

Design Feasibility Study
New Beach Facility
@ Town Neck Beach – Town of Sandwich

Town Neck Beach

70 WOOD AVE
SANDWICH, MA



1 SEPTEMBER 2016

SUBMITTED BY:



BROWN LINDQUIST FENUCCIO & RABER ARCHITECTS, INC.
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Design Feasibility Study New Beach Facility @ Town Neck Beach – Town of Sandwich

Executive Summary:

Brown Lindquist Fenuccio & Raber Architects, Inc. was hired by the Town of Sandwich to complete a feasibility study at Town Neck Beach for a new beach support facility. The study consisted of three primary program elements; seasonal public restrooms, a lifeguard station, and concessions space. Through this study, the architect and design committee were able to establish general program needs, determine preliminary size requirements, investigate multiple siting options, complete schematic plans and elevations for the proposed buildings and develop preliminary project budgets.

The site presents multiple environmental and permitting challenges which have a significant influence on the proposed facility's design. One of the more significant site considerations is the high hazard FEMA velocity flood zone which will require the building to be substantially elevated above the adjacent grades.

Multiple design and siting options were studied and through numerous design committee meetings and 1 public forum, two conceptual building designs were developed and conceptually priced. A mobile restroom trailer option was also investigated and is included in this report. All three options studied for Town Neck Beach are briefly outlined below and detailed in the body of this report.

Preferred Design Concept:

The preferred design developed by the committee encompassed all three program requirements; seasonal public restrooms, a lifeguard station with associated storage, and concessions space. Additional outside open deck space was included for dining and viewing over the marsh and Cape Cod Bay. The proposed facility contains approximately 1,600 sf of enclosed space and a footprint of 4,300 sf. The remaining 2,700 sf footprint is composed of open deck areas, access stairs, ramps and landings. The FEMA velocity flood zone requires the building to be elevated approximately 10 feet above the parking lot on an open pile type foundation to allow flood water with wave action to move freely under the building.

The building design aesthetic is intended to invoke a maritime and coastal New England vernacular. Colors, materials, and forms used are reminiscent of old New England Coast Guard lifesaving stations and boathouses. There is a desire for the building to be seen as a destination not only for typical beach activities but for other community and social events.

Other proposed general site improvements include a better and more efficient use of the existing parking footprint which is not permitted to be increased. A new 5' wide pedestrian walkway along the existing northern edge and a defined turnaround and drop off area is at the east end of the parking lot adjacent to the new building. Other proposed amenities would include bike racks, benches, and exterior rinse showers.

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Square footage allocations and estimated cost data for the Preferred Design concept are listed below:

Preferred Design Area Calculations

Program Element	Space Allocated
Gross Enclosed Building Area:	±1,600 gsf
<ul style="list-style-type: none"> • Public Restrooms (±754 sf) • Concessions (±515 sf) • Lifeguard Station (±331 sf) 	
Open Deck Area:	±1,600 gsf
Stairs, Ramps and Landing required for code compliant access	±1,100 gsf
Total Building Footprint	±4,300 gsf
<i>(Note: a life guard storage area of ±600 sf is provided at grade underneath the building.)</i>	

Preferred Design Project Cost Estimate

Cost Item	Estimated Cost
Sub-total Construction Costs	\$2,016,624
Estimated Project Expenses "Soft Costs"	\$444,411
Total Estimated Project Cost	\$2,461,035

Reduced Program Concept:

A reduced design was born out of a public forum meeting where some expressed they understood the need but felt the building was too big and provided services which were not truly necessary. In this concept all program elements were removed except for the restrooms. This presented a 43% smaller footprint for the building; however it is still required to be elevated along with the stairs, ramps, and landings required for access. The proposed site improvement work for the reduced concept would be largely unchanged from the larger design.

Square footage allocations and estimated cost data for the Reduced Design concept are listed below:

Reduced Design Area Calculations

Program Element	Space Allocated
Gross Enclosed Building Area:	±754 gsf
<ul style="list-style-type: none"> • Public Restrooms <u>ONLY</u> 	
Open Deck Area primarily for circulation	±578 gsf
Stairs, Ramps and Landing required for code compliant access	±1,100 gsf
Total Building Footprint	±2,432 gsf
<i>(Note: a storage area of ±600 sf is provided at grade underneath the building.)</i>	

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Reduced Design Project Cost Estimate

Cost Item	Estimated Cost
Sub-total Construction Costs	\$1,450,830
Estimated Project Expenses "Soft Costs"	\$385,928
Total Estimated Project Cost	\$1,836,758

Mobile Restroom Facility:

Separate from the Architect's scope of work, the Recreation Department investigated mobile restroom facility options and pricing which were to be included as part of this study. This facility would be viewed as a temporary structure to be removed from the site in the off season and therefore would not need to comply with code requirements for flood zone construction.

The following outlined costs associated with a mobile restroom facility were provided by the Recreation Department to be included in this study:

Mobile Restroom Facility Costs

Status Quo	Estimated Cost
Yearly expenses associated with the port-a-johns currently used at the beach	\$7,000

Mobile Facility Alternative	Estimated Cost
One-time expense of trailer purchase and extension of site utilities	\$94,500

Yearly Operating Costs	Estimated Cost
Yearly operating costs for trailer	\$15,120

1. Project Summary

2. Information Gathering

- Photo Survey
- Site Analysis Drawing
- Pre-design Program Outline

3. Preferred Conceptual Design:

- Site Plans
- Building Plans
- Elevations
- Conceptual Project Cost Estimate

4. Reduced Program Conceptual Design:

- Building Plan & Elevation
- Conceptual Project Cost Estimate

5. Mobile Restroom Facilities:

- Mobile Restroom Configuration Option
- Mobile Restroom Facilities Cost Data

6. Support Documents:

- MassDEP Report
- Board of Health Septic Memorandum
- Preliminary Permitting and Septic Design Narratives with Supporting Locus Maps
- Floor Zone Construction Code Review
- Structural Schematic Design Narrative
- Preliminary Zoning Review
- Full Construction Cost Estimate for Preferred & Reduced Building Designs

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Project Summary:

Brown Lindquist Fenuccio & Raber Architects, Inc. was hired by the Town of Sandwich to complete a feasibility study at Town Neck Beach for a new beach support facility. The study consisted of three primary program elements; seasonal public restrooms, a lifeguard station, and concessions space. Through this study, the architect and design committee were able to establish general program needs, determine preliminary size requirements, investigate multiple siting options, complete schematic plans and elevations for the proposed building and develop a preliminary project budget.

Town Neck Beach is a very popular beach in the Town of Sandwich and is frequented by thousands of residents and visitors throughout the year. Its combination of both bay side beach and marsh side recreation opportunities, with the boardwalk over Mill Creek and the marsh makes it a unique destination on Cape Cod. The beach has been without permanent restroom facilities since 2008 when the previous concrete block restroom building was razed due to its age and inadequacies. Since that time “port-a-john” type temporary facilities have been seasonally placed at the edge of the parking lot. The lack of proper restroom and support facilities has been seen as a major deficiency at Town Neck Beach.

There are currently no lifeguard services at Town Neck Beach; however, due to the volume of visitors each summer the Town’s Recreation Department has a long term goal of establishing a presence at this location if resources become available in the future. In support of this service a lifeguard room and adequate storage needs to be provided in the new building.

On any given summer day at least one, and sometimes more mobile food vendors can be found in the parking lot. This has been a nice amenity which has evolved over recent years with mobile food vendors operating at the beach. There is a desire to enhance the food vendor options and opportunities with a permanent concessions space in the new building as well as dedicated locations in the parking lot to better control traffic flow and to avoid occupying general parking spaces. Enhanced food vendor options would increase the Town’s potential for revenue generation and would represent an additional draw to the beach.

The site presents multiple environmental challenges which have a significant influence on the proposed facility’s location, shape, size, and constructability. The entire site is considered a Coastal Dune and Barrier Beach and it’s mapped as critical habitat for multiple endangered species. A new facility at the beach would be subject to review and requirements of multiple local, state and federal agencies having jurisdiction. The site is also designated as a high hazard velocity (“V”) flood zone as established by FEMA FIRM maps. This designation requires any new building to be elevated above “Base Flood Elevation”.

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Multiple siting options were studied and discussed with local and state agencies. The design committee's preferred location for the building was north of the parking lot over the dune and at the midpoint of the parking lot. This was preferred because it did not occupy valuable parking spaces and would be positioned to more equally serve the full length of the beach; however this was ultimately determined to be infeasible. State jurisdiction MassDEP and MassWildlife reviewed various siting options and determined that no new building construction would be allowed outside the perimeter of the existing parking lot. Due to this feedback and the narrowness of the existing parking lot, the new building was ultimately positioned at the far east end of the site with a turn around and drop off area. The existing parking lot has the area available to accommodate approximately 200 parking spaces; however, even on a maximum capacity day the actual parking yield is substantially less than this. Currently parking spaces are not delineated with striping and port-a-john restrooms occupy potential parking area as do mobile food vendors. All these factors effectively reduce the actual parking yield down to the 170 range which is what the proposed preferred design would yield. With this understanding in mind the proposed project would not present a significant change in parking count from what is currently seen.

Two permanent building design concepts were ultimately studied as well as a "temporary" solution in the form of mobile restroom trailers. Each concept is described below and within the body of this document.

Preferred Design Concept:

The building committee arrived at a preferred design concept by establishing the desired program functions and then quantifying the space needs for each function. This design encompassed all three program requirements established by the design committee; seasonal public restrooms, a lifeguard station with associated storage, and concessions space. In addition to the enclosed program elements listed above there was a desire to offer outside open deck space for view over the marsh to the south and Cape Cod Bay to the North. These deck areas would also support circulation and seating/ dining areas relating to the concessions vendor. All these elements were felt to strengthen Town Neck Beach as a destination for activities beyond simply beach recreation.

The proposed new beach facility contains approximately 1,600 sf of enclosed space and a footprint of 4,300 sf. The remaining 2,700 sf footprint is composed of open deck areas for observation & dining, access stairs, ramps and landings. Based on the FEMA established base flood elevation of 16 feet, the main level of the building will need to be elevated approximately 10 feet above the parking lot which is at elevation ± 10 . This presents significant access issues which needed to be overcome. As a commercial public building, it must be in full compliance with all Americans with Disabilities Act (ADA) and Massachusetts Architectural Access Board (MAAB) requirements for accessibility. An accessible ramp of approximately 150 linear feet wraps around the

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building to provide the compliant access while also serving to screen and hide the pile foundation understory. Velocity Flood Zone construction requirements dictate an open pile type foundation to allow flood water with wave action to move freely under the building while resulting in minimal damage or debris. Open vertical board screening is allowed and is proposed at the understory to limit access under the building and to provide a small semi-enclosed area of grade level open air lifeguard storage. Square footage allocations for the preferred design are listed below:

Program Element	Space Allocated
Gross Enclosed Building Area:	±1,600 gsf
<ul style="list-style-type: none"> • Public Restrooms (±754 sf) • Concessions (±515 sf) • Lifeguard Station (±331 sf) 	
Open Deck Area:	±1,600 gsf
Stairs, Ramps and Landing required for code compliant access	±1,100 gsf
Total Building Footprint	±4,300 gsf
<i>(Note: a life guard storage area of ±600 sf is provided at grade underneath the building.)</i>	

The building design aesthetic is intended to invoke a maritime and coastal New England vernacular. Colors, materials, and forms used are reminiscent of old New England Coast Guard lifesaving stations and boathouses. There is the desire for the building to be seen as a destination not only for typical beach activities but for other community and social events. Its unique location at the end of the iconic Sandwich boardwalk and surrounding dunes and marsh land provides an opportunity for the building to act as a welcoming beacon of the Town within the rolling natural landscape.

The **seasonal public restrooms** contain 4 stalls for each sex which was determined through anticipated parking count. East restroom also contains a single changing stall, a 2 station sink and infant changing table. A plumbing chase space between the restrooms contains the janitorial fixtures and equipment as well as hot water and electrical utilities that serve the building.

A **concessions** space was provided along with associated storage area to be leased by the Town to a concessions vendor. Commercial kitchen items such as ansul hood, 3 bay sink and hand sink would be provide with the space but the vendor would be responsible for all additional equipment fit-up to meet their needs. Concessions were viewed by the design committee as another amenity to bring visitors to the beach and is commonly available at many other beaches on Cape Cod. The design committee also desired to continue providing opportunities for mobile food vendors who have become more and more popular at the beach. A designated area with remote power pedestals has been planned so these vendors do not occupy general parking spaces.

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Town Neck Beach does not currently offer any **lifeguard** services; however, due to the volume of visitors each summer, the Town’s Recreation Department would like to establish a presence at this location. In support of these services a lifeguard room has been provided along with a small employee locker and changing room. Within the lifeguard room is planned a small medical treatment area to handle minor medical issues that arise at the beach. The lifeguard room location was positioned to maximize its view over both the bay and mash side beaches. Though guards would be stationed on the beaches a supervisor could have general observation over all beach activities from the building. A grade level storage area under the building has been provided to secure handicap beach wheel chairs, rescue boards, and other beach related equipment.

Other proposed general **site improvements** include a better and more efficient use of the existing parking footprint which is not permitted to be increased. Much of this is achieved through the use of striping for better delineation. A new 5’ wide pedestrian walkway is proposed along the existing northern edge which will provide safer separation of pedestrian and vehicular circulation. A defined turnaround and drop of area is planned at the east end of the parking lot adjacent to the new building. Other proposed amenities would include bike racks, benches, and exterior rinse showers.

Estimated construction costs were developed by A.M. Fogarty & Associates (independent cost estimator) based on conceptual drawings and outline specifications. The estimated construction costs and anticipated project soft costs are outlined below:

Preferred Design Project Cost Estimate

Cost Item	Estimated Cost
Vertical Construction Costs	\$1,059,919
Site Work Costs	\$364,312
Anticipated General Contractor fees	\$261,910
15% Contingency & 4% Escalation	\$330,483
Sub-total Construction Costs	\$2,016,624
Estimated Project Expenses “Soft Costs”	\$444,411
Total Estimated Project Cost	\$2,461,035

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Reduced Program Concept:

At a public forum meeting the design committee presented the “in progress design” and solicited feedback and input from all interested parties. The group in attendance was generally split down the middle in favor and against. Some of the voices in opposition noted that while they understood the need for a facility at the beach they felt the proposed design was too large and perhaps provided more than was really necessary. In response to this feedback a reduced building concept was developed which eliminated all program functions except for the restrooms. This presented a 43% smaller footprint for the building; however it is still required to be elevated above the base flood elevation along with the stairs, ramps, and landings. The proposed site improvement work for the reduced concept would be largely unchanged from the larger design. Square footage allocations for the reduced concept are listed below:

Program Element	Space Allocated
Gross Enclosed Building Area:	±754 gsf
• Public Restrooms <u>ONLY</u>	
Open Deck Area primarily for circulation	±578 gsf
Stairs, Ramps and Landing required for code compliant access	±1,100 gsf
Total Building Footprint	±2,432 gsf
<i>(Note: a storage area of ±600 sf is provided at grade underneath the building.)</i>	

Estimated construction costs were developed by A.M. Fogarty & Associates (independent cost estimator) based on conceptual drawings and outline specifications. The estimated construction costs and anticipated project soft costs are outlined below:

Reduced Design Project Cost Estimate

Cost Item	Estimated Cost
Vertical Construction Costs	\$660,330
Site Work Costs	\$364,312
Anticipated General Contractor fees	\$188,427
15% Contingency & 4% Escalation	\$237,761
Sub-total Construction Costs	\$1,450,830
Estimated Project Expenses “Soft Costs”	\$385,928
Total Estimated Project Cost	\$1,836,758

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Mobile Restroom Facility:

Separate from the Architect's scope of work, the Recreation Department investigated mobile restroom facility options and pricing which were to be included as part of this study. This facility would be viewed as a temporary structure to be removed from the site in the off season and therefore would not need to comply with code requirements for flood zone construction.

The following outlined costs associated with a mobile restroom facility were provided by the Recreation Department to be included in this study:

Mobile Restroom Facility Costs

Status Quo	Estimated Cost
Yearly expenses associated with the port-a-johns currently used at the beach	\$7,000

Mobile Facility Alternative	Estimated Cost
One-time expense of trailer purchase and extension of site utilities	\$94,500

Yearly Operating Costs	Estimated Cost
Yearly operating costs for trailer	\$15,120

Design Committee Members:

Town of Sandwich Staff:

- Doug Lapp (*Assistant Town Manager*)
- David Mason (*Director of Health*)
- Mark Galkowski (*Director, Department of Natural Resources*)
- Guy Boucher (*Recreation Department Director*)
- Ted Hamilton (*Director of Public Facilities*)

Sandwich Citizen:

- Paul Schrader

Architect and Consultants:

- Tim Sawyer (*Brown Lindquist Fenuccio & Raber Architects*)
- Amy Ball (*Horsley Witten Group –Civil Engineering & Environmental Permitting*)
- Joe Longo (*Horsley Witten Group –Civil Engineering & Environmental Permitting*)
- Brian Walsh (*Consulting Structural Engineers, Inc.*)

- Photo Survey
- Site Analysis Drawing
- Pre-design Programming Outline

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PHOTO SURVEY



The above aerial photo shows the location of the previous bathhouse structure razed in 2008

The image to the left is of the former bathhouse located at the Beach

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PHOTO SURVEY



The above aerial photo shows the Town Neck Beach in the spring of 2016 after the beach renourishment project

The image to the right captures the iconic Town Neck Beach Boardwalk bridge over Mill Creek



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PHOTO SURVEY



The left photo depicts the proposed site view from the main boardwalk dune crossing to the east

The photo below depicts the proposed site viewed from the dune crossing to the west



