to be contacted for a data request of any state or federal rare species. Also, verification if the proposed project is within a designated Prime Wetland must be completed.

6.2.2 Shoreland Protection Permit

An application must be submitted for a Shoreland Protection Permit to NHDES under RSA 483-B; ENV-Wq 1400, the Shoreland Water Quality Protection Act. The Shoreland Permit is for projects involving excavation, fill or construction activities within 250 feet of the water body.

NHDES reviews applications within 30 days of receipt and may issue a request for additional information. Shoreland permits are valid for five years.

During the pre-application meeting with NHDES regarding the Dredge and Fill Permit, the Shoreland Permit should also be discussed to confirm applicability and information needed.

6.2.3 Section 401 of the Clean Water Act Water Quality Certification

A 401 Water Quality Certification (WQC) from NHDES Watershed Management Bureau may be required for the placement of fill below the elevation of the high tide line at the project site. A consultation is recommended to determine if this application is warranted. Applicants for activities that are covered under federal general permits including, but not limited to, the U.S. Army Corps of Engineers Section 404 general permits do not need to apply for WQC unless notified by NHDES. This is because NHDES has already issued a WQC for activities covered under those general permits.

6.3 Federal Permits

6.3.1 Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act of 1899

A Section 404 of the Clean Water Act Permit is required for the placement of fill or dredged material below the elevation of the High Tide Line and for the placement of structures within navigable waters from the US Army Corps of Engineers (USACE). The General Permits for the State of New Hampshire were issued September 29, 2022.

A pre-application meeting or telephone call is recommended to discuss with the USACE if the proposed pier can be permitted under General Permit 4, Pile-Supported Structures and Floats with pre-construction notification (PCN) or if an Individual Permit (IP) is required. The review of a complete PCN by the USACE typically requires 60 days. The review of an IP application typically requires 120 or more days, depending on the level of potential impacts. The permit is valid for five years.

7. Climate Change, Resiliency, and Risk

Hampton Beach exists in a dynamic exposed ocean environment along the New Hampshire coastline. There are several key environmental factors that are constantly influencing the physical, social, and economic conditions of the Hampton Beach area. Each of these is important to consider both in terms of historic trends and predicted future changes as next steps towards implementation of a new pier at Hampton Beach move forward are considered. An action plan should be established that considers resiliency measures in preparation for potential increases in flood risk. In addition to the wind, wave and tidal assessment factors noted previously in this study, potential future coastal climate risk factors include:

- Coastal Flooding
- Sea Level Rise
- Coastal Storms

7.1 Flooding

There is an extensive amount of historical flood data that Federal Flood Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM)s and most current regulatory policies are based on.

- The Town of Hampton participates in the National Flood Insurance Program (Community ID #330132). FEMA has recently updated a Flood Insurance Rate Study (FIS) for Rockingham County effective January 29, 2021.
- FEMA has recently developed FIRMs for the Hampton Beach area effective January 29, 2021.

These FEMA 100-Yr BFEs have a 1% annual chance of occurrence within any given year. This prediction is based on historic data and does not consider potential increases in flood elevation or rate of recurrence due to predicted future climate change scenarios. FEMA cannot say with any greater level of certainty that future conditions will be under or exceed these flood levels, nor do they predict changes in the rate of recurrence and annual exceedance probabilities of these flood events over a 100-Yr period.

- Future flood impacts are challenging to predict with exact certainty. A 0.2% or 1% flood, or a 500-Yr BFE or 100-Yr BFE respectively, doesn't sound like something that poses an eminent threat, yet the rate of annual exceedance probability can vary and has been increasing in recent decades. Recent examples of this include the back to back storms (Irene and Sandy) that occurred within one year of each other and exceeded 500-year storm conditions in several areas along

the northeastern seaboard. This past year include record Hurricane Fiona (eastern Canadian maritime provinces) and Hurricane Ian (Florida).

- Hampton Beach has experienced several significant coastal storms over the past couple of decades, often with storm surge on top of astronomic high tide conditions. The most recent was this past January, and there have been eight (8) other storm related flood events since 2000.

- Terms like 100-Yr flood and 500-Yr flood, or 1% and 0.2% chance are often misunderstood and should be looked at more in terms of recurrence intervals (years) and annual exceedance probabilities (%). A 100-Yr flood has a 1% chance of occurring in any given year. Over a 10-year period, there is an approximate 10% chance of a 100-Yr flood occurrence, and so on. Add in the increasing frequency of extreme flood events and SLR over the past couple of decades in

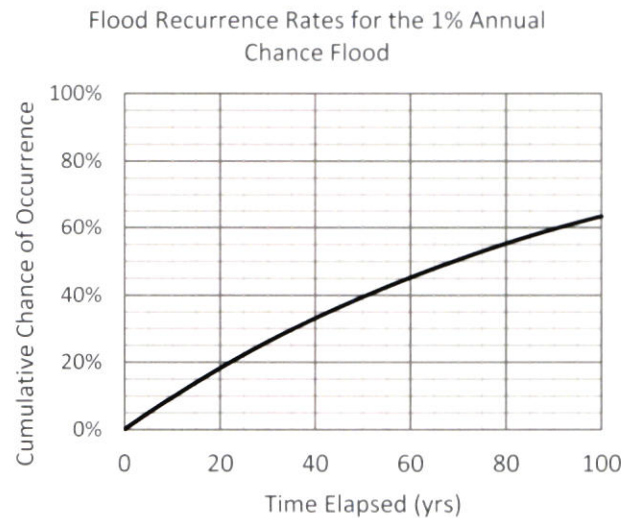


Fig. 20 – Flood Recurrence Rates

comparison to the previous century and the 100-Yr flood probabilities increase as the historic flood of record is less substantial than events we are experiencing more recently and at higher frequencies.

- Often perceived flood risks don't always match actual flood risks, especially when flood elevation estimates and lines on maps are based on historic information only and may not reflect what is occurring today, nor what may become increasingly likely to occur in the future. Having lines drawn on the FEMA FIRMs should not give the community a 100% sense of comfort that those are the limits of flood boundaries.
- There is also an increasing amount of scientific climate change study and predictive storm modeling data that is continually being refined and should be considered further during future pier project planning, design, funding and construction phases.
- Under current effective FEMA 100-Year flood predictions, the majority of the Hampton Beach area would be inundated, including most of the access roads to

other parts of the Town of Hampton, and neighboring Hampton Falls, North Hampton and Seabrook. These current risks, along with potential increased flood risks from relative sea level rise and/or increased frequency and severity of coastal storms are something that has been studied extensively in the area and should remain a key consideration for future implementation of a new pier, in light of flood risks to the entire Hampton Beach area.

(See Appendix B – Figure 4 Coastal Hazards Map)

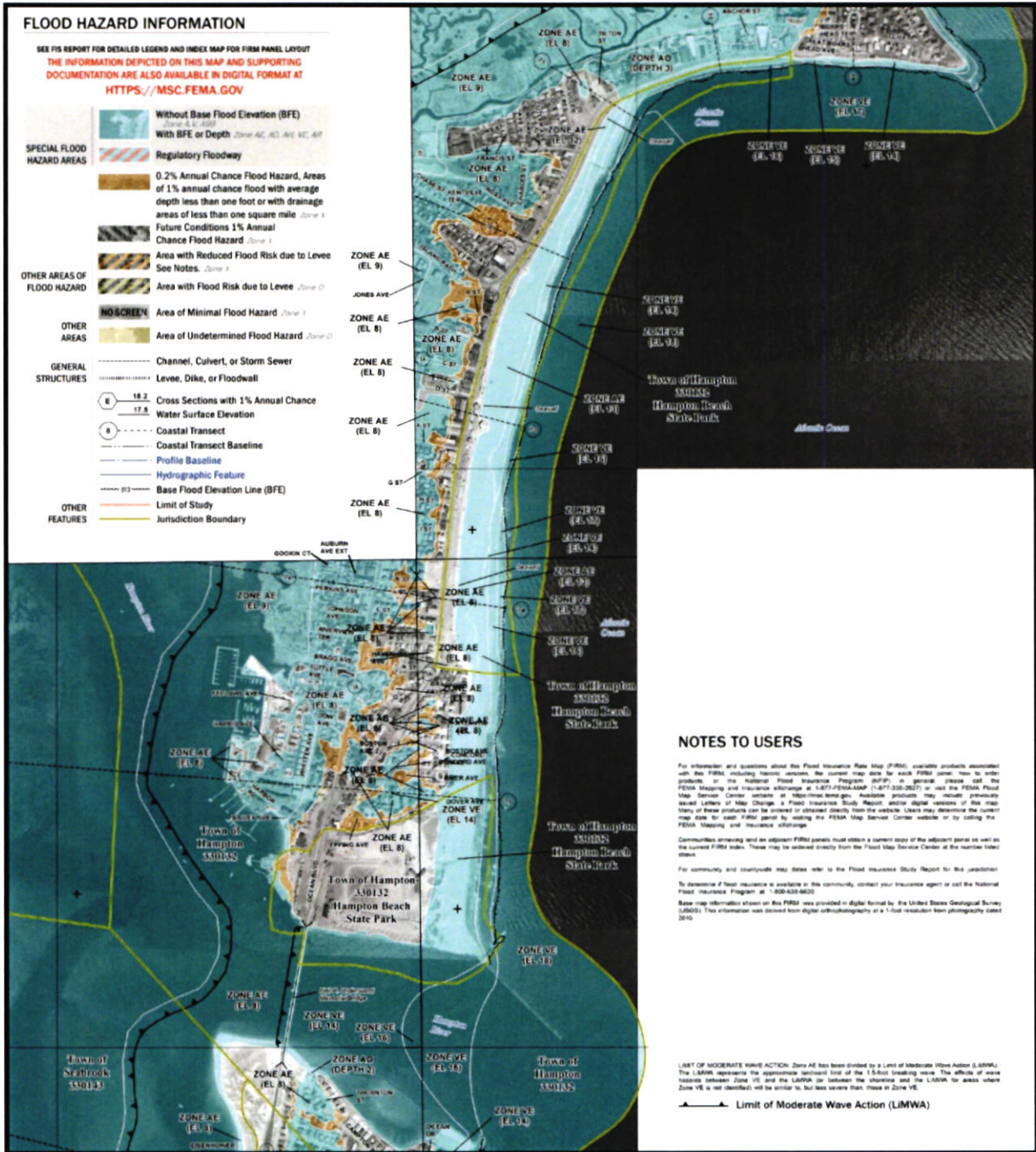


Fig. 21 – Composite Image of FEMA FIRM 33015 Panels 439, 441 & 442

7.2 Sea Level Rise

Advances in predictive scientific modeling of climate change in combination with over a century of historic data indicate that SLR is occurring and is likely to continue to occur over

the next century. As this project may take a decade or more to implement, it is recommended that the latest scientific projects of SLR be considered prior to constructing the pier.

Selection of relative sea level rise scenarios in consideration of the pier conceptual designs are re described in *Section 3.1 – Tide and Currents* above. The tables below show predicted design flood elevations adjusted with relative sea level rise in various FEMA FIRM Zones at Hampton Beach. The VE Zone (18) represents the worst-case scenario flood level along and is recommended for use at any proposed pier location on Hampton Beach.

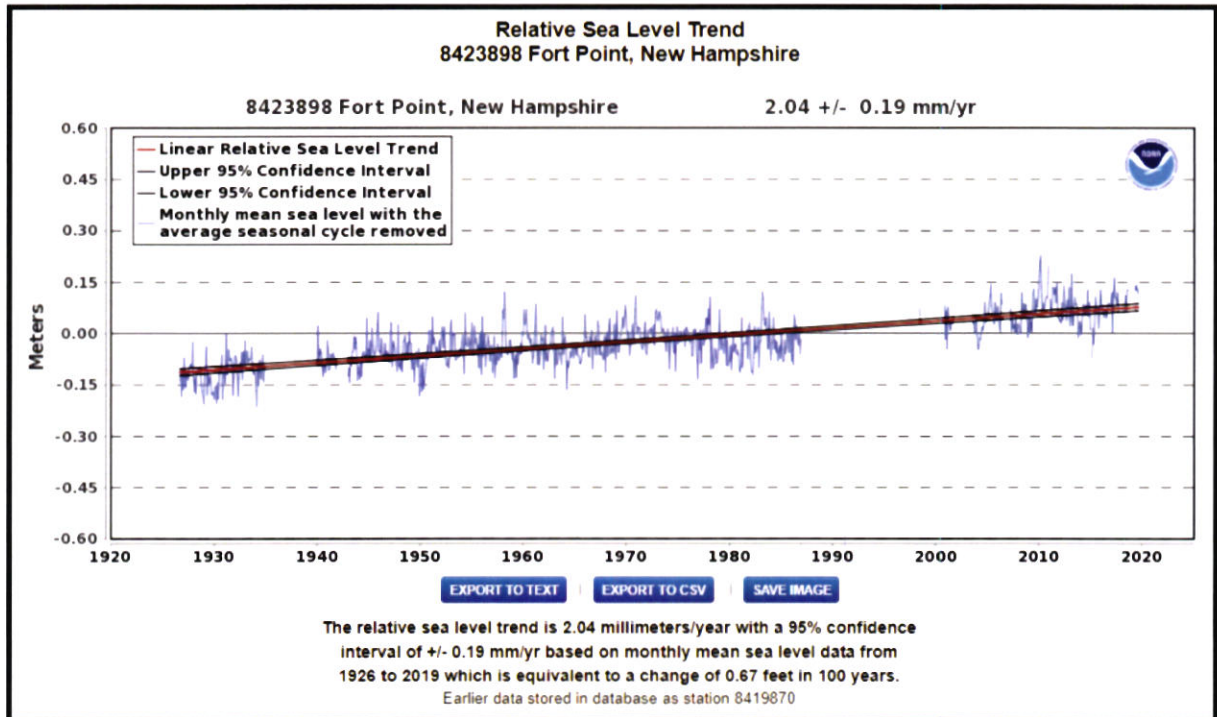


Fig. 22 – NOAA Relative Sea Level Rise Trend for Station 8423898 – Fort Point, NH

Table 7. Relative Sea Level Rise Predictions in AE Zone (12) in NAVD88

Coastal AE Zone (12)				
Year	RCP 4.5 RSLR (ft)	BFE from FIRMette (ft)	Required Freeboard (ft)	RSLR adjusted DFE (ft)
2050	1.6	12	1	14.6
2070	2.5	12	1	15.5
2100	3.8	12	1	16.8
2120	4.9	12	1	17.9

RSLR: Relative Sea Level Rise
 RCP 4.5 can be found in the New Hampshire Coastal Flood Risk Summary (2020)
 BFE: Base Flood Elevation
 DFE: Design Flood Elevation

Table 8. Relative Sea Level Rise Predictions in VE Zone (16) in NAVD88

VE Zone (16)				
Year	RCP 4.5 RSLR (ft)	BFE from FIRMette (ft)	Required Freeboard (ft)	RSLR adjusted DFE (ft)
2050	1.6	16	1	18.6
2070	2.5	16	1	19.5
2100	3.8	16	1	20.8
2120	4.9	16	1	21.9

RSLR: Relative Sea Level Rise
 RCP 4.5 can be found in the New Hampshire Coastal Flood Risk Summary (2020)
 BFE: Base Flood Elevation
 DFE: Design Flood Elevation

Table 9. Relative Sea Level Rise Predictions in VE Zone (18) in NAVD88

VE Zone (18)				
Year	RCP 4.5 RSLR (ft)	BFE from FIRMette (ft)	Required Freeboard (ft)	RSLR adjusted DFE (ft)
2050	1.6	18	1	20.6
2070	2.5	18	1	21.5
2100	3.8	18	1	22.8
2120	4.9	18	1	23.9

RSLR: Relative Sea Level Rise
 RCP 4.5 can be found in the New Hampshire Coastal Flood Risk Summary (2020)
 BFE: Base Flood Elevation
 DFE: Design Flood Elevation

7.3 Coastal Storms

Many of the points noted in the *Flood* section above are also relevant to coastal storm impacts on Hampton Beach.

- The extent and magnitude of flooding from coastal storms depends on their severity, timing and duration. If a storm passes quickly and at low tides, flood damage may be minimal. If it occurs at high tide and for a long duration, then flooding may be more extensive.
- The National Weather Service (NWS) in coordination with NOAA, has developed the Sea, Lake and Overland Surges from Hurricanes (SLOSH) computerized numerical model to estimate storm surge heights resulting from historical, hypothetical, or predicted hurricanes. NWS and NOAA use this model to look at predicted worst case storm surge scenarios by modeling the Maximum Envelop of Water (MEOW). In addition to this scenario, NWS and NOAA model the Maximum of the MEOWs (MOM), representing the most conservative storm surge scenario under their scientific modeling predictions. According to SLOSH model, estimates under the MOM scenarios for Category 1, 2 and 3 hurricanes at Hampton Beach could potentially inundate significant portions of the community. Predicted increases in relative sea level rise would likely further increase these impacts from storm surge.



Fig. 23 – National Hurricane Center Storm Surge Risk Map – Category 1 Hurricane

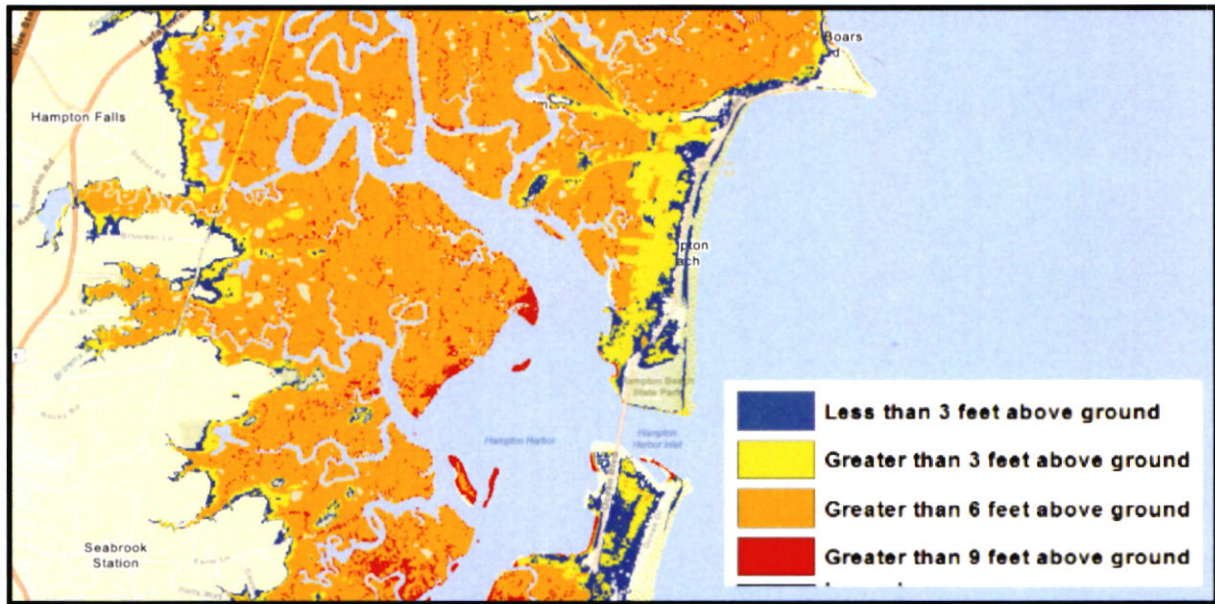


Fig. 25 – National Hurricane Center Storm Surge Risk Map – Category 2 Hurricane

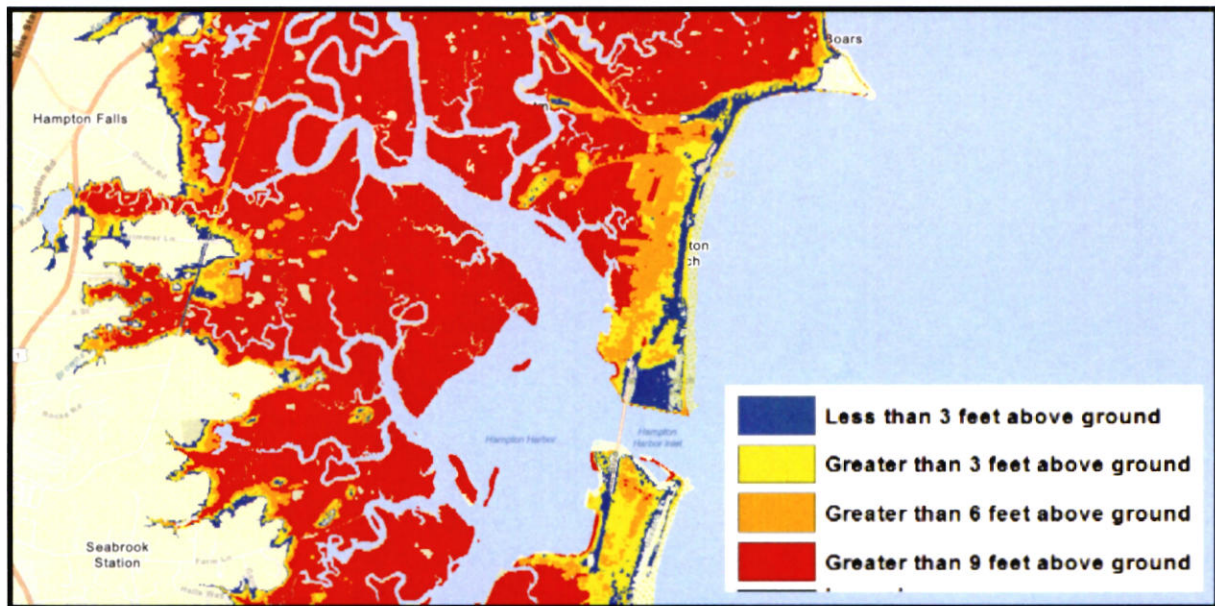


Fig. 24 – National Hurricane Center Storm Surge Risk Map – Category 3 Hurricane

- Nor-Easters are storms along the East Coast of North America that are gaining increased attention in New England where they are much more likely to occur versus hurricanes. They often have longer durations than hurricanes and typically occur between November and April when astronomical high tides routinely coincide. These storms can create significant damage when they last over two consecutive tide cycles. This was the case during the “Blizzard of 1978”, which

brought storm surges of 4 to 6-feet above predicted flood levels at the time, along with extreme wave heights of 10-feet to much of the Northeast coastline.

- Since the late 1800s, the National Hurricane Center's (NHC) hurricane strike data set records indicate that four (4) hurricanes and fourteen (14) tropical storms have passed within 25 miles of Hampton Beach.

