Wood Island Feasibility Study

Part One: Study of Site History and Initial Site Assessment

Part Two: Site Assessment and Recommendations

Part Three: Recommended Alternatives

May 2009

Completed for the Town of Kittery, Maine in cooperation with the University of New Hampshire and Appledore Engineering, Inc.

Written by Katherine E. Andruchuk
Mary Ferguson
Krystian E. Kozlowski
Seth Lizotte
Kyle Urso
Lawrence Yassanye
University of New Hampshire, Department of Civil Engineering

Project oversight by Jennifer L. Viarengo, P.E., Appledore Engineering Inc.
and Duncan Mellor, P.E., Waterfront Engineers LLC

Funded by the 2008 State of Maine Shore and Harbor Technical Assistance Grant

Wood Island Feasibility Study

Part One: Study of Site History and Initial Site Assessment

August 2008

Completed for the Town of Kittery, Maine in cooperation with the University of New Hampshire and Appledore Engineering, Inc.

Written by Krystian E. Kozlowski
University of New Hampshire, Department of Civil Engineering

Project oversight by Jennifer L. Viarengo, P.E., Appledore Engineering Inc.
and Duncan Mellor, P.E., Waterfront Engineers LLC

Funded by the 2008 State of Maine Shore and Harbor Technical Assistance Grant

Preface

The following report is the work of a student completed under the guidance and supervision of professional engineers. This report should only be used by the reader for the purpose of conveying general information regarding Wood Island, Kittery, ME. The information in this document is based on several sources regarding the history of the site. These written and photographic sources are cited and credit is given for their reference and use.

Table of Contents

List of Figures

I. Description of Site

A. Wood Island

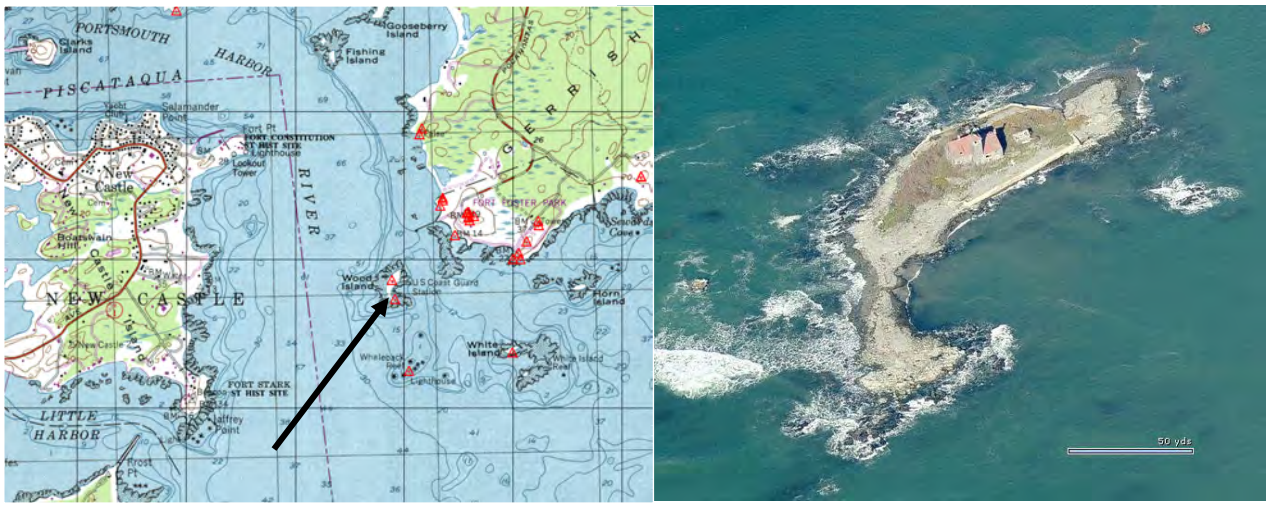


Figure 1: Wood Island (Courtesy of Terrain Navigator & Virtual Earth)

Names

Known as U-Me-449A, Wood Island, Wood Island Coast Guard Station, Wood Island Lifesaving Station and Old Portsmouth Harbor Lifeboat Station.