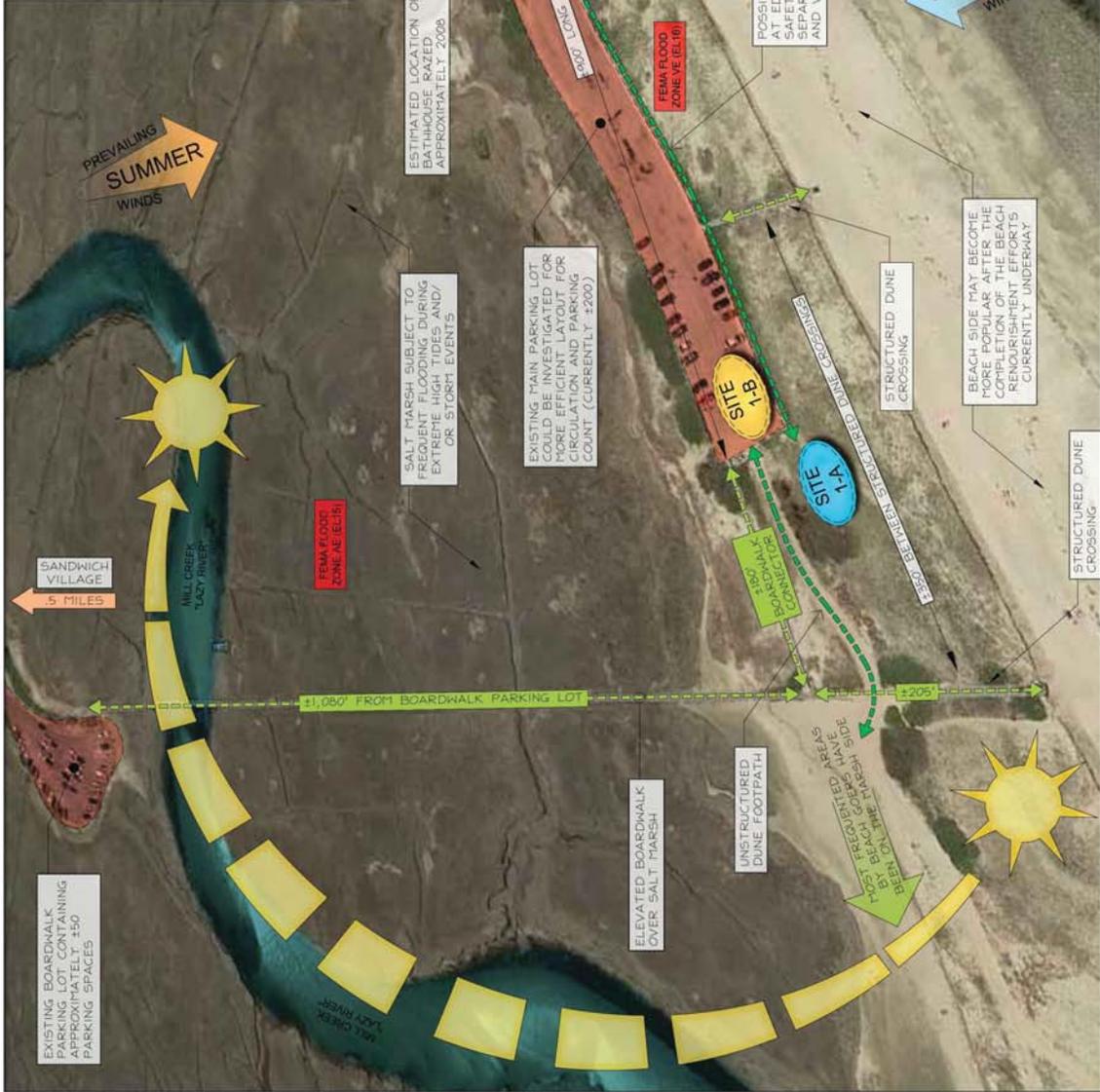
The left photo was taken from the parking lot level



The above photo was taken from the boardwalk connector at the east end of the parking Lot

SITE DESIGN CONSIDERATIONS

- ALL POTENTIAL BUILDING SITES ARE WITHIN A FEMA HIGH HAZARD VELOCITY FLOOD ZONE WHICH WILL REQUIRE THE BUILDING TO BE SUBSTANTIALLY ELEVATED ABOVE EXISTING RELATIVE GRADES AND COMPLY WITH PREVISIONS FOR FLOOD ZONE CONSTRUCTION
- BUILDING SITING OPTIONS WILL NEED TO BE REVIEWED WITH NATURAL HERITAGE & ENDANGERED SPECIES PROGRAM (NHESP) AS WELL AS DEP TO ASSESS APPROVABILITY
- THE SITE IS CONSIDERED BOTH COASTAL DUNE AND BARRIER BEACH.
- THE BEACH IS SERVED BY 2 SEPARATE PARKING AREAS CONNECTED BY A LONG BOARDWALK OVER THE SALT MARSH AND CONTINUES OVER THE DUNE FOR BEACH ACCESS.
- THE BOARDWALK IS AN ICONIC FEATURE OF TOWN NECK BEACH AND PROVIDES PEDESTRIAN ACCESS ACROSS MILL CREEK AND THE MARSH FROM NEARBY SANDWICH VILLAGE.
- THE BEACH IS UNIQUE IN THAT IT OFFERS RECREATION ACTIVITIES NOT ONLY ON THE BEACH SIDE BUT THE MARSH SIDE AS WELL WITH MILL CREEK.



Google earth



BROWN LINDQUIST FENUCCIO & RABER ARCHITECTS, INC.



Preliminary Site Analysis Board

Town Neck Beach Comfort Station Feasibility Study
Town of Sandwich, MA



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Pre-Design Programming Outline

<p>1. Structure:</p>	<ul style="list-style-type: none"> • Appropriate to historic district • Assumed wood framed and gable roof forms • Elevated due to FEMA Velocity Flood Zone • Stairs, ramps and decks will be utilized for access and ADA/ MAAB compliance
<p>2. Anticipated Personnel:</p>	<ul style="list-style-type: none"> • 8-10 Lifeguards (June – September). Not all will be in building at any given time • 2 Gate attendants • 1 Head Guard (supervisor)
<p>3. Program Functions to be Designed for:</p>	<ul style="list-style-type: none"> • Public Restrooms & Changing Rooms • Lifeguard Station & Storage Area • Concessions are in building • Power pedestals and dedicated space for mobile food vendors • Observation Areas (i.e. Open deck & seating areas)

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<p>4. Public Restrooms & Changing Rooms:</p> <ul style="list-style-type: none"> ➤ There currently are no permanent restroom facilities at the site. Port-O-potty type units are currently used and require frequent pumping and cleaning. 	<ul style="list-style-type: none"> • 4 fixtures per men's and women's rooms • Single additional interior changing stall included for both men's and women's rooms • Double bowl sinks and changing tables in both • Single combination janitor's closet, utility room and plumbing chase between restrooms.
<p>5. Lifeguard Office & Storage Area:</p> <ul style="list-style-type: none"> ➤ There currently are no lifeguard services at Town Neck Beach however the Recreation Department would like to have a presence at this location. 	<ul style="list-style-type: none"> • Open room to act as staff break area and office • Desired Amenities: <ul style="list-style-type: none"> ○ Staff lockers in small changing room ○ Kitchennette with small refrigerator • Medical treatment area • Lockable closet • Maximized visibility over primary beach areas • Anticipated storage needs: <ul style="list-style-type: none"> ○ Lifeguard rescue boards ○ Handicapped beach wheel chairs ○ Miscellaneous beach items
<p>6. Concessions and/or Mobile Vendor Area:</p> <ul style="list-style-type: none"> ➤ Providing concessions options has the opportunity to generate revenue for the Town and can make the beach a more desirable destination even outside of prime beach times. ➤ Providing for mobile vendors can generate revenue and limit their impact on available parking. 	<ul style="list-style-type: none"> • Full commercial kitchen for lease by concessions vendor – Vendor to outfit most of equipment • Provide remotely located power pedestal(s) which could be rented to mobile food vendors in dedicated parking spaces.

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<p>7. Observation Areas:</p> <p>➤ The elevated main level required by the flood zone presents unique opportunities for elevated panoramic views over the surrounding landscape.</p>	<ul style="list-style-type: none"> • Provide bench and table seating at elevated deck for observation and eating associated with concessions. • Observation areas may be provided overlooking both the bay and marsh sides. • Seating should be durable and permanently affixed to limit vandalism.
<p>8. Basic building systems:</p>	<ul style="list-style-type: none"> • A new elevated septic system would be located below the building • Power service would be extended to the building underground • The seasonal building would have no heating or cooling – ventilation only • No solar hot water or photovoltaic at this time but could be implemented in the future.
<p>9. Other site improvements and amenities which need to be considered:</p>	<ul style="list-style-type: none"> • Multiple bike racks • Outdoor cold water rinse showers • Defined pedestrian path separated from vehicular drive isles for safety • Create a defined turn around, loading and unloading area at end of dead-end parking lot

- Site Plans
- Building Plans
- Building Elevations
- Conceptual Project Cost Estimate

NOTE: BASE SITE INFORMATION TAKEN FROM A CAD "EXISTING CONDITIONS" PLAN DATED 4/22/2011 PROVIDED BY THE TOWN AS PREPARED BY TIGHE & BOND. BEACH RENOVATION PLAN INCLUDED IN THE SFG AND DATED SEPTEMBER 2010.

- Parking Data: (Similar to Existing)**
- Parking Yield Per Layout = ± 170 Sp.
 - 90° Double Loaded Configuration
 - Two Way central Drive Isle
 - Loop Turnaround at East End
 - 5' Pedestrian Walk @ North Edge
- (Existing parking Count = ±200 Spaces)



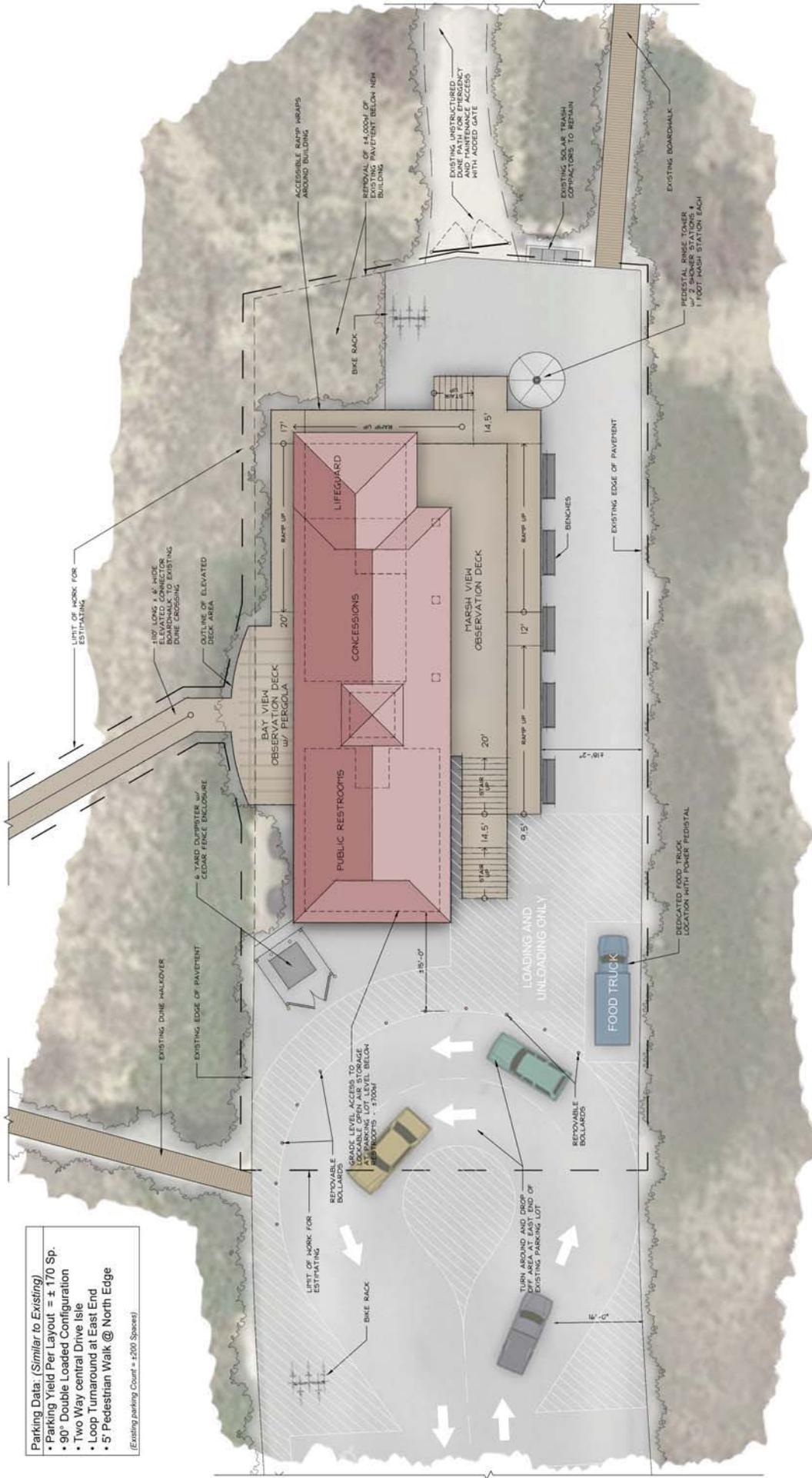
Proposed Site Overview
Scale: 1:40



**TOWN NECK BEACH
BATHHOUSE FEASIBILITY STUDY
FOR THE
TOWN OF SANDWICH**



**BROWN LINDQUIST FENUCCIO & RABER
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FAX: 508-362-8828
www.brownlindquist.com



Parking Data: (Similar to Existing)

- Parking Yield Per Layout = ± 170 Sp.
- 90° Double Loaded Configuration
- Two Way central Drive Isle
- Loop Turnaround at East End
- 5' Pedestrian Walk @ North Edge

(Existing parking Count = ±200 Spaces)



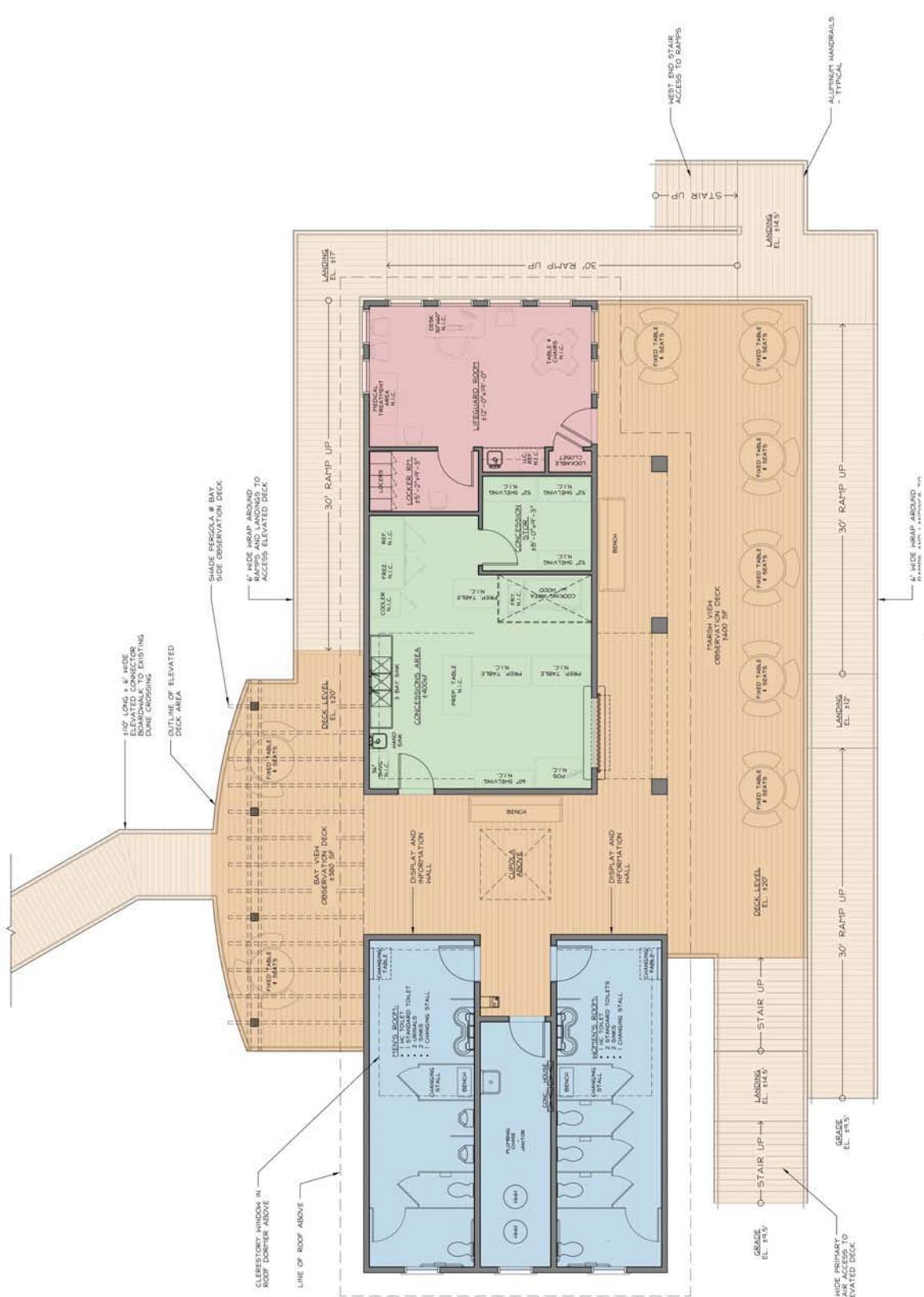
Building & Site layout
Scale: 8"=1'-0"

**TOWN NECK BEACH
BATHHOUSE FEASIBILITY STUDY
FOR THE
TOWN OF SANDWICH**



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www.brownlindquist.com

Area Calculations:	
• Gross Building Area	= ±1,600 sf
• Open Deck Area	= ±1,600 sf
• Storage area below	= ±600 sf
• Footprint (total)	= ±4,300 sf
(includes Building, stairs & ramp)	
• ±150 lf. of 6' wide access ramp up to deck & building elevation (± 930 sf) Included in total footprint above	
• Additional ±110 lf. of 6' wide boardwalk connector to ex. dune crossing (± 660 sf) (NOT Included in total footprint above)	



- Access Ramps & Stairs
- Elevated Deck Area
- Public Restrooms
- Concessions
- Lifeguard Room

**TOWN NECK BEACH
BATHHOUSE FEASIBILITY STUDY
FOR THE
TOWN OF SANDWICH**



Main Level Plan Concept
Scale: 1/4" = 1'-0"