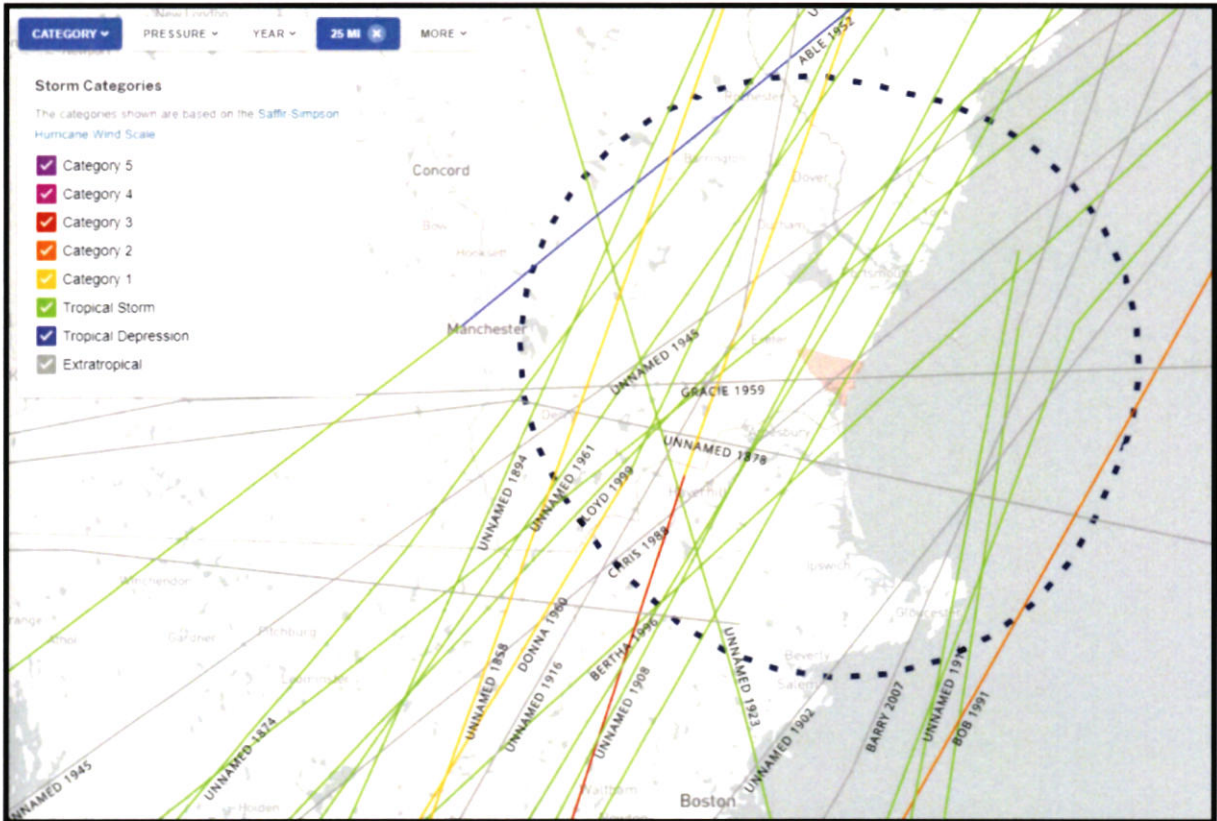


Fig. 26 – National Hurricane Center Historic Hurricane & Tropical Storm Strikes (1858 – 2021)

7.4 General Predicted Climate Change Trends

Predicted climate change trends in the Hampton Beach are identified by a wealth of recent studies in the area are informed by a significant wealth of recent research and study efforts by the Town of Hampton, Rockingham Planning Commission, The University of New Hampshire, CHAT, SHEA, NH DES Coastal Program and others. GEI generally is in agreement with the findings of these efforts.

Again, as noted elsewhere in this report, it is recommended that these studies be considered in light of any new scientific data and predictions, as the pier project moves forward, likely taking a decade or more to implement.

Many of today's governmental regulations are based on policies that pre-date recent climate change discussions and it may take a while still for research and politics to provide support for regulations that guide future planning and development in flood prone areas. The risks of potential climate change forces are not necessarily lessened because policies and regulations don't reflect them. Nor are they lessened by political boundaries between municipalities and states. When investing significant capital funds for a public infrastructure facility like a new pier at Hampton Beach, it is recommended that the pier be designed to reduce the greatest amount of risk to the structure from the coastal environment.

Additionally, project stakeholders should continue to consider the implementation of the pier in light of the predicted coastal risks to the entire community. While the pier will be designed to accommodate a level of protection from coastal environmental risk factors and their predicted future changes, this level of risk protection may likely be above the potential risks to other parts of the Hampton Beach community, including existing beach facilities, adjacent properties, and access roads to and from Hampton Beach to points inland.

Appendix A

Pier Advisory Committee Input Summary

The Pier Advisory Committee (PAC) served as the key local, regional and state stakeholder representatives, providing input to assist GEI with development of the New Pier Feasibility Study. Their input was received through the following engagement efforts:

- Kick-Off Meeting – Video conference meeting held on July 14, 2022.
- Site Meeting – In-person meetings at the State’s Seashell building and during walking tours of Hampton Beach held on August 23, 2022.
- Online Input Survey - Offered by GEI to the PAC during September, 2022.
- General Input - Received by GEI via direct phone calls and emails from individual PAC members over the duration of the project.
- Draft Feasibility Study Review Meeting – Video conference meeting held October 21, 2022.

Summaries of each of these engagement efforts are provided under Appendix A, and as noted throughout the report.

At the conclusion of the study, GEI presented the project to the Hampton Beach Area Commission at their regularly scheduled monthly meeting at 7:00pm on October 27, 2022 at the Town Hall Selectmen’s Meeting Room. This meeting was recorded by the Town of Hampton on local cable channel 22 and is available for viewing on the Town’s website.

MEETING MINUTES

Subject: Kickoff Meeting
Hampton Beach New Pier Feasibility Study
GEI Project No. 2202415

Date/Time: July 14, 2022: 2:00PM – 3:00PM

Location: Video Conference (Zoom): [Click Here to Join](#)
Meeting ID: 897 9394 0633
Passcode: 097287
Tel: 1 (669) 444-9171

From: Travis Pryor, RLA /, LEED-AP – Project Manager, GEI Consultants

Attendees: *GEI Consultants:*
Travis Pryor, Dan Bannon, Dan Robbins, Alex Gray

Hampton Beach Area Commission (HBAC):
Nancy Stiles, Ann Carnaby, Barbara Kravitz

Pier Advisory Committee (PAC):
Alex Loiseau, John Nyhan, Bob Preston, Susan Whicher, Gordon Whicher, Skip Windemiller, Bob Ladd, Jim O’Loughlin, Dave Hobbs, Keith Lessard, Ben Moore, Breanna O’Brien, Mike McMahon, Tobey Reynolds, Meggan Hodgson, Rene Boudreau, Joseph Desmarais, Geno Marconi, Patrick Murphy

Others:
Shawn Hamilton; NH State Parks, Deputy of Park Operations
Monica Desmarais

Absent: *PAC:*
Pat Collins, Steve LaBranche, Richard Collins

** Italicized text denotes minutes recorded*

1. Introductions

Brief introductions by GEI Staff and PAC Committee Members present. Not all members of the PAC listed below were present.

GEI:

Travis Pryor Dan Bannon Dan Robbins Alex Gray

Pier Advisory Committee:

Bob Preston Dick Roy Jim O’Loughlin
Patrick Murphy Michael McMahon Skip Windemiller

TJP

B:\Working\NEW HAMPSHIRE DNCR\2202415 Hampton Beach New Pier Feasibility Study\02_PM\03-Mtg\20220714-Kickoff\Mtg\2202415-HBAC_NewPierStudy-Kickoff\MtgNotes-20220714.docx

John Nyhan	Ben Moore	Tobey Reynolds
Meggan Hodgson	Keith Lessard	Alex Loiseau
David Hobbs	Steve LaBranche	Rene Boudreau
Breanna O'Brien	Susan Whicher	Gordon Whicher
Joe Desmarais	Pat Collins	Geno Marconi
Meredith Collins	Greg Grady (Alternate)	

2. Contact information and communication protocols *(No comments on this item)*

GEI: Travis Pryor

PAC: Bob Preston, Chair

tpryor@geiconsultants.com

bobpreston100@gmail.com

Tel: (207) 797-8904

Tel: (603) 234-4993

3. Project Background: *(No comments on this item)*

2022 Session New Hampshire Legislature

SB 346 An ACT relative to a feasibility and impact study for the construction of a pier on Hampton Beach has been adopted by both bodies.

Goals

- a. The primary goals of this Feasibility Study are to identify an appropriate location for a new ADA accessible pier that provides improved life safety access seaward of the beach and beyond the breakers.
- b. ADA access to the water is priority number one.
- c. The project will study and seek to identify anticipated local impact through a public meeting process.
- d. Limits of project are within the Hampton Beach Area with specific focus south of Boars Head
- e. The State and HBAC have a schedule objective to complete the Feasibility Study by November 1, 2022.
- f. Other? *(No comments on this item)*

Additional Project Design Goals from PAC? *(No comments on this item)*

4. Schedule *(No comments on this item)*

Kickoff Meeting

July 2022

Basemapping	July 2022
Site Visit / PAC Meeting	August 2022
Draft Concept Plan Options	September 2022
Draft Preferred Concept Plan	October 2022
Final Feasibility Study Report	November 1, 2022

5. Pier Examples: *(No comments on this item)*

We are providing a range of pier options for initial discussion with HBAC to determine which types are acceptable for consideration during the development of the feasibility study.

COMMERCIAL PIER



Old Orchard Beach Pier – Old Orchard Beach, ME (Image from Internet)

TIMBER PIER



Fort Foster Pier – Kittery, ME (Images from Internet)

TIMBER PIER w/ STEEL PILES & CONCRETE CAPS



Payson Pier – Cumberland, ME (Image from GEI)

CONCRETE PIERS



Town Pier – Plymouth, MA (Image from GEI)



Fishing Pier – Burlington, VT (Image from Internet)

CURVILINEAR PIER



7th St Wharf Recreation Pier – Washington, DC (Images from Internet)

6. Other discussion items?

- a. Pier out past breakwater / surf zone. Estimated at 1,200+ LF?

(No comments on this item)

- b. Potential dates for August site visit?

None proposed. GEI will coordinate with Bob Preston.

- c. Other?

- *Accessibility of parking near the pier is important. If the pier is located in the middle of the beach, then there may not be a lot of parking readily available nearby.*
- *Allow for smaller cruise ships to dock at pier, or moor nearby and access the pier by tenders? This approach could increase pedestrian traffic to Hampton Beach without impacting parking.*
- *Can the pier provide access to the beach?*
- *Can the pier be located at the Town of Hampton's Bicentennial Park at the north end of North Beach?*
- *An original idea for a new pier was to look at locating it off the stone jetty along the Hampton River. Feedback received suggested that a pier off the jetty would not last long and would also be challenging to site, use and navigate around due to nearby ocean currents. It was recommended at that time that a new pier should be sited elsewhere on Hampton Beach.*
- *Current legislative council decided to look at Hampton Beach south of Boars Head for the location of a new pier.*
- *Current legislative council's goals are to make it a non-commercial pier and provide ADA accessibility beyond the beach and over the ocean.*
- *Coastal environmental conditions are thought to have calmer waters and safer shelter immediately south of Boars Head.*
- *Question from PAC: Are there minutes of earlier legislative group discussions? GEI response: None that GEI is aware of. Just the stated goals noted above from legislative council. No specific goals are stated in authorized bill other than authorizing HBAC to study the feasibility and impacts of constructing and maintaining a pier directly south of Boars Head in the Town of Hampton. Response from Bob Preston: State public meetings held with the legislature in Concord, NH are accessible via the State's website and include testimony at the hearings leading up to approval of the bill. No final decisions regarding installation of a new pier have been made to-date.*
- *Has GEI done any research into what other local area piers are doing with regards to rescues associated with a pier on a public beach? The State's lifeguards at Hampton Beach are concerned with rescues created as a result of a new pier. GEI response: We will be reaching out to comparable facilities on the east coast to discuss their experiences with comparable piers*

Kickoff Meeting

on public beaches and we will include the feedback we receive in the feasibility study report.

- *There are ADA accessibility concerns with the length of the walk (Approximately ½ mile from the Sea Shell building area) to the north end of Hampton Beach from the rest of the beach area. There is no readily available parking near Boars Head and no formally designated handicap parking near Boars Head?).*
- *The best location for a new pier might be at the State Park, but then you might lose parking / access to other State Park facilities.*
- *Would the State allow a pier near their State Park? State Park staff response: This would need further discussion. Beside locating it on the State Park property, the jetty is an Army Corps of Engineers facility and they would need to approve a pier on the jetty.*
- *Can the new pier be located near the Marine Memorial? This is a more centralized location for Hampton Beach and currently has restrooms nearby.*
- *A new pier should provide some shaded areas with seating.*
- *A new pier should have a “T” head on the end, or some breakout balcony areas for seating.*
- *A new pier should have vertical clearance underneath for a portion of the beach above the intertidal zone (above the mean higher high water level) to transverse underneath and not divide the beach in sections as a physical barrier.*
- *Will a new pier have winter access? How would access to the pier be controlled if it is closed?*
- *Access to the new pier should be controlled (restricted) during significant storm events (Nor’Easters for example).*
- *Should fish cleaning stations be provided on the new pier? Do we want them or need to have them? Consider issues associated with nuisance smells, visual experience and as an attraction for birds.*
- *A new pier near Boars Head is “respective” of Hampton Beach.*
- *Lots of people visit Hampton Beach, but a new pier at Bicentennial Park could draw more people to North Beach. Residents would use a new pier at Bicentennial Park without having to go through Hampton Beach tourist / visitor areas.*
- *A new pier project should be coordinated with the State in terms of parking needs along Ocean Boulevard (Route 1A). Crosswalks are currently in place that provide adequate access to and from wester side of Ocean Boulevard.*
- *A new pier near Boars Head would give users an iconic view of Hampton Beach, like the one those living on Boars Head enjoy.*
- *There are probably many reasons why a new pier would be good at a variety of locations along Hampton Beach.*

Kickoff Meeting

- *Boars Head looks like it has the most protection from the environment. Is there a way to quantify how much longer it will last in a more sheltered area? GEI Response: The design of piers considers sustainable life expectancies for all potential locations, and the pier design construction costs, and operations and maintenance costs are considered in detail after the preferred pier uses and location are prioritized.*
- *How long will different pier types last in general? Should maintenance and operations costs be considered before a preferred location is prioritized. GEI response: We would design for a 50 year +/- life expectancy typically, and regardless of location. If the preferred new pier location is more exposed, then the new pier structure might become more expensive.*
- *A lot of details regarding shape and size of a new pier are based on desired uses that PAC will help define for GEI.*
- *Are the current redevelopment plans for Ocean Boulevard to far advanced to consider a new pier? NH DOT response: No. The plans are in the concept phase now. New pier access off Ocean Boulevard for parking should be coordinated in terms of any proposed impacts to the Ocean Boulevard travelway.*
- *What is the intent of ownership of the pier? GEI response: The Town or State owns the public facilities in the area and HBAC helps support implementation of improvement projects. If the new pier is on State property and owned by the Town, the State would need easement access on to and across the facility. Bob Preston replied that a new pier is likely going to be owned and operated by the State and is not likely something the Town would fund and operate.*
- *It might be difficult to get 66% approval from town voters and a bound rating for the Town to fund the new pier project.*
- *Location of the new pier should consider environmental impacts. Most of Hampton Beach has the same environmental conditions but there may be some nuances. Does NH DES have any input regarding a new pier at Hampton Beach? GEI response: We are coordinating with NH DES and will identify local, state and federal regulatory requirements for a new pier at Hampton Beach, in the feasibility study report.*
- *In the little nook just south of Boars Head there is a lot of wave action in the winter, including overtopping of the Ocean Boulevard sea wall. Wave action north of Boars Head is probably more active in general, with wave tossed stones from the beach thrown over the Ocean Boulevard sea wall in addition to overtopping waves.*
- *Was the stone groin on Hampton Beach near Church Street installed to dissipate waves? There may have been a stormwater outfall at the stone groin on the beach? It is not known by the PAC or GEI as to why it was installed.*
- *The new pier feasibility study should consider flooding potential along the entire beach. The north end of Hampton Beach near Boars Head is*

Kickoff Meeting

inundated regularly throughout the year during seasonal high tide conditions as well as during storms, with over topping of the Ocean Boulevard sea wall. What are the considerations for a new pier in light of potential increases in sea level rise and storm surge risks? Should the Town / State allocate resources to protect what is currently at Hampton Beach, should those resources be focused on protecting a new pier, or should they be allocated to both?

- *The new pier should be considered for siting north of the stone groin on Hampton Beach, across from the Church Street (Route 101) area. That area of Hampton Beach may not be as valuable to the State as the rest of Hampton Beach to the south.*
- *New pier should consider opportunities for fishing, with allowance for lower railings on pier to accommodate ADA accessibility needs for this use.*
- *GEI's scope of work tasks for the New Pier Feasibility Study should give the PAC a solid understanding of what GEI's findings will be identified to assist the PAC with prioritization of new pier uses, location and structure type going forward with implementation after the study is completed.*
- *A site visit meeting during August at Sea Shell building might be hard to get to. Parking for the meeting needs to be planned. GEI will coordinate with Bob Preston on the logistics of the site visit meeting.*
- *GEI has questions about a possible new pier goal to provide access beyond breakers for lifeguard rescue operations. Is this a goal for the State and Town lifeguard / emergency services staff? If so, what type of access to the water would you need:*
 - *A jet ski with davits to be lowered into the water?*
 - *Ladders to the water along the sides of the pier?*
 - *A new pier located in the middle of Hampton Beach for equidistant access to / from each end of Hampton Beach*

State lifeguards have not discussed this to-date. They think that water rescues would be as quick by entering the water from the beach as they would be from a new pier. State lifeguards have more concerns at this point with regards to unsafe conditions that a new pier might create. (Swimming obstructions / stronger currents, limited emergency access around and under pier, etc.)

- *Is there more info about the new pier and life safety issues that have been discussed prior to the New Pier Feasibility Study? GEI response: We have only heard from legislative council discussions that opportunities for a new pier to improve life safety operations are an improvement goal.*
- *There is no surfing allowed on Hampton Beach until the winter. If there are life safety issues past the breaking waves, rip currents would carry those in distress further out.*
- *Could a watch tower be provided on a new pier?*
- *If the State won't fund the new pier, it is not likely that a new pier project*

Kickoff Meeting

will move forward beyond the initial New Pier Feasibility Study.

- *Are there any preferences regarding materials used for pier construction?*
PAC responses:
 - *The new pier surface should drain so it isn't icy on surface during the winter.*
 - *The decking could be made of recycled plastic material.*
- *The new pier should be a year-round facility, especially if Town supports some of the funding.*
- *A new pier should be considered close to the Sea Shell building and lifeguard facilities. There is more parking in this area. There may be better life safety coverage in this area as well. Is this area also better for Town's emergency services to access? The area is congested now with vehicular and pedestrian traffic so access might be difficult. Town Police/Fire response: The Town's emergency services do not typically have access issues at any particular location on Hampton Beach.*
- *Is this a life safety benefit project or a tourism benefit project?*
- *It seems like a new pier should be located further north on Hampton Beach where there is less vehicular and pedestrian traffic congestions, and more parking, which is currently not as suitable for beach access.*
- *The new pier project should be coordinated with NH DOT Ocean Boulevard project.*
- *Does the Town have regulatory jurisdiction if the new pier is located on State Park lands?*

7. Detailed Scope of Work: *(No comments on this item.)*

TASK 1: EXISTING SITE ASSESSMENT

Task 1.1 – Review of Existing Information

- a. Collect and review available existing information.
 - i. Site tidal data
 - ii. FEMA flood mapping
 - iii. Site environmental data from public domain sources
 - iv. Regulatory data including zoning and land use restrictions, and setbacks
 - v. Environmental regulatory requirements for construction
 - vi. Potential sea level rise and storm surge risk factors and impacts
 - vii. NOAA nautical chart information
 - viii. Site conditions
 - Accessible route locations

Kickoff Meeting

- Shoreline revetment
 - Public facilities and features
 - Parking
 - Utilities
- ix. Summary of 3 existing pier projects on east coast with similar features to those contemplated by HBAC

Task 1.2 – Kick Off Meeting and On-Site Inspection

- a. Meet with HBAC to review unique aspects of site and desired project goals
- i. Desired use of facility is for the walking disabled, possible fishing, safety for all tourism use and lifeguard access.
- b. Perform on-site inspections including:
- i. Photo documentation of project area through on-the-ground site walk and drone flight to capture high-resolution aerial imagery
 - ii. Limited field verification of existing conditions
 - iii. Minimum of 3 in-person follow-up phone/video interviews with PAC

Task 1.3 – Existing Conditions

- a. Submit a draft written memorandum summarizing existing information findings, including considerations for recommended construction and pier location
- b. Attend a meeting in-person with HBAC to review the memorandum and prioritize a location for the pier, which may include a second site visit as part of this meeting.
- c. Provide a final memorandum summarizing existing information findings.

TASK 2 – DRAFT ASSESMENT

Task 2.1 – Base mapping

- a. Prepare a site condition plan to include:
- i. Aerial imagery
 - ii. Topographic data (LiDAR contours, prior site plans, etc.)
 - iii. Tax map parcel data (and/or boundary survey plans/deeds if readily available)
 - iv. FEMA Flood data
 - v. State and Federal environmental data (endangered species, geology, sea level rise predictions, etc.)
 - vi. County level soil survey data
 - vii. Utilities (based on readily available data from local provider/prior developed

Kickoff Meeting

plans)

- viii. NH DOT Route 1A plans
- ix. NOAA Nautical Chart data
- x. Bathymetric survey (Vertical datum to be NAVD88 and horizontal datum referenced to State Plan coordinates)
 - Perform bathymetric survey out to 100' beyond the edges of the conceptual pier layout. Bathymetric survey will define seabed topography, highest annual tide line, observed high and low water, Mean Higher High Water and Mean Low Lowest Water.

Task 2.2 – Design Basis Memorandum

Prepare a draft written design basis memorandum for HBAC review. The design basis memorandum shall identify:

- a. Project goals, PAC and public input
- b. Existing conditions
- c. Site opportunities and constraints
- d. Conceptual options for pier location
- e. Potential site features
- f. Design criteria including:
 - i. ADA requirements
 - ii. On shore connections
 - iii. On shore access and parking
 - iv. Code requirements
 - v. Regulatory agency requirements and anticipated permits
 - vi. Life safety rescue vessel sizes and drafts
 - vii. Vehicle or other live and surcharge loads
 - viii. Pier buildings and amenities
 - ix. Loading unloading uses and methods
 - x. Fendering and mooring requirements if applicable
 - xi. Vessel access
 - xii. Tidal datum
 - xiii. Summary of available soils/subsurface information with recommendations for future geotechnical exploration to define design-level subsurface conditions.
 - xiv. Potential impact of future sea level rise and storm surge
 - xv. Life safety equipment
 - xvi. Lighting

Kickoff Meeting

- xvii. Utility requirements
- xviii. Wind/Wave regime including baseline assessment of wind exposure and significant wave heights from available NOAA buoy data in the vicinity.
- xix. Structure length and water depths
- xx. Proximity to other public facilities
- g. Summary of findings and any recommendations
- h. Identification of additional investigations if applicable s(i.e., geotechnical investigations, wind/wave analysis, coastal processes analysis to understand beach scour and erodibility)
- i. List of project references for similar beach-based piers to provide examples of design precedents.