Location

The Island is near the New Hampshire-Maine line in Portsmouth Harbor. It is approximately thirteen hundred feet southwest of Fort Foster, on Gerrish Island, in Kittery, Maine. Located at 43°03'49.39" N 70°41'54.18" W.

Geology

Small sandy crescent beaches with rock ledge outcrops and rocky beach sections cover 1.24 acres of island. There are scattered deposits of small stones and sand.

Vegetation

Small trees and bushes cover the area around the main building. Poison ivy covers 50% of the island. Weeds and grass three to five feet tall surround the main structures.

Current Use

According to the 2001 Kittery Comprehensive Plan, 750 to 1,000 people visit the island yearly for recreational purposes. The buildings are empty and have no use.

B. Existing Structures and Infrastructure

1. Wood Island Station

Figure 2 Wood Island Station

The station is a multi-room, multi-level, wood frame and masonry construction with approximately 7,596 square feet of living and utility space. The building has a basement, living room, mess hall, officer's and crew's quarters, bathrooms, a boathouse, a four-level observation tower, an exterior observation deck on the fourth level. The building is a combined Colonial Revival and Shingle Style design. It features a Colonial Revival gambrel roof and siding iconic of American Queen Anne Shingle architecture. (1)

The Origins of Lifesaving in the Region

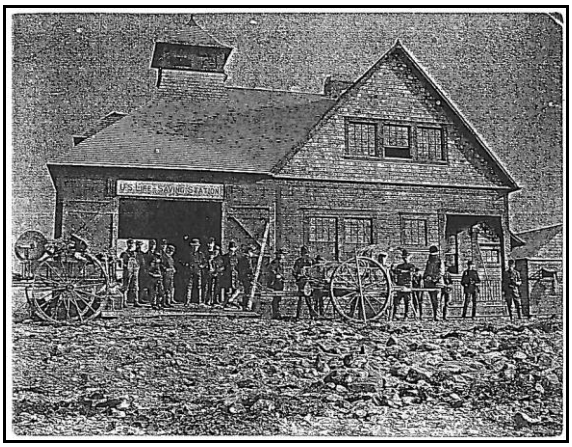


Figure 3 Jerry's Point Lifeboat Station circa 1890 (Courtesy of The Portsmouth Athenaeum)

In the mid 18th Century, the people of the Piscataqua River region recognized the need for a rescue service to mitigate loss of life in nautical disasters near Gerrish Island. The Federal Government responded by constructing and commissioning a United States Lifesaving Service (USLSS) station on Jerry's Point in 1887. It was positioned near Fort Stark and the current United States Coast Guard (USCG) Station in Newcastle, New Hampshire. (5)

Jerry's Point Lifeboat Station was recognized as the "No. 1 Station" in the USLSS for its impressive service record. In 1893, just five years after officially being commissioned, it had forty-four recorded instances where assistance was rendered to distressed vessels. During that time, sixteen people were rescued by Captain Silas H. Harding and seven lifeboat men. Captain Harding said of his men: "Every man of the crew is a typical sailor; he is agile, courageous and courteous, with a strong love for humanity in his big heart." (5)

The famous rescue mission of the *Oliver Dyer* occurred on November 26, 1888. The schooner was wrecked on rocks near the station and four crew members were saved from the ship. The lifeboat men received gold medals as official recognition of their brave rescue. (5)

In 1908, the Jerry's Point Station crew and equipment was transferred to its successor, the Wood Island Station. The Jerry's Point site was required for military purposes. (5)

Structure's History

Prior to use by the USLSS, the U.S. Navy constructed a military barrack on Wood Island in the early 19th Century. Towards the end of the century it was used as quarantine for naval patients suffering from Yellow Fever. (6)

The main station building, registered in the USLSS as Station #12, was built in 1907 on Wood Island, Kittery, Maine. The building is a Duluth-style station designed by architect George R. Tolman. The style originated in the Great Lakes region of Minnesota. The Wood Island Station is one of an original twenty-eight Duluth-style stations in the United Stated. It was constructed by builder Sugden Brothers of Portsmouth, NH. (1, 7)

In 1908, the building began functioning as an air-sea rescue station until 1941. During the World War II period of 1941 to 1945, the U.S. Navy used the site as an observation station. A submarine net anchor was installed on the island to protect Portsmouth Harbor from German U-boat attack. (6)

Since 1972, the Wood Island Station has been neglected. The site has served as an intended recreational facility for the general public under the stewardship of the Town of Kittery.