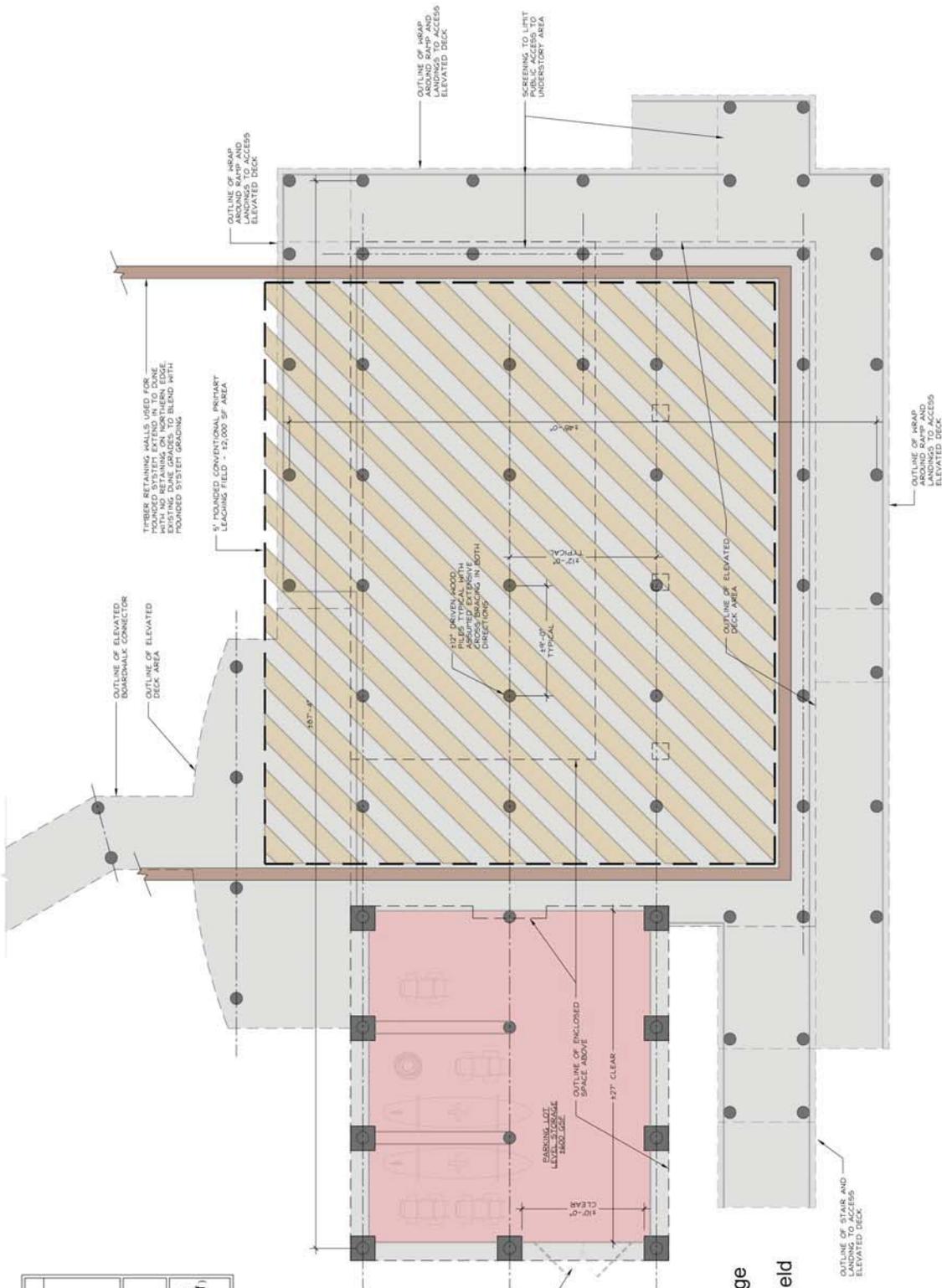


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Area Calculations:	
• Gross Building Area	= ±1,600 sf
• Open Deck Area	= ±1,600 sf
• Storage area below	= ±600 sf
• Footprint (total)	= ±4,300 sf
<small>(Includes Building, stairs & ramp)</small>	
• ±150 lf. of 6' wide access ramp up to deck & building elevation (± 800 sf) Included in total footprint above	
• Additional ±110 lf. of 6' wide boardwalk connector to ex. dune crossing (± 660 sf) (NOT Included in total footprint above)	



- Total Footprint
- Grade Level Lifeguard Storage
- Mounded Septic Leaching Field



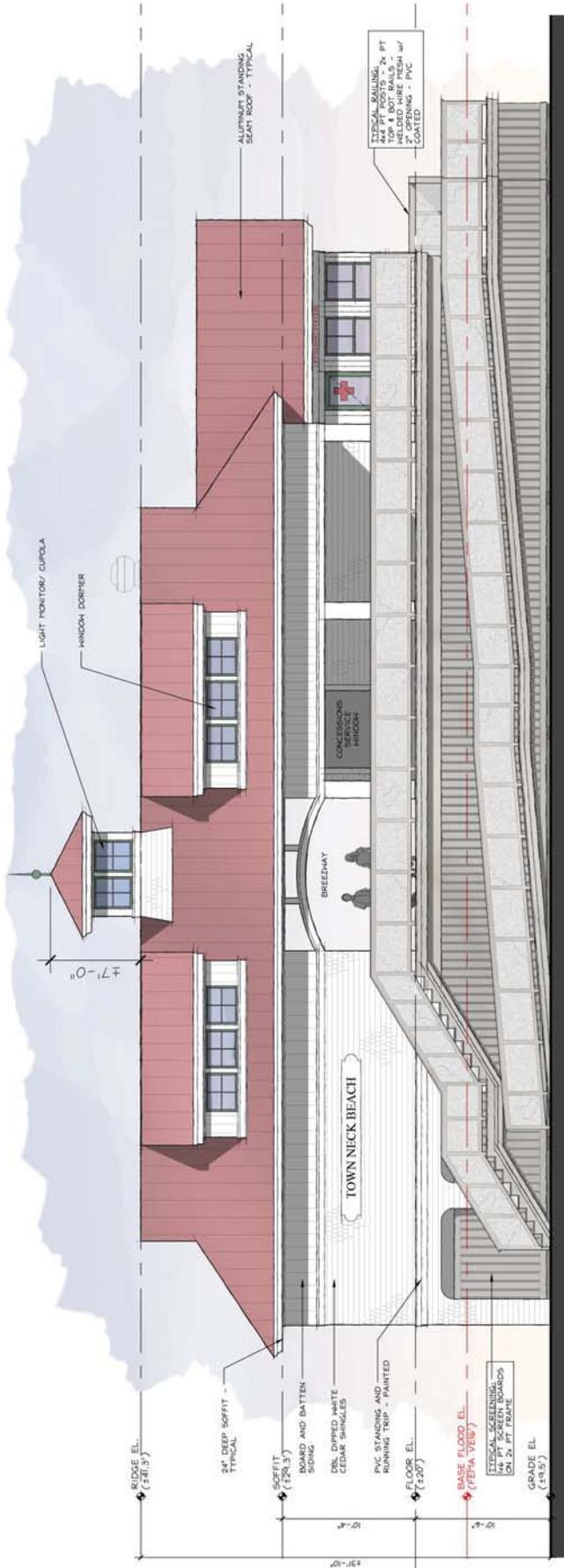
Understory Preliminary Pier Plan
Scale: 1/4" = 1'-0"

**TOWN NECK BEACH
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1/4" = 1'-0" Scale. All dimensions are approximate and subject to change. The information contained herein is for informational purposes only and does not constitute a contract. The information contained herein is for informational purposes only and does not constitute a contract. The information contained herein is for informational purposes only and does not constitute a contract.



South Elevation



West Elevation

Massing & Elevation Studies
Scale: 1/4"=1'-0"

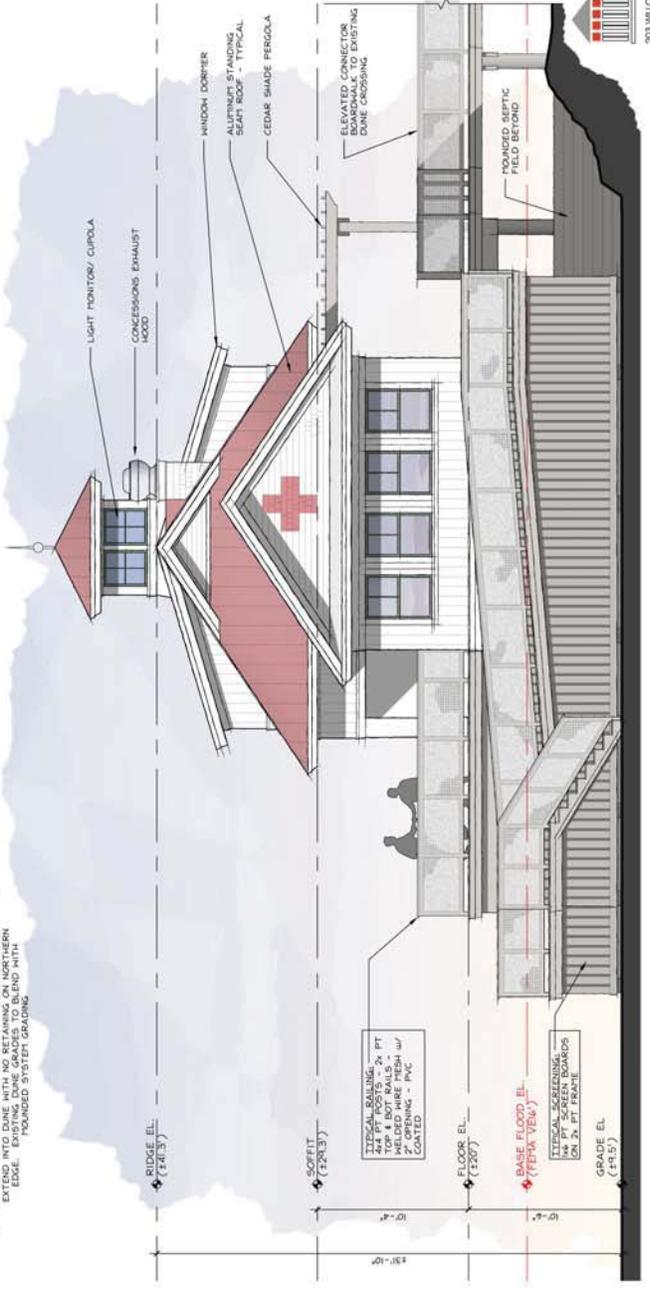
TOWN NECK BEACH
BATHHOUSE FEASIBILITY STUDY
FOR THE
TOWN OF SANDWICH



203 WILLOW STREET, SUITE A
HARRISBURG, PA 17105
PH: 717-632-8882
FAX: 717-632-2828
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North Elevation



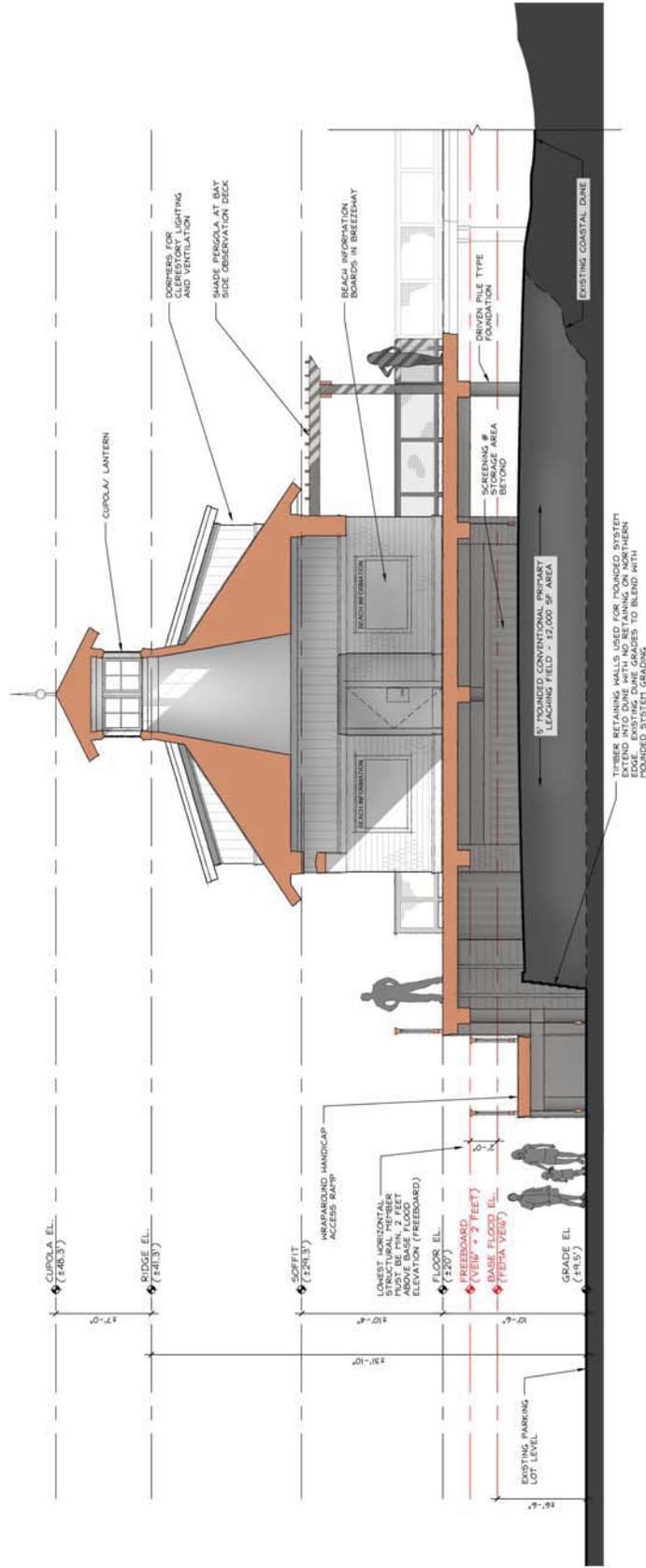
East Elevation

Massing & Elevation Studies
Scale: 1/4"=1'-0"

TOWN NECK BEACH
BATHHOUSE FEASIBILITY STUDY
FOR THE
TOWN OF SANDWICH



BROWN LINDQUIST FENUCCIO & RABER
ARCHITECTS, INC.
203 WILLOW STREET, SUITE A
YARROLDSPORT, MA 02875
PH: 508-362-8882
FAX: 508-362-2828
www.brownlindquist.com



Building Cross Section @ Breezeway
Scale: 3/8"=1'-0"

Design Feasibility Study New Beach Facility @ Town Neck Beach – Town of Sandwich

Preliminary Estimated Project Cost Data (Preferred Conceptual Design)

The following preliminary cost estimate was prepared by an independent construction cost estimator and is based upon the current conceptual design drawings only. We would recommend that the budget be updated as the schematic design & construction documents are further developed.

Construction Cost		
New Beach Facility Building (Vertical Construction Only):	4,300 GSF (footprint) @ \$ 247/SF	
• (Includings: Decks, Ramps, Public Restrooms, Concessions & Lifeguard Room)		\$1,059,919
Site Work:		
• (Includings: Mounded Septic, General Site Improvements, Boardwalk Connector & Site Utilities)		\$364,312
Contractor Markups:		
General Conditions	- 8%	\$113,938
Overhead & Profit	- 8%	\$123,054
P&P Bond	- 1.5%	\$24,918
Sub-Total		\$1,686,141
+ 15% Construction Contingency (Based on Current Stage of Design)		\$252,921
+ 4% Escalation based on a fall 2017 construction start. An escalation of 4% should be figured for each subsequent year until construction)		\$77,562
Hard Costs Sub-Total		\$2,016,624
Miscellaneous Project Expenses - "Soft Costs"		
Architectural & Engineering Fees (10% of Construction Costs exclusive of Feasibility Study Fees)		\$193,906
Civil Engineering Fee	Allowance	\$35,000
Geotechnical borings and report	Allowance	\$5,000
Updated Construction Cost Estimate @ 75% Bid Documents	Allowance	\$6,000
Exterior Signage (by Owner's Vendor)	Allowance	\$8,000
Security System (by Owner's Vendor)	Allowance	\$10,000
Telephone/Computer Wiring & Hardware (by Owner's Vendor)	Allowance	\$10,000
Furnishings - Furniture - Equipment (FFE)	Allowance	\$30,000
Materials Testing During Construction	Allowance	\$10,000
Estimated Reimbursable Expenses (i.e. shipping, postage, misc. printing)	Allowance	\$5,000
Bidding through "Project Dog"	Allowance	\$500
Owner's Project Manager and Clerk (Assumed 12 months @ 20hrs wk.)	Allowance	\$80,000
Special Utility Back charges (electric, Water tap fees etc.)	Allowance	\$20,000
Soft Costs Sub-Total		\$413,406
+ 7.5% Soft Cost Contingency		\$31,005
Total Estimated Project Cost		\$2,461,035

- Building Plan & Elevation
- Conceptual Project Cost Estimate

Design Feasibility Study New Beach Facility @ Town Neck Beach – Town of Sandwich

Preliminary Estimated Project Cost Data (Reduced Program Conceptual Design)

The following preliminary cost estimate was prepared by an independent construction cost estimator and is based upon the current conceptual design drawings only. We would recommend that the budget be updated as the schematic design & construction documents are further developed.

Construction Cost		
New Beach Facility Building (Vertical Construction Only):	2,432 GSF (<i>footprint</i>) @ \$ 272/SF	
• (Includings: Decks, Ramps, Public Restrooms, Concessions & Lifeguard Room)		\$660,330
Site Work:		
• (Includings: Mounded Septic, General Site Improvements, Boardwalk Connector & Site Utilities)		\$364,312
Contractor Markups:		
General Conditions	- 8%	\$81,971
Overhead & Profit	- 8%	\$88,529
P&P Bond	- 1.5%	\$17,927
Sub-Total		\$1,213,069
+ 15% Construction Contingency (<i>Based on Current Stage of Design</i>)		\$181,960
+ 4% Escalation based on a fall 2017 construction start. An escalation of 4% should be figured for each subsequent year until construction)		\$55,801
Hard Costs Sub-Total		\$1,450,830
Miscellaneous Project Expenses - "Soft Costs"		
Architectural & Engineering Fees (<i>10% of Construction Costs exclusive of Feasibility Study Fees</i>)		\$139,503
Civil Engineering Fee	Allowance	\$35,000
Geotechnical borings and report	Allowance	\$5,000
Updated Construction Cost Estimate @ 75% Bid Documents	Allowance	\$6,000
Exterior Signage (<i>by Owner's Vendor</i>)	Allowance	\$8,000
Security System (<i>by Owner's Vendor</i>)	Allowance	\$10,000
Telephone/Computer Wiring & Hardware (<i>by Owner's Vendor</i>)	Allowance	\$10,000
Furnishings - Furniture - Equipment (<i>FFE</i>)	Allowance	\$30,000
Materials Testing During Construction	Allowance	\$10,000
Estimated Reimbursable Expenses (<i>i.e. shipping, postage, misc. printing</i>)	Allowance	\$5,000
Bidding through "Project Dog"	Allowance	\$500
Owner's Project Manager and Clerk (<i>Assumed 12 months @ 20hrs wk.</i>)	Allowance	\$80,000
Special Utility Back charges (<i>electric, Water tap fees etc.</i>)	Allowance	\$20,000
Soft Costs Sub-Total		\$359,003
+ 7.5% Soft Cost Contingency		\$26,925
Total Estimated Project Cost		\$1,836,758

- Mobile Restroom Configuration Option
- Mobile Restroom Facilities Cost Data

(Research and pricing information pertaining to mobile restrooms facilities was provided by the Town to be incorporated into this feasibility study.)

Mobile Restroom Facilities

Design Feasibility Study New Beach Facility @ Town Neck Beach – Town of Sandwich

Mobile Restroom Facilities

(Research and pricing information pertaining to mobile restroom facilities was provided by the Town to be incorporated into this feasibility study.)