Task 2.3 – Conceptual Design and Planning Level Implementation Cost Estimates

- a. Develop draft concept layouts and cost estimates (up to three concepts) for PAC and HBAC review
- b. Identify general materials and construction types suitable to the proposed conditions
- c. Attend an in-person meeting with HBAC to review the draft design materials and receive comments
- d. Revise draft materials and provide HBAC with updated materials for stakeholder review and comment.
- e. Prepare photo simulations for the concept alternatives and gather feedback
- f. Facilitate meeting with PAC/public forum to review the concept alternatives and gather feedback
- g. Review input with HBAC and identify prioritized concept plan option
- h. Develop initial assessment of construction costs, potential regulatory impacts, estimated maintenance scope and frequency and potential costs

TASK 3 – FINAL ASSESSMENT

Task 3.1 – Final Assessment Materials (Design Basis Memorandum, Preferred Concept Plan and Planning Level Implementation Cost Estimates)

- a. Prepare final preferred concept plan and typical cross sections for the prioritized concept plan and update the design basis memorandum and planning level implementation cost estimate. The final design basis memorandum recommendations will identify.
 - i. Pier layout, dimensions, materials, and other typical details
 - ii. Updated photo -simulations to depict the preferred options
 - iii. Regulatory constraints
 - iv. Estimated costs of construction

Kickoff Meeting

- v. Anticipated life cycle, operations and maintenance costs
- vi. Additional implementation costs (survey, site assessments, design, permitting, construction and contingencies)
- vii. Potential implementation funding sources
- viii. Requirements for routine inspection and maintenance
- ix. Potential implementation schedule

The final assessment will also include documentation of all meetings and input collected, as an appendix to the design basis memorandum.

Task 3.2 – Final Assessment Presentation

- a. Prepare a presentation summarizing all work of the project and present to HBAC for final plan adoption.

Deliverables:

- a. All project submittal materials will be provided to HBAC in electronic (PDF) file format PRIOR to November 1, 2022.

Assumptions

- a. HBAC will provide any known studies relative to this new project, any impacted work currently going on, information on parking restrictions in the neighborhoods, etc.
- b. No specialized environmental studies will be required (i.e., shellfish surveys, habitat characterizations, sediment sampling, etc.). Habitat identification will be completed from desktop review of published data from State and Federal agencies.
- c. HBAC will identify a Pier Advisory Committee (PAC) composed of stakeholder groups to be available to the consultant to provide local input.
- d. HBAC will be responsible to forward this report in both electronic and hard copy format to the Speaker of the House of Representatives, the President of the Senate, the House Clerk and the Senate Clerk, the Governor and the State Library on or before November 1, 2022.

MEETING MINUTES

Subject: Site Visit Meeting
Hampton Beach New Pier Feasibility Study
GEI Project No. 2202415

Date/Time: August 23, 2022: Noon – 4:00PM

Location: Hampton Beach, Hampton, NH

From: Travis Pryor, RLA /, LEED-AP – Project Manager, GEI Consultants

Attendees: *GEI Consultants:*
Travis Pryor, Dan Robbins

Pier Advisory Committee (PAC):
Joseph Desmarais (On-site with Travis Pryor)

Bob Preston, Ben Moore, Rene Boudreau, Jim O’Loughlin, Bob Ladd, Meggan Hodgson, Gordon Whicher, Tobey Reynolds, Richard Roy, Steve Labranche, Skip Windemiller, Dave Hobbs, Mike McMahon, Meredith Collins, Patrick Murphy, John Nyhan

Others:
Brendan Clifford, NH Fish & Game Department; Nongame & Endangered Species Program, Wildlife Biologist (Grew up in Hampton)
Mike Marchand, NH Fish & Game Department; Nongame & Endangered Species Program, Wildlife Biologist
Melanie Roy, Business Owner

Absent: *PAC:*
Susan Whicher, Geno Marconi, Alex Loiseau, Keith Lessard, Breanna O’Brien, Pat Collins

* *Italicized text denotes minutes recorded*

1. General Discussion

Parking *(No discussions on this item)*

Parking will be available at the Hampton Municipal Lot on Ashworth Avenue in front of the Hampton Police Department. Please contact Bob Preston if you have questions.

Site Meeting

A site meeting will be held at the state’s Seashell Building at 160 Ocean Avenue from Noon to 2:00pm. The goals of this meeting are to:

TJP

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www.geiconsultants.com

5 Milk Street
Portland, ME 04101
Phone # 207.797.8901

Site Visit Meeting

- a. Review and discuss the design considerations matrix as a continuation of the new pier design discussion initiated at the kickoff meeting during July of 2022.
 - *There have been lots of renewal projects recently planned and/or implemented at Hampton Beach (Sea Shell building and adjacent state facilities at Hampton Beach, NH DOT Ocean Boulevard (Rte 1A) and Hampton River Bridge improvements, private property improvements, and the state pier on the Hampton River for example).*
 - *A new pier on Hampton Beach might be a nice attraction for those who don't come here too often.*
 - *Funding for implementation of a new pier is still to be determined.*
 - *The Hampton community and the State of New Hampshire have been talking about a new pier for at least the past 17 years. Most of those discussions have focused on locating a new pier at the north end of Hampton Beach, so as not to detract from the rest of Hampton Beach. The new pier should consider being built over the rocky coast and seabed in this area, and not over sandy areas of Hampton Beach.*
 - *Boars Head protects the cove immediately to the south from coastal environmental wind and wave conditions.*
 - *A new pier should consider cruise ship access (mooring and tender service, or docking at the pier).*
 - *There is currently not much retail north of where Ocean Boulevard's (Route 1A) travel lanes come together and a new pier might encourage more retail in at the north end of Hampton Beach.*
 - *Recent coastal erosion and landslides have occurred along the south shore of Boars Head, reportedly caused by coastal wave action.*
 - *Winter storms have impacted the south shorefront of Boars Head and the adjacent Hampton Beach area to the south in the recent past, even if the area is typically protected from prevailing wind and waves.*
 - *Recent early autumn periods have experienced waves over topping the sea wall on north end of Hampton Beach and the storms have produced greater wave impacts in this area during the winter.*
 - *Many PAC members who are residents on Hampton Beach have witnessed more wave overtopping of the sea wall at the north end of Hampton Beach in the past 5 years vs the past 25+ years.*
 - *More retail near the north end of Hampton Beach would be nice. The north end of Hampton Beach is a relatively nice, quieter experience than the rest of the beach to the south. It would be nice to see more people spread out there.*
 - *The grassy median at the end of the separated Ocean Boulevard travelways near Boars Head might accommodate a restroom and/or additional parking.*
 - *A new pier can be designed to withstand coastal risks, often at some additional construction cost.*

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- *Parking at the north end of Hampton Beach is typically the last to fill, but it does fill on busy beach visitor days.*
- *Is the new pier supposed to be a season extender for visitors to Hampton Beach? Hampton Beach is currently full on nice sunny days and empty on rainy days. What does a new pier really enhance for Hampton Beach?*
- *Is retail allowed on a new pier?*
- *A new pier shouldn't have a significant impact to views of Hampton Beach and the ocean from Church Street. Light pollution already exists in this area so new pier lighting won't likely add significant increased light pollution impacts either.*
- *Why are we doing this New Pier Feasibility Study? What is the end result supposed to be? If taxpayers are supporting this New Pier Feasibility Study, we need a good reason as to why we are doing it?*
- *The north end of Hampton Beach is the worst location for a new pier. This area would need a restroom and dedication of existing parking, or new parking to support a new pier. Those items will increase total new pier project costs. A new pier should consider how project costs can be reduced / eliminated.*
- *If a pier, parking and restrooms are added to the north end of the beach, the current, quiet beach area goes away.*
- *You can't continue to look at the past environmental conditions in light of potential increased risks.*
- *Stones are now washing over the north beach sea wall.*
- *Limited land around the pier that won't be impacted by potential future flood conditions.*
- *Harbor seal haul-out area towards north end and harbor seal pups have been documented in the area.*
- *Waves overtop the sea wall seasonally, especially during high tides, and can flood the neighborhoods and marsh to the west of Ocean Boulevard in combination with tidal waters from the Hampton River and upland precipitation, but the flood waters dissipate with the tide cycles. The Atlantic Ocean doesn't relent and will always be an environmental factor to deal with. CHAT and SHEA are looking at these issues.*
- *The prior recent elevation of the sea wall along North Beach was very helpful. It would be nice to add to the wall along Hampton Beach but the sea wall structure is impaired, especially at the foundation, and may not be able to accommodate additional elevation of the sea wall in its current condition.*
- *There are three ways to deal with coastal flooding:*
 - *Armoromg*
 - *Adaptation*
 - *Retreating*

Site Visit Meeting

Issues regarding climate change and coastal environmental risks have been studied a lot in Hampton and the community is about to start receiving recommendations from these studies.

- *What happens if the Hampton Beach goes away / changes significantly in the future as a result of coastal environment changes?*
- *Bob Preston has pictures of waves over topping the sea wall that he can share.*
- *A new pier might be seen as a visual deterrence wherever the pier is located along Hampton Beach, but a new pier might be an economic benefit even with Hampton Beach as popular as it currently is, especially on the north end of Hampton Beach.*
- *Boars Head residents probably won't want to look at a new pier.*
- *A new pier should be considered for location at the Town's Bicentennial Park, at the north end of North Beach. This location would not be in front of someone's view, nor would it have a direct impact on a public beach. There is retail nearby in this area to support visitors. Parking and restrooms are also in place at this location.*
- *If you build a new pier will they come? Where you build a new pier will have a big impact on that question.*
- *Piping Plovers are inhabiting the north end of Hampton Beach as documented by the state since 2020 when COVID-19 temporarily closed the beach to human visitors.*
- *There are no documented piping plover nesting on North Beach.*
- *State legislative council is focused on the Feasibility Study of a new pier south of Boars Head, but nothing "has to be" anyplace. A new pier technically can be anyplace but should it?*
- *The NH DOT Ocean Boulevard project proposed infrastructure changes plans along Church Street which were recently rejected by the community, and a new pier in this neighborhood might face similar opposition.*
- *A new pier would be better suited for Hampton Beach if located near where Ashworth Avenue splits off from Ocean Boulevard, where restrooms already exist.*
- *If the new pier is implemented, it should be an "iconic" project and nationally recognized.*
- *Original discussions regarding "why" a new pier should be considered at Hampton Beach, were focused on providing some infrastructure to enhance recreational activities on Hampton Beach. Not for commercial activities. A new pier should be accessible to family, children, elderly and mobility impaired / handicapped.*
- *Nothing during prior discussions and the current appropriated state legislative council funding for the New Pier Feasibility Study dictates that a new pier has to be on Hampton Beach. Originally, discussions considered providing one in the area of the state pier on the Hampton River. If everyone says look at the*

Town's Bicentennial Park on North Beach then we should later, but the overall focus of the current state funded Feasibility Study should be to look at the original "why" goals stated above.

- *Will there be user fees for the new pierr? GEI response: This is an administrative / policy decision that would likely be up to the Town, State and/or HBAC to consider.*
- *The Village District and Chamber of Commerce have a lot of data on who comes to Hampton Beach. A new pier would likely be an enhancement for people who live here or are already coming to Hampton Beach. A new pier would not likely be a draw for new visitors, so increased parking may not be an issue. More designated handicap parking at a new pier may be needed, but not necessarily more general parking capacity for a new pier.*
- *Some PAC members expressed opposition to charging for parking. A new pier located on the north end of Hampton Beach might increase parking revenues under the existing system if those parking spaces already in place are occupied more as a result of the new pier.*
- *A new pier would impact some people's view of Hampton Beach from Boars Head.*
- *Access to Hampton Beach for mobility impaired is challenging. Beach access from Ocean Boulevard near 18th Street has a ramp to the beach and two handicap parking spaces. Coastal waters rush up the ramp it in the winter time and causes impacts to private properties on the west side of Ocean Boulevard. The third beach access point along Ocean Boulevard heading south from Boars Head has a staircase with (6) six steps and is a little easier to use for mobility impaired than other access points to Hampton Beach with staircases that have more steps. A grated ramp has been recently installed at the beach access point along Ocean Boulevard closest to Boars Head. The area at the bottom of the beach access routinely gets washed out in the winter. In general it seems that there ongoing difficulties providing beach access from Ocean Boulevard from a handicap / mobility impaired perspective. Access to Hampton Beach could perhaps be more meaningfully improved by providing additional ramps instead of staircases from Ocean Boulevard to the beach, instead of from a new pier.*
- *If a new pier impacts wave patterns around Boars Head, what are the consequences to the adjacent shoreline?*
- *GEI should add constructability to the design decisions matrix, providing information regarding:*
 - *Length of construction period?*
 - *What infrastructure is needed to construct it (staging, equipment, onshore and offshore access?)*
 - *Recognition that significant community interaction / impacts can be anticipated during further design development and construction periods.*

GEI response: A variety of project constructability items will be considered in

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the design decisions matrix. A new pier project is not likely to be constructed in a phased approach. The New Pier Feasibility Study will consider next steps for design, permitting and funding.

- *Does NH DOT have thoughts about a new pier approach attached to the sea wall along Ocean Boulevard? NH DOT response: The sea wall is owned by DNCR and not DOT. As part of the currently planned improvements to Ocean Boulevard, parking is remaining in the middle between the north and south bound travel lanes, which would also remain in their current locations, so NH DOT does not see a new pier as having a major impact to the Ocean Boulevard project regardless of where it is located. The new pier will need to consider impacts to parking in terms of new parking needs immediately adjacent to the new pier.*
- *If an opening in the sea wall is created for a new pier that matches the existing sidewalk grade behind the sea wall, then a point of vulnerability for coastal storm/flooding impacts would be created.*
- *Rocks larger than a vehicle are being reset/replaced at jetty more regularly and a pier will be subject to similar forces.*
- *If the pier is located anywhere other than at the north end of Hampton Beach, then it will be an obstruction to pass under at beach grade. A new pier will affect lifeguard and emergency services access greatly. Hampton Beach patrons don't pay attention to emergency services vehicles on the beach as is, and there will need to be adequate clear width and height underneath the pier for these vehicles. GEI response: We will be looking into those needs and what it will take to address them, or identify if it is technically not feasible to construct a pier and allow for the emergency service vehicles to have access under the pier.*
- *Where will funding come from to maintain the new pier? The State and Town can't agree on taking care of the sidewalks along Ocean Boulevard. GEI response: There are lots of new federal funding programs that we are all learning about which might assist the project. Potential funding sources will be discussed in the New Pier Feasibility Study.*
- *There will likely be issues with public safety resulting from people diving off a new pier. This could be a particular issue with regarding changes in water levels during tide cycles where people dive off the new pier during low tide would be at greater risk of injury hitting the seabed.*
- *In California lifeguards train off of their public beach piers for special rescues. Hampton Beach lifeguards do not think there is a need for that type of training currently, but they may need to add this type of training as a result of having a new pier at Hampton Beach.*
- *Will a new pier create changes in movement of sand, and water currents that are could be more challenging for swimmers and boaters to navigate?*
- *People who jump off a new pier located at the north end of Hampton Beach would be at risk of landing on seabed rock outcrops.*
- *If a fisherman falls off the new pier when State lifeguards are not on duty (3-4*

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months per year, the Town's emergency services will need to be prepared to respond.

- *GEI question to State Park Lifeguards: Any benefits to having a new pier from a life safety operations perspective? State Parks response: A new pier may draw people away from the jetty where they have a long history of lifeguard and Town emergency services rescues. A new pier may cause more issues with fishing gear injuries to swimmers. They don't see benefits of the new pier having a jet ski launching from the new pier in comparison to existing launch conditions from the beach.*
- *GEI question to State Park Lifeguards: Any benefits to having a lifeguard station on the pier from a life safety operations perspective? There could be depending on where the new pier is located along Hampton Beach (further away from the Sea Shell building where they currently monitor the beach from above, if the pier blocks visual access to points beyond the new pier further north or south). They will need additional staffing (2.5 persons) for a lifeguard station on the pier. Currently, they struggle with hiring dispatchers each year. Current location of dispatchers at the Sea Shell building is adequate for Hampton Beach. There could be some benefit to locating a pier at the north end of Hampton Beach if a lifeguard station on the pier was tall enough to observe North Beach, but they recognize that such a vertical structure near Boars Head may not be popular in terms of potential visual impacts.*
- *If swimmers have made it to end of a 1,000 foot length pier from the beach then State lifeguards have not done their current job responsibilities. They think most of the life safety issues would occur during their off hours / season periods. They don't see a strong need for lifeguard services operating from the pier. GEI response: The new pier might consider limiting public access, with gates closed during periods when lifeguards are not operating.*
- *Lifeguard access under, or up and over the new pier should be considered. Does the new pier create blind spots regardless of location along Hampton Beach and at any particular elevation above, which might dictate the need for a lifeguard staff person on the new pier? Town emergency services thinks these life safety issues can be addressed and they can make their services work to accommodate emergency service needs associated with a new pier.*
- *Why is a new pier going out beyond the breakers? GEI response: Initial thoughts from the community guiding GEI's Feasibility Study suggested consideration of life safety operations improvements that the new pier could provide, including access from the pier to in water rescues beyond the breaking waves. There is also interested in the benefit of providing a pier for docking of recreational boats, which might be best suited beyond the breaking waves.*
- *A new pier does not benefit handicapped / mobility impaired people who want to get to the water.*
- *Fishing gear and swimmers / beach goers don't work well together.*
- *Surf fishing is currently allowed on Hampton Beach, but not during the day.*

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- *There may or may not be much demand for fishing off the new pier. It might be comparable to the amount of activity near the jetty at the Hampton River?*
- *Fishing from the new pier should not impact the fishing boat charter companies. Some responded that it likely would not, and might enhance their services, bringing more fishing a*
- *If we build a new pier people will want to fish from it, and they will be interested in doing so at times associated with the tide cycles. Morning and evening times are also preferable. Lights on the new pier should be present for safety around fishing activities. A pier in Dover is very popular for fishing. State Fish & Game doesn't see issues with overfishing resulting from the new pier.*
- *A new pier will be popular on Wednesday nights during beach fireworks. Can fireworks be launched from the new pier? That might not be allowed if the new pier is sited close to Boars Head.*
- *A new pier located in the middle of Hampton Beach will impact beach access and/ life safety operations along the beach the most. If a new pier is located anywhere else on Hampton Beach people may be more likely to jump off it. A new pier might have many of the same life safety issues as those occurring at the Hampton River jetty where people jump off that structure.*
- *GEI will be reaching out to other comparable pier facility operators on the east coast to learn more about their operations and life safety experiences.*
- *Piping Plovers are now nesting on the north end of Hampton Beach. When Hampton Beach was closed during COVID-19, new nesting sites were observed on the middle and north end areas of Hampton Beach.*
- *The State Park area is of primary interest to the State for nesting Piping Plovers. The second area of interest to the State is the north end of Hampton Beach where there are good feeding grounds immediately off shore and new nesting sites have consistently occurred over the past few years. The middle area of Hampton Beach is of least importance to the State in terms of potential impacts to nesting areas. This area is the most developed and active by human activities, and has not experienced consistent nesting by Pipe Plovers from year to year. The State recognizes that Piping Plovers could nest anywhere on Hampton Beach.*
- *Increased predatory habitat on a new pier and increased life safety rescue activities associated with a new pier could increase impacts to Piping Plover nesting areas.*
- *There are two State endangered species and one Federal endangered species present on south end of Hampton Beach.*
- *State Parks does not have specific thoughts about a pier at the south end. U.S. Army Corps of Engineers owns the Jetty and they would need to be engaged to build on/off of the jetty.*
- *A lot of similar issues near the State Park as the other areas (both pros and cons). A fair amount of parking is at the State Park (1,000 spaces) and it is*

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full most weekends.

- *Dunes and adjacent beach area have the most erosion along the entire beach.*
- *Is there a plan from NH DOT for the Hampton River bridge? Yes. On the State's website. Higher than existing bridge. Shifted immediately to the northwest of the existing bridge and may have a bit of a curve to it.*
- *Can you leave the old bridge as two piers with the middle section removed? NH DOT: There's a reason the existing bridge is being replaced and it may not be structurally sound as two piers for fishing.*
- *Where is the money coming from? GEI: We don't know at this point but anticipate it will be from the state given that it will be located on state property.*
- *Will be designed for a service life and can be extended with expected maintenance. Can someone say how much it will cost? GEI: There's a lot of elements that will play into the costs for construction and operations/maintenance.*
- *How much is the new bridge? \$60 million and 30 years of planning(?)*
- *Lifespan (50 to 75 years?) If the 25+ year option, that may not be long enough for a significant investment. Will close temporarily and then permanently and then tear down. Not as likely to invest significant funds for repairs. Should be built up front to last as long as possible.*
- *Should also account for coastal impacts 50 years out. Projections are that Ocean Boulevard will be routinely underwater in 50 years. Past recent predictions are becoming out of date quickly and are updating regularly with increased likelihood of climate change related risks.*
- *Consider naming rights if you build the pier as a way to financially support it?*
- *We are at an initial planning stage that came from an idea and we are at a stage where we need to build upon that idea in this study and then consider costs in more detail in a future design development phase. May site on the shelf for a while before everyone is ready to move it forward and costs would be more appropriate to consider in detail when everyone supports the concept.*
- *Don't expect any funding support required from the Town of Hampton. Will be supported by state and federal money. Local people still have a share in the costs for state and federally funded projects.*
- *OOB pier was first built in the 1800's and most recently rebuilt as a timber structure in 1980.*
- *GEI's study is not looking at finding the money to implement it. It is to give a planning level cost for future improvements which will need to be considered in further detail.*
- *Will we look at the North Beach area? We will note it as a potential consideration but state legislative requirements for this study are to focus on Hampton Beach south of Boars Head.*

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- *Feedback on pier materials (especially decking / at grade amenities) would be helpful.*
- *Concrete has the least maintenance issues. More consistent surface. Less piles and caps to support. Large spans, less bracing and more clear space underneath. Piles could be still, "H" pile with composite casing, concrete, timber, etc.*
- *How about pile repairs if damaged? Designed to accommodate a significant amount of impacts, including from boats (recent sail boat went ashore near Boars Head.) All pile types can be repaired and procedures vary.*
- *Most durable, longest lasting, lowest maintenance should be the preference.*
- *Hard to make a decision on materials without being able to see the alternatives.*
- *Historically, people think of timber when thinking of piers. Ultimately will have to put a number on the differences in pier material types.*
- *If costs are similar, aesthetics should be a priority, but if costs vary significantly, costs should be a priority.*
- *Can GEI point to a "worlds greatest something" version of a pier that we might strive towards? Used to have the worlds longest wooden bridge. Think the pier should have a significant level of notoriety.*
- *Have we designed a hybrid pier with timber, composite materials and concrete?*
- *Follow up with the group on a quick survey to gather detailed design input from the group. GEI will send out a survey to the PAC after the site visit meetings.*
- *There is reportedly a contract between the Town and the State (since the 1930's) where no commercial activities can occur on state lands (east of Ocean Boulevard). GEI: With the exception of vending machines. Water? Not even that necessarily. Intended to support local retail businesses adjacent to the Beach and Route 1A. Might depend on definition of the beach area in the agreement. Might need amendments / negotiations between the Town and the State.*
- *Survey needs to recognize existing rules and regulations. Survey may note that a particular use is not currently allowed as far as we know and may require changes to regulations, like retail / commercial use on the pier. Blue Ocean was recently stopped from selling bottled water on the beach side of Route 1A.*

Site Walk

The goals of this meeting are to:

- a. Review potential site locations on the beach for a new pier in person. We will discuss the potential benefits / costs of each location while examining the site conditions on the ground.