Historical & Cultural Significance

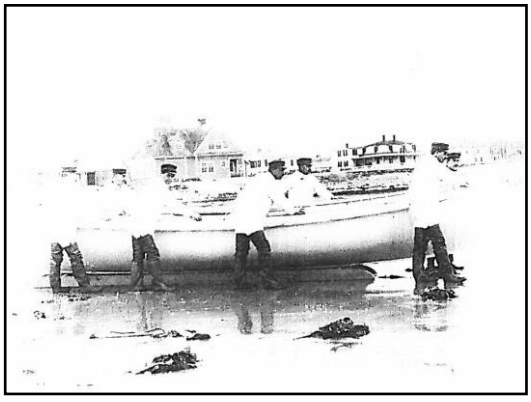
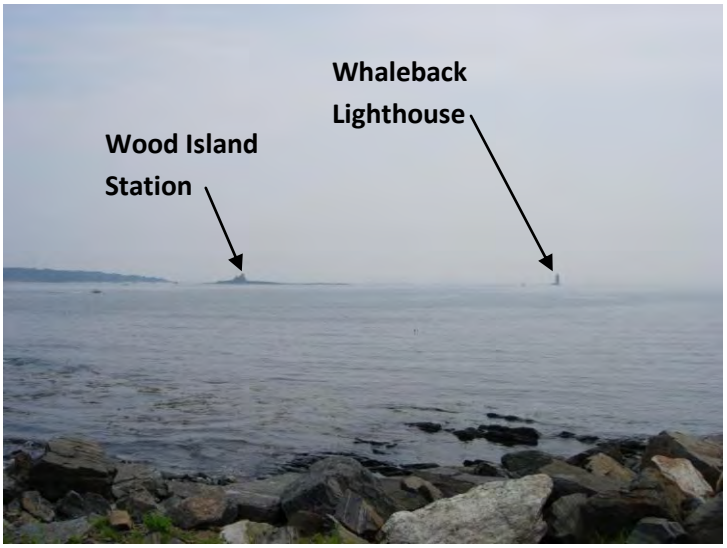


Figure 4 Lifeboat Men at Jenness Beach, Rye, NH, circa 1900
(Courtesy of The Portsmouth Athenaeum)

For thirty-two years the Wood Island Station provided a vital service to the maritime and shipping industry of southern Maine and New Hampshire. The USLSS consisted of teams of eight men residing in

stations positioned at strategic locations along the oceanic coasts and the Great Lakes of America. During good weather they would train lifesaving techniques and maintain their equipment while keeping watch. If a ship was in distress, the men would launch their boat into the violent sea and row through rough surf to attempt a rescue. Lifeboat men were known for their motto "You have to go out, but you don't have to come back." Today, the USLSS is often romanticized as a courageous service that was the forerunner of the USCG. (8)



(Photo: K. Kozlowski)

Figure 5 View of Whaleback Lighthouse (right) and Wood Island Station (left) from Newcastle Commons, NH

Wood Island Station lies 1,500 feet from Whaleback Light and complements an iconic seascape depicting the maritime history of Maine and New Hampshire. Although the building has deteriorated significantly, from a distance it portrays an enduring symbol of its former duty to the Piscataqua River region.

Conditions Assessment

The following descriptions are based on the initial Wood Island site investigation on August 15, 2008. All photographs of the site were taken by K. Kozlowski. Approximate reproductions of the original building's elevations and plans, as well as current damage summaries, are located in Appendix B of this report.

Exterior

Generally the roof appears to be in good condition; however, a section over the boathouse has partially collapsed. The roof on the southern elevation has approximately fifty-percent of roofing shingles missing. This damage contributes to further deterioration of interior timber frame elements by rainwater.