Events Grade Restroom Trailers



834 Oasis with ADA Lift Room

Trailer Specifications // Standard Equipment

Unibody Steel Frame 8' x 34'
Five Year Warranty Steel Frame
Goodyear Tires LT 235 x 85R16
High Efficiency Ducted A/C
Laminate Interior Walls – Customer Choice of Color
Chrome Wheels
34" Commercial Doors (36" for ADA)
Door Trim Package
Electric Brakes
Wired for Optional Baseboard Heat
Load Levelers 5,000 lb (4)
2 5/16" Adjustable Hitch
3/4" Marine Plywood T/G Floor
Truss Rafter 16" O/C
Seamless Aluminum Roof
Five Horizontal Belt Rails
Locks Keyed Alike
Waste Tank Sight Glass
3" Cam Lock Waste Valve
Wood Trim and Vanities – Customer Choice of Color
Aluminum Exterior
Porch Assemblies Available
Step Assemblies with Handrails

Triple 6,900 lb Dexter TorFlex Axles
Five Year Warranty TorFlex Axles
Waste Tank 1,050 gallons
Entrance / Exit Doors (5)
Multi Source Sound System
Frame Skirts
20 Amp Electrical Circuits
Frame Undercoating
Sure Lube Hubs
FiberCorr Smooth Finish Ceiling
DOT Safety and Light Package
Electric Break-a-Way System
Floor Joist 2" x 2" Steel 16" O/C
All Walls and Ceiling Insulated
Recessed Night Lights for Doors
Rain Gutters over each Door
Aluminum Kick Plates
3/4" Fresh Water Connection
Lockable Thermostat
Vinyl Flooring
LED Exterior Lights
Fold-in-Door ADA Ramp

Women's Accommodations

China Flushing Water Saver Toilets (5)
Stainless Sanitary Receptacles (5)
Steel Partition Doors with Transport Locks
Wood Vanity with Triple Solid Surface Sink Top
Wall Recessed Towel Dispenser and Waste Receptacle

12V Recessed Ceiling Lights
Framed Glass Mirror
Extra Large Partitions
Delta Water Saver Faucets
Chrome Floor Drain

Men's Accommodations

China Flushing Water Saver Toilets (2)
Steel Partition Doors with Transport Locks
China Flushing Water Saver Urinals (3)
Wood Vanity with Double Solid Surface Sink Top
Framed Glass Mirror
Wall Recessed Towel Dispenser and Waste Receptacle

Chrome Floor Drain
Extra Large Partitions
Urinal Dividers
Delta Water Saver Faucets
12V Recessed Ceiling Lights

Hydraulic ADA Compartment

China Flushing Water Saver ADA Toilet
Stainless Sanitary Receptacle
Delta Water Saver Faucet
Wall Recessed Towel Dispenser and Waste Receptacle
ADA Door Handle & Locking System
12V Recessed Ceiling Lights

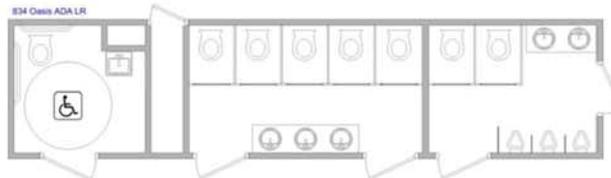
ADA Door Closure
Chrome Floor Drain
ADA Sink
Framed Glass Mirror
ADA Wall Rails

Oasis Series Trailers

All the rugged strength of our commercial trailers with a range of designer interior packages, providing a quality refined look for special events requirements. Upgraded interior packages with powder coated steel partitions.

Base Price

\$ 69,985.00



Drawing not to scale.



Available Options

Hot Water System	\$ 845.00
Heat Package (interior heaters only)	\$ 925.00
Cold Weather Package (includes the heat package)	\$ 3,387.15
Arctic Weather Package (for more extreme temperatures)	\$ 5,942.15
Baby Change Station	\$ 545.00
Trailer Skirts – Canvas	\$ 1,282.50
Spare Tire – 16"	\$ 247.30
Fresh Water System (adds 3' to trailer) Tank Size = 300 gallons / Waste Tank becomes 1,175 gallons	\$ 3,895.00
Upgrade to Electric Hands Free Delta Faucets (price per faucet)	\$ 385.75
Upgrade to Rubberized Flooring	\$ 3,332.00
Upgrade to Fold Up Porch Steps (price per door)	\$ 875.00

Since 1988 America's Premier Specialty Trailer Manufacturer

Design Feasibility Study
New Beach Facility
@ Town Neck Beach – Town of Sandwich

Town Neck Beach Portable Toilets	
Current Costs	
Current porta-johns rental, pump-outs & cleaning for Memorial Day - Columbus Day	\$ 7,000 18 weeks
Potential Portable Trailer	
Ameri-Can 834 Oasis with ADA Lift Room (1,050 gallon holding tank)	\$ 70,000 one time cost to purchase
Cost to update water line from the street to the trailer location (\$50/linear ft x 450')	\$ 22,500 one-time cost
Cost to trench & install new electric line from existing pole to new trailer site	\$ 2,000 one-time cost
Total One-Time Capital Expenses	\$ 94,500
Operating Expenses	
Waste pump-out 3 times per week (for 1,050 gallon unit)	\$ 630 assumes \$0.20 per gallon
New Part-time Town employee to clean (2 hours per day x 7 days per week)	\$ 210 assumes \$15 per hour
Subtotal operating expenses per week	\$ 840
Annual Operating Expenses for Memorial Day - Columbus Day	\$ 15,120 x 18 times 18 weeks
Issues	
<ul style="list-style-type: none"> - Likely not possible to rent portable trailers for the beach. Town would need to buy one. - Recommend ADA accessible unit, despite the fact that it's significantly more expensive than non-ADA compliant units. - Town will need to secure a special pump-out arrangement for the trailer since we will no longer be renting porta-johns with service. Alternatively, the Town could purchase its own pump-out truck and have a (new) town employee do pump-out service. - Getting the pump-outs done for the trailer done on a timely basis will be difficult to guarantee, and will be critical to success. Particularly on weekends. - Assuming Rec Dept gate attendants will open trailer when they arrive in the morning and would lock it when they leave. - Town would be responsible for installing the trailer at the beginning of the season, then removing, and storing it somewhere off-site, at the end of each season annually. 	

- MassDEP Report Document
- Board of Health Septic Memorandum
- Preliminary Permitting and Septic Design Narrative with Supporting Locus Plans
- Flood Zone Construction Code Review
- Structural Schematic Design Narrative
- Preliminary Zoning Review
- Full Construction Cost Estimate for Preferred and Reduced Building Designs



Commonwealth of Massachusetts
Executive Office of Energy & Environmental Affairs

Department of Environmental Protection

Southeast Regional Office • 20 Riverside Drive, Lakeville MA 02347 • 508-946-2700

Charles D. Baker
Governor

Matthew A. Beaton
Secretary

Karyn E. Polito
Lieutenant Governor

AUG - 1 2016

Martin Suuberg
Commissioner

Mark S. Galkowski
Town of Sandwich
Department of Natural Resources
16 Jan Sebastian Drive
Sandwich, Massachusetts 02563

RE: SANDWICH—Wetlands
Technical Assistance
Town Neck Beach

Dear Mr. Galkowski:

Thank you for meeting to discuss the Town's desire to construct an elevated bathhouse at Town Neck Beach. The Town also seeks guidance on the feasibility of reconstructing a septic system at the site, and the potential to either expand the existing parking area to the east and/or south.

As you know, this barrier beach along Sandwich's northern shore on Cape Cod Bay is subject to significant wave action, overwash and increasing erosion rates. These natural processes make Town Neck Beach vulnerable to erosion, yet it is a valuable natural resource which provides critical storm damage protection from coastal storm events. As a result, MassDEP strongly recommends against investment in new infrastructure in eroding coastal areas and instead advocates retreat from those areas whenever possible. Accordingly, the Wetlands Protection Act offers very specific protection standards for coastal features such as barrier beaches, coastal dunes and Primary Frontal Dunes. Additionally, Massachusetts Executive Order # 181 states that "at a minimum, no development shall be permitted in the velocity zone or primary dune areas of barrier beaches identified by the Department."

Given MassDEP's recommendation against infrastructure investment on this barrier beach, should Sandwich still desire to consider siting a new bathhouse on Town Neck Beach, I offer the following comments and regulatory compliance guidance.

As depicted in a preliminary plan, the proposed bathhouse would be located on the backside of a coastal dune on a barrier beach. In addition, the proposed bathhouse would be located on the Primary Frontal Dune as defined at 310 CMR 10.04 and within a FEMA-designated Velocity Zone. As discussed at the site meeting, new construction within the Primary Frontal Dune of a barrier beach is generally not permissible under the Wetlands Protection Act Regulations. For these reasons, MassDEP recommends Sandwich consider using portable bathroom facilities at this location. These would not require alteration of the coastal dune, can be seasonally deployed and can be removed in the event of an impending coastal storm. Also,

This information is available in alternate format. Call Michelle Waters-Ekanem, Diversity Director, at 617-292-5751. TTY# MassRelay Service 1-800-439-2370
MassDEP Website: www.mass.gov/dep

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they can be equipped with wastewater holding capabilities to obviate the need for a Title 5 wastewater discharge facility on the barrier beach.

If Sandwich determines portable bathroom facilities to be unacceptable and wishes to pursue siting a permanent bathhouse facility in compliance with the Wetlands Protection Act, I would recommend Sandwich consider siting the new bathhouse on the existing parking lot surface rather than in the Primary Frontal Dune. This is similar to the bathhouse upgrade DCR implemented in 2008 at DCR's Horseneck Beach facility in Westport, MA. This alternative, however, may result in a loss of parking spaces at Town Neck Beach.

To offset the potential loss of parking should Sandwich move forward with bathhouse placement on the parking lot, the Town is seeking guidance on the potential expansion of the parking lot to the east. This area was viewed at the site meeting and consists of typical back barrier topography and vegetative cover. In MassDEP's opinion, the construction of a new use (the bathhouse) that then results in an expansion of parking into a well vegetated coastal dune on a barrier beach is not consistent with the "no adverse effect" performance standard established for barrier beaches and coastal dunes.

Sandwich also offered another alternative to offset the loss of parking and to address stormwater runoff as shown on a plan entitled: Sandwich Harbor Stormwater Mitigation Plan. This proposal would create additional parking along the backside of the coastal dunes south of the existing parking lot. Specifically, this proposal would utilize porous pavement or pervious concrete over a 900-foot long by 15-foot wide area for a total footprint of 13,500 square feet. This proposal would also provide for stormwater infiltration. As mitigation for coastal dune impacts, the proposal includes the removal of approximately 3,500 square feet of pavement beneath the proposed elevated bathhouse building. This proposal still results in a substantial expansion of parking in terms of total footprint on the barrier beach. In MassDEP's opinion, a proposed expansion of parking on a barrier beach is not likely to comply with the applicable performance standards under the Wetlands Protection Act Regulations.

Please be aware that MassDEP has had discussions with a number of Towns on the concept of "retreat" of beach parking lots, landings and roads when shoreline erosion has threatened their existence and where shoreline stabilization is not feasible due to costs or other considerations. In these instances, MassDEP has indicated that retreat of threatened infrastructure may be allowed provided that the threatened infrastructure is removed and the area restored to its natural condition. MassDEP has indicated in these instances that the provided mitigation (restoration of abandoned seaward areas) must be equal or greater than the proposed impacts. Here, the proposed increase in parking is not adequately mitigated through 1:1 or greater restoration of other disturbed or altered areas on the barrier beach.

At the site meeting it was conveyed that a septic system was abandoned some time ago at Town Neck Beach. Because the septic system is reported to have been in use after 1995 and prior to the building's demolition in or before 2007, Title 5 of the State Environmental Code may allow for the reconstruction or repair of the septic system. However, the Wetlands Regulations has no such grandfathering clause. Under the Wetlands Protection Act Regulations, a reconstructed septic system needs to comply with the performance standards for barrier beaches

and coastal dunes, unless it replaces a failed septic system for an existing building in the dune. In MassDEP's opinion, a reconstructed septic system in the Primary Frontal Dune of Town Neck Beach would not meet the applicable performance standards.

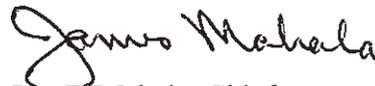
MassDEP has been strongly supportive of the Town's efforts to restore and increase the resiliency of Town Neck Beach through an ongoing beach nourishment program. These nourishment efforts have enhanced the natural ability of the barrier beach to protect landward areas from wave action and serve the wetland interests of storm damage prevention and flood control. These nourishment efforts may have also enhanced rare species habitat.

In closing, MassDEP is concerned that alterations to the Primary Frontal Dune may lead to predictable negative impacts to the storm damage prevention function of the barrier beach. This is particularly true today as the rate of sea level rise increases and the erosive effects of coastal storm events become more evident.

I realize that my comments are largely critical of the Town's goals of developing a beach facility at Town Neck Beach. I hope we can work together to seek project alternatives that can provide an enhanced public experience at the beach while protecting the valuable functions that Town Neck Beach provides.

Please let me know if you would like to discuss these preliminary comments and/or have a follow-up meeting. You can reach me at 508-946-2806.

Very Truly Yours,



James Mahala, Chief
Wetlands & Waterways Program

JM/jm

cc: Sandwich Conservation Commission

ecc: MA Coastal Zone Management Office

ATTN: Steven McKenna
Rebecca Haney

MassDEP

ATTN: David Johnston, Deputy Regional Director, BWR, SERO
Lealdon Langley, Director, Wetland & Waterways Program, Boston
Brian Dudley, BWR, SERO

NHESP

ATTN: Amy Hoenig

Town Of Sandwich

THE OLDEST TOWN ON CAPE COD



BOARD OF HEALTH

16 Jan Sebastian Drive

Sandwich, MA 02563

PHONE: (508) 888-4200

FAX: (508) 833-0018

E-mail: health@townofsandwich.net

MEMORANDUM

TO: The Town Neck Beach Bathhouse Feasibility Study Group

FROM: David B. Mason, RS, CHO, Director of Public Health

DATE: September 6, 2016

SUBJECT: Proposed Bathhouse Facility and Associated Septic Considerations

As part of the study for a new bathhouse facility at Town Neck Beach, the Health Department was asked to evaluate the existing abandoned septic system that serviced the previous now demolished bathroom facility in relation to the new proposed bathhouse facility.

The existing septic system in the original location of the previous bathroom facility does provide under the State Environmental Code Title V, protection as an existing septic system which allows for the upgrade of the septic system for a new septic system relocated as necessary for the new bathhouse meeting the current Title V design criteria. It should be noted that the anticipated flow would represent a net reduction of sewage flow due to the proposed building being located on an existing parking lot and reducing the gross parking capacity.

A conversation with Brian Dudley, DEP, Southeast Region did confirm the aforementioned interpretation which would allow the a new septic system meeting current Title V criteria for the proposed bathhouse facility.



MEMORANDUM

TO: Tim Sawyer, BLFR
FROM: Joe Longo and Amy Ball
DATE: September 1, 2016
RE: Town Neck Beach Bathhouse

The Horsley Witten Group, Inc. (HW) has prepared the following analysis for the referenced project on behalf of the Town of Sandwich. We worked directly with Brown Lindquist Fenuccio and Raber Architects to assess the feasibility of constructing a bathhouse with various amenities at Town Neck Beach in Sandwich, MA.

The proposed project would result in work or alterations on a regulatory Barrier Beach, within Land Subject to Coastal Storm Flowage (LSCSF), and within the 100-foot buffer zone to Coastal Dune and Salt Marsh. Work within these jurisdictional areas require review and approval under an Order of Conditions (OOC) under the Massachusetts *Wetlands Protection Act* (M.G.L. Ch. 131 § 40) and Town of Sandwich Wetlands Protection Bylaw and associated guidelines and policies. The Massachusetts Department of Environmental Protection (MassDEP) has advised in a written letter that should the Town pursue the proposed bathhouse, that the structure would be best sited on a portion of the existing parking lot, and that any proposed expansion of the parking lot into currently undisturbed area would need to be proportionally offset at a 1:1 ratio. MassDEP also advocated for retreat of threatened infrastructure in locations where shoreline erosion has occurred.

MassDEP has also advised that the reconstructed septic system must comply with the performance standards under the regulations at 310 CMR 10.00 for barrier beaches, and has stated that they do not believe that a reconstructed septic system in a primary frontal dune would meet these performance standards. MassDEP offers an alternate solution of using portable bathroom facilities. A copy of MassDEP's August 1, 2016 letter is attached. The site is also located within an area mapped as *Estimated Habitat of Rare Wildlife and Priority Habitat of Rare Species* (EH 79/ PH 15) for rare shorebird species. Review and approval under Massachusetts *Endangered Species Act* (M.G.L. Ch. 131A; MESA) will also be required. MESA and wetlands permits can be applied for jointly.

The proposed septic system upgrade would be a Title 5 compliant system including a septic tank, distribution box, grease trap, pump and pump vault, and subsurface infiltration field. The

system wastewater flow was calculated using Title 5 (310 CMR 15.203) regulations for the number of parking spaces, the number of seats associated with the restaurant, as well as office and lifeguard space. The proposed lot includes 146 spaces, at two people per car and using 5 gallons per day (GPD) per person. Total proposed flow is 2,438 GPD. Because the wastewater flow is over 2,000 gallons per day (GPD) the system will need to include a pressure dosing component. Because of the shallow depth to groundwater (less than 3 feet from existing ground surface), the leaching system must be "mounded" to allow for the minimum five foot separation from the bottom of the field to groundwater. Components include:

- 5,000 gallon pre-cast concrete two compartment septic tank.
- Pump and pump vault.
- Grease trap (installed due to presence of kitchen).
- 2,000 square foot (45 feet by 45 feet footprint) leaching facility constructed of perforated pipe, double washed stone, title 5 sand under and around the system
- 9 outlet precast concrete distribution box.
- General fill to create the required separation from groundwater (mounded system).

This system will be sufficient to dispose of the wastewater as created by the new facility as currently programmed.