Site Visit Meeting

(9:00am to 10:00am)

Joe Desmarais of the PAC and Travis Pryor with GEI met at the north end of the beach and walked to the south end. General discussions were as follows:

- *North end has a rocky shore and seabed*
- *How far is the pier going out? Initial thoughts were to get out past the breakers (around 1,000 LF) but this is open to discussion in consideration of pier design goals and cost considerations.*
- *That should be an adequate distance for fishing. Boaters fish around the rocks on the north end, within 1,000 feet of the shore.*
- *Do people fish from the beach? Typically, at least a half dozen people or so around the jetty at the south end of the beach.*
- *Salisbury, MA was considering a 300 to 400-foot pier with an "L" at the end. Ultimately they only completed a boardwalk along the shore.*
- *Pier will need to consider adequate room for fishermen casting off pier. Will need a fishing area at the end ("T") for casting.*
- *Maybe consider a cantilevered deck so fishermen can cast underhand and out of the way of other pier users behind them.*
- *Railing height for fishing needs to be lower for ADA wheelchair accessibility needs. Should be a dedicated area.*
- *Parking is an issue on the north end. It will be tough everywhere in general though. Distance from parking near the Seashell to a pier on the north end is too far for mobility impaired. 1,000 walk to get to pier and then another 1,000 feet to end of pier is too much. A 1,000-foot pier is a long way as is.*
- *Pier sited further south may have issues with beach goers using the pier to jump off.*
- *No dedicated Handicap Parking spaces on the north end. Generally open priority policy for people with Handicap Parking permits/placards but available parking is hard to find. Parking near the Seashell Building has some dedicated Handicap Parking. Near restrooms and Seashell Building as public facilities. No public facilities on the north end requiring ADA spaces.*
- *Need to account for required "Van Accessible" space(s).*
- *Even if you provide Handicap parking spaces, they need to be controlled/enforced so that they are only used by mobility impaired.*
- *Consider dedicating some parking at the north end for the pier only.*
- *Parking in the middle between north and south bound Route 1A lanes is not too bad with crosswalks.*
- *Wouldn't mind paying to park and use the pier.*
- *State pier on the Hampton River has pay for parking.*
- *Greater concerns with people jumping off pier on north end over rocks.*

Site Visit Meeting

- *Most people will bring their own bait for fishing coolers for storing caught fish.*
- *Would be nice to have a shade structure and seating for fishing areas.*
- *North end or Jetty area are the best along the beach for fishing. Stripers at the mouth of the Hampton River. Mackerel and periodic bluefish on north end.*
- *Wash area for gutting fish? Maybe but what will happen with fish waste? Tossed back into the ocean? State Park has tried stopping it near the Jetty as fish waste ends up in the swimming zone.*
- *Should anticipate potential storm / flood risks.*
- *Portsmouth and mouth of the Merrimac River have small pier-like areas. People walk out on Jetties to fish. Nothing in this area of the coast other than Maine that have fishing pier facilities. Have to look from New Jersey south to Florida for comparable pier facilities otherwise.*
- *Many people will likely use the pier as part of an overall pedestrian experience like those early in the morning that walk along the Ocean Boulevard sidewalk.*
- *If the pier is over the rocks, it is less likely to impact nesting area of Piping Plovers.*
- *Pier should be high enough so that waves/storm surge goes under the pier.*
- *Height for fishing is less of a concern. May be able to use nets or walk to shore to land fish.*
- *North end has waves breaking against the seawall, but it is a shorter distance to get out over the water, versus 100 feet +/- of sand beach to the south before the seawall.*
- *At least 25% of the pier users are likely to be mobility impaired/elderly.*
- *If ramp and floats for boat to dock along pier, need space away from fishermen. Maybe a lift for boat access instead of gangway and floats?*
- *What are the changes that this project continues to move forward through the State? Potential to move forward with new federal funding support. Hampton Beach is a significant tax contributor to the state and is of importance to the state to continue to support.*
- *Pier would be used all four seasons.*
- *April to October striper fishing. Not sure about local crabbing interests.*
- *Pier off sea wall grades will have limited vertical clearance over beach. Would need to ramp up to allow for beach access underneath.*
- *ADA access to the beach is generally in the middle area of the beach as well. Some beach mats and large tired wheelchairs, but it's still a long way across the beach.*
- *Restrooms / Port-a-potty near pier is important.*

Site Visit Meeting

(2:00pm and 4:00pm).

Several members of the PAC who attended the site meeting walked from the Seashell Building to the north end of the beach with Travis Pryor and Dan Robbins of GEI.

- *Add constructability to the Design Decision Matrix. GEI: Will add lifecycle analysis info and constructability info to the New Pier Feasibility Study.*
- *On a busy day, beachgoers are packed in all over the beach and up against the seawall. (Showed a picture with beach full on a Wednesday in the summer.) Normally lifeguards can drive along the wall and rope off some emergency service access routes. Have been considering a delineated emergency access area along the wall. Would like to add an emergency services truck in addition to ATVs that can routinely patrol along the back wall. Beachgoers sit in and around the ATVs and it takes some time to clear people out.*
- *Cutting off any portion of the beach to emergency vehicles would be an issue. Ramp access over the pier from the beach could work near the sea wall.*
- *1st stop at the NH Marine Memorial. Explained that the north area location was between the Memorial and the north end of the beach at Boars Head. At this point there is a public restroom and two lanes of Ocean Boulevard with divided median for parking.*
- *Can't see that parking should be a main concern for where the pier is located. Generally parking is adequate along most of the beach and may not be likely to be dedicated for the pier. Could consider shuttle service to the pier from parking further away.*
- *If Ocean Boulevard is redeveloped with parking in the middle that will be an ongoing issue of concern for pedestrian crossing and traffic queuing up. If it could be located on the beach side that would be better. HBAC voted not to recommend parking adjacent to the beach in this area because of public feedback, preferring a safe median area for pedestrian crossings vs crossing four lanes of traffic at once. In this area, people can see the ocean while driving now and parking would block that as well. Several in the group today voiced that they did not agree with those priorities.*
- *Tighter turn onto Church St (Rte 101) would be tough for large trucks if middle parking area relocated along the beach.*
- *Abutters may not want a restroom built near a new pier on the north end of the beach.*
- *North Beach public park already has those facilities and no beach would be divided.*
- *Pier near Boars Head would provide an iconic view of Hampton Beach for all to enjoy and would not interfere with beach use / access.*
- *Could control some safety concerns at the new pier with gates limiting how far out people could go on the pier at particular times of day / seasons.*
- *Has the State experimented with options for ADA matting across the beach at other locations and at different lengths other than the extents currently present*

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in front of the Sea Shell building which go about half way across the beach? Can't go all the way across the beach because of beach raking equipment access needs. Beach rake can't go in the intertidal zone and it is too much work to remove and reset each day.

- *An at-grade concrete walkway option across the beach and then elevates up to a new pier at and beyond the intertidal zone could work for the beach rake equipment.*
- *Second stone at rock groin across from Church Street.*
- *There are a fair amount of rocks on the seabed between the groin and "Ocean Rock" exposed boulder further out beyond the intertidal zone. Kids are often cut and scraped in this area. If someone jumped off the pier in this area that would be of particular concern. Pier could be sited north of there in between the ground and the rocks to the north along the sea wall approach to Boars Head.*
- *Already deal with a sand ramp over the groin for access to the beach further north with their lifeguard and beach rake equipment so a pier with a ramp off the beach in this area would work as well and be more stable than the sand beach.*
- *Does the pier have to start at the sidewalk? Could it start out on the beach?*
- *Further out would be more vulnerable of an approach across the beach and would have to accommodate beach rake and emergency service vehicles but would be less obstructive to the beach visually. Would need to be a concrete walkway and long ramp up to an elevated pier. Sand moves a lot, in particular during the winter and keeping grades stable for an at-grade pier approach across the beach would be a lot of operations and maintenance investment.*
- *Not many people use the beach in the winter so maybe its not as much of an O&M issue for the at-grade access then. Maybe the pier is closed then?*
- *A new pier at the north end could have a bumpout and a few adjacent parking spaces, ramps and restroom at the pier approach from Ocean Boulevard.*
- *Pier across from Church Street (Rte 100) would not work well with vehicular and pedestrian traffic in this area. Police department notes that there are particular times of the when the left lane turning onto Church St backs up. Right lane usually remains open heading north. Pedestrians cross all over the place and not always at crosswalks. It is typically at peak travel times (busiest on Sunday afternoons when folks are leaving the beach). Is dealt with by adding traffic cops for temporary needs.*
- *Police would prefer parking along Beach and turn onto Church Street would be fine across two lanes of traffic. Would reduce pedestrian traffic in this area.*
- *If pier opens up the sea wall it creates a point of vulnerability for coastal flooding onto Ocean Boulevard and abutting properties to the west.*
- *Breaking waves along Boars Head impact the beach all the way to the rock groin near Church St (especially in the winter)*

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- *Rocks are thrown over the wall with waves in the north end area, especially during winter storms.*
- *The sea wall in this area has some deterioration that should be addressed in coordination with or ahead of a new pier at the north end of the beach all the way to Boars Head.*
- *Are there many rescues on the rocks? Sometimes lifeguard, in coordination with the Town emergency services, have rescued kids at the base of the sea wall and lifted them over it to safety. At low tide, the area is accessible to walk across.*
- *This area used to be more covered with sand and most of the rocks used to be covered. A big southerly storm could restore that. Ends of staircase access points to beach can change a lot in grade with changes in beach sand. Some disagree and think it has been exposed rocks for a long time.*
- *Small green median at the end of parking area between the divided Ocean Boulevard section on the north end next to Boars Head might be useable for a restroom? Additional parking? This area is a long ways away from the rest of the beach (2,000 feet+) and would be a long walk to, and then across a 1,000 foot+ pier, especially for the elderly and mobility impaired.*
- *If seals are hauling out in this area on the rocks, pier orientation could have more impacts to them if going out at an angle in front of the rocks, vs perpendicular to the sea wall and away from the rocks.*
- *A pier perpendicular to Boars Head would have less of a visual impact to properties on Boars Head. Would be more vulnerable to wave impacts across the full length of the structure. Not a preferred layout from a technical design perspective. Preferred design would be an alignment facing directly into the waves with waves hitting the head of the pier directly.*
- *When storms are severe (winter mostly) they impact the Boars Head shoreline and adjacent sea wall.*
- *SLR seems the same for those who have lived in the area over the past 50 years. Sand is washing in a lot more. Used to be 12 stairs to the beach and now 4 or 5 steps are often all that is exposed when sand washes around.*
- *Make it a statement with a golf tee / hole or a miniature golf course on the pier?*
- *If the pier is too close to Boars Head, the parking becomes more limited and vehicular and pedestrian traffic becomes more challenging as the divided highway lanes come back together.*
- *Vehicles speed up in this area heading north of Boars Head.*
- *Most of the surfing is on North Beach.*
- *Could pier near Church St head perpendicular over the beach and then turn north towards Boars Head?*

Site Visit Meeting

Site Visit / PAC Meeting	Aug. 2022
Draft Concept Plan Options Submission	Beginning of Oct. 2022
PAC Review Meeting (Video Conference)	Beginning of Oct. 2022
Public Presentation of Draft Concept Plans	Week of Oct. 3 rd – 7 th 2022 <i>(Adjusted to HBAC regularly scheduled meeting October 27th, 2022)</i>
Final Feasibility Study Report	By November 1, 2022

Other discussion items? *(None noted)*

PAC Input Survey

Part 1 – Pier Use (16 Responses)

Question 1

What uses should the pier support (e.g. fishing, viewing, public gathering venue...)?
Please list all uses that you think it should accommodate.

Responses <i>(Additional details / comments)</i>	Totals
Viewing <i>(Sunsets, fireworks, beach, clouds, planes, ships, boats, special events, platform)</i>	13
Fishing <i>(Tournaments, sport fishing, no fish cleaning allowed on pier)</i>	11
Public Gathering Venue <i>(Weddings, special events, speakers, seafood festivals)</i>	5
Elderly, Disabled and Handicap Access <i>(Seating)</i>	3
Recreation <i>(Non-commercial, fitness classes, daily exercise classes, walking, activities that are consistent with State Parks administrative rules, swimming)</i>	3
Relaxing / Sitting <i>(Benches)</i>	2
Small Tourist-Type Boat Docking	1
Bait Shop	1
Boardwalk	1
Photographers	1
Artists	1

Question 2

Who do you think will use the pier? (Select all that you think would be appropriate)



“Other” Responses	Totals
Anyone	2
Fishermen	1
Other Local Community Members	1
The Same People Who Currently Visit Hampton Beach	1

Question 3

Pier access should accommodate which of the following?
(Select all that you think would be appropriate)



“Other” Responses	Totals
Prohibit <i>(Vehicles, Bicycles, Skateboards, Scooters)</i>	3
Trash Receptacles and Trash Removal Trucks	1

Question 4

Pier operations should allow for which of the following general purpose?
(Select all that you think would be appropriate)

(Note: The Town of Hampton and the State of New Hampshire have a current agreement prohibiting all sales on State property, which may not allow for commercial use of the pier, unless the agreement can be amended)

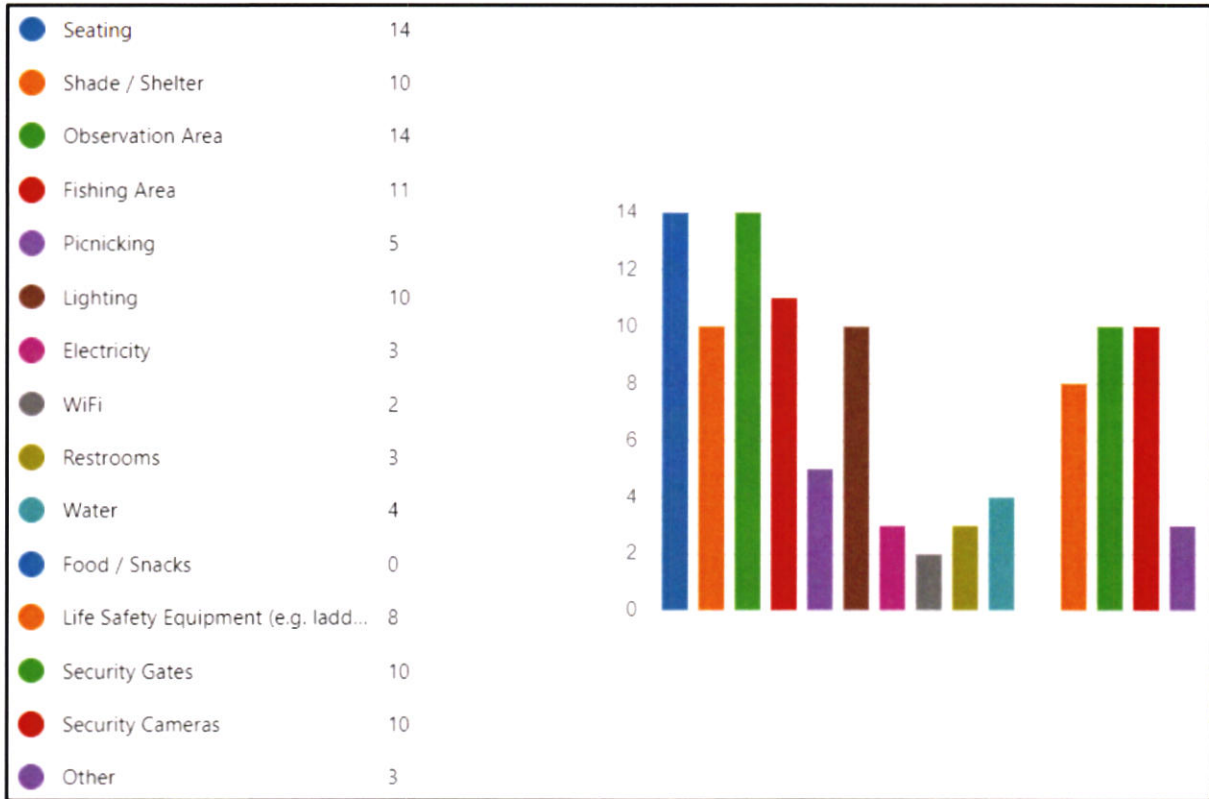


“Other” Responses	Totals
Commercial Use Would Be Docking For Tourist Boats	1
Recreational If Water Access Is Acceptable	1

Question 5

What amenities should the pier provide? (Select all that you think would be appropriate)

(Life Safety Equipment (e.g. ladder access to the water, jet skis, life rings...))



“Other” Responses	Totals
Solar Lighting <i>(On posts for boat siting)</i>	2
Emergency Phone	1
Trash Receptacles	1
Water to Clean Pier	1
Water Vendor Might Need Electric Supply	1

Question 6

Seasonally, when should the pier be open? (Select all that you think would be appropriate)



Question 7

What day(s) of the week should the pier be open?
(Select all that you think would be appropriate)

Responses <i>(Additional details / comments)</i>	Totals
Everyday <i>(As allowed per season, June, July and August only, not at night, perhaps for a minimal general use fee, additional use fees for fishing equipment - fishing poles, nets, drop lines, etc.)</i>	16
Weekends Only <i>(April, May, September, October)</i>	1
Closed <i>(November, December, January, February, March)</i>	1

Question 8

What time(s) of day should the pier be open?
(Select all that you think would be appropriate)

Responses <i>(Additional details / comments)</i>	Totals
Sun Up to Sun Down	5
30 Minutes Before Sun Up to 30 Minutes After Sun Down <i>(Maybe until 11 PM during summer months)</i>	2
7 AM to 9 PM <i>(7 AM to 10 PM on special nights – fireworks, festivals, etc., time may have to be controlled for safety – when lifeguards are on duty)</i>	1
Sun Up to 10 PM <i>(Gating it closed will be challenging to meet user interests and make it more difficult for emergency services to access)</i>	1
8 AM to 10 PM	1
4 or 5 AM to 1, 2 or 3 AM If For Fishing <i>(Fishing is tide dependent)</i>	1
When Lifeguards Are On Duty	1
Hours Concurrent with Hampton Beach	1
Same Hours as NH State Parks <i>(NH State Parks closes at 1 AM. Wouldn't be opposed to closing earlier for the pier)</i>	1
7 AM to 10 PM	1

Question 9

How many people should the pier accommodate at any particular time?

● 1 to 25	0
● 25 to 50	2
● 50 to 100	8
● 100 to 200	2
● 200+	4

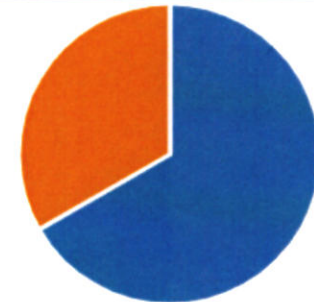


Part 2 – Pier Type / Geometry (15 Responses)

Question 1

From a visual compatibility perspective, should a Timber Pier be considered for Hampton Beach?

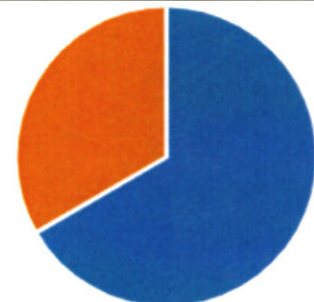
● Yes	10
● No	5



Question 2

From a visual compatibility perspective, should a Concrete Pier be considered for Hampton Beach?

● Yes	10
● No	5



Question 3

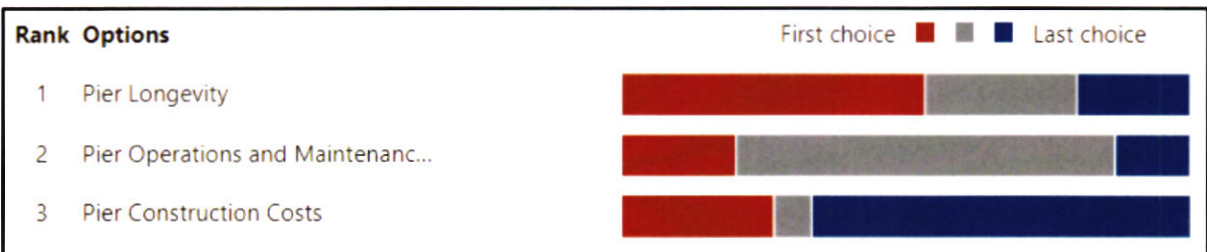
From a visual compatibility perspective, should a Concrete/Timber Hybrid Pier be considered for Hampton Beach?



Question 4

Rank the following in terms of priority.
(Top = Highest Priority / Bottom = Lowest Priority)

(Pier Operations and Maintenance Costs)



Question 5

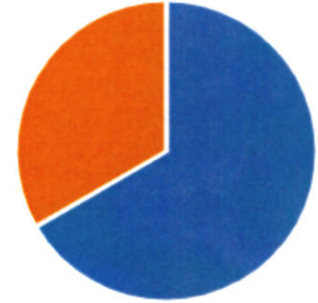
Should a Curvilinear Pier be considered for Hampton Beach?



Question 6

Should a “Hammerhead” or T-Shaped Pier be considered for Hampton Beach?

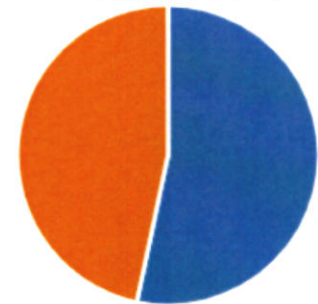
● Yes	10
● No	5



Question 7

Should an L-Shaped Pier be considered for Hampton Beach?

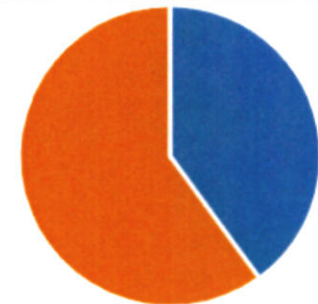
● Yes	8
● No	7



Question 8

Should an Angled Pier be considered for Hampton Beach?

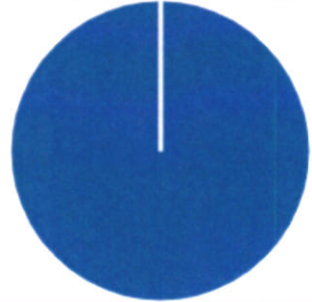
● Yes	6
● No	9



Question 9

Should a Rectilinear Pier be considered for Hampton Beach?

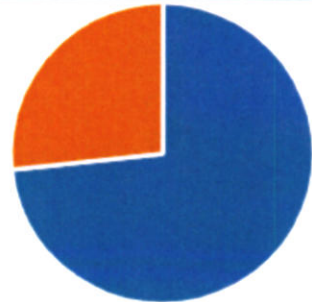
● Yes	15
● No	0



Question 10

Should Mobility Impaired (ADA) access be provided to the beach from the pier / pier approach?

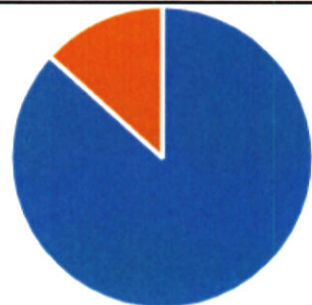
● Yes	11
● No	4



Question 11

What should the pier approach elevation priority be?

● Top of adjacent road / sidewalk ...	13
● Level with the beach	2



Question 12

What is the preferred access to either side of the pier from the beach?



Part 3 – Pier Siting (17 Responses)

Question 1

The Study as authorized by the State of New Hampshire prioritizes construction of a new pier directly south of Boar's Head. Please prioritize alternative areas as described below for consideration of future study after this current effort is completed.