Figure 6 Collapsed station roof

The siding on the building has aged well and continues to protect the building. Siding shingles are missing in some small areas on the exterior walls.

The porch decks appear in good condition; there is no noticeable deterioration.

No original windows remain in the building. Many of the window frames are unblocked and continue to allow seagulls to enter and inhabit the building. Some windows and exterior door frames remain blocked by previous attempts to seal the building. Evidence of damage and break-in attempts by vandals exists along the perimeter of the building.

The observation deck on the fourth level was not closely inspected due to lack of access. The deck appears in good condition. The deck is not believed to be part of the original 1907 structure; it was probably constructed during the 1940s by the U.S. Navy.

Figure 7 Wood Island Station

Interior

The conditions inside the structure vary depending on the condition of the roof above. Rooms below shingled roof sections are dry and without damage from moisture. The spaces in the boat house section below the roof failure have extensive damage from rotting structural elements. Parts of the floor in the boathouse on the first and second levels have damage and voids. There are dangerous soft spots in these floors. Floor damage is also present near open windows throughout the building.

The joists near the wall in part of the second level of the boathouse have collapsed as seen in Figure 9; however, all other beams and columns supporting the level appear structurally sound as seen in Figure 10.

Figure 8 Interior damage of boathouse

Extensive damage to non-structural elements exists throughout the interior. Wall plaster and gypsum are damaged or missing in most rooms. Entire wall sections, including framing, are also missing in many rooms.

Figure 9 Non-structural interior damage

Large piles of seagull droppings exist in all spaces in the building. These piles are many inches deep in some areas on the upper levels. The putrid odor of the droppings is strong and present everywhere within the building. There is evidence that seagulls continue to inhabit the building.

Figure 10 Seagull droppings

The foundations of the building are in good condition. There are no obvious signs of Alkali-Silica Reaction (ASR) on the structural columns or perimeter foundation in the basement. The smallest columns measure eighteen inches by eighteen inches.

Alkali-Silica Reaction (ASR) occurs when reactive aggregates form a gel-like substance within concrete exposed to water. These gels grow within the concrete and can create high expansive stresses that lead to cracking and eventual failure. According to Duncan Mellor, P.E., these stresses usually range between 250 psi and 300 psi and normally little can be done to prevent expansion. Depending on aggregate reactivity, cement type, moisture exposure and other factors, ASR may take decades to undermine the concrete's structural integrity.

Figure 11 Station foundations

Piping in the basement appears to be covered with asbestos insulation. Only large diameter pipes like those pictured in Figure 16 are insulated.

Figure 12 Fibrous pipe insulation

The paint used on the interior walls and moldings appears to be lead based due to its flaky appearance and the time period the building was constructed and maintained.

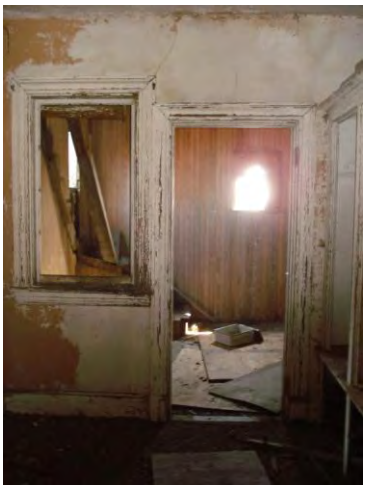


Figure 13 Stairs and peeling paint

The stairs throughout the interior are damaged or missing. On many levels, make-shift boards with footings were installed previously. The stairs to the basement from the first floor and from the outside are in good condition.

2. Tool House Building

The tool house building is a twenty foot long by ten foot wide structure formerly used to store equipment. The building is timber framed with wooden shingle siding.

Figure 14 Tool House Building

Conditions Assessment

A section of rafters failed resulting in a partial collapse of the roof. Much of the roof structure is heavily deteriorated and at risk of collapse. A section of the rear wall has been destroyed.

Most of the siding shingles remain and are in good condition; they appear to match the shingles on the station.