TOWN NECK BEACH, MA

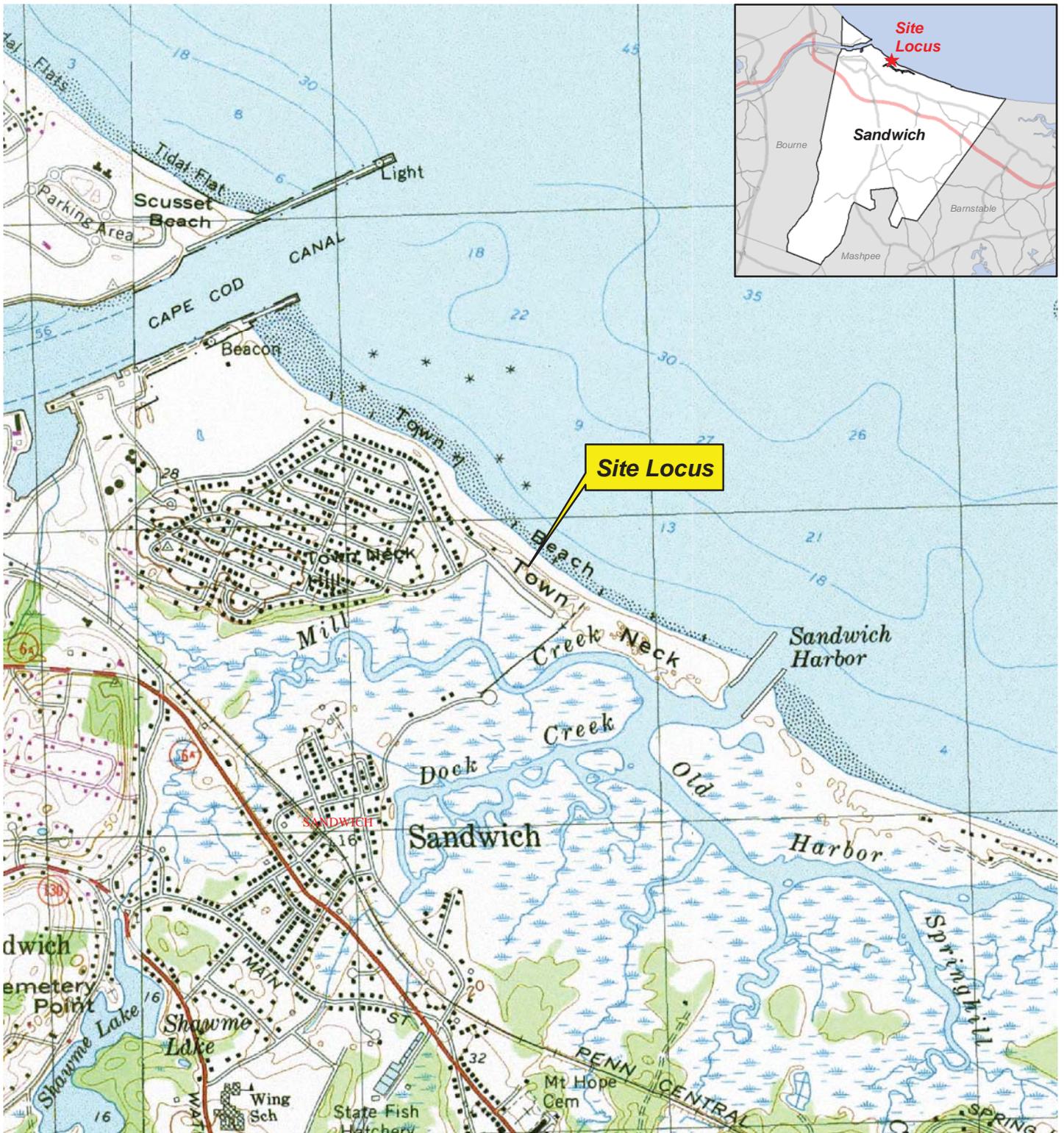
WASTEWATER UPGRADE CONSTRUCTION COSTS

COST ESTIMATE - 2,438 GPD PRESSURE DOSED SEPTIC SYSTEM

DESCRIPTION	Unit	QUANTITY	UNIT COST	ITEM COST
Septic Tank	GAL	7,500	\$ 2.00	\$ 15,000
Effluent Dosing Chamber	GAL	5,000	\$ 2.00	\$10,000
Effluent Dosing Pump Equipment installed	LS	1	\$20,000	\$20,000
System Piping (4-inch)	FT	90	\$ 15	\$ 1,400
Effluent Disposal Facilites	S.F.	3,300	\$ 6.00	\$ 19,800
Title 5 Sand Fill under and around system (not including backfill or pavement)	C.Y.	572	\$ 23.00	\$ 13,161
Electrical	20%	20,000		\$4,000
Misc. Grading	LS	1	\$ 5,000.00	\$ 5,000
Subtotal				\$ 88,361
General Conditions (a)	5%			\$ 4,418
Overhead and Profit	10%			\$ 8,836
Estimated Construction Cost (d)				\$ 101,615
Owner Contingency (b)	20%			\$ 17,672
ESTIMATED TOTAL CONSTRUCTION BUDGET (MATERIAL AND LABOR)				\$ 119,300

Notes:

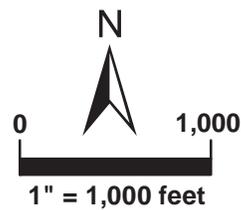
- a. General conditions include costs for mobilization and demobilization, bonds and insurance premium, submittals, clear water testing, contractor O&M manual work, and contractor project start up and close out.
- b. The contingency is provided for variability in the bidding climate, project changes before bidding, and change orders due to unforeseen conditions.
- c. Provisions for shoring and dewatering are not included.
- d. Engineering services are not included. These services may be required for project startup, submittal review, construction observation, witness of clear water testing, project closeout, and O&M manual preparation.
- f. This estimate does not include provisions for bedrock excavation or removal.
- g. This estimate does not include any construction permit costs.
- h. All costs are referenced to construction in 2016. Future estimated costs should be adjusted to allow for inflation and market conditions.



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*Sagamore & Sandwich Topographic Quadrangles

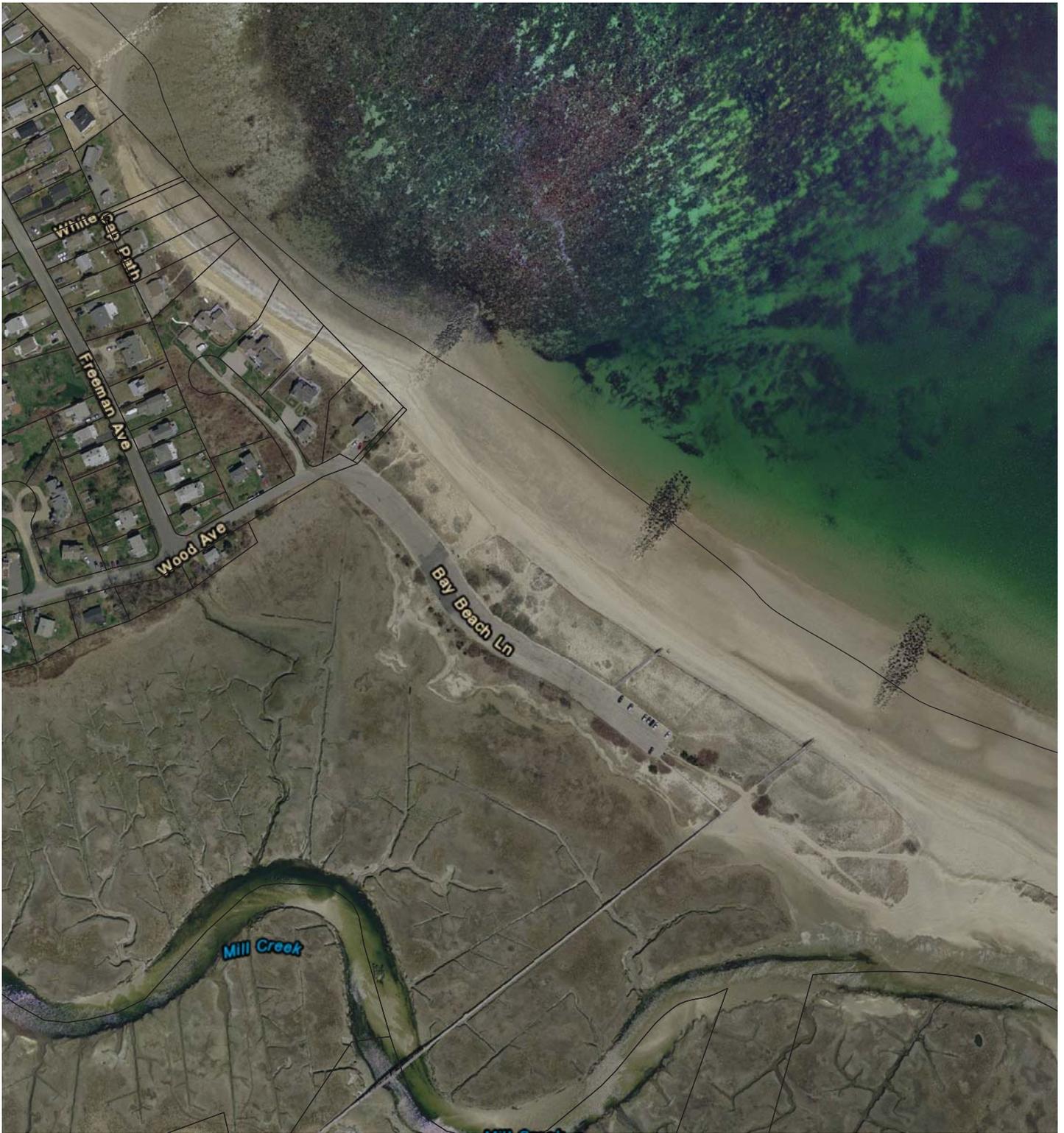
Horsley Witten Group
 Sustainable Environmental Solutions
 90 Route 6A • Unit 1 • Sandwich, MA 02563
 508-833-6600 • horsleywitten.com

**USGS Locus
 Town Neck
 Sandwich, MA**

Date: 3/29/2016

Figure 1



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Legend

 Parcels

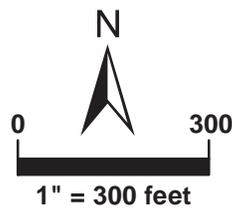
*Aerial Photo - MassGIS 2014
Parcels - Town of Sandwich 2014

Horsley Witten Group
Sustainable Environmental Solutions

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Aerial Photo
Town Neck
Sandwich, MA



Date: 3/29/2016

Figure 2



Document Path: H:\Projects\2016\16021 Town Neck Beach Building Feasibility Study, Sandwich MA\GIS\Maps\Constraints.mxd

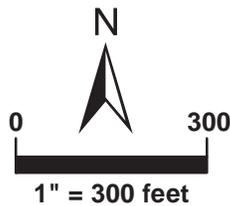
Legend

-  Parcels
-  NHEP Priority Habitats of Rare Species
-  NHEP Estimated Habitats of Rare Wildlife

DEP Wetlands

-  Hydrologic Connection
-  Wooded marsh
-  Salt Marsh
-  Open Water
-  Tidal Flats

 Beach/Dune



*Aerial Photo - MassGIS 2014
Site is within the Old King's Highway Regional Historic District
NHESP, MassGIS

Horsley Witten Group
Sustainable Environmental Solutions

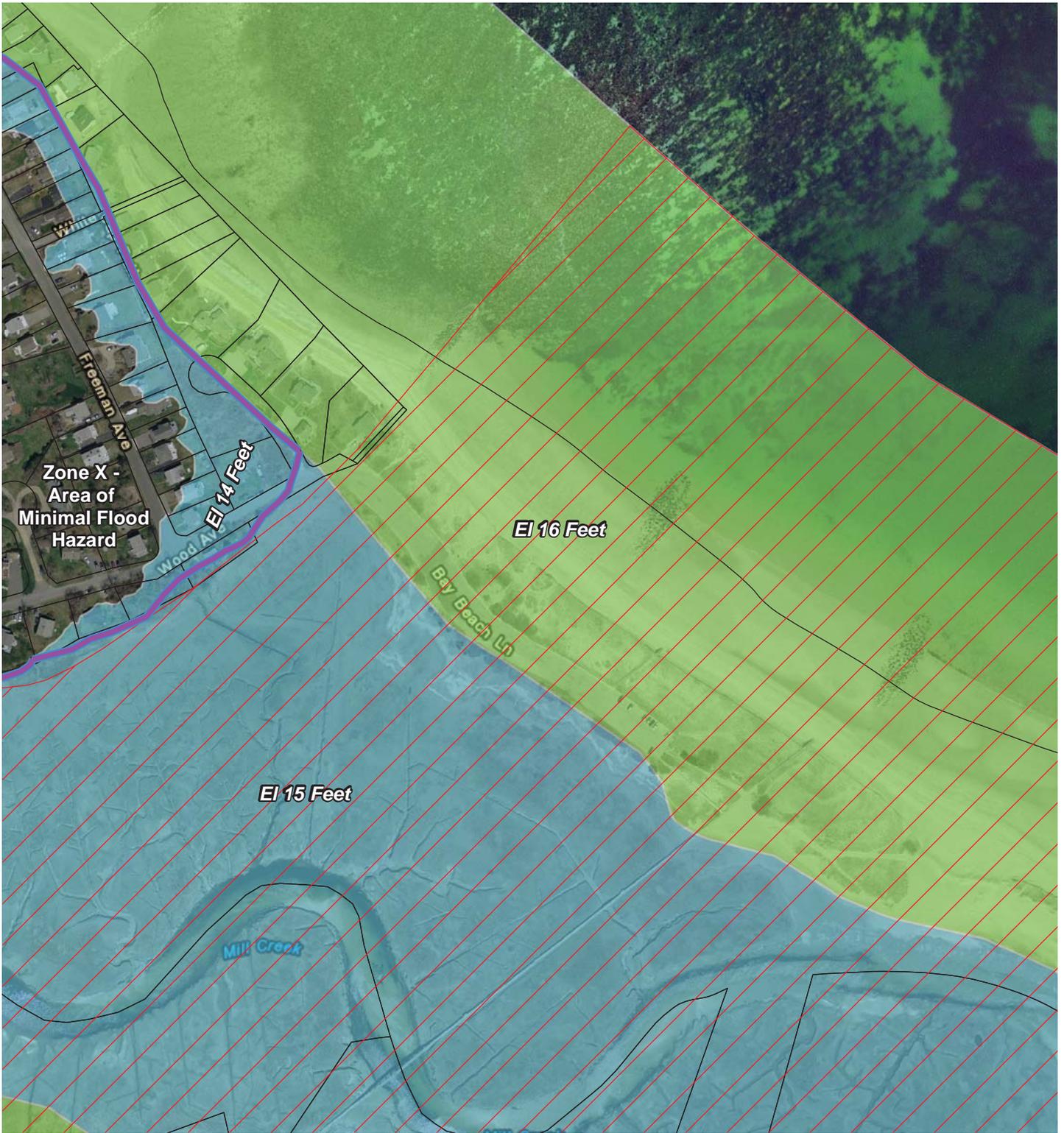
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**Existing Constraints
Town Neck
Sandwich, MA**

Date: 3/29/2016

Figure 3



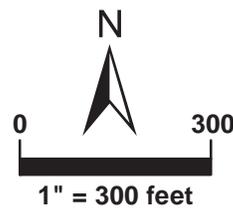
Document Path: H:\Projects\2016\16021 Town Neck Beach Building Feasibility Study, Sandwich MA\GIS\Maps\FEMA.mxd

Legend

-  Parcels
-  Limit of Moderate Wave Action (LiMWA)
-  Coastal Barrier Resources System
-  Zone AE - 1% Annual Chance Flood Hazard
-  Zone VE - 1% Annual Chance Flood Hazard

*Aerial Photo - MassGIS 2014
 FEMA's National Flood Hazard Layer, July 2014

Horsley Witten Group
 Sustainable Environmental Solutions
 90 Route 6A • Unit 1 • Sandwich, MA 02563
 508-833-6600 • horsleywitten.com

FEMA's National Flood Hazard Layer
 Town Neck
 Sandwich, MA

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PARTIAL CODE REVIEW: FLOOD ZONE CONSTRUCTION

The 8th edition of the Mass State Building Code/IBC 2009 and its associated Massachusetts Amendments includes a separate section “Chapter 115 - Appendix G” with specific requirements relating to Flood-Resistant Construction. The Proposed New Town Neck Beach Facility is located in a “VE” Velocity Flood Zone (with wave action) per the most current FEMA maps dated July 6, 2014.

IBC SECTION 1604.11 GENERAL DESIGN REQUIREMENTS, SNOW, WIND, AND EARTHQUAKE DESIGN FACTORS (SUBSECTION ADDED PER MA AMENDMENTS):

IBC 2009 Section 1604.11 Snow, Wind, and Earthquake Design Factors: “Ground snow load, P_g , minimum design flat roof snow load, P_f , basic wind speed (three second gust speed), V , and earthquake response accelerations for the maximum considered earthquake, S_s and S_1 , for each city and town in Massachusetts shall be as given in Table 1604.11.”

Table 1604.11 – Town of Sandwich: Basic Wind Speed = 115

IBC SECTION 1609 WIND LOADS (INCLUDING MA AMENDMENTS):

APPLICABLE DEFINITIONS:

IBC Chapter 16, Section 1609.2, Hurricane-Prone Regions Definition: “Areas vulnerable to hurricanes defined as:

1. *The U.S. Atlantic Ocean and Gulf of Mexico Coasts where the basic wind Speed is greater than 90 mph (40 m/s);”*

The Town of Sandwich is considered a Hurricane-Prone Region, Basic Wind Speed = 115 per Table 1604.11 in MA Amendments

IBC Chapter 16, Section 1609.2, Wind-Borne Debris Region Definition: “Portions of hurricane-prone regions that are within 1 mile of the coastal mean high water line where the basic wind speed is 110 mph (48 m/s) or greater; or portions of hurricane-prone regions where the basic wind speed is 120 mph (53 m/s) or greater; or Hawaii.

The Proposed New Town Neck Beach Facility is within 1 mile of the coastal mean high water line, with a basic wind speed of 115 mph – This site is considered a Wind-Borne Debris Region.

IBC Chapter 16, Section 1609.1.1 Determination of Wind Loads: “Wind loads on every buildings or structure shall be determined in accordance with Chapter 6 of ASCE 7 or provisions of the alternate all-heights method Section 1609.6. The Type of opening protection required, and the exposure category for a site is permitted to be determined in accordance with Section 1609 or ASCE 7. See Section 1609.3 for basic wind speed. Wind shall be assumed to come from any horizontal direction and wind pressures shall be assumed to act as normal to the surface considered.”

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IBC Chapter 16, Section 1609.4 Exposure Category: *“For each wind direction considered, an exposure category that adequately reflects the character of ground surface irregularities shall be determined for the site at which the building or structure is to be constructed. Account shall be taken of variations in ground surface roughness that arise from natural topography and vegetation as well as from constructed features.”*

IBC Chapter 16, Section 1609.4.2 Surface Roughness Category: *“A ground surface roughness within each 45-degree sector shall be determined for a distance upwind of the site as defined below, for the purpose of assigning an exposure category as defined in Section 1609.4.3.*

Surface Roughness C: Open terrain with scattered obstructions having heights generally less than 30 feet. This category includes flat open country, grasslands, and all water surfaces in hurricane-prone regions.”

IBC Chapter 16, Section 1609.4.3 Exposure Category: *“An exposure category shall be determined in accordance with the following:*

Exposure C: Exposure C shall apply for all cases where Exposure B or D do not apply.”

IBC Chapter 16, Section 1609.1.2 Protection of Openings: *“In wind-borne debris regions, glazing in buildings shall be impact resistant or protected with an impact resistant covering meeting the requirements of an approved impact resistant standard or ASTM E 1996 and ASTM E 1996 referenced herein as follows:*

- 1. Glazed openings located within 30 feet of grade shall meet the requirements of the large missile test of ASTM E 1996.”*

IBC Chapter 16, Section 1609.5.1 Roof Deck: *“The roof deck shall be designed to withstand the wind pressures determined in accordance with ASCE 7.”*

IBC Chapter 16, Section 1609.5.2 Roof Coverings: *“Roof coverings shall comply with Section 1609.5.1.*

Exception: Asphalt Shingles installed over a roof deck complying with Section 1609.5.1 shall comply with wind resistance requirements of Section 1507.2.7.1.”

IBC SECTION 1612 FLOOD LOADS (INCLUDING MA AMENDMENTS):

APPLICABLE DEFINITIONS:

IBC: Chapter 16, Section 1612 – Flood Hazard Area Subject to High-Velocity Wave

Action Definition: *“Area within the flood hazard area that is subject to high-velocity wave action, and shown on a Flood Insurance Rate Map (FIRM) or other flood hazard map as Zone V, VO, VE, or V1 – 30.*

The site is shown as a “VE” on the FEMA map, and is considered a Flood Hazard area Subject to High-Velocity Wave Action.