(Top = Highest Priority / Bottom = Lowest Priority)

(8 Responses Only Ranked Top Choice)

Pier Location Area	1 st Priority	2 nd Priority	3 rd Priority	4 th Priority
Mid-Beach Area (NH Marine Memorial to State Park)	6	2	1	2
South End of Beach (State Park)	2	4	2	2
North End of Beach (Boars Head to NH Marine Memorial)	6	2	4	1
Other Location (North Beach / Town Bicentennial Park)	3	1	2	4

Question 2

Should the pier extend past the breaking waves?
(Approximately 1,000 linear feet from the seawall)



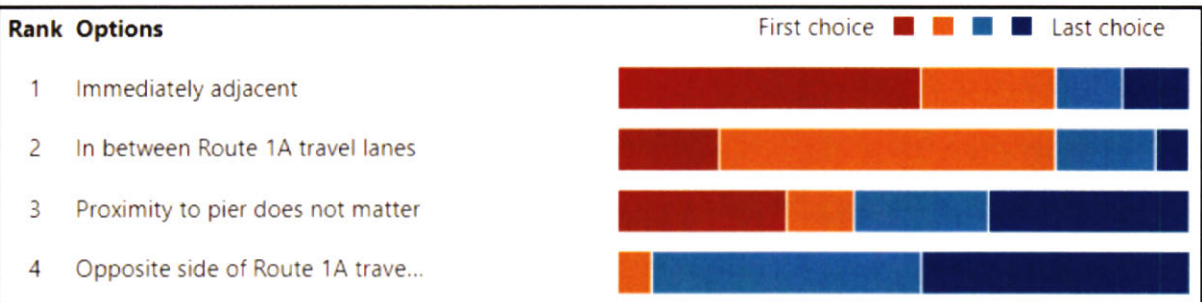
Question 3

Should parking be dedicated for pier users only?



Question 4

Prioritize parking proximity to pier approach.
(Top = Highest Priority / Bottom = Lowest Priority)



Question 5

Prioritize proximity of public restrooms to the pier. (Select top priority below)



PAC General

In addition to input received during scheduled meetings between GEI and the PAC, the following general input was provided by the PAC to GEI via direct phone calls and emails from individual PAC members over the duration of the project.

- Look at other existing piers for data in terms of :
 - Annual usage.
 - Users per month, seasonal, annual?
 - Is the pier open 24 hours / year round?
 - Is it frequented by all ages?
 - Are there problems with fishing off the pier
 - Problems with access to the pier?
 - Solutions for access to or from the water?
 - Solutions for safety and security?
 - Were any of them specifically designed to be ADA compliant?
 - Staffing and ordinary maintenance requirements?
 - Anything they would do differently or not do?
- Suggest connecting the pier to nearby parking via a bridge over Ocean Boulevard with ramped approach that vehicles can't drive on.
- Provide a lockable gate at the pier entrance
- Provide vending machine and water / electric services at the pier entrance.
- Recommend that State Legislature develop polices such as:
 - No trash receptacles available (carry-in / carry-out)
 - No jumping or diving from the pier (\$500 fine) with signs placed at pier entrance and before the end of the pier.
- Fish and Game Department input regarding piping plover:
 - The piping plover nesting sites are certainly of concern and rise to the top of the list of feedback received. The piping plovers are both state endangered and

federally threatened. The department works closely with the USFS as they both have separate authorities through their endangered species acts. As a result, I am going to ask the biologist overseeing this program to join me next week. Below is some preliminary commentary directly from the project team and a map of current nesting sites

- NHFG, and project partners spend considerable effort each year managing and monitoring piping plovers on NH's sandy coastlines, primarily Seabrook and Hampton beaches and the program has been a great success. Attached is a map of our recent piping plover nesting at Hampton beach.
- South (southern red polygon)- The southern section of beach at the state park north of the Hampton Harbor jetty has been our long-term stronghold for piping plover recovery and any development in this area would be of concern for piping plovers, as well as state endangered least terns.
- Middle (between two red polygons)- Piping plovers have now also nested on the main beach at Hampton for three consecutive years (coinciding with the beach shutdown during the 2020 pandemic). Some of the exact locations have been used in consecutive years as piping plovers have high site fidelity.
- North (northern red polygon) - The northern section of beach has been recently occupied and has become a prime feeding area for the adult plovers and their chicks and will likely be occupied every year going forward. Development of a pier in this area would be of concern for piping plovers.
- Given that plovers may nest anywhere along Hampton's sandy beaches, the construction of a pier will have some level of impact regardless of where it is placed and need further evaluation. However, the exact level of impact is unknown and may vary depending on the location and design. Initial potential concerns with a new pier in the sandy portions of Hampton Beach include direct removal of potential nesting habitat, additional disturbance from human activities (although this beach is already extremely crowded), increased predator pressure in the form of perching gulls or crows (which may predate eggs or chicks), and a potential increased need for vehicular traffic (i.e., ATVs) under and around the pier for crowd control and enforcement. Other concerns may be identified upon further detailed review.
- We know where nest densities have been highest in the past but specific nest sites can change from year to year. Nests could occur anywhere along the sandy beach portions from the Hampton jetty to edge of Boars Head where it transitions to rock. That said, the southern section of beach has been and will likely continue to be a stronghold for nesting. Let me know what you think will be most useful for your analysis and we can try to accommodate.



- I read the pier could be 1600 feet. In order to get an idea of that I figured 7 blocks and 6 Streets would be approximately that. So, Seashell to Bernie's, F St to M St. If that's the case, we might want to have a second gate on the pier that Parks or Safety people could close somewhere in the middle.
- Also, at the entrance it might be good to have a meeting area so people would not be blocking the sidewalk
- Also, I've heard ok fishing, but not cleaning fish.
- It's important that all the voices of various stakeholder groups be heard.
- In referencing the actual legislation perhaps our contributions (advice) is best focused on these questions.
 - Senate Bill 346-FN-A provides an Appropriation to Study the feasibility and impacts of constructing and maintaining a Pier directly South of Boar's Head, in the Town of Hampton.

- Is it feasible to construct a Pier directly South of Boars Head in the Town of Hampton? (YES or NO ?)
 - Yes
 - Perhaps. Anything is possible if funds are available.
- If YES, then, WHERE and WHY there? (The engineers will determine the appropriateness of the Land / Ocean floor etc)
 - North side of the west-east rock wall just north of Church Street.
 - We discussed several spots. The south end was eliminated because of Piping Plovers by Fish and Game. Church Street was eliminated by the Police Chief because of turning traffic and lack of public crossings. Across from the Ashworth was eliminated by the lifeguards because it divides the beach and they can't see what's going on from their observation quarters. Just south of Boars Head was eliminated because of the dangerous curve, lack of parking, narrow access and the waves would broadside the pier. The ideal spot would be directly in front of the Seashell itself. It divides the beach, yet the lifeguards can see BOTH sides. There are bathrooms and plenty of parking along with services (first aid station). This location is ideal and would add foot traffic to the businesses as well.
- Is there appropriate access?
 - Believes there could be but it would have to be coordinated with DOT and State Parks
- Is there appropriate parking? Handicapped spaces? Others considerations,
- Signaled Crosswalks? Anything that should not be considered?
- Have any/all Safety concerns been considered?
 - Yes. During discussions.
- What does the recommended structure look like?
 - Concrete base building – straight out to ocean.
 - Designs should be presented to the PAC.
- What are the options for Building Materials? And WHY?
 - Whatever is most appropriate
- Estimated cost and longevity to be determined by the engineers

- 1) Timber - Maintenance level, High. Medium. Low.
 - 2) Hybrid - Maintenance level, High. Medium. Low.
 - 3) Cement - Maintenance level, High. Medium. Low.
- The Building of the Pier WOULD be a State Appropriation.
 - Maintenance of the Pier WILL be determined by the Legislature. The Pier is on State Property, therefore various State Agencies would hold the responsibility for Maintenance. The following are just suggestions for overseeing the Construction and Maintenance.
 - 1) State Parks because the Pier is within the AREA of NH State Parks.
 - 2) Pease Development Authority, Ports and Harbors, since they would be familiar with Docks and Piers.
 - 3) DOT, abuts the Pier.
 - 4) Fish and Game, for whatever reason.
 - 5) NHDES, perhaps due to impact on water quality.
 - If NO, then WHY?
 - It was suggested that this pier would be welcomed for handicapped people. Yet the one person representing his handicapped wife said she is not interested in a pier, but access to the water.
 - Is there another area to be considered? Why?
 - 1) SeaShell area
 - 2) South Beach
 - 3) Harbor area
 - 4) North Beach. This would require additional legislation and town participation.
 - The only other feasible location would be just south of the old Coast Guard Station on the NH beach north of Boars Head where there is plenty of parking and restrooms. The problem it would not benefit the businesses at the main beach.

- Is it not feasible at all? WHY?
 - It is feasible with the proper planning and coordination.
 - I do not see that this pier is necessary as an attraction. Having lived on this beach for 27 years, the thing that brings people to this beach is the ocean and a sunny day. This beach is one mile of sand and I think a pier will be an unnecessary disruption and will not add value to the experience. I think the money would be better spent elsewhere.
- Whether or not building a pier that juts out perhaps a quarter of a mile into the ocean, eliminating some portion of the beach, is feasible or not is really a secondary question. The questions that need to be considered are: Is it beneficial?, Is it adding or subtracting to our current resource?, Is it an environmentally sound practice?, Is it even necessary?
- If we are going to ask the state to support a project costing “10’s of millions” of dollars let’s be certain this is the project we want. I’m not sure Hampton would get another bite at the budget apple for a long time were this to be approved.
- Mr. Murphy raised many important points that need to be considered. Along with the myriad of safety concerns was the point that a pier would break or split the sight-line of the beach. This is not only problematic for safety reasons but endangers the current views that so many come to enjoy.
- While locals and visitors alike enjoy the businesses along the beach we all know that the reason many live here and visit here is a simple one, it’s the beach. I don’t see how this project enhances that important resource. This change is not one I am willing to risk.
- So no, I do not think the building of a pier along the beach at Hampton is feasible, beneficial, or adds to the resources of the beach.
- Let all the stake holders work together to develop a plan that benefits the business community, the residents, the tourists as well as the taxpayer, while at the same time protecting our beach.
- I think almost anything could be made feasible, for me the question is, is it worth the effort to make it feasible? I would need a lot of supporting evidence to lead me to answer "yes".
- I don't know that I have the expertise to answer the rest of the questions, but my comments and concerns regarding the outlined topics are: What is the potential increase in tourism? How many additional people would be anticipated to visit because of the pier and what is the anticipated economic benefit? Conversely, how would that affect traffic and parking especially during high tides where we already see local distress with flooding. Also, what is the longevity of the usefulness of the

pier? Does that rely on the improvement of roads/infrastructure elsewhere to support access to and use of this pier into the future?

- If the intention is for this pier to allow for an increase in access to the beach for folks with disabilities, should we not be heavily relying on that demographic to influence the design and installation? (I don't know how much this has already been happening but the one comment I heard at the first meeting was that at least one woman was seeking access to the water which this pier does not provide.) Is this what others are asking for? Does this meet their needs? Could those needs be met in a more practical way with a smaller economic and environmental impact?
- Respectfully, if this kind of effort and money is going to be spent on a project at the beach, I believe there are a number of other pressing needs that should be addressed (in the realm of coastal resilience) that would in turn benefit local businesses, property owners, and people with disabilities. There is a disabled woman who lives at the beach year-round and cannot leave her home regularly throughout the year because of flooding... These issues are going to become the norm and should be addressed urgently.
- Feasibility to be determined by the study. The largest detractors discussed to date to be considered in the study:
 - Stakeholders buy-in. this includes residences with ocean view north (towards Boars Head) and south (towards cape ann and the harbor) which would be impacted (both negative and positive) by the pier.
 - Disturbance to the existing ocean processes around Boars Head which are different depending on the time of year and extraordinary events such as major storms including hurricanes. boars head is a fragile feature which may be negatively impacted. major additional armoring of the bluff should be considered prior to the construction of the pier. pier construction, operation and maintenance phases must be considered.
 - Lack of space for needed access infrastructure (parking facilities, bathroom facilities, traffic capacity, etc.) during operation to handle the increased visitors to the beach. TBD by study contractor
 - Fishing detritus washing up on the beach
 - unsafe uses (access during major and extraordinary storms, jumping off pier, especially during low tide, etc.) during the four seasons.
- Some topics to be considered by the study contractor:
 - How does the pier integrate with the ongoing study to improve public utility of ocean boulevard, considering construction (where are the staging areas, safety, traffic disruption, etc.), operation (support, parking, safety requirements, beach evacuation during planned and unplanned events, etc.)

and maintenance (yearly and special events, etc.)

- Land and ocean use requirements and associated disruption (to businesses, public, beach evacuation, etc.) during construction, operation, and maintenance.
- Access to the ocean's edge for disabled individuals needing wheelchairs is limited. As it stands, the only access to the water's edge is the natural ramp just north of Dumas Avenue which was constructed last year and reworked this year. Annual maintenance is probably required after the winter storms. Use is restricted around high tide since the water rises to the seawall. Susan is able to get to the water's edge and get her toes wet using our beach wheelchair and assistance from a friend helping me up and down the ramp.
- The sidewalks along Ocean Boulevard need to be repaired (mostly addressing the cracks) to improved use for disabled individuals needing wheelchairs.
- I completed the GEI survey questions but those surveys seem to presuppose that the project should go forward, I would question whether it is indeed feasible.
- My main concern is the question of not separating the beach into two segments and the only way to do that is to build the pier either at the extreme north end of the beach or at the extreme south end.
- Comments made at the two meetings we have had tend to rule out these locations due to the Plovers or the Corp of Engineer consent needed and to possible adverse effects on Boar's Head caused by unknown wave action changes that could be caused by the pilings for the pier (as well of course by changes in view from Boar's Head).
- A mid beach location that would not separate the beach would require the ability to pass under the pier by foot and for emergency response vehicles and also by maintenance equipment- sand rake, and bulldozer and dump truck used in spring. This additional height would not allow direct, (i.e. no ramp) access from the sidewalk and the taller the pier is off the sand the more it adversely affects the line of sight for the NH Beach Patrol team and for us poor residents who would see it every day. The construction of the ramp itself would have to maintain this under pier height so the ramp would have to be built on the current sidewalk or parallel to the sidewalk on the beach side.
- As to other locations that maybe more suitable, the site of the former Coast Guard Station could work if the Town residents would support it.
- If you are measuring interest and desired components of a pier shouldn't the response of "no interest" be included? Isn't answering anything after "no interest" superfluous? I went in with an open mind and have been convinced that a pier is not in the best interests of Hampton. I think that answer should be allowed and tabulated.

- The prohibition of selling retail on the East side of the road is in the property deed, so it wouldn't be quite as simple as changing a MOA. Still possible, but a bit more challenging.
- New Hampshire Port Authority:
 - Construction and maintenance management. All our construction projects are managed by a consulting engineer that specializes in marine construction design and construction management. As the representative of the "owner" which is the State of New Hampshire, we take an active role in the day-to-day decisions, with the advice of the consulting engineers. On a higher level, there needs to be in place an approval process for the big decisions such as major change orders because believe me there will be change orders.
 - On the maintenance level, we conduct condition surveys on all our structures at intervals of no more than 10 year. Sometimes as the structure ages it may be necessary to shorten that cycle up. Translation – future capital requests will be necessary for the cost of the condition surveys with keeping in mind the cost of any identified repairs
 - If anyone really wants to see what a concrete structure looks like after 40 years, you are more than welcome to come to the Market Street Marine Terminal and see the \$12.5 million rehabilitation we are doing on a 600-foot concrete ship dock. I would leave it to the Chair if the group want to come here.
- Is there anything that can be learned from the hurricane damage to the Naples historic pier? Cherry Grove Pier in North Myrtle Beach and Pawley's Island Pier north of Charleston? Hurricane Ian impacts to FL in general?
- Could the pier be built safely and accommodating in that area - costs/maintenance-recommendations - construction materials - or better build in any suggested other area/s? Local impact - maintenance - public acceptance?
- Draft report:
 - No consideration of visual impact for pier located at center or north locations.
 - No consideration for environmental impact on Boars Head (fragile geologic feature) if the pier is located at center or north locations. Note the visible damage caused by significant storm on south face of bluff. Does "hardening" of the bluff need to be included in costs?
 - Tides should consider storm surge as an adder to astronomical tides.
 - No consideration given to storm damage and the necessary remediation considering minor/major/total storm caused loss of the pier. There must be available info from the damage caused to existing piers from major events

(some of which were mentioned in the report). Cleanup? Repairs? Rebuild?

- We have all seen the recent photos/videos of the destruction from Ian. Where does the pier debris go and end up should there be damage? How long will the cleanup take for minor/major/total loss? (NOTE: The harbor rock jetty has been in need of repair for years.) Will there be damage to homes/businesses along Ocean Blvd? Liability? Does this require a revision to evacuation plans due to floating debris which could act as “battering rams” driven by storm waves and storm surge into the structures along Ocean Blvd?
- Construction Staging Area: How large? How long? Where, especially for the mid and north location.
- Annual and Extraordinary Events (storm damage and repair) staging area: How large? How long? Where, especially for the mid and north location.
- Visual Impact: With reference to the profile slide of the pier overlay on the buildings/residences at the north site, there is a major visual impact to businesses and residences once the pier is constructed. This is less at the south site.
- Any need to purchase privately owned land for construction and operation at the 3 sites?
- ADA Beach Access: Limited value at the north site since there is no beach or minimal beach. Definite value at mid and south sites.
- Projected cost of energy for NH: Cost is projected to be some of the highest in the nation. Does this impact the decision process for the pier?

MEETING MINUTES

Subject: Draft Feasibility Study Review Meeting
Hampton Beach New Pier Feasibility Study
GEI Project No. 2202415

Date/Time: October 21, 2022: 8:00AM – 9:30AM

Location: Video Conference (Microsoft Teams) [Click here to join](#)
Meeting ID: 282 206 853 37
Passcode: KKyJkD
Tel: +1 213-336-0347,,529216813# United States, Los Angeles
Phone Conference ID: 529 216 813#

From: Travis Pryor, RLA / , LEED-AP – Project Manager, GEI Consultants

Attendees: *GEI Consultants:*
Travis Pryor, Dan Robbins

Pier Advisory Committee (PAC):
Ben Moore, Geno Marconi, Keith Lessard, Gordon Whicher, Susan Whicher,
Steve Labranche, Skip Windemiller, Mike McMahon, Meredith Collins, Patrick
Murphy, John Nyhan

Absent: *PAC:*
Bob Preston, Alex Loiseau, Breanna O'Brien, Pat Collins, Rene Boudreau, Jim
O'Loughlin, Bob Ladd, Meggan Hodgson, Tobey Reynolds, Richard Roy,
Dave Hobbs,

** Italicized text denotes minutes recorded*

1. Draft Study Presentation

Dan Robbins gave a summary presentation of the draft Feasibility Study findings and recommendations via PowerPoint.

2. General Discussion

The following items were discussed between the PAC and GEI.

- On site construction could be limited with the use of precast materials for the pier.*
- None of the three pier location options seem to be preferable to one another.*
- Locating the pier on either end of the beach would be preferable to minimize impacts to the beach.*
- Economic benefits of a pier are important to demonstrate to the State.*

TJP

B:\Working\NEW HAMPSHIRE DNCR\2202415 Hampton Beach New Pier Feasibility Study\02_PM\03-Mtg\20221021-PAC_ReviewMtg\2202415-HBAC_NewPierStudy-PAC_ReviewMtgNotes-20221021.docx

Draft Feasibility Study Review Meeting

- *General prioritization for a large gathering, staging, bump-out area at the shore for the pier to connect to.*
- *PAC asked GEI strictly from an engineering perspective, which pier option is “best” structurally? GEI responded that the precast pier option is the most durable and requires the least maintenance. It also allows for the most access on the beach from underneath the pier, has the least visual impact in terms of greater spacing of pile bents. As previously noted, it also has less impacts on construction area staging and assembly. Precast members are also less likely to pose a threat to adjacent areas if damaged during a storm event vs timber which could become floating debris. At the north end in particular, timber piles may not be feasible due to shallow bedrock.*
- *What windspeed design was considered? GEI noted that the report discussed extremal wind analysis and the design recommendations based on this analysis recommend designing the pier to withstand sustained 113mph winds.*
- *Preference for precast superstructure members in combination with timber materials for decking, in consideration of pier aesthetics, was expressed.*
- *Which location is best for fishing? GEI noted that the best area is probably at the north end over the rocky shore and seabed areas which appear to be preferable for local fish habitat. It is also preferable from a site safety perspective in this location, where there would be reduced conflict with beach swimming activities.*
- *What pier head type / configuration is recommended? GEI noted that there are a variety of options that could be selected. Sizing of the pier head is most important functionally to accommodate desired uses (fishing, public gathering, passive recreation, viewing, etc.). Shape may be prioritized during further planning and design efforts from an aesthetics standpoint.*
- *Can more information be provided about construction staging needs? Will acquisition of adjacent property be required? The south end of the beach has lots of area for staging at the Hampton Beach State Park parking lot. GEI responded that no acquisition of private property is anticipated at the feasibility study stage. It is possible that temporary construction easements might be negotiated for staging as has been done for prior projects in the area where staging was done at the water tower property, for example. There is some written description regarding future construction phases in the report appendices.*
- *Visual impacts to abutters will be greatest to those looking south towards Hampton Beach.*
- *There is less desirable beach use / access at the north end, limited by the tides.*
- *Will the costs of a new pier project be considered in light of other significant costs of living like current spikes in energy costs? GEI noted that prioritization of local, state and federal fundings for a variety of issues is something that could factor into future funding support for a new pier, and that would be decided by local, state and/or federal elected officials.*
- *What are the potential threats of pier debris to the surrounding community.*

GEI noted that the pier would be designed to withstand future predicted coastal flood risks as far out as 2100 and would likely be more resilient and less prone to damage generating floating debris than other existing structures in the area. If timber is the preferred option, there is greater potential for storms to damage the pier and cause debris that could float into adjacent areas.