3. Marine Railway

The marine railway consists of two sets of tracks that originate inside the boathouse. The tracks are sloped down from the boat house doors to the water. The rails from one of the boathouse bays converge with the rails from the other bay, which runs directly to the water. The rails are made of iron. A timber structure atop a concrete foundation supports the railway. The rails run through the existing sea wall.

Structure's History

(Photo: Bob Muncaster)

Figure 15 Launching the Thomas Fielden, an English Lifeboat from the early 20th Century that used a gravity launching system similar to the one at Wood Island

The marine railway was used as a rapid launch system for outgoing USLSS boats. Double-ended lifesaving boats would sit on special dollies on the rails until they were needed. When a distress call was received, the men would open the boathouse doors, climb on board the lifeboat and fly down the rails into the water. The apparatus allowed the team to access the water quickly regardless of the tide level. (9)

Conditions Assessment

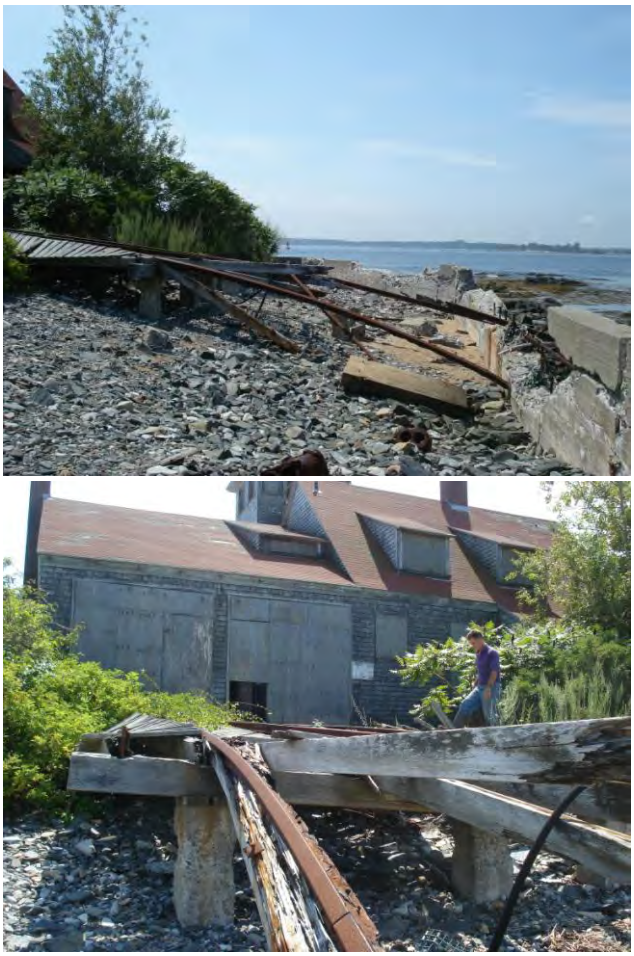


Figure 16 Marine Railway

The railway is badly damaged and unsafe. The railway originally extended several yards beyond the sea wall. The concrete foundation is intact but has degraded and appears damaged. The primary wood beams supporting the rails are partially intact; some secondary beams have collapsed. The rails and wooden decking have also collapsed. Most of the original rails have bent out of shape due to the missing substructure. Sections of the rail are missing.

4. Seawall

The existing seawall is comprised of two sections located at the south and north of the building.

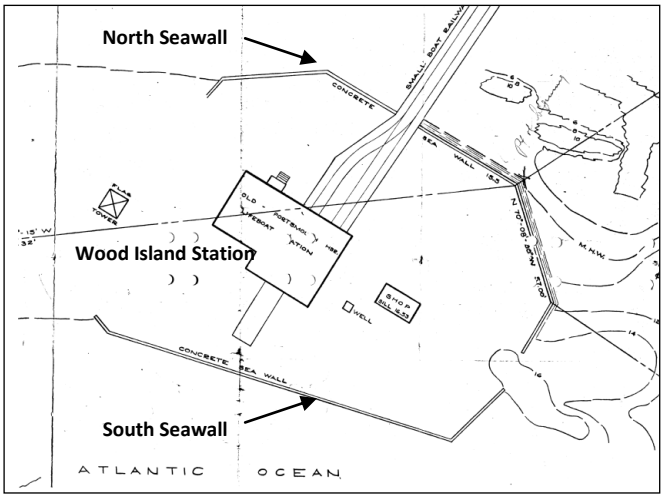


Figure 17 Seawall (Taken from a topographic map dated 1955)