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IBC SECTION 1612 FLOOD LOADS (INCLUDING MA AMENDMENTS):

IBC 2009 Section 1612.1 General: *“Within flood hazard areas as established in Section 1612.3, all new construction of buildings, structures, and portions of buildings and structures, including substantial improvement and restoration of substantial damage to buildings and structures, shall be designed and constructed to resist the effects of flood hazards and flood loads in accordance with this Section and Appendix G.”*

IBC 2009 Section 1612.4 Design and Construction: *“The design and construction of buildings and structures located in flood hazard areas including flood hazard areas subject to high-velocity wave action, shall be in accordance with Chapter 5 of ASCE 7 and with ASCE 24. Plans shall be prepared by a registered design professional. Note: In using ASCE 24, delete Tables 1-1, 2-1, 4-1, 5-1, 6-1, and 7-1. For elevation requirements use Section 1612 and Chapter 115 Appendix G. Also, delete references to Coastal A Zones and instead use requirements for A zones in Section 1612 and Appendix G.”*

IBC 2009 1612.5 FLOOD HAZARD DOCUMENTATION: *“The following documentation shall be prepared and sealed by a registered design professional and submitted to the building official:*

2. For construction in flood hazard areas subject to high velocity wave action:
 - 2.1 The elevation of the bottom of the lowest horizontal structural member as required by the lowest floor elevation inspection in Section 110.3.3.
 - 2.2 Construction documents shall include a statement that the building is designed in accordance with ASCE 24, including that the pile or column foundation and building or structure to be attached thereto is designed to be anchored to resist flotation, collapse, and lateral movement due to the effects of wind and flood loads acting simultaneously on all building components and other load requirements of Chapter 16.
 - 2.3 For breakaway walls designed to resist a nominal load of less than 10 psf (0.48 kN/m²) or more than 20 psf (0.96 kN/m²), construction documents shall include a statement that the breakaway wall is designed in accordance with ASCE 24.”

IBC 2009 CHAPTER 115 – APPENDIX G (INCL. STATE OF MA AMENDMENTS):

IBC 2009 Chapter 115, Appendix G, Section G102.1 General: *“This appendix, in conjunction with section 1612 and other sections of this code provides minimum requirements for development located in flood hazard areas and coastal dunes, including installation of utilities; placement and replacement of manufactured homes; new construction and repair, reconstruction, rehabilitation or additions to existing construction; substantial improvement of existing buildings and structures, including restoration after damage, substantial repairs of foundations, temporary structures, and temporary or permanent storage, utility and miscellaneous Group U buildings and structures, and certain building work exempt from permit under section 105.2.”*

IBC 2009 Chapter 115, Appendix G, Section G301 Design and Construction Requirements in Flood Hazard Areas and Coastal Dunes (per MA Amendments):

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G301.1 General: *“Work subject to the requirements of Appendix G shall be designed by a Registered Design Professional. Design certification shall be provided in accordance with Section 1612.5 Construction Documents shall indicate proposed details of floor, wall, foundation support components, loading computations, and other essential technical data used to meet the requirements of this Appendix.*

G301.2.2 Elevation of Structures in Flood Hazard Areas Subject to High Velocity Wave Action: *“For new buildings and structures, substantial improvements, replacement or substantial repair of a foundation and lateral additions that are substantial improvements, the entire structure shall be elevated so that the bottom of the lowest horizontal structural member supporting the lowest floor, with the exception of mat or raft foundations, piling, pile caps, columns, grade beams and bracing, is located at an elevation that is at least two feet above base flood elevation. For lateral additions that are not a substantial improvement, only the addition shall be elevated so that the bottom of the lowest horizontal structural member of the lowest floor, with the exception of the pilings or pile caps is located at an elevation that is at least two feet above the base flood elevation.*

The Base Flood Elevation per FEMA maps is 16 Feet. Increase by 2 Feet per G301.2.2, the lowest horizontal structural member to be at 18Feet minimum.

G301.3.2 Enclosures below Base Flood Elevation in Flood Hazard Areas Subject to High Velocity Wave Action: *“All spaces that are less than two feet above the base flood elevation shall not be used for habitation and shall be free of obstruction except as permitted:*

1. *Mat or raft foundations, piling, pile caps, bracing, grade beams, and columns which provide structural support for the building.*
2. *Entrances and exits used for required means of egress.*
3. *Incidental storage of portable or mobile items readily moved in the event of a storm.*
4. *Walls and partitions are permitted to enclose all or part of the space below the elevated floor provided such walls and partitions are not part of the structural support of the building and area constructed with insect screening, open wood lattice or non-supporting walls designated to break away or collapse without causing collapse, displacement or other structural damage to the elevated portion of the building or supporting foundation system due to the effect of wind and water loads as specified in Section 16.00 acting simultaneously.”*

G301.5.2 Foundations Flood Hazard Areas Subject to High Velocity Wave Action: *“Foundations for work meeting the elevation requirements of Section G301.2.2, shall consist of pilings or columns.”*

G401.2 Flood Hazard Areas Subject to High Velocity Wave Action: *“In flood hazard areas subject to high velocity wave action:*

1. *New Buildings and Buildings that are substantially improved shall only be authorized landward of the reach of mean high tide.*
2. *The use of fill for structural supports of buildings is prohibited.”*

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G401.3 Sewer Facilities: *“In addition to complying with applicable provisions of 310 CMR 15.00: The State Environmental Code, Title 5: Standard Requirements for the Siting, Construction, Inspection, Upgrade and Expansion of On-Site Sewage Treatment and Disposal Systems and for the Transport and Disposal of Septage and 314 CMR 3:00: Surface Water Discharge Permit Program and 314 CMR 5.00: Ground Water Discharge Permit Program, All new or replaced sanitary sewer facilities, private sewage treatment plants (including all pumping stations and collector systems) and on-site waste disposal systems shall be designed in accordance with Chapter 7, ASCE 24, to minimize or eliminate infiltration of floodwaters into the facilities, and discharge from facilities into floodwaters, or impairment of the facilities and systems.*

G401.4 Water Facilities: *“In addition to complying with applicable provisions of 310 CMR 22.00 Drinking Water and the DEP Guidelines for Public Water Systems, All new or replacement water facilities shall be designed in accordance with the provisions of Chapter 7, ASCE 24, to minimize or eliminate infiltration of floodwaters into the systems.”*

G1001.6 Protection of Mechanical, Plumbing, and Electrical Systems in a Flood Hazard Zone: *“New and replacement electrical, heating, ventilating, air conditioning, and other service equipment in a flood-hazard area shall either be placed above the base flood elevation or protected so as to prevent water from entering or accumulating within the system components during floods up to the base flood elevation in accordance with the mechanical code listed in Chapter 1.0. Installation of electrical wiring and outlets, switches, junction boxes and panels below the base flood elevation shall conform to the provisions of 527 CMR 12:00 2008 Massachusetts Electrical Code (Amendments) listed in Chapter 1.0 for location of such items in wet locations. Duct insulation subject to water damage shall not be installed below the base flood elevation.”*

Conclusion:

Upon review of the Building Code for applicable Wind Load and Flood Zone requirements, BLFR has made the following conclusions for options at the Proposed New Town Neck Beach Facility.

The building is required to comply with the code provisions of Sections 1609, 1612, and Appendix G for a High Velocity Zone with wave action. Construction requirements per code include (but not limited to) the following:

- Lowest Horizontal Structural Member to be elevated to 18 feet.
- Breakaway walls required below the raised floor. (*Elevator not required to have breakaway walls*).
- Foundations to be pilings or columns
- Septic System designed to minimize infiltration by floodwaters in to system, or contamination of flood waters by system.
- Water Facilities to be designed to minimize infiltration by floodwaters into system.
- MEP Equipment to be located above base elevation (16 feet).
- Building to be designed per Wind Load Exposure Category C requirements.
- Impact-Rated Windows (or Hurricane Shutters) required.
- Roof deck and roof covering designed for high wind requirements.

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Summary of Coastal Construction Requirements and Recommendations



FEMA



General Requirements	
Design	Requirement: building and its foundation must be designed, constructed, and anchored to prevent flotation, collapse, and lateral movement due to simultaneous wind and water loads
Free of Obstructions	Requirement: the space below the lowest floor must be free of obstructions (e.g., free of any building element, equipment, or other fixed objects that can transfer flood loads to the foundation, or that can cause floodwaters or waves to be deflected into the building), or must be constructed with non-supporting breakaway walls, open lattice, or insect screening.
Materials	Requirement: structural and nonstructural building materials at or below Base Flood Elevation (BFE) must be flood-resistant
Construction	Requirement: building must be constructed with methods and practices that minimize flood damage



Foundation	
Structural Fill	Prohibited
Solid Foundation	Prohibited
Open Foundation	Required
Enclosures Below BFE	
(Also see Certification) [see Fact Sheet No. 27]	Prohibited , except for breakaway walls, open lattice, and screening ^f Recommendation: if constructed, use open lattice or screening instead of breakaway walls
Use of Space Below BFE ⁱ (see Fact Sheet No. 27)	
	Allowed only for parking, building access, and storage
Utilities ⁱ	
	Requirement: utilities, including ductwork and equipment, must be designed, located, and elevated to prevent flood waters from entering and accumulating in components during flooding; utility lines must not be installed or stubbed out in enclosures below BFE



CONSULTING STRUCTURAL ENGINEER, INC.

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July 26, 2016

Town Neck Beach Bath House
Town Neck Beach
Sandwich, MA

CSE 04623

STRUCTURAL SCHEMATIC DESIGN NARRATIVE

GENERAL

The structural construction consists of a single story wood framed building supported on a deep pile foundation within the coastal high hazard flood area (Zone VE, EL. 16). The total footprint of the building and framed floor/decks at top of pile is approximately 4,300 SF. The understory area will consist of unoccupied space around piles and structural bracing with approximately 600 SF of the understory area utilized as incidental storage.

The height of the main level floor framing (top of pile) is anticipated to be approximately 10-feet above the natural site grade.

BUILDING CODE

The governing building code for the project is anticipated to be the Massachusetts State Building Code (MSBC), 8th ed. based upon the 2009 International Building Code (IBC). It should be noted that the Commonwealth of Massachusetts intends to promulgate the 9th ed. of the MSBC based upon the 2015 IBC sometime in 2016.

Structural design within the coastal high hazard flood area will be in accordance with the Flood Resistant Design and Construction manual, ASCE 24.

FLOOD DESIGN CRITERIA

The following flood design criteria for structural design are applicable to this project:

Flood Hazard Area:	Velocity zone (VE)
Design/Base Flood Elevation (DFE/BFE):	16-feet
Flood Design Class:	2 (Table 1-1, ASCE 24)
Bottom of lowest structural horizontal member:	BFE plus 2-feet (MSBC G301.2.2)
Foundation type:	Pilings
Enclosures below BFE:	Open wood lattice and/or break-away walls

SOIL CHARACTERISTICS AND FOUNDATION DESIGN CRITERIA

The soil characteristics, foundation design criteria, and geotechnical pile design will be described in a geotechnical engineering report performed exclusively for this project by a geotechnical engineer licensed in the Commonwealth of Massachusetts and used as a basis for the foundation design. The report must include test borings to a depth necessary to determine the characteristics of the soils and strata below the structure. In addition, an estimate of potential surface erosion around the piles should be made by the geotechnical engineer for use in the structural pile design. The contractor shall be responsible for reviewing this report and coordinating the site preparation requirements with the structural foundation documents.

LOADS

Dead Loads

Dead loads shall be based on the unit weight of the materials of construction in accordance with the drawings. Additional general uniform service loads shall be included to account for the imposed loads due to utilities on the structural system. Service loads will be specified on the drawings. Minimum design dead loads from ASCE 7 will be used in the design.

Live Loads

Area	Live Loads (psf)	Concentrated Live Load (lbs.)	Remarks
Concessions/Lifeguard Room	100	-	-
Exterior Balconies/Decks	100	-	-
Restrooms	60	-	-
Attic	20/10	-	Storage above ceiling/non-storage
Roof (Snow)	30	-	Note #1
Stairs and Exitways	100	300	Note #2

Notes:

1. Ground snow load = 30 PSF, Flat roof/sloped roof snow load = 25 PSF, plus drifting, unbalanced and surcharge snow loads in accordance with the MSBC.
2. Stair tread concentrated load of 300 pounds shall be applied over an area of 2"x2" non-concurrent with the uniform load.

Wind Loads

In accordance with the MSBC 8th ed., the following criteria shall be used for the wind design:

Basic wind speed (V): 115 mph

Exposure: C

Importance factor (I) 1.0

Wind loads shall be applied to the structure and components in accordance with the MSBC 8th ed., based on the building height, exposure and geometry.

Seismic Loads

In accordance with the MSBC 8th ed., the following criteria shall be used for the seismic design:

Seismic Coefficient (S_s) 0.22

Seismic Coefficient (S₁) 0.058

Occupancy Category II

Site Class D (assumed, geotechnical report to confirm)

Seismic Design Category B

Flood Loads

Flood loads including hydrostatic loads, hydrodynamic loads, wave action and debris impact will be considered on all structural elements (piles and bracing) below the BFE in combination with other loads specified in the MSBC 8th ed.

DESCRIPTION OF SYSTEMS USED

Foundation

Deep foundation system consisting of pilings driven to required geotechnical depth to resist all required loads as follows:

Pile type:	Timber.
Corrosion protection:	Timber piles shall be preservative treated.
Pile layout:	Spacing of approximately 10-foot centers along load bearing pile tie-beam lines and approximately 12-foot centers along floor joist spans. Additional piles will be added at locations with significant uplift or lateral loads.

Main Level Framing

The concept of the main level framing is to have both interior areas and exterior deck areas constructed as a uniformly framed level of joists bearing on the pile tie-beams. Transitions from interior to exterior will be structurally level with waterproofing and flashing treatments along the base of all walls per the architectural drawings.

The main level floor will be wood framed as follows:

Pile tie-beam level:	Preservative treated 2x12 built-up beams and/or parallel strand lumber (PSL) beams treated service level-2 for longer spans/higher loads. PSL beams to be solid 3½"x or 5¼"x required depth. Tie-beams should be assumed in each primary direction between each pile.
Pile to tie-beam connections:	Steel through-bolts, nuts, washers, plates and angles as needed. All steel shall be provided in either hot-dip galvanized finish or stainless steel finish. The contractor will be asked to provide alternate pricing for all stainless steel hardware for consideration by the owner.
Floor joists:	Preservative treated lumber 2x framing spaced at 16-inch centers.
Interior floor sheathing:	¾-inch Advantech VIP+, APA rated sheathing.
Exterior decking:	As per architectural drawings.

Roof Framing

The roof will be constructed as follows:

General roof framing:	Pre-fabricated wood trusses at 24-inches on center. All loads, bearing points and roof geometry will be specified on the design documents. The contractor will be responsible to retain a qualified truss designer to engineer actual truss components. All truss shop drawings shall be submitted to the design team for review and approval. At clerestory dormers and cupola, with conventional lumber 2x framing spaced at 16-inch centers. Lay-on framed areas may include conventional stick framing or pre-fabricated wood trusses as deemed appropriate during design.
Roof sheathing:	5/8-inch APA rated sheathing.

Beams:	Drop beams and flush beams of laminated veneer lumber (LVL) or built-up 2x framing as needed in design.
Posts:	Posts from the main level to the roof will consist of solid lumber posts or solid PSL posts as needed. All posts will be connected with suitable hardware for continuous load path for uplift.
Attic:	Attic access by pull down stair or scuttle for service/maintenance access only. No habitable attic space.

Load Bearing Walls

All exterior bearing walls of the Restroom and Concession areas will be constructed as follows:

Studs:	2x6 at 16" centers
Wall sheathing:	7/16" thick wood structural panel (or 1/2" zip sheathing as otherwise required for thermal envelope)
Headers:	Conventional 2x or LVL as required by design.
Sole/Sill plate anchorage:	16 gage coil strap at 32" o.c., stud to pile tie-beam level.
Wind connection hardware:	Coil strap and/or holdowns at wind posts/wall corners to the pile tie-beam level as required by design. Exterior sheathing continuous from sill to top plate will be utilized as permitted by design. Rafter clips to wall plates with heavier tie-down devices at girder trusses and beams.

All interior bearing walls will be constructed as follows:

Studs:	2x4 at 16" centers
Wall sheathing:	Gypsum drywall per architect. Interior wood structural panel as necessary for interior shear walls.
Headers:	Conventional 2x or LVL as required by design.
Sole/Sill plate anchorage:	16 gage coil strap at 32" o.c., stud to pile tie-beam level.

Lateral Force Resisting System (LFRS)

Lateral loads due to wind and seismic will be resisted by light framed wood walls sheathed with wood structural panels rated for shear resistance at the main level Restroom and Concession areas.

Bracing within the understory area will be required to resist lateral loads due to flood, wind and seismic. The stiffness of timber piles at a 10-foot stick up length is not anticipated to be sufficient to resist the required lateral loads without supplemental bracing. Bracing may consist of timber cross or steel rod cross in all bays in each direction beneath the main level framing. Where bracing must be omitted in certain bays or sections for incidental storage areas, heavier timber and/or tube steel diagonals will be utilized in the adjacent bays around the clear space.

Miscellaneous Accessory Construction

Concrete slabs-on-grade are permitted where they are independent of the primary structure and are made to be frangible so as to break away in a flood event. In addition, concrete slabs-on-grade shall not be reinforced and have a maximum thickness of 4-inches without turned down edges.

All stair, deck and ramp framing below the BFE plus 2-feet must be structurally detached from the primary main level structure and supported on their own pile foundations so as to remain intact and anchored during the base flood event. Where these elements are not supported on piles, they must be constructed to be frangible and break away so as to minimize the debris capable of causing significant damage to any structure. It should be expected all stairs and ramps will be supported on piles except for the parts of those elements that are in contact with the ground. These end runs will be constructed to break away from the first line of pile supports from the ground level.

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@ Town Neck Beach – Town of Sandwich

Zoning Regulations per– Town of Sandwich MA:

The property Resides in the following Zoning district(s) Per

- **Medium Density Residential, “R-1’**
- **Overlay Districts:**
 - Flood Plain Overlay District:
 - Coastal High Hazard Area – Zone VE
 - Requires compliance with State, Federal and Local Regulations
 - Old King’s Highway Historic District:
 - A Certificate of Appropriateness must be obtained

2600 - Intensity or Use Schedule for Medium Density Residential “R-1’:

Criteria	Required	Proposed
Minimum Lot Area	40,000 SF	Existing exceeds minimum
Minimum Frontage	150 feet	Existing exceeds minimum
Minimum front Yard	30 feet	Exceeds minimum
Minimum Setbacks from Side and Rear	25 feet	Exceeds minimum
Maximum Building Height	35 feet	+/- 32 feet

3100 – Parking Requirements:

- Parking requirements will be satisfied via the existing Town Neck Beach parking lot containing space for approximately 200. Due to the position of the proposed building within the existing parking lot as required by MassDEP there will be a Net reduction of parking area.
 - *Note: Though the lot has the potential area for approximately 200 spaces this potential is not achieved because the lot is not striped. Additional spaces are lost for placement of port-a-johns and still more when mobile food vendors are on site. The proposed project would likely not result in a substantial loss of parking vs current utilization.*
- A new turnaround and loading & unloading area is proposed within the existing parking lot to alleviate the issues of the current dead-end circulation.