- The State has been replacing their existing timber waterfront structures with precast and steel materials over time. They are seeing increased impacts from marine borers on timber piles. Hampton and Rye have seen damages to their timber structures in the past.*
- The Town's public safety department and the State's lifeguards acknowledged that a new pier as proposed was something they could operate around and continue to provide life safety services to Hampton Beach.*
- The State's lifeguards asked what the construction shutdown would look like during the summer months when the beach is at peak use? They noted familiarity with having to shut down construction about a decade ago when the State upgraded their facilities along Ocean Boulevard (parking, seawall, Seashell building, etc.) and were curious what it might look like for pier components constructed in the water? GEI noted that construction sequencing would be defined as the project prepares to be bid. Accommodations would be made to address beach access, operations and safety needs during the summer season, as well as during the off-season period.*

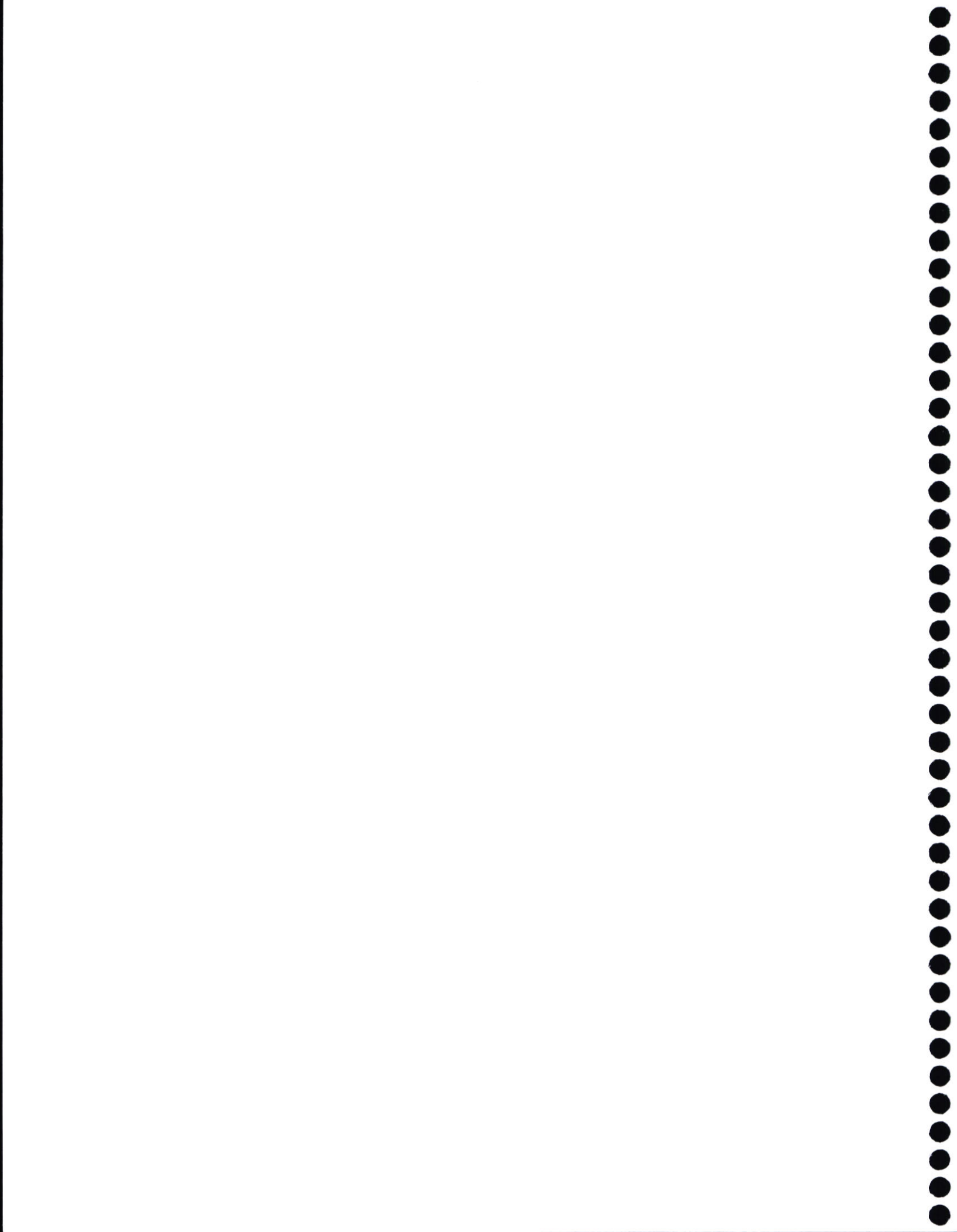
3. Schedule

Public Presentation of Draft Concept Plans October 27th 2022 at 7:00pm during the HBAC regular monthly meeting at the Town Hall.

Final Feasibility Study Report

Due November 1, 2022 to the State

4. Other discussion items? *(None noted)*



Appendix B

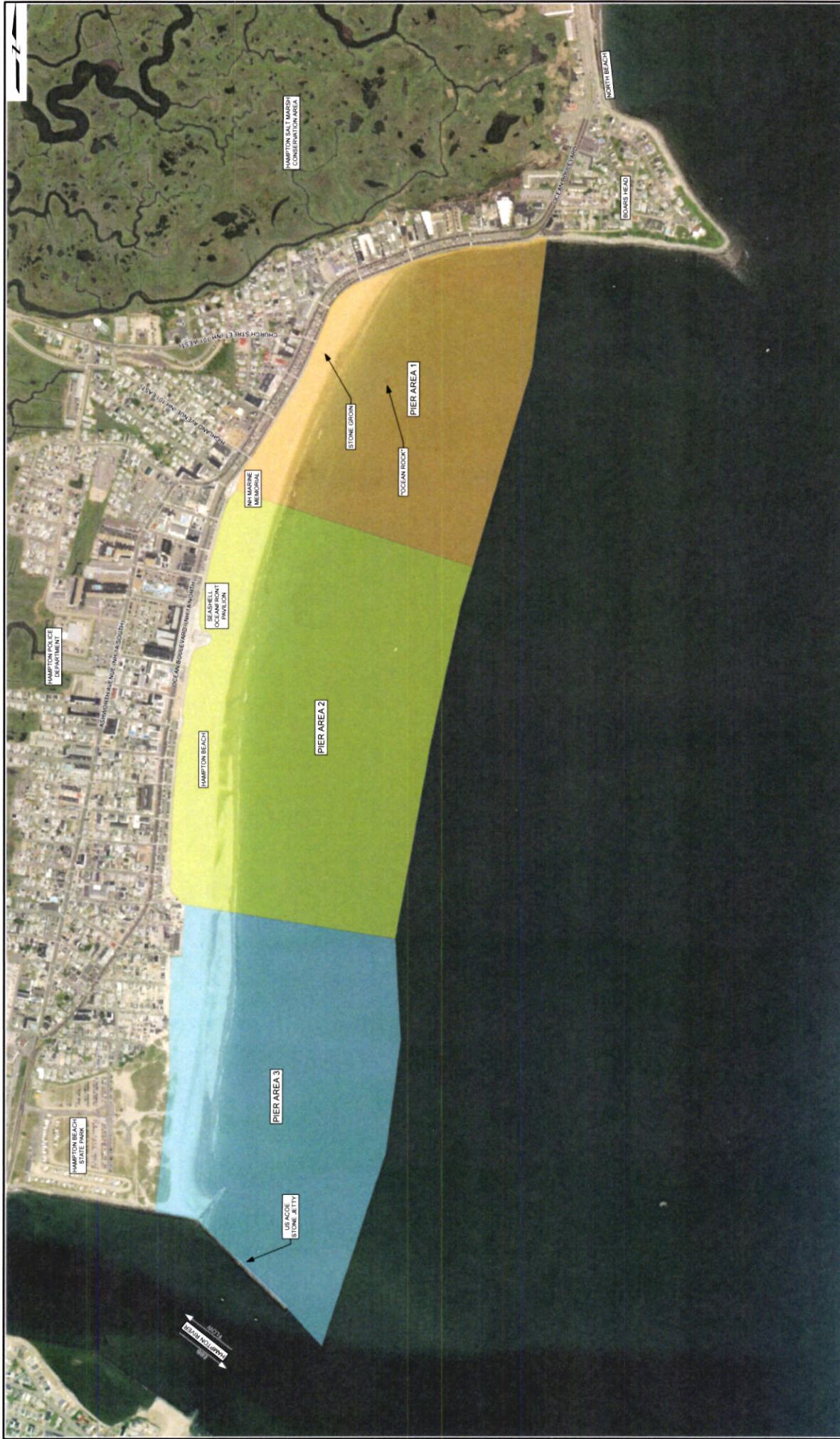
Base Mapping

- 01 – Overview Map
- 02 – Pier Location Map
- 03 – Environmental Resources Map
- 04 – Coastal Hazards Map
- 05 – Topography/Bathymetry Map
- 06 – Site Accessibility Map
- 07 – Land Use Map
- 08 – Soils and Surficial Geology Map



<p>Feasibility Study Hampton Beach Pier Hampton, New Hampshire Hampton Beach Area Commission Hampton, New Hampshire</p>	 <p>GEI Consultants</p>		<p>OVERVIEW MAP</p>	<p>Project 2202415 October 2022</p>	<p>Fig. 1</p>
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SOURCE:
1. AERIAL IMAGERY (ESRI, 2019)



SOURCE: AERIAL, MADE BY (ESRI, 2016)



Feasibility Study
Hampton Beach Pier
Hampton, New Hampshire
Hampton Beach Area Commission
Hampton, New Hampshire

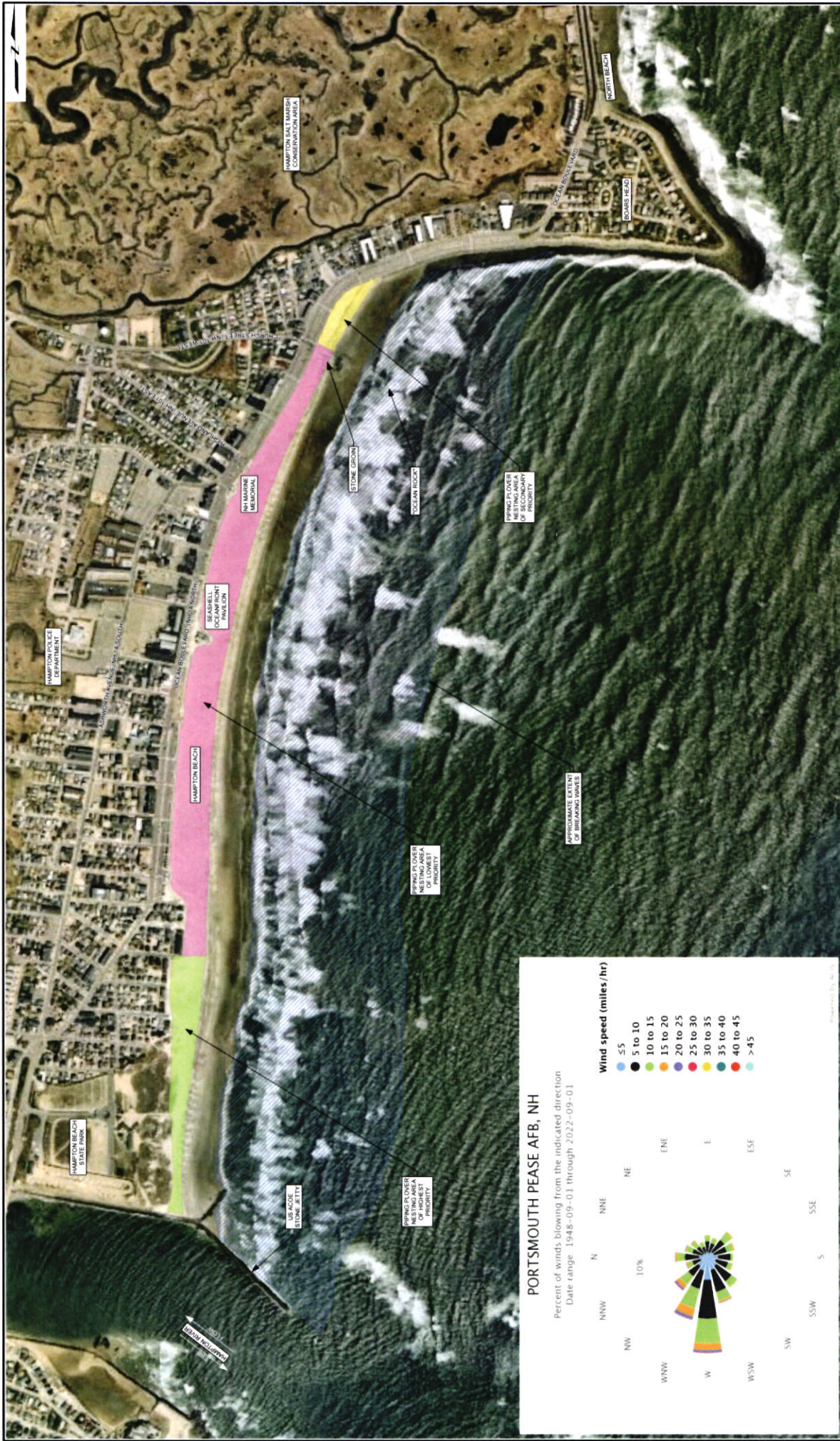


PIER
LOCATION
MAP

Project 2202415
October 2022

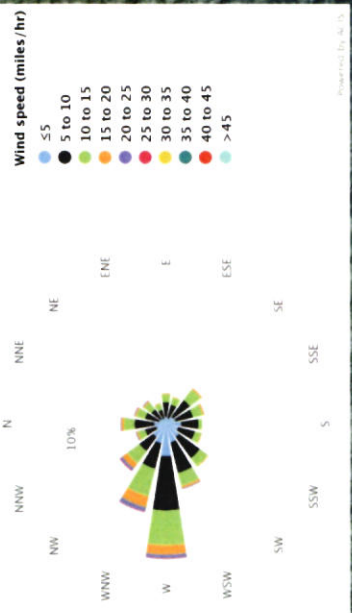
Fig. 2

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PORTSMOUTH PEASE AFB, NH

Percent of winds blowing from the indicated direction
 Date range 1948-09-01 through 2022-09-01



SOURCE:
 1 AERIAL IMAGERY (ESRI, 2019)
 2 PIPING FLOWER NESTING AREAS BASED ON NEAR MAP AERIAL IMAGE FROM MAY 4, 2022
 3 PIPING FLOWER NESTING AREAS BASED ON INFORMATION OBTAINED FROM NEW HAMPSHIRE FISH AND GAME DEPARTMENT
 4 WIND ROSE DATA OBTAINED FROM MOVESTER REGIONAL CLIMATE CENTER





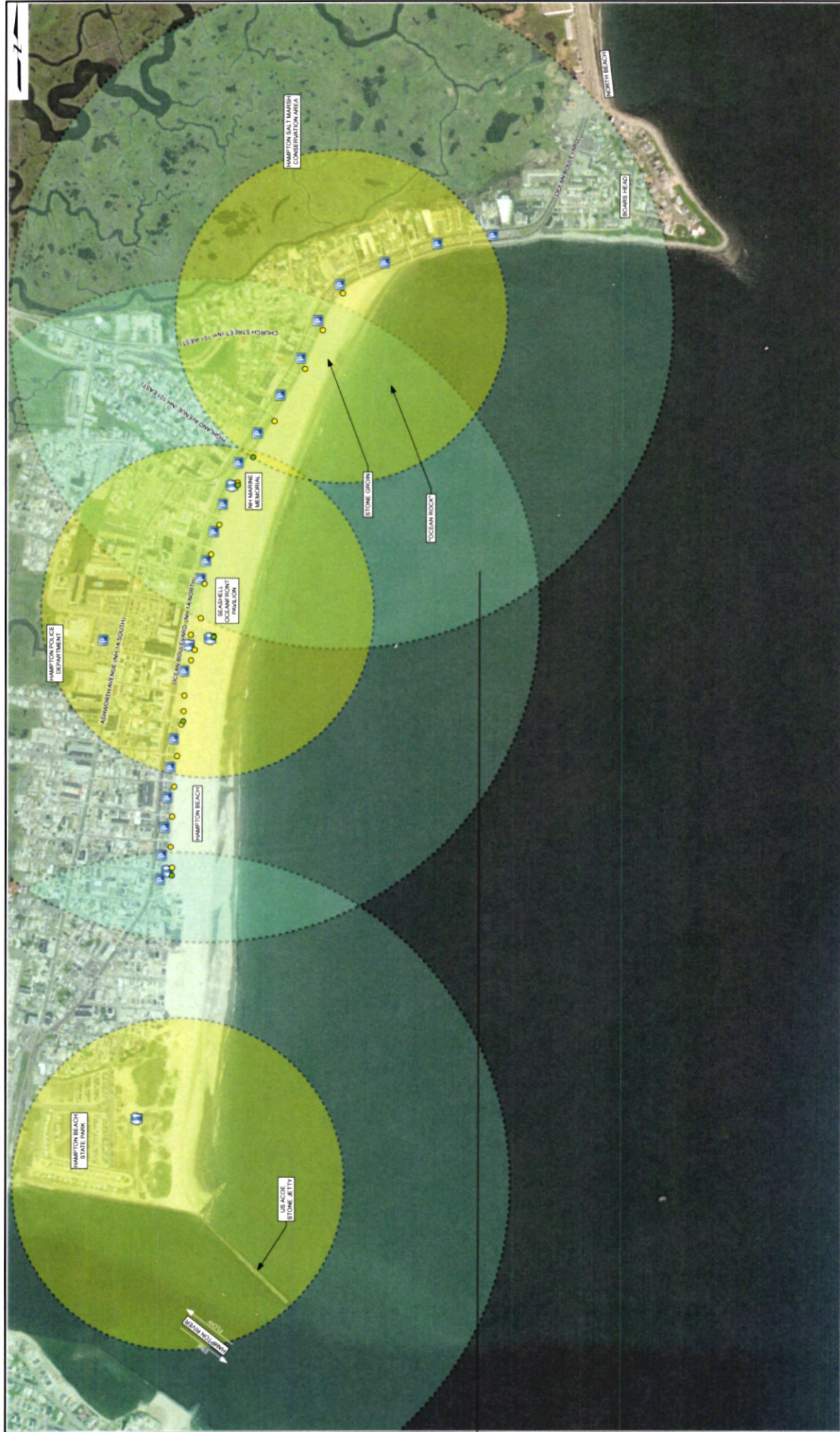
SOURCE
 1 AERIAL IMAGERY (ESRI, 2019)
 2 CONTOURS AND PERTINENT LEVELS DEVELOPED FROM LEAR SOURCE, 2018

GEI
 Geomatics Engineering Inc.

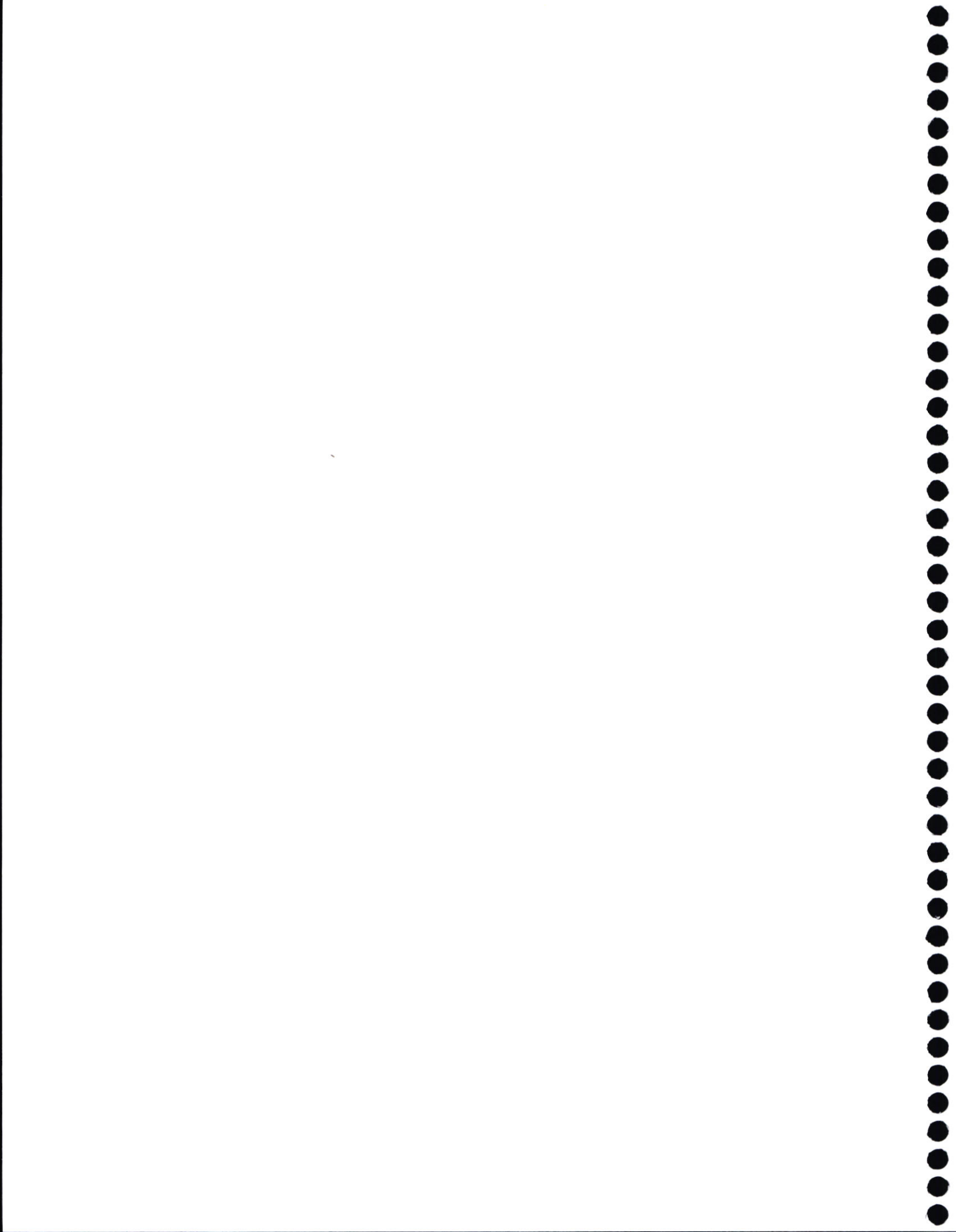
TOPOGRAPHY/BATHYMETRY MAP

Feasibility Study
 Hampton Beach Pier
 Hampton, New Hampshire
 Hampton Beach Area Commission
 Hampton, New Hampshire

Project 2202415 | October 2022 | Fig. 5



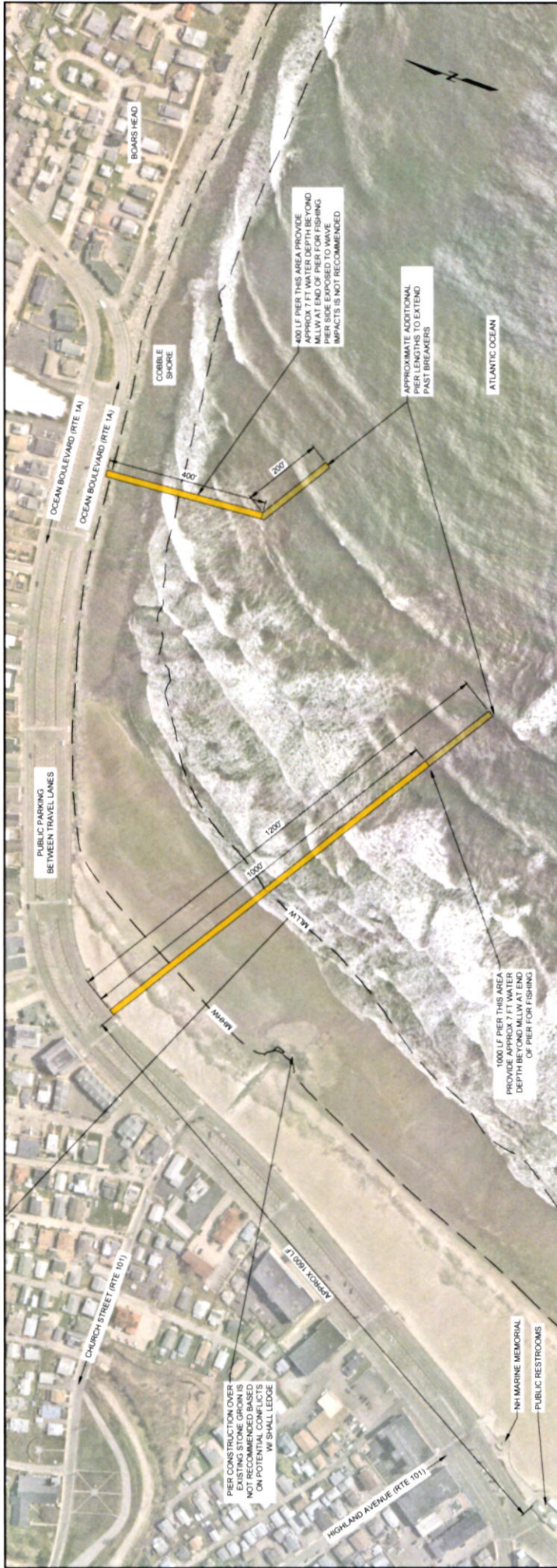
LEGEND: ADA ACCESSIBLE BEACH RAMP BEACH ACCESS STAIRCASE QUARTER MILE RADIUS AROUND APPROXIMATE POTENTIAL PIER LOCATION PUBLIC RESTROOM PARKING	SOURCE: MADEYER, ERIN, 2019 2. PARKING AREAS, RESTROOM FACILITIES AND BEACH ACCESS POINTS DIGITIZED FROM NEARMAP IMAGES (MAY 3, 2022)				Feasibility Study Hampton Beach Pier Hampton, New Hampshire	SITE ACCESSIBILITY MAP
					Hampton Beach Area Commission Hampton, New Hampshire	Project 2202415 October 2022