New Bathhouse, Concessions & Lifeguard Facility
Town Neck Beach
Sandwich, MA

September 6, 2016

GRAND SUMMARY

BASE ESTIMATE		\$1,424,231

	TOTAL DIRECT COST	\$1,424,231
GENERAL CONDITIONS	8%	\$113,938
GENERAL ADMINISTRATIVE O&P	8%	\$123,054
P&P BOND	1.5%	\$24,918
CONTINGENCY		By Others
ESCALATION		NIC

	TOTAL CONSTRUCTION COST	\$1,686,141

REDUCED SCHEME		\$1,024,642

	TOTAL DIRECT COST	\$1,024,642
GENERAL CONDITIONS	8%	\$81,971
GENERAL ADMINISTRATIVE O&P	8%	\$88,529
P&P BOND	1.5%	\$17,927
CONTINGENCY		By Others
ESCALATION		NIC

	TOTAL CONSTRUCTION COST	\$1,213,069

PROJECT: New Bathhouse, Concessions & Lifeguard Facility NO. OF SQ. FT.: 1,600
 Town Neck Beach COST PER SQ. FT.: 890.14
 LOCATION: Sandwich, MA *GSF excludes ext main deck 1,600 GSF
 CLIENT: Brown Lindquist Fenuccio & Raber Architects, Inc.
 DATE: 06-Sep-16

BASE ESTIMATE

No.: 16093

SUMMARY	DIVISION TOTAL	PERCENT OF PROJECT	COST PER SF
DIVISION 02 - EXISTING CONDITIONS	0	0%	0.00
DIVISION 03 - CONCRETE	0	0%	0.00
DIVISION 04 - MASONRY	0	0%	0.00
DIVISION 05 - METALS	0	0%	0.00
055000 METAL FABRICATIONS	74,945	5%	46.84
DIVISION 06 - WOOD, PLASTICS & COMPOSITES	220,794	16%	138.00
DIVISION 07 - THERMAL & MOISTURE PROTECTION			
071000 DAMPPROOFING & WATERPROOFING	3,366	0%	2.10
072000 THERMAL PROTECTION	7,185	1%	4.49
074000 SIDING AND TRIM	156,995	11%	98.12
075000 ROOFING AND FLASHING	98,752	7%	61.72
079000 JOINT PROTECTION	1,000	0%	0.63
DIVISION 08 - OPENINGS	29,900	2%	18.69
085000 WINDOWS	44,106	3%	27.57
088000 GLAZING	0	0%	0.00
DIVISION 09 - FINISHES			
092000 GYPSUM WALLBOARD ASSEMBLIES	22,672	2%	14.17
096600 EPOXY FLOORING	19,481	1%	12.18
099000 PAINTING & COATING	14,690	1%	9.18
DIVISION 10 - SPECIALTIES	18,465	1%	11.54
DIVISION 11 - EQUIPMENT	8,050	1%	5.03
DIVISION 12 - FURNISHINGS	0	0%	0.00
DIVISION 13 - SPECIAL CONSTRUCTION	0	0%	0.00
DIVISION 14 - CONVEYING EQUIPMENT	0	0%	0.00
DIVISION 21 - FIRE SUPPRESSION	0	0%	0.00
DIVISION 22 - PLUMBING	85,020	6%	53.14
DIVISION 23 - HVAC	7,500	1%	4.69
DIVISION 26 - ELECTRICAL	37,000	3%	23.13
DIVISION 31 - EARTHWORK	307,123	22%	191.95
DIVISION 32 - EXTERIOR IMPROVEMENTS	132,464	9%	82.79
DIVISION 33 - UTILITIES	134,725	9%	84.20

TOTAL	1,424,231	100%	890.14

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
DIVISION 02 - EXISTING CONDITIONS				
022600 HAZARDOUS MATERIAL ASSESSMENT		NIC		----- 0
DIVISION 03 - CONCRETE				
033000 CAST IN PLACE CONCRETE		N/A		
DIVISION 04 - MASONRY				
		N/A		
DIVISION 05 - METALS				
055000 METAL FABRICATIONS				
Ext PVC Coated Alum Rails:				
Ramp handrail w/ wire mesh infill	295	LF	215.00	63,425
Stair handrail	62	LF	145.00	8,990
Concession service ctr -stainless	6	LF	255.00	1,530
Misc. metals	1	LS	1,000.00	1,000
				----- 74,945
DIVISION 06 - WOOD, PLASTICS & COMPOSITES				
061000 ROUGH CARPENTRY				
Building:				
Floor Frame (PSL & PT 2 x 12):	1,600	GSF	13.20	21,120
3/4" Advantech Sub floor	1,600	SF	3.20	5,120
Underlayment	1,600	SF	1.90	3,040
Main Deck :				
Floor Frame (PSL & PT 2 x 12)	1,600	GSF	12.50	20,000

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
Exterior Wall Framing:				
2 x 6 wall frame	3,370	SF	4.10	13,817
2' H Lower LVL header framing (84 LF)	462	SF	8.00	3,696
9' Lower LVL pier framing (9loc)	486	SF	8.00	3,888
7' Deck LVL pier framing (3 EA)	126	SF	8.00	1,008
1/2" Zip sheathing	4,444	SF	2.55	11,332
Interior Wall Framing 11' H :				
2 x 4 wall frame	1,065	SF	2.22	2,364
Shear wall ply -allow	1	LS	1,500.00	1,500
Roof Framing:				
Sloped roof	3,150	SF	14.00	44,100
5/8" roof sheathing	3,150	SF	1.95	6,143
Exhaust chimney - complete	1	EA	1,000.00	1,000
Cupola -premium	1	EA	1,500.00	1,500
Roof Blocking:				
Box beam	30	LF	24.00	720
Breezeway box beam/ radial	26	LF	70.00	1,820
Eave w/ 12" soffit	98	LF	5.50	539
Eave w/ 24" soffit	227	LF	9.00	2,043
Rake w/ 12" soffit	56	LF	5.50	308
Rake w/ 24" soffit	58	LF	9.00	522
Gable end eave w/ 24" soffit	25	LF	12.00	300
Wrap Around Ramp, Landing & Stair (PT 2 x):				
Floor Frame	970	GSF	16.00	15,520
Stair frame	162	LFT	27.00	4,374
Lower Lever Screen Storage Area 600 GSF:				
7' H screen wall	392	SF	4.00	1,568
8' DBL gate	1	EA	1,000.00	1,000
* Screen wall (pt frame & 1x6 board)				
Lower Lever Screen -Limit Understory Access::				
Screen wall -allow	1,450	SF	4.00	5,800
Access panels -allow	4	EA	750.00	3,000
* Screen wall (pt frame & 1x6 board)				
Attic framing & decking - allow	1	LS	2,500.00	2,500
Interior blocking	1,600	GSF	0.30	480
Misc. rough carpentry	1,600	GSF	1.00	1,600

062000 FINISH CARPENTRY

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
Concessions Casework:		NIC		
Life Guard Room Casework:				
P.L. Counter top	5.5	LF	125.00	688
Base cab	3.5	LF	235.00	823
Wall cab	5.5	LF	175.00	963
Closet shelving - 5 tier	20	LF	35.00	700
Janitor closet shelving	1	LS	150.00	150
FRP Wall Panel -Allow:				
8' Toilet rms	1,150	SF	9.00	10,350
8' Janitor closet	425	SF	9.00	3,825
8' Concession w/ storage	950	SF	9.00	8,550
Life guard rooms	750	SF	9.00	6,750
Interior Trim :				
Window sill / apron	120	LF	18.00	2,160
Window trim	319	LF	6.00	1,914
Ext Door trim		NIC		
Int Door trim	120	LF	5.00	600
Misc int trim	1,600	GSF	1.00	1,600

				220,794

DIVISION 07 - THERMAL & MOISTURE PROTECTION

071000 DAMPPROOFING & WATERPROOFING

Ext. Wall Barrier	W / Zip Sheathing			
Perim ext wall opening	561	LF	6.00	3,366

				3,366

072000 THERMAL PROTECTION

Minimum Insul - Summer Cooling & Sound Only:				
8" Roof - batt	3,150	SF	1.35	4,253
Ext wall R-21 batt	3,200	SF	0.75	2,400
Crawl space		NIC		
Int wall sound attenuation insulation	1,065	SF	0.50	533

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
				----- 7,185
074000 SIDING AND TRIM				
Prefinished Siding :				
White Cedar Shingles typ	3,154	SF	13.00	41,002
White Cedar Shingles @ cupola	50	SF	18.00	900
Vertical ship lap - 3'H band	750	SF	12.50	9,375
Vertical ship lap @ dormer	240	SF	12.50	3,000
Exterior PVC Trim:				
Sill trim w/ flashing	235	LF	14.00	3,290
Band trim @ 7' AFF	250	LF	9.00	2,250
Window sill	120	LF	24.00	2,880
Window trim	319	LF	6.75	2,153
OH grill trim	28	LF	6.75	189
Door trim	100	LF	6.00	600
Box beam trim	30	LF	28.00	840
Breezeway box beam/ radial trim	26	LF	45.00	1,170
Frieze trim	325	LF	9.50	3,088
Eave trim	325	LF	9.50	3,088
Gable end sloped eave trim	25	LF	42.00	1,050
Rake trim	114	LF	18.00	2,052
12" soffit @ eave trim	98	SF	8.00	784
12" soffit @ rake	56	SF	8.00	448
24" soffit @ eave trim	454	SF	8.00	3,632
24" soffit @ gable end eave trim	50	SF	8.00	400
24" soffit @ rake	116	SF	8.00	928
Beach information bd (2 loc)	48	SF	25.00	1,200
Ceiling	530	SF	7.50	3,975
Cupola light well trim/ finish	315	SF	15.00	4,725
Exterior Composite Decking- Trek:				
Main Deck	1,600	SF	8.75	14,000
Landing/ramp	970	SF	8.75	8,488
Stair tread	162	LFT	8.75	1,418
Stair riser	162	LFR	8.75	1,418
Stair /deck skirt	339	LF	8.75	2,966
Deck Rail s (4x4 PT post - 2x PT top/bot rail w/ ww mesh):				
Deck (level)	147	LF	65.00	9,555
Ram/stair (sloped)	192	LF	65.00	12,480

Cedar Shade Pergola:

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
9' post (4 EA)	36	VLF	32.00	1,152
33' Beam (2 EA)	66	LF	45.00	2,970
Building tie	33	LF	45.00	1,485
12' rafter	156	LF	16.00	2,496
Lattice	370	GSF	15.00	5,550

				156,995

075000 ROOFING AND FLASHING

Standing Seam Alum Roofing(25% slope	3,150	SF	24.00	75,600
Ice & water	3,150	SF	3.20	10,080
Flashing & Accessories:				
Cupola flashing	1	LOC	1,000.00	1,000
Exhaust vent flashing	1	LOC	200.00	200
Alum gutters	228	LF	26.00	5,928
Alum downspout (6 EA)	128	LF	23.00	2,944
Weathervane - complete	1	EA	1,500.00	1,500
Misc. flashing	1	LS	1,500.00	1,500

				98,752

079000 JOINT PROTECTION

Int joint sealants	1	LS	500.00	500
Ext joint sealants	1	LS	500.00	500

				1,000

DIVISION 08 - OPENINGS

083000 SPECIALTY DOORS AND FRAMES

Attic access w/ pull down stair	1	EA	2,500.00	2,500
Concessions ctr service grille (6' x 4')	1	EA	2,800.00	2,800
Overhead Coiling Storm Shutter:				
Window 3' x 2' 6"	3	EA	1,300.00	3,900
Window 3' x 4' 8"	8	EA	1,300.00	10,400

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
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Life guard room dr - sgl	1	EA	1,600.00	1,600
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082500 DOOR OPENING ASSEMBLIES

Ext Door, Frame, Glass, Glazing & finish Hardware (Impact Rated Fiberglass):

Toilet room - multi user	2	EA	1,200.00	2,400
Storage - sgl	1	EA	1,200.00	1,200
Concessions - sgl	1	EA	1,200.00	1,200
Life guard room - sgl	1	EA	1,200.00	1,200

Int WD Door, WD Frame & finish Hardware:

Storage - sgl	3	EA	900.00	2,700
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Auto openers NIC

Card access systems NIC

29,900

085000 WINDOWS

Window(11 EA)	134	SF	150.00	20,100
Dormer Window(12 EA)	91	SF	150.00	13,650
Cupola Window(8 EA)	62	SF	150.00	9,300
*Anderson "A" series storm watch window				

Roof Skylight NIC

Gable exhaust louver (2 EA)	22	SF	48.00	1,056
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44,106

088000 GLAZING W / 0825000 & 085000

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DIVISION 09 - FINISHES

092000 GYPSUM WALLBOARD ASSEMBLIES

1 Lyr 5/8" gyp @ ext. wall	2,600	SF	2.20	5,720
1 Lyr 5/8" gyp @ Int wd frame partitions	2,130	SF	2.20	4,686

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
Gyp ceilings & Soffits -Complete:				
Toilet rms	518	SF	8.50	4,403
Janitor closet	132	SF	8.50	1,122
Concession w/ storage	485	SF	8.50	4,123
Life guard rooms	308	SF	8.50	2,618
*GWB includes sound attenuation, LVL 5 veneer plaster finish compound finish				-----
				22,672

096600 EPOXY FLOORING

Epoxy Flooring w/ Integral Base :				
Toilet rms	518	SF	13.50	6,993
Janitor closet	132	SF	13.50	1,782
Concession w/ storage	485	SF	13.50	6,548
Life guard rooms	308	SF	13.50	4,158

				19,481

099000 PAINTING & COATING

Interior Painting	1,600	GSF	2.00	3,200
Exterior Painting				
FG Door			W / unit cost	
Window			W / unit cost	
Siding			W / unit cost	
Sill trim w/ flashing	235	LF	3.00	705
Band trim @ 7' AFF	250	LF	3.00	750
Window sill	120	LF	3.00	360
Window trim	319	LF	3.00	957
OH grill trim	28	LF	3.00	84
Door trim	100	LF	3.00	300
Box beam trim	30	LF	6.00	180
Breezeway box beam/ radial trim	26	LF	6.00	156
Frieze trim	325	LF	3.00	975
Eave trim	325	LF	3.00	975
Gable end eave trim	25	LF	3.00	75
Rake trim	114	LF	3.00	342
12" soffit @ eave trim	98	SF	3.00	294

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
12" soffit @ rake	56	SF	3.00	168
24" soffit @ eave trim	454	SF	3.00	1,362
24" soffit @ gable end eave trim	50	SF	3.00	150
24" soffit @ rake	116	SF	3.00	348
Beach information bd (2 loc)	48	SF	3.00	144
Ceiling	530	SF	3.00	1,590
Cupola light well trim/ finish	315	SF	5.00	1,575
Deck Rails 4x4 PT post - 2x PT top/bot rail		W / unit cost		
Deck skirt trim		NIC		
1x6 PT Deck screen		NIC		
Decking		N/A		
				14,690

DIVISION 10 - SPECIALTIES

101400 SIGNAGE

Bld mtd town seal 5' dia	BY OTHERS
Bld mtd ID 13' x 18" H	BY OTHERS
Misc building signage	BY OTHERS

102100 COMPARTMENTS AND CUBICLES

Solid HDPE Partitions:

HC Toilet Stall	2	EA	1,500.00	3,000
Reg Toilet Stall	4	EA	1,300.00	5,200
Changing Stall w/ bench	2	EA	1,300.00	2,600
Privacy screen	3	EA	285.00	855

102800 TOILET ACCESSORIES

Grab bars	4	EA	95.00	380
Mirror w/ SS shelf	4	EA	220.00	880
Soap dispenser	4	EA	45.00	180
Toilet tissue dispenser	6	EA	45.00	270
Towel disp./waste receptacle	2	EA	250.00	500
Sanitary prod. receptacle	4	EA	60.00	240
Coat hooks	8	EA	20.00	160
Baby changing sta	2	EA	525.00	1,050
Elec hand dryer	2	EA	950.00	1,900

*Excludes Life guard room & concessions accessories

104400 FIRE PROTECTION SPECIALTIES NIC

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
105100 LOCKERS				
Staff locker	5	EA	250.00	1,250
109000 MISC SPECIALTIES				
		NIC		
				----- 18,465
DIVISION 11 - EQUIPMENT				
110000 EQUIPMENT				
Concessions:				
Hand sink	1	EA	600.00	600
3 bay sink	1	EA	950.00	950
Ansul hood vent.	1	EA	6,500.00	6,500
*Balance of Concessions equipment & casework		By Others		
Life guard room:				
Under ctr refrigerator		By Others		
				----- 8,050
DIVISION 12 - FURNISHINGS				
120000 FURNISHINGS				
Window shades		NIC		
Deck Furnishings:				
8' Bench		BY OTHERS		
Table w/ fixed seating		BY OTHERS		
				----- 0
DIVISION 13 - SPECIAL CONSTRUCTION				
		N/A		
DIVISION 14 - CONVEYING EQUIPMENT				
		N/A		

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
DIVISION 21 - FIRE SUPPRESSION		N/A		
DIVISION 22 - PLUMBING				
220000 PLUMBING				
Fixtures :				
Cold rinse shower tower	2	EA	1,500.00	3,000
Water closet	4	EA	1,720.00	6,880
Water closet ADA	2	EA	1,720.00	3,440
Urinal	2	EA	1,500.00	3,000
Lavatory (2 bowl)	2	EA	3,800.00	7,600
Janitors sink	1	EA	1,400.00	1,400
Life guard rm sink	1	EA	1,400.00	1,400
Drinking fountain	1	EA	3,050.00	3,050
Fixture Piping and Connection	15	EA	2,200.00	33,000
Grease interceptor	1	EA	4,500.00	4,500
Hose bib	3	EA	900.00	2,700
Floor drain restrooms	2	EA	850.00	1,700
Floor drain concessions	1	EA	850.00	850
Electric Water Heater	1	LS	3,000.00	3,000
Test Permit and cleaning	1	LS	2,000.00	2,000
Tie into water main	1	LS	2,500.00	2,500
Misc plumbing	1	LS	5,000.00	5,000

				85,020
DIVISION 23 - HVAC				
230000 HVAC				
Restroom ventilation	1	LS	4,000.00	4,000
Concessions ansul hood vent. Connection	1	LS	3,500.00	3,500

				7,500

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
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DIVISION 26 - ELECTRICAL

260000 ELECTRICAL

Electrical -bldg	1,600	GSF	20.00	32,000
Remote power @ food truck parking	1	LS	5,000.00	5,000
Site lighting		NIC		

				37,000

DIVISION 31 - EARTHWORK

310000 EARTHWORK

Misc. site grading	1,475	SY	2.00	2,950
Timber Pile @ :				
Building	32	EA	3,000.00	96,000
Deck, stair & ramp	38	EA	3,000.00	114,000
Allow - Connector @ dune walkover 9' c	24	EA	3,000.00	72,000