Appendix C

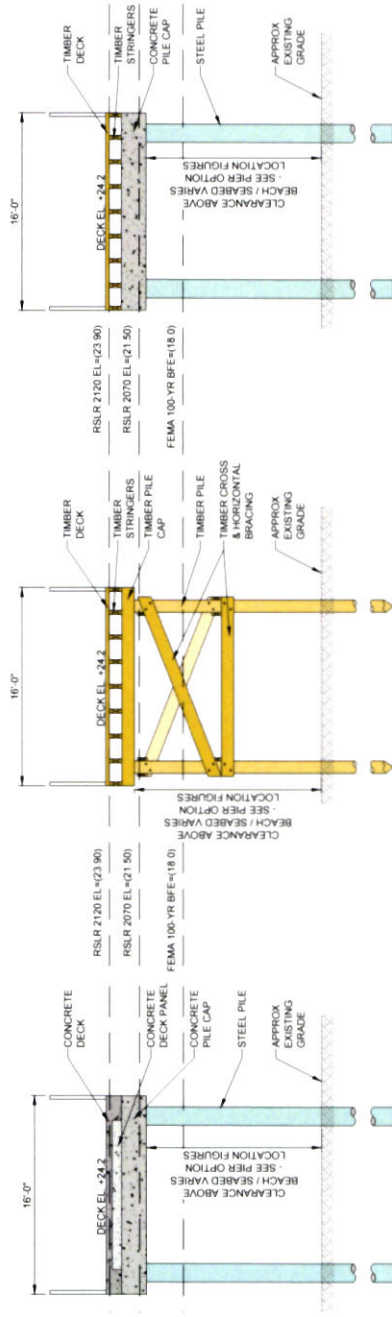
Conceptual Design Figures

- Figure 01 – Area 1 (North End) Pier Location Options & Typical Pier Cross Sections
- Figure 02 – Area 1 (North End) Concrete, Timber & Hybrid Pier Profiles
- Figure 03 – Area 2 (Middle) Pier Location Options & Pier Profile At Seashell Bldg
- Figure 04 – Area 3 (State Park) Pier Location & Pier Profile Off Beach
- Figure 05 – Pier Approach Options



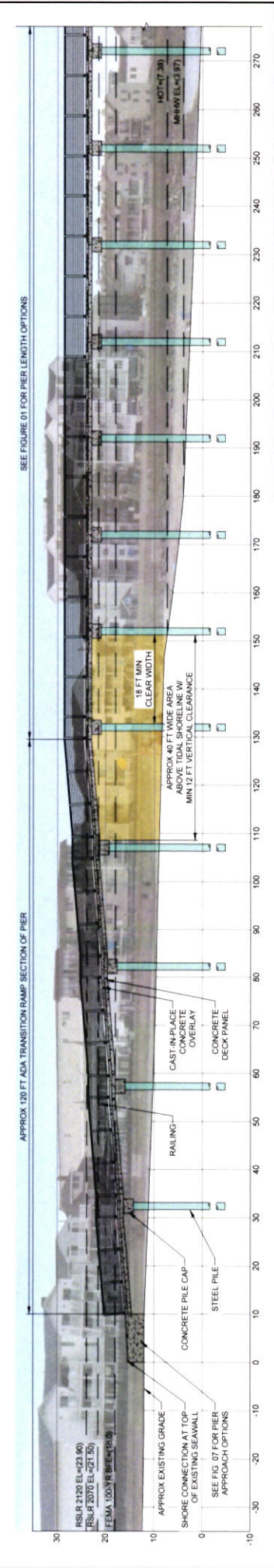
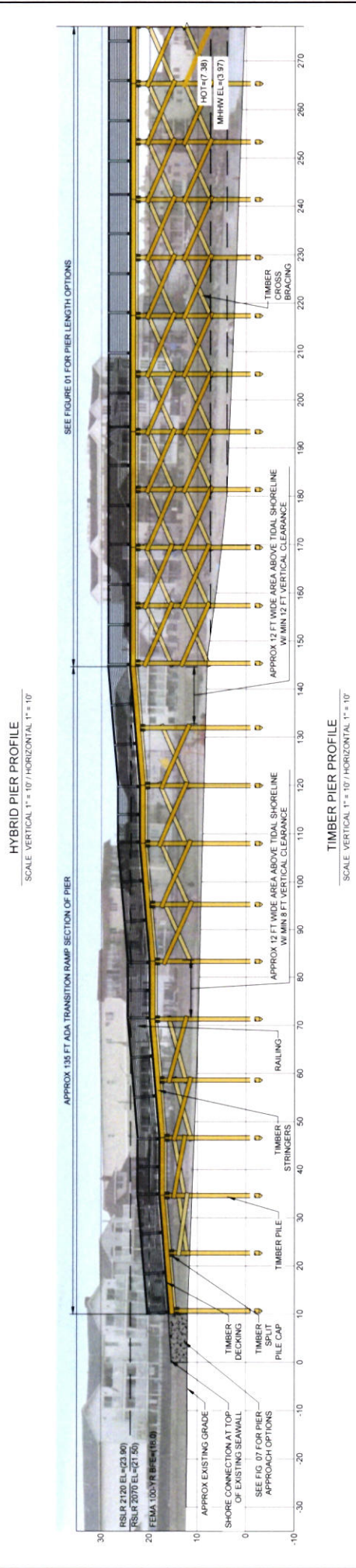
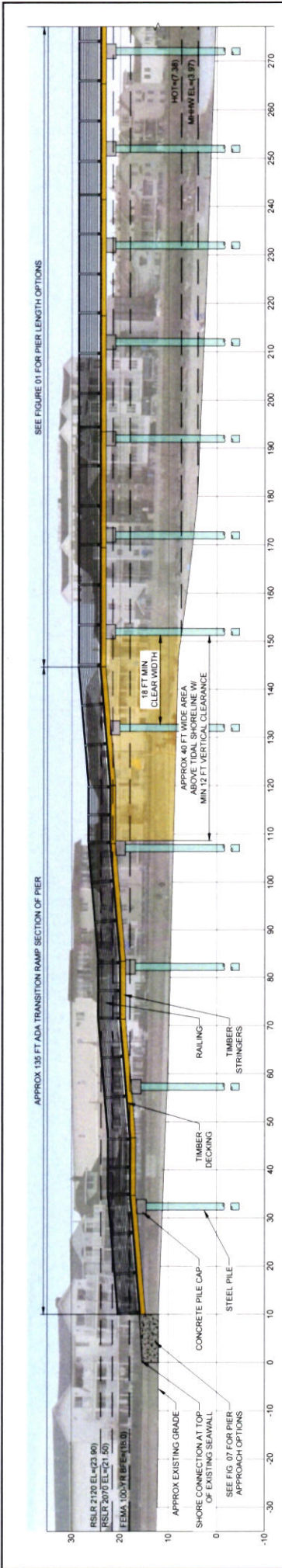
AREA 1 - LAYOUT PLAN
SCALE: 1" = 120'

0 100 200
SCALE: 1" = 120'

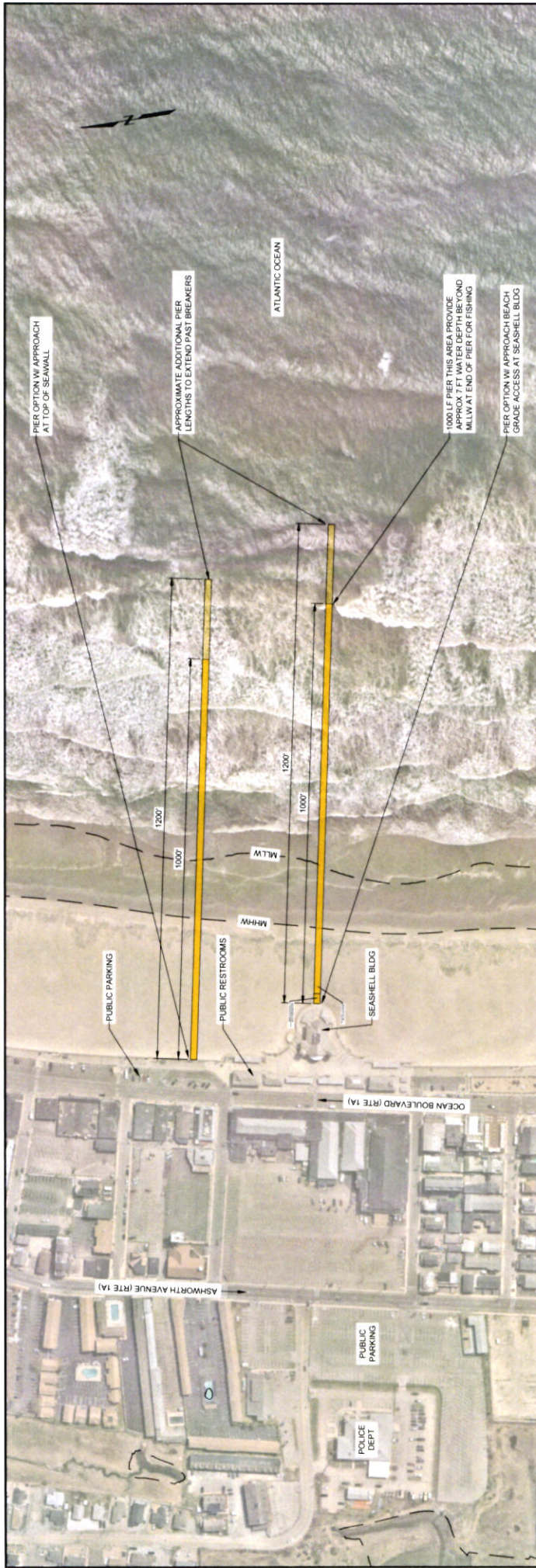


Feasibility Study Hampton Beach New Pier Hampton, New Hampshire Hampton Beach Area Commission Hampton, New Hampshire	GEI Consultants	AREA 1 (NORTH END) PIER LOCATION OPTIONS & TYPICAL PIER CROSS SECTIONS Project 2202415 October 2022	Fig. 1
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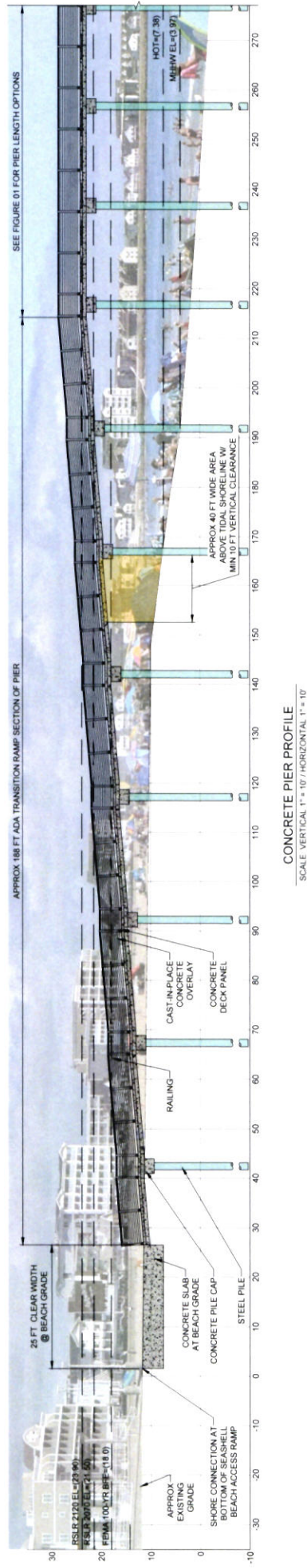
REV. 08/2022: 01 - REVISIONS TO LAYOUT PLAN; 02/2202415 - Hampton Beach New Pier Feasibility Study; 02/2202415 - Hampton Beach Area Commission; 02/2202415 - Hampton Beach Area Commission; 02/2202415 - Hampton Beach Area Commission



Feasibility Study Hampton Beach New Pier Hampton, New Hampshire Hampton Beach Area Commission Hampton, New Hampshire			Project 2202415 October 2022
AREA 1 (NORTH END) CONCRETE, TIMBER & HYBRID PIER PROFILES		Fig 2	



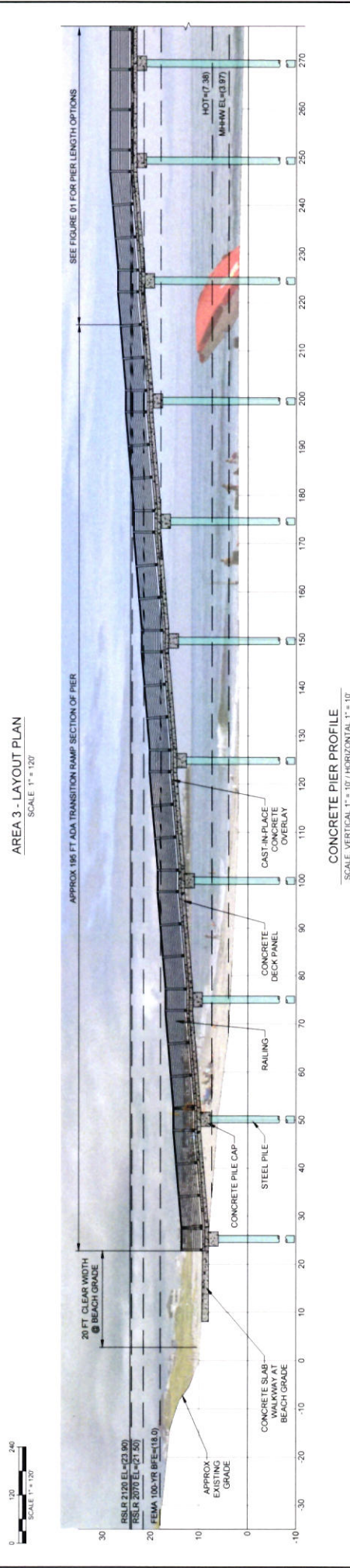
AREA 2 - LAYOUT PLAN
SCALE 1" = 120'



CONCRETE PIER PROFILE
SCALE VERTICAL 1" = 10' / HORIZONTAL 1" = 10'

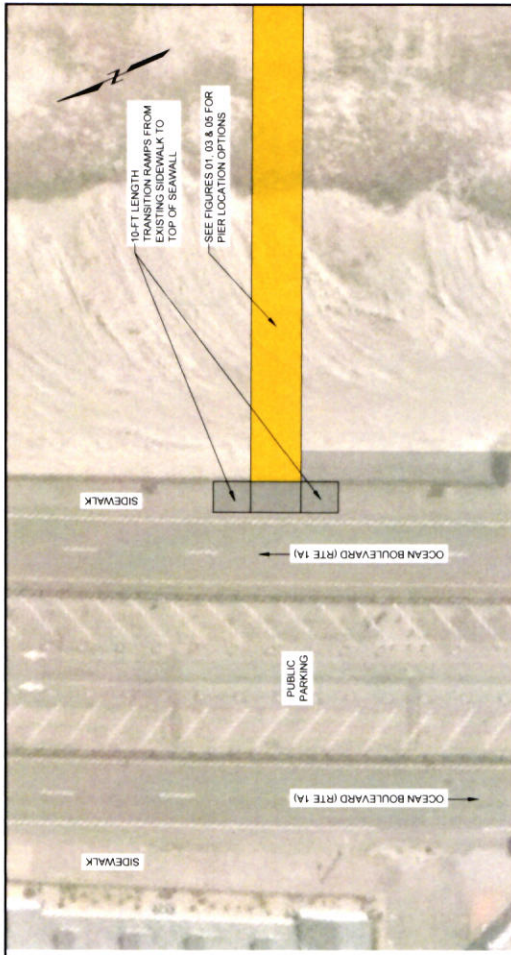
Feasibility Study Hampton Beach New Pier Hampton, New Hampshire Hampton Beach Area Commission Hampton, New Hampshire		AREA 2 (MIDDLE) PIER LOCATION OPTIONS & PIER PROFILE AT THE SEASHELL BUILDING	Project 2202415 October 2022 Fig. 3
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PROJECT: 2202415 - Hampton Beach New Pier Feasibility Study; DATE: 2024-10-11; LOCATION: Hampton Beach, New Hampshire; SCALE: 1" = 10' / HORIZONTAL 1" = 10' / VERTICAL



Feasibility Study Hampton Beach New Pier Hampton, New Hampshire Hampton Beach Area Commission Hampton, New Hampshire		AREA 3 (STATE PARK) PIER LOCATION OPTIONS & PIER PROFILE OFF THE BEACH	Project 2202415 October 2022
		Fig 4	

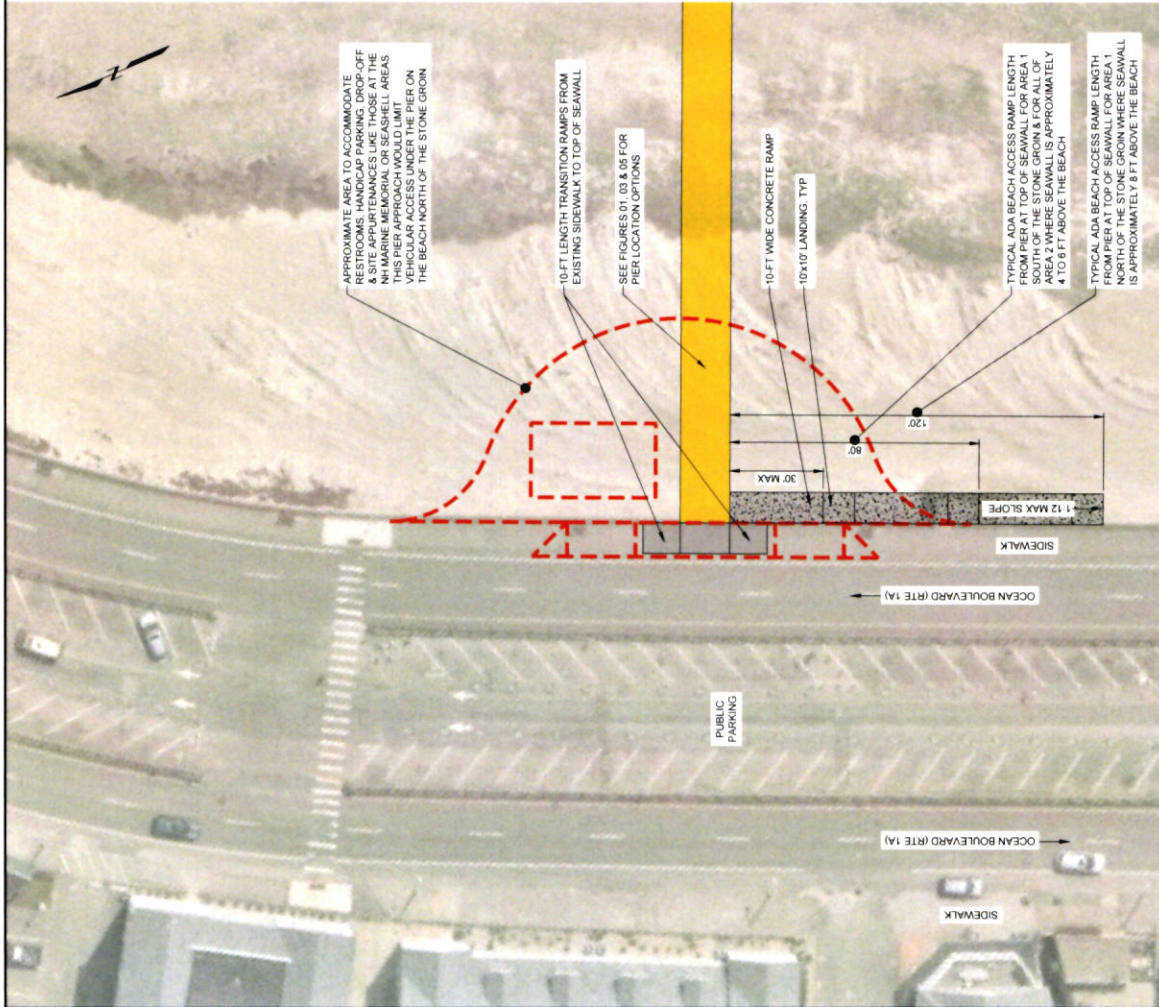
PROJECT: 1000015 - HAMPTON BEACH NEW PIER FEASIBILITY STUDY; 2202415 - HAMPTON BEACH NEW PIER FEASIBILITY STUDY; 2202415 - HAMPTON BEACH NEW PIER FEASIBILITY STUDY; 2202415 - HAMPTON BEACH NEW PIER FEASIBILITY STUDY; 2202415 - HAMPTON BEACH NEW PIER FEASIBILITY STUDY



PIER ACCESS FROM TOP OF SEAWALL



PIER ACCESS FROM BEACH



PIER ACCESS FROM TOP OF SEAWALL W/ ACCESS FROM PIER TO BEACH

SCALE 1" = 20'



Feasibility Study Hampton Beach New Pier Hampton, New Hampshire		PIER APPROACH OPTIONS
Hampton Beach Area Commission Hampton, New Hampshire		Project 2202415 October 2022

Appendix D

Conceptual Cost Estimate

The following cost estimates provide a rough order of magnitude for budgetary consideration of constructing a new pier within Hampton Beach. The cost estimates evaluate three different pier options: Timber, Hybrid Concrete with Timber Decking, and Concrete. Both the Hybrid and Concrete pier options are assumed to utilize rock socketed steel pipe piles due to the potential for limited overburden soils near the northern end of the facility.

Specific length and orientation of pier has yet to be selected and would vary based on selected location, shape, and materials. Budgetary costs per linear foot have been included to allow for comparative assessment of costs.

These costs include a 25% construction contingency based on the high-level stage of design and 40% inflation assuming that the project would take approximately 10 years to develop, design, permit, appropriate funding, and construct.

Additional premium would need to be applied for specialty designed and shaped piers that would make the new pier a unique statement for Hampton Beach.