*Gravel paving base is w/ Div 32

*Site utilities and improvements include excavation & backfill

0311000 SITE PREPARATION

Erosion control	500	LF	5.00	2,500
CB protection -allow	5	EA	50.00	250
Construction fence	500	LF	11.00	5,500
Construction entrance	1	EA	3,000.00	3,000
Saw cut bit pavement	70	LF	4.25	298
Remove bit pavement -allow	4,000	SF	1.00	4,000
Misc. site preparation	13,250	GSF	0.50	6,625

				307,123

DIVISION 32 - EXTERIOR IMPROVEMENTS

321000 BASES, BALLASTS AND PAVING

Pervious pavement 10' W - complete	1600	SF	34.00	54,400
Bituminous drive/parking- 3 1/2"	688	SY	28.00	19,264
12" gravel base	223	CY	26.00	5,798

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
Curbing		NIC		
Parking line painting & pavement markin	1	LS	2,500.00	2,500
Pavement patching -allow	1	LS	2,500.00	2,500
5' Pedestrian walk @ North edge of parking		NIC		
323000 SITE IMPROVEMENTS				
Connector @ dune walkover(110lf x 6')	660	GSF	25.00	16,500
Dune walkover extension (2 LOC)		NIC		
Removable bollards @ drop off	11	EA	1,100.00	12,100
14'W DBL Vehicle gate	1	EA	3,200.00	3,200
Parking & traffic signage	1	LS	1,500.00	1,500
Solar trach compactors		REMAIN		
Bike rack	2	EA	450.00	900
Dumpster enclosure (1 loc):				
Dumpster pad	64	SF	18.00	1,152
Dumpster enclosure - cedar fence	30	LF	65.00	1,950
10' W DBL Gate @ enclosure - cedar fer	1	EA	2,500.00	2,500
Bollards	4	EA	850.00	3,400
8' Bench	4	EA	1,200.00	4,800
*Excludes existing boardwalk @ dune cross over repairs				
				----- 132,464
DIVISION 33 - UTILITIES				
330000 UTILITIES				
Roof Drainage:				
Drywell 6'dia - allow	2	EA	5,500.00	11,000
Drain line - allow	250	LF	44.00	11,000
Downspout boot	6	EA	750.00	4,500
Exist. Site / street connection		NIC		
Site Drainage Improvements		NIC		
Sanitary:				
5'H Mounded septic sys (2,000sf below l	1	LS	60,000.00	60,000
Timber retaining walls	165	LF	65.00	10,725
Septic tank 5,000 gal	1	EA	7,500.00	7,500
Grease trap		w/ plumbing		

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
Water:				
Tie in existing water service - ALLOW	1	LS	15,000.00	15,000
Electrical :				
Extend electrical utility service	1	LS	15,000.00	15,000
Gas				
		NIC		-----
				134,725

PROJECT: New Bathhouse, Concessions & Lifeguard Facility NO. OF SQ. FT.: 712
 Town Neck Beach COST PER SQ. FT.: 1439.10
 LOCATION: Sandwich, MA *GSF excludes ext main deck
 CLIENT: Brown Lindquist Fenuccio & Raber Architects, Inc.
 DATE: 06-Sep-16

REDUCED SCHEME

No.: 16093

SUMMARY	DIVISION TOTAL	PERCENT OF PROJECT	COST PER SF
DIVISION 02 - EXISTING CONDITIONS	0	0%	0.00
DIVISION 03 - CONCRETE	0	0%	0.00
DIVISION 04 - MASONRY	0	0%	0.00
DIVISION 05 - METALS	0	0%	0.00
055000 METAL FABRICATIONS	68,825	7%	96.66
DIVISION 06 - WOOD, PLASTICS & COMPOSITES	113,390	11%	159.26
DIVISION 07 - THERMAL & MOISTURE PROTECTION			
071000 DAMPPROOFING & WATERPROOFING	954	0%	1.34
072000 THERMAL PROTECTION	3,405	0%	4.78
074000 SIDING AND TRIM	74,637	7%	104.83
075000 ROOFING AND FLASHING	47,421	5%	66.60
079000 JOINT PROTECTION	1,000	0%	1.40
DIVISION 08 - OPENINGS	17,800	2%	25.00
085000 WINDOWS	11,856	1%	16.65
088000 GLAZING	0	0%	0.00
DIVISION 09 - FINISHES			
092000 GYPSUM WALLBOARD ASSEMBLIES	10,431	1%	14.65
096600 EPOXY FLOORING	8,775	1%	12.32
099000 PAINTING & COATING	7,211	1%	10.13
DIVISION 10 - SPECIALTIES	17,215	2%	24.18
DIVISION 11 - EQUIPMENT	0	0%	0.00
DIVISION 12 - FURNISHINGS	0	0%	0.00
DIVISION 13 - SPECIAL CONSTRUCTION	0	0%	0.00
DIVISION 14 - CONVEYING EQUIPMENT	0	0%	0.00
DIVISION 21 - FIRE SUPPRESSION	0	0%	0.00
DIVISION 22 - PLUMBING	74,170	7%	104.17
DIVISION 23 - HVAC	4,000	0%	5.62
DIVISION 26 - ELECTRICAL	19,240	2%	27.02
DIVISION 31 - EARTHWORK	277,123	27%	389.22
DIVISION 32 - EXTERIOR IMPROVEMENTS	132,464	13%	186.04
DIVISION 33 - UTILITIES	134,725	13%	189.22

TOTAL	1,024,642	100%	1439.10

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
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DIVISION 02 - EXISTING CONDITIONS

022600 HAZARDOUS MATERIAL ASSESSMENT		NIC		----- 0
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DIVISION 03 - CONCRETE

N/A

DIVISION 04 - MASONRY

N/A

DIVISION 05 - METALS

N/A

055000 METAL FABRICATIONS

Ext PVC Coated Alum Rails:				
Ramp handrail w/ wire mesh infill	291	LF	215.00	62,565
Stair handrail	38	LF	145.00	5,510
Misc. metals	1	LS	750.00	750
				----- 68,825

DIVISION 06 - WOOD, PLASTICS & COMPOSITES

061000 ROUGH CARPENTRY

Building:				
Floor Frame (PSL & PT 2 x 12):	712	GSF	13.20	9,398
3/4" Advantech Sub floor	712	SF	3.20	2,278
Underlayment	712	SF	1.90	1,353
Main Deck :				
Floor Frame (PSL & PT 2 x 12)	512	GSF	12.50	6,400
Exterior Wall Framing:				
2 x 6 wall frame	1,450	SF	4.10	5,945

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
2' H Lower LVL header framing (84 LF)	330	SF	8.00	2,640
9' Lower LVL pier framing	378	SF	8.00	3,024
7' Deck LVL pier framing	168	SF	8.00	1,344
1/2" Zip sheathing	2,326	SF	2.55	5,931
Interior Wall Framing 11' H :				
2 x 4 wall frame	465	SF	2.22	1,032
Shear wall ply -allow	1	LS	750.00	750
Roof Framing:				
Sloped roof	1,511	SF	14.00	21,154
5/8" roof sheathing	1,511	SF	1.95	2,946
Roof Blocking:				
Box beam	33	LF	24.00	792
Rake w/ 24" soffit	28	LF	9.00	252
Eave w/ 24" soffit	141	LF	9.00	1,269
Wrap Around Ramp, Landing & Stair (PT 2 x w/ pile tile):				
Floor Frame	1,117	GSF	16.00	17,872
Stair frame	90	LFT	27.00	2,430
Lower Lever Screen Storage Area :				
7' H screen wall	238	SF	4.00	952
8' DBL gate	1	EA	1,000.00	1,000
* Screen wall (pt frame & 1x6 board)				
Lower Lever Screen -Limit Understory Access::				
Screen wall -allow	1,000	SF	4.00	4,000
Access panels -allow	2	EA	750.00	1,500
* Screen wall (pt frame & 1x6 board)				
Attic framing & decking - allow	1	LS	2,000.00	2,000
Interior blocking	712	GSF	0.30	214
Misc. rough carpentry	712	GSF	1.00	712
062000 FINISH CARPENTRY				
Janitor closet shelving	1	LS	150.00	150
FRP Wall Panel -Allow:				
8' Toilet rms	1,150	SF	9.00	10,350
8' Janitor closet	425	SF	9.00	3,825
Interior Trim :				
Window sill / apron	36	LF	18.00	648

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
Window trim	86	LF	6.00	516
Ext Door trim		NIC		
Misc int trim	712	GSF	1.00	712

				113,390

DIVISION 07 - THERMAL & MOISTURE PROTECTION

071000 DAMPPROOFING & WATERPROOFING

Ext. Wall Barrier	W / Zip Sheathing			
Perim ext wall opening	159	LF	6.00	954

				954

072000 THERMAL PROTECTION

Minimum Insul - Summer Cooling & Sound Only:

Roof - batt	1,511	SF	1.38	2,085
Ext wall R-21 batt	1,450	SF	0.75	1,088
Int wall sound attenuation insulation	465	SF	0.50	233

				3,405

074000 SIDING AND TRIM

Prefinished Siding :

White Cedar Shingles typ	1,000	SF	13.00	13,000
Vertical ship lap - 3'H band	372	SF	12.50	4,650

Exterior PVC Trim:

Sill trim w/ flashing	124	LF	14.00	1,736
Band trim @ 7' AFF	124	LF	9.00	1,116
Window sill	120	LF	24.00	2,880
Window trim	319	LF	6.75	2,153
Door trim	60	LF	6.00	360
Box beam trim	33	LF	28.00	924
Frieze trim	124	LF	9.50	1,178
Eave trim	132	LF	9.50	1,254
Rake trim	28	LF	18.00	504

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
24" soffit @ eave trim	264	SF	8.00	2,112
24" soffit @ rake	56	SF	8.00	448
Beach information bd (2 loc)	48	SF	25.00	1,200
Ceiling	512	SF	7.50	3,840
Exterior Composite Decking- Trek:				
Main Deck	511	SF	8.75	4,471
Landing/ramp	1,117	SF	8.75	9,774
Stair tread	90	LFT	8.75	788
Stair riser	90	LFR	8.75	788
Stair /deck skirt	291	LF	8.75	2,546
Deck rail(4x4 PT post PT top/bot w/ r	291	LF	65.00	18,915
Cedar Shade Pergola:		N/A		-----
				74,637

075000 ROOFING AND FLASHING

Standing Seam Alum Roofing(25% slope	1,511	SF	24.00	36,264
Ice & water	1,511	SF	3.20	4,835
Flashing & Accessories:				
Alum gutters	141	LF	26.00	3,666
Alum downspout (4 EA)	72	LF	23.00	1,656
Misc. flashing	1	LS	1,000.00	1,000

				47,421

079000 JOINT PROTECTION

Int joint sealants	1	LS	500.00	500
Ext joint sealants	1	LS	500.00	500

				1,000

DIVISION 08 - OPENINGS

083000 SPECIALTY DOORS AND FRAMES

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
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Attic access w/ pull down stair	1	EA	2,500.00	2,500
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Overhead Coiling Storm Shutter: Window 3' x 2' 6"	9	EA	1,300.00	11,700
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082500 DOOR OPENING ASSEMBLIES

Ext Door, Frame, Glass, Glazing & finish Hardware (Impact Rated Fiberglass):

Toilet room - multi user	2	EA	1,200.00	2,400
Storage - sgl	1	EA	1,200.00	1,200

Auto openers		NIC		
Card access systems		NIC		

17,800

085000 WINDOWS

Window(9 EA) *Anderson "A" series storm watch window	72	SF	150.00	10,800
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Roof Skylight		NIC		
Gable exhaust louver (2 EA)	22	SF	48.00	1,056

11,856

088000 GLAZING W / 0825000 & 085000

0

DIVISION 09 - FINISHES

092000 GYPSUM WALLBOARD ASSEMBLIES

1 Lyr 5/8" gyp @ ext. wall	1,300	SF	2.20	2,860
1 Lyr 5/8" gyp @ Int wd frame partitions	930	SF	2.20	2,046

Gyp ceilings & Soffits -Complete:

Toilet rms	518	SF	8.50	4,403
Janitor closet	132	SF	8.50	1,122

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
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*GWB includes sound attenuation, LVL 5 veneer plaster finish compound finish

10,431

096600 EPOXY FLOORING

Epoxy Flooring w/ Integral Base :

Toilet rms	518	SF	13.50	6,993
Janitor closet	132	SF	13.50	1,782
				----- 8,775

099000 PAINTING & COATING

Interior Painting 712 GSF 2.00 1,424

Exterior Painting

FG Door		W / unit cost		
Window		W / unit cost		
Siding		W / unit cost		
Sill trim w/ flashing	124	LF	3.00	372
Band trim @ 7' AFF	124	LF	3.00	372
Window sill	120	LF	3.00	360
Window trim	319	LF	3.00	957
Door trim	60	LF	3.00	180
Box beam trim	33	LF	6.00	198
Frieze trim	124	LF	3.00	372
Eave trim	132	LF	3.00	396
Rake trim	28	LF	3.00	84
24" soffit @ eave trim	264	SF	3.00	792
24" soffit @ rake	56	SF	3.00	168
Ceiling	512	SF	3.00	1,536
Deck Rails 4x4 PT post - 2x PT top/bot rail		W / unit cost		
Deck skirt trim		NIC		
1x6 PT Deck screen		NIC		
Decking		N/A		
				----- 7,211

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
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DIVISION 10 - SPECIALTIES

101400 SIGNAGE

Bld mtd town seal 5' dia		BY OTHERS		
Bld mtd ID 13' x 18" H		BY OTHERS		
Misc building signage		BY OTHERS		

102100 COMPARTMENTS AND CUBICLES

Solid HDPE Partitions:

HC Toilet Stall	2	EA	1,500.00	3,000
Reg Toilet Stall	4	EA	1,300.00	5,200
Changing Stall w/ bench	2	EA	1,300.00	2,600
Privacy screen	3	EA	285.00	855

102800 TOILET ACCESSORIES

Grab bars	4	EA	95.00	380
Mirror w/ SS shelf	4	EA	220.00	880
Soap dispenser	4	EA	45.00	180
Toilet tissue dispenser	6	EA	45.00	270
Towel disp./waste receptacle	2	EA	250.00	500
Sanitary prod. receptacle	4	EA	60.00	240
Coat hooks	8	EA	20.00	160
Baby changing sta	2	EA	525.00	1,050
Elec hand dryer	2	EA	950.00	1,900

104400 FIRE PROTECTION SPECIALTIES NIC

109000 MISC SPECIALTIES NIC

17,215

DIVISION 11 - EQUIPMENT

110000 EQUIPMENT N/A

0

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
DIVISION 12 - FURNISHINGS				
120000 FURNISHINGS				
Window shades		NIC		
Deck Furnishings: 8' Bench		BY OTHERS		
				----- 0
DIVISION 13 - SPECIAL CONSTRUCTION				
		N/A		
DIVISION 14 - CONVEYING EQUIPMENT				
		N/A		
DIVISION 21 - FIRE SUPPRESSION				
		N/A		
DIVISION 22 - PLUMBING				
220000 PLUMBING				
Fixtures :				
Cold rinse shower tower	2	EA	1,500.00	3,000
Water closet	4	EA	1,720.00	6,880
Water closet ADA	2	EA	1,720.00	3,440
Urinal	2	EA	1,500.00	3,000
Lavatory (2 bowl)	2	EA	3,800.00	7,600
Janitors sink	1	EA	1,400.00	1,400
Drinking fountain	1	EA	3,050.00	3,050
Fixture Piping and Connection	14	EA	2,200.00	30,800
Hose bib	2	EA	900.00	1,800
Floor drain restrooms	2	EA	850.00	1,700
Electric Water Heater	1	LS	2,000.00	2,000
Test Permit and cleaning	1	LS	2,000.00	2,000
Tie into water main	1	LS	2,500.00	2,500

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
Misc plumbing	1	LS	5,000.00	5,000

				74,170
DIVISION 23 - HVAC				
230000 HVAC				
Restroom ventilation	1	LS	4,000.00	4,000

				4,000
DIVISION 26 - ELECTRICAL				
260000 ELECTRICAL				
Electrical -bldg	712	GSF	20.00	14,240
Remote power @ food truck parking	1	LS	5,000.00	5,000
Site lighting		NIC		

				19,240
DIVISION 31 - EARTHWORK				
310000 EARTHWORK				
Misc. site grading	1,475	SY	2.00	2,950
Timber Pile @ :				
Building	22	EA	3,000.00	66,000
Deck, stair & ramp	38	EA	3,000.00	114,000
Allow - Connector @ dune walkover 9' c	24	EA	3,000.00	72,000
*Gravel paving base is w/ Div 32				
*Site utilities and improvements include excavation & backfill				
0311000 SITE PREPARATION				
Erosion control	500	LF	5.00	2,500
CB protection -allow	5	EA	50.00	250

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
Construction fence	500	LF	11.00	5,500
Construction entrance	1	EA	3,000.00	3,000
Saw cut bit pavement	70	LF	4.25	298
Remove bit pavement -allow	4,000	SF	1.00	4,000
Misc. site preparation	13,250	GSF	0.50	6,625

				277,123

DIVISION 32 - EXTERIOR IMPROVEMENTS

321000 BASES, BALLASTS AND PAVING

Pervious pavement 10' W - complete	1600	SF	34.00	54,400
Bituminous drive/parking- 3 1/2"	688	SY	28.00	19,264
12" gravel base	223	CY	26.00	5,798
Curbing		NIC		
Parking line painting & pavement markin	1	LS	2,500.00	2,500
Pavement patching -allow	1	LS	2,500.00	2,500
5' Pedestrian walk @ North edge of parking		NIC		

323000 SITE IMPROVEMENTS

Connector @ dune walkover(110lf x 6')	660	GSF	25.00	16,500
Dune walkover extension (2 LOC)		NIC		
Removable bollards @ drop off	11	EA	1,100.00	12,100
14'W DBL Vehicle gate	1	EA	3,200.00	3,200
Parking & traffic signage	1	LS	1,500.00	1,500
Solar trach compactors		REMAIN		
Bike rack	2	EA	450.00	900
Dumpster enclosure (1 loc):				
Dumpster pad	64	SF	18.00	1,152
Dumpster enclosure - cedar fence	30	LF	65.00	1,950
10' W DBL Gate @ enclosure - cedar fer	1	EA	2,500.00	2,500
Bollards	4	EA	850.00	3,400
8' Bench	4	EA	1,200.00	4,800

*Excludes existing boardwalk @ dune cross over repairs

132,464

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
DIVISION 33 - UTILITIES				
330000 UTILITIES				
Roof Drainage:				
Drywell 6'dia - allow	2	EA	5,500.00	11,000
Drain line - allow	250	LF	44.00	11,000
Downspout boot	6	EA	750.00	4,500
Exist. Site / street connection		NIC		
Site Drainage Improvements		NIC		
Sanitary:				
5'H Mounded septic sys (2,000sf below l	1	LS	60,000.00	60,000
Timber retaining walls	165	LF	65.00	10,725
Septic tank 5,000 gal	1	EA	7,500.00	7,500
Grease trap		w/ plumbing		
Water:				
Tie in existing water service - ALLOW	1	LS	15,000.00	15,000
Electrical :				
Extend electrical utility service	1	LS	15,000.00	15,000
Gas		NIC		

				134,725