Initial construction costs are only a portion of the overall life cycle cost. Overall life cycle costs include the sustainment of the structure well after initial construction has been completed and should be considered within the decision of materials and overall project feasibility. Annualized sustainment costs have been included with the cost estimate summary table as well as overall life cycle cost. These costs assume a minimum 50-year design life for concrete elements and minimum 25-year design life for timber elements. Routine inspection and maintenance programs are anticipated to occur at approximately 5-to-10-year intervals throughout the life of the structure to maintain good working order.

Additionally budgetary costs for appurtenances (benches, bicycle posts, shade structures, interactive signage, lighting, flag poles, life rings, ladders, trash receptacles, restrooms, etc.), shoreside improvement options including integration with the beach, a ramp off the sidewalk, and a shoreside gathering area with ADA accessible beach ramps, and a restroom have been included.

It should be noted that the cost estimates are based on present-day costs and assume typical construction methodologies which may require refinement as design is progressed.

Budgetary Cost Estimate Summary

	Estimated Pier Cost (1000 LF)	Cost per LF	Annualized Sustainment Cost	Life Cycle Cost (50 Years)
<i>Pier Construction</i>				
Timber Pier	\$11,900,000	\$12,000	\$310,000	\$27,400,000
Hybrid Pier with Rock Socketed Steel Piles	\$15,500,000	\$15,500	\$130,000	\$22,000,000
Concrete Pier with Rock Socketed Steel Piles	\$16,700,000	\$17,000	\$100,000	\$21,700,000
<i>Pier Head Options</i>				
	<i>Timber</i>	<i>Hybrid</i>	<i>Concrete</i>	
T-Head (assumes 20x60 pier head)	\$900,000	\$1,162,500	\$1,275,000	
Octagonal Landing (assumes 20 ft each side)	\$1,500,000	\$1,937,500	\$2,125,000	
<i>Shoreside Interface</i>				
Pier Access From Beach	\$75,000			
Pier Access from Top of Seawall	\$200,000			
Pier Access from Top of Seawall with Access from Pier to Beach	\$1,800,000			
<i>Appurtenances</i>				
Appurtenances	\$950,000			
<i>Public Facilities</i>				
Restroom	\$800,000			

Timber Pier

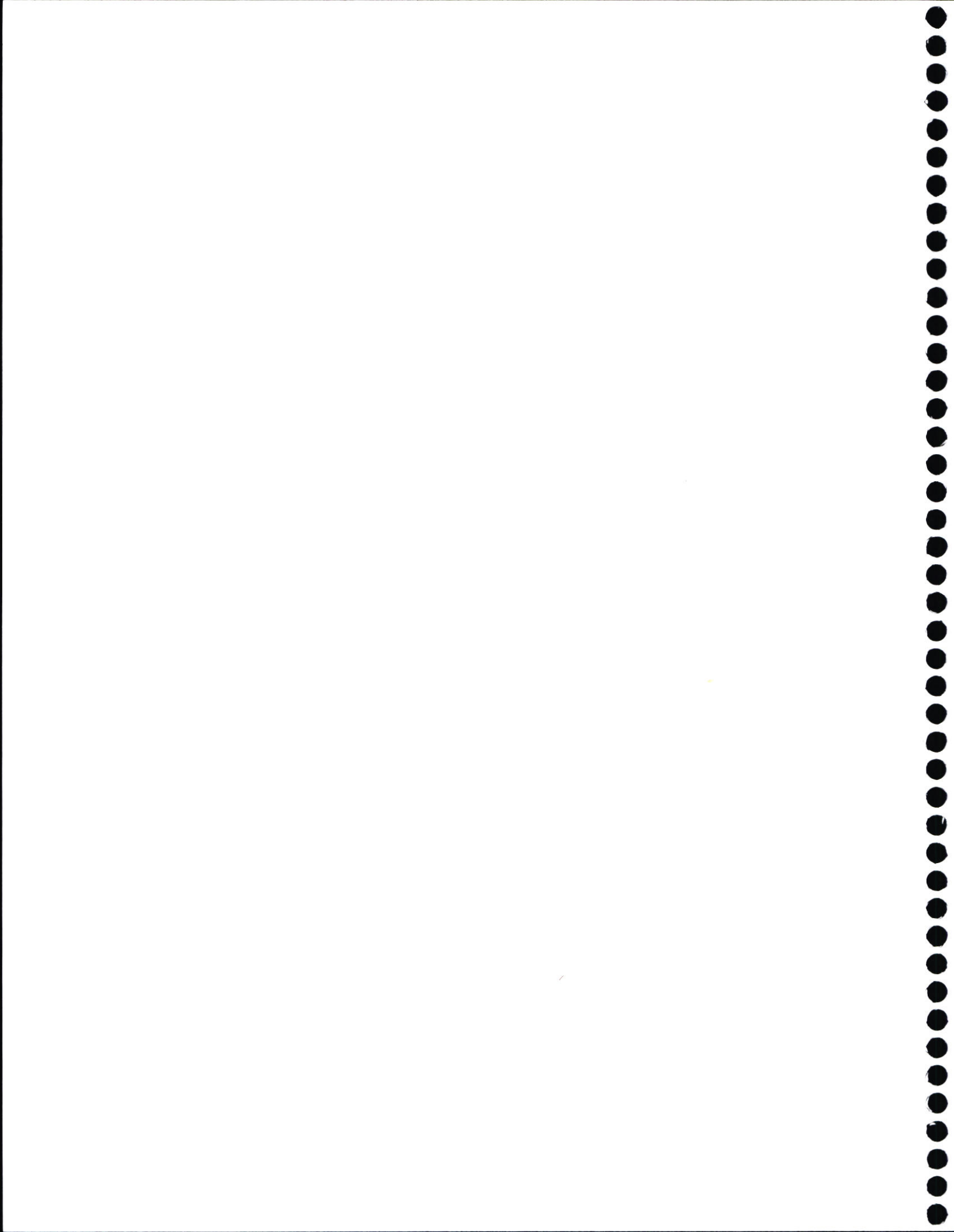
Description	Quantity		Materials	Labor	Equipment	Estimated Total
	Unit	Number	Unit Cost	Unit Cost	Unit Cost	Total
Mobilization & Site Prep	LS	1	\$98,000	\$15,737	\$42,625	\$156,362
Demolition	LS	1	\$5,000	\$7,629	\$12,576	\$25,206
Timber Pier	LS	1	\$2,817,520	\$1,020,703	\$1,282,776	\$5,120,998
<i>Subtotal</i>						<i>\$5,302,566</i>
Contractor General Conditions					2%	\$106,051
Contractor Overhead					15%	\$795,385
Contractor Profit					10%	\$530,257
Bonds					2%	\$106,051
<i>Total Contract Cost (Contractors Bid, Rounded Up)</i>						<i>\$6,841,000</i>
Inflation (Assumed 10 years)					40%	\$2,736,400
Construction Contingency					25%	\$1,710,250
Engineering Construction Support					8%	\$547,280
<i>Total Design and Engineering Allowance</i>						<i>\$4,993,930</i>
Estimated Budget Amount (Rounded Up)						\$11,900,000

Hybrid Pier with Rock Sockets

Description	Quantity		Materials	Labor	Equipment	Estimated Total
	Unit	Number	Unit Cost	Unit Cost	Unit Cost	Total
Mobilization & Site Prep	LS	1	\$98,000	\$15,737	\$42,625	\$156,362
Demolition	LS	1	\$5,000	\$7,629	\$12,576	\$25,206
Hybrid Pier with Rock Sockets	LS	1	\$4,356,520	\$947,660	\$1,398,210	\$6,702,389
<i>Subtotal</i>						\$6,883,957
Contractor General Conditions					2%	\$137,679
Contractor Overhead					15%	\$1,032,594
Contractor Profit					10%	\$688,396
Bonds					2%	\$137,679
<i>Total Contract Cost (Contractors Bid, Rounded Up)</i>						\$8,881,000
Inflation (Assumed 10 years)					40%	\$3,552,400
Construction Contingency					25%	\$2,220,250
Engineering Construction Support					8%	\$710,480
<i>Total Design and Engineering Allowance</i>						\$6,483,130
Estimated Budget Amount (Rounded Up)						\$15,400,000

Concrete Pier with Rock Sockets

Description	Quantity		Materials	Labor	Equipment	Estimated Total
	Unit	Number	Unit Cost	Unit Cost	Unit Cost	Total
Mobilization & Site Prep	LS	1	\$98,000	\$15,737	\$42,625	\$156,362
Demolition	LS	1	\$5,000	\$7,629	\$12,576	\$25,206
Concrete Pier w/ Rock Sockets	LS	1	\$4,916,360	\$956,803	\$1,391,503	\$7,264,666
<i>Subtotal</i>						\$7,446,233
Contractor General Conditions					2%	\$148,925
Contractor Overhead					15%	\$1,116,935
Contractor Profit					10%	\$744,623
Bonds					2%	\$148,925
<i>Total Contract Cost (Contractors Bid, Rounded Up)</i>						\$9,606,000
Inflation (Assumed 10 years)					40%	\$3,842,400
Construction Contingency					25%	\$2,401,500
Engineering Construction Support					8%	\$768,480
<i>Total Design and Engineering Allowance</i>						\$7,012,380
Estimated Budget Amount (Rounded Up)						\$16,700,000



Appendix E

Implementation Considerations

While this Feasibility Study assessed the technical design aspects of developing a new pier on Hampton Beach, there are several project implementation factors that should be considered after completion Feasibility Study including:

1. Additional planning
 - a. Project partners should establish prioritized goals to construct a new pier on Hampton Beach, elsewhere in Hampton, or not at all.
 - b. As part of, or shortly after the goal prioritization effort, project partners should identify who will be responsible for operations and maintenance, inclusive of labor/staffing, materials and equipment needs.
 - c. After a prioritized goal is identified to move forward with, additional planning and public engagement are anticipated to take place during design development, permitting and construction.
 - d. As the design is refined, a strategic implementation funding plan should be established to address costs associated with permitting, final design, construction and ultimately operations and maintenance.
2. Design Development
 - a. After project prioritization, design development for the preferred pier option are anticipated to involve:
 - i. Detailed field investigations preliminary design to identify the preferred pier location and materials. This design development would likely entail: existing conditions surveys; geotechnical investigations; pre-permitting meetings; and concept design development.
 - ii. Design would then progress to 30% where basic plans and elevations are developed along with outline specifications and confirmation of the scope, budget, and schedule. The 30% design should culminate with a project team design review meeting.
 - iii. Once the 30% design review has occurred the design team would progress with development of 60% design documents implementing changes from the 30% design review meeting and further detailing the design to a level that will allow for permit applications to be submitted and all major design details developed.

- iv. Following 60% design review, any changes would be incorporated and pre-final construction documents would be prepared to a 90% design level.
- v. Lastly final construction documents would be prepared for public bid.

Stakeholder and client review meetings should be included throughout the design process to make sure key community is involved with the design.

3. Permitting

- a. *See Section 6 – Regulatory Impact Review* for permit requirements.

4. Bidding

- a. Project procurement will be required to follow public procurement laws. Typically, procurement will take 8 to 12 weeks with competitive bidding for a project requiring a minimum of two weeks following advertisement before bids are opened. Given the scale of the project greater durations may want to be considered to allow competitive bidding. Ultimately, how the project is sponsored and funded (Local, State and/or Federal support) will affect the length of the bid and contracting period, adding months of administrative scheduling at a minimum.

5. Construction

- a. Construction: It is anticipated that construction would likely take approximately 18 to 24 months to complete. Due to the high surf environment construction may utilize a temporary pier structure built adjacent to the new pier or jack up barges positioned within the water to allow access for cranes.

It is assumed that construction would need to be phased to limit onsite work between Memorial Day and the end of September due to the busy summer tourist season. Temporary constructing fencing would be installed around the construction site to limit public access. The layout would require coordination to allow use of the beach without limiting passage.

- b. Construction staging and traffic patterns will need to be coordinated with NH State Parks, NH DOT, and the Town of Hampton. There is limited laydown area outside the beach to laydown equipment which may require roadway diversions, temporary parking restrictions, and offsite laydown and staging areas. Piles and large precast elements will need to coordinate deliveries and offloading as these are likely to have oversized loads.
- c. Other considerations that may need coordination during construction include local and/or state special events beyond the summer tourist season, and possibly coordination with other concurrent construction projects in the area.

Appendix F

Project References

The following project references have not been included within this report. The sources of information are as noted below:

Town

Town of Hampton: Zoning Ordinance Building Codes and Impact Fee Ordinance, amended March 2022.

Town of Hampton: Zoning Map of Hampton, New Hampshire, current to April 1, 2009

Town of Hampton: Master Plan (Part I); Draft Coastal Resilience Chapter, prepared by SLR, March 2021

State

NH State Legislature: SB 346-FN-A

NH DOT: Ocean Boulevard Rehabilitation; project # 40797, latest update, May 2022

NH DOT: Hampton River Bridge Rehabilitation; project # 15903, latest update, January 14, 2021

NH Fish and Game Department: Piping Plover Nesting Data, September 2022

NH Granit: Shoreline Structure data, May 10, 2016

Federal

ADAAG: 2010 Standards for Accessible Design, September 15, 2010

ASCE: 24-14 Flood Resistant Design and Construction, July 2015

FEMA: Flood Insurance Rate Map panels 439, 442 and 442, January 29, 2021

FEMA: Flood Insurance Study, Rockingham County, New Hampshire, January 29, 2021

FEMA: Coastal Flood Frequency and Extreme Value Analysis. Guidance for Flood Risk Analysis and Mapping, 2016

National Hurricane Center: Storm Surge Risk Maps, latest SLOSH grids, 2021

National Hurricane Center: Hurricane and Tropical Storm Strikes, October 2022

NOAA: Tides and Currents, Tidal Station 8423898 Fort Point, NH

NOAA: Bathymetric Data Viewer. Accessed online from
<https://www.ncei.noaa.gov/maps/bathymetry/> October 2022

NOAA: Digital Coast: Data Access Viewer. Accessed online from
<https://coast.noaa.gov/dataviewer/#/lidar/search/> October 2022

USACE: Wave Information Studies. Station 63045. <http://frf.usace.army.mil/wis/>, October 21, 2022

USACE: STWAVE: Steady-State Spectral Wave Model, Version 6.0, September 2011

USACE: 404 Clean Water Act, September 9, 2022

USACE, NOAA & USGS: Interagency Working Group Ocean and Coastal Maps, 2022

USACE: Repairs of the North Jetty of the Hampton Harbor Federal Navigation Project, Hampton, NH, January 25, 2022

Other

Goda, Y: "Random Seas and Design of Maritime Structures." World Scientific Publications. London, 2000

Melby, Jeffery A., Nadal-Caraballo, Norberto C., Pagan-Albelo, Yamiretsy, and Ebersole, Bruce: Wave Height and Water Level Variability on Lakes Michigan and St Clair. ERDC\CHL TR-12-23, 2012

Midwestern Regional Climate Center & Northeast Regional Climate Center: Cli-MATE Wind Rose and Wave Rose data, Portsmouth / Pease AFB, NH Station, September 1, 1948 to September 1, 2022

Wake et. al.: New Hampshire Coastal Flood Risk Summary, Parts I and II, August 2019

ERSI: Aerial Imagery, 2019

Near Map: Aerial Imagery, May 5, 2022

GEI: Drone Survey, May and September 2022

SHEA: Flooding in Hampton, NH; Situational Assessment, prepared by EF / Design & Planning, LLC with SHEA and NH DES, January 30, 2019

Appendix G

Decision Matrix

PIER USE (Needs, Capacity & Configuration)		ACCESS (PHYSICAL)	ACCESS (TIME)	APPURTENANCES	ESTIMATED PEAK CAPACITY	PIER CONFIGURATION NEEDS	ADDITIONAL CONSIDERATIONS
RECREATIONAL USES (Listed in Order of PAC Priority)							
Viewing	Pedestrian / ADA	7 Days a Week Sunup to Sundown Seasonally	Lighting, Seating Shade Shelter	Up to 200	Perimeter Pier Head Side Platforms	Consider view priorities at each Area location. Views of beach? Views of Boars Head?, etc.	
Fishing	Pedestrian / ADA / Casting / Lowered Railings	24 / 7 (Tide Dependent) Year Round	Lighting, Seating, Bait / Fish Storage, Water Services Shade Shelter	Up to 25	Perimeter Pier Head Side Platforms	Consider cantilevering portions of fish pier areas beyond the so that casting can be performed. Fishing location priority (Area 1, 3, 2)	
Public Gathering	Pedestrian	7 Days a Week Sunup to Sundown Seasonally	Lighting, Electrical Service, Sound, Staging	Up to 200	Pier Head Side Platforms	Consider staging area at shoreline. Consider scheduling / administrative needs.	
Fitness / Exercise	Pedestrian	7 Days a Week Sunup to Sundown Seasonally	Snacks / Water	Up to 50	Pier Head Side Platforms	Consider scheduling / administrative needs.	
Others - Low Priority:					Other (?)		
Swimming	Pedestrian	7 Days a Week Sunup to Sundown Seasonally	Gangway . Float Access to the Water	Not Recommended	Not Recommended	Considered a no swim zone around the pier if fishing is allowed.	
Boating	Pedestrian	7 Days a Week Sunup to Sundown Seasonally	Dolphin Piles, Gangway . Float Access to the Water	Not Recommended	Not Recommended	Exposed conditions are not suitable for docking of boats. It is recommended that this be considered at the State Pier in the harbor.	
Photography	Pedestrian	7 Days a Week Sunup to Sundown Seasonally	None	Up to 25	None	Consider view priorities at each Area location. Views of beach? Views of Boars Head?, etc.	
Art	Pedestrian	7 Days a Week Sunup to Sundown Seasonally	None	Up to 25	Pier Head and Side Platform Areas	Consider scheduling / administrative needs.	

PIER USE (Needs, Capacity & Configuration)							
COMMERCIAL	ACCESS (PHYSICAL)	ACCESS (TIME)	APPURTENANCES	ESTIMATED PEAK CAPACITY	PIER CONFIGURATION NEEDS	ADDITIONAL CONSIDERATIONS	
Bait / Rental Gear for Fishing	Vehicular / Pedestrian / Cart	7 Days a Week Sunup to Sundown Seasonally	Storage, Electrical Service / Data Services	Up to 25	Pier Head and Side Platform Areas Onshore Area	Commercial activities may require amendments to an agreement between the Town of Hampton and the State that does not allow retail activities east of Ocean Boulevard.	
Water / Snacks (Vending)	Vehicular / Pedestrian / Cart	7 Days a Week Sunup to Sundown Seasonally	Storage, Electrical Service / Data Services	Up to 200	Pier Head and Side Platform Areas Onshore Area	Commercial activities may require amendments to an agreement between the Town of Hampton and the State that does not allow retail activities east of Ocean Boulevard.	
Cruise Ships	Pedestrian	7 Days a Week Sunup to Sundown Seasonally	None	Not Recommended	Not Recommended	Exposed conditions are not suitable for docking of boats. It is recommended that this be considered at the State Pier in the harbor, via boat tenders.	
CIVIC	ACCESS (PHYSICAL)	ACCESS (TIME)	APPURTENANCES	ESTIMATED PEAK CAPACITY	PIER CONFIGURATION NEEDS	ADDITIONAL CONSIDERATIONS	
State Parks - Lifeguards & Beach Maintenance Operations	Under, On & Over the Pier / Pedestrian / ATV / Tractor w/ Beach Rake / Water	7 Days a Week Sunup to Sundown Seasonally	Life Safety Equipment Ladders to Water	Two (2) Additional Staff	Pier Head and Side Platform Areas	Consider no swimming zone within 200 feet of the pier.	
Town of Hampton Emergency Services	Pedestrian Ambulance	24 / 7 Year Round	Life Safety Equipment Ladders to Water	None	Pier Head and Side Platform Areas	Security cameras on the pier Gated access to close the pier during pending storm events and outside of normal pier use operation times / days / seasons.	

PIER LOCATION (Orientation and Alignment)							
NORTH END (BOARS HEAD TO NH MARINE MEMORIAL) APPROXIMATELY 2,000 LF OF BEACH	SHORE CONNECTION	PIER LENGTH (To MILLW, Fishing, Breakers)	PIER ALIGNMENT	OCEAN VIEW FROM PIER	ADJACENT USES (ABUTTING)	ADJACENT USES (WITHIN 0.25 MI)	ADDITIONAL CONSIDERATIONS
Between NH Marine Memorial and North End of Beach	Existing Sea Wall Bumpout Beach	500 LF 1,000 LF 1,200 LF	Rectilinear Curvilinear Perpendicular to Shore	180 Degrees	Existing Sea Wall Ocean Boulevard	Sidewalk Parking Commercial Marsh Residential Lodging Civic	3rd most physical obstruction to beach 3rd most visual obstruction of beach
Between North End of Beach and Boars Head	Existing Sea Wall Bumpout	200 LF 400 LF 600 LF	Rectilinear Curvilinear Angled From Shore	135 Degrees	Existing Sea Wall Ocean Boulevard	Sidewalk Parking Commercial Marsh Residential Lodging Civic	4th most visual obstruction of beach Most at risk from wave damage Least physical obstruction to beach
MIDDLE OF BEACH (NH MARINE MEMORIAL TO N ST) APPROXIMATELY 3,400 LF OF BEACH	SHORE CONNECTION	PIER LENGTH (To MILLW, Fishing, Breakers)	PIER ALIGNMENT	OCEAN VIEW FROM PIER	ADJACENT USES (ABUTTING)	ADJACENT USES (WITHIN 0.25 MI)	ADDITIONAL CONSIDERATIONS
From the Seashell Beach Access	Beach	175 LF 1,000 LF 1,200 LF	Rectilinear Curvilinear Perpendicular to Shore	180 Degrees	Seashell Building Ocean Boulevard	Sidewalk Parking Commercial Marsh Residential Lodging Civic Restrooms	2nd most visual obstruction of beach Least physical obstruction to beach Most ADA accessible Closest to site amenities
From the Seawall Adjacent to Ocean Boulevard	Existing Sea Wall Bumpout	350 LF 1,000 LF 1,200 LF	Rectilinear Curvilinear Perpendicular to Shore	180 Degrees	Existing Sea Wall Ocean Boulevard	Sidewalk Parking Commercial Marsh Residential Lodging Civic Restrooms	Most visual obstruction of beach Most ADA accessible Closest to site amenities 2nd most physical obstruction to beach
SOUTH END (N ST TO HAMPTON RIVER) APPROXIMATELY 2,500 LF OF BEACH	SHORE CONNECTION	PIER LENGTH (To MILLW, Fishing, Breakers)	PIER ALIGNMENT	OCEAN VIEW FROM PIER	ADJACENT USES (ABUTTING)	ADJACENT USES (WITHIN 0.25 MI)	ADDITIONAL CONSIDERATIONS
At Grade from Beach in front of Sand Dunes	Beach	50 LF 1,000 LF 1,200 LF	Rectilinear Curvilinear Perpendicular to Shore	180 Degrees	Sand Dunes Jetty / Hampton River State Park & Campground Residential	Public Works Sand Dunes Jetty / Hampton River State Park & Campground Residential Lodging	400 ft to ADA access at State Park over sand dunes or 2,300 ft to ADA access at Ocean Boulevard Adjacent to existing fishing in Hampton River Least visual impact obstruction of beach Most physical obstruction to beach