The south wall measures approximately two hundred and fifteen feet in length. It stands six feet tall at the highest point. The front seawall has been damaged repeatedly by tidal surge and wave action. A town document reported that in 1993, a one hundred foot by two foot by six foot section of the wall was repaired by Shotcrete Systems International, Inc. at the cost of approximately $40,000.00 using FEMA Federal and State disaster assistance. The photos in Figures 24 and 25 are of the front concrete wall that was repaired by Shotcrete Systems. The contractor installed a steel wire mesh over the damaged wall and shot pressurized concrete over the mesh.

The wall north of the building is approximately two hundred and fifty feet long with sections of wall over eight feet tall. By visual inspection, the wall has not been modified or repaired since it was originally constructed. The wall is un-reinforced concrete with small and large stone aggregate. The wall was presumably built of natural materials found on the premises. Large iron pins are located in the rock face near the base of the wall. Duncan Mellor, P.E. suggests the pins may provide a shear brace to prevent the wall from sliding toward the water.

Conditions Assessment

South Seawall

Figure 18 Outer south seawall

By visual inspection, the entire two hundred and fifteen foot wall appeared to have been covered with new concrete. Many sections along the top of the wall have broken away from the steel mesh as seen in Figure 26.

Figure 19 Damaged top section of south seawall

North Seawall

Signs of Alkali-Silica Reaction (ASR) are present along the seawall. ASR will need to be confirmed by laboratory testing. Large wall sections have been destroyed and are missing. Presumably the combination of wave action, ASR expansion and freeze/thaw cycles has reduced the wall to its present state.

Figure 20 Inner north seawall damage

Figure 21 Outer north seawall damage

5. Flag Tower

The flag tower was originally a wooden frame that stood near the station building.

Conditions Assessment

The structure was not found during the inspection and is presumed to have been destroyed or removed from the island.

6. Drill Pole

Structure's History

Figure 22 Beach apparatus drill reenactment in Cape Cod (Photo: John Galluzzo)

The beach apparatus drill was considered one of the most important rescue maneuvers of the time. The USLSS required the drill to be practiced at least twice each week at each lifeboat station. The maneuver was specifically designed to rescue sailors from ship wrecks or vessels that had run aground within six hundred yards of shore. The apparatus was used when the conditions were too dangerous for a lifeboat rescue attempt. (9)
The equipment involved included many lines, wooden frames, a Lyle gun, a drill pole, block pulleys and other equipment. The Lyle line throwing gun was set up on the beach and used to fire a lead line to the stranded ship. Heavy lines were then attached between the beach apparatus and the ship's mast. Tension created a zip line apparatus that used a breeches buoy to rescue one sailor at a time from the wrecked ship. This was an effective rescue maneuver that saved countless lives during the active period of the USLSS. (9)

The drill pole located on Wood Island was meant to mimic a ship's mast during the regular training of the maneuver. The drill pole was made of steel.

Conditions Assessment

The structure was not found during the inspection and is presumed to have been destroyed or removed from the Island.

7. Well

The well was not found during the inspection.

8. Miscellaneous Facilities

As seen in Figure 33, any existing pathways on the Island are completely overgrown.

Figure 23 Overgrowth

A total of three tanks were found outside near the station and tool house building. A large reservoir (assumed to be for drinking water) was found inside the basement of the station building.

Figure 24 Abandoned tanks

A manhole structure was found to the north of the station building. The interior was not inspected.

Figure 25 Manhole

Many large diameter pipes lay scattered on the island. They appear to be damaged and corroded through. There are also several dozen abandoned lobster traps scattered across the island as seen in Figure 38.

Figure 26 Piping

The following items were considered to be on the island at one time but were not found during the inspection: picnic tables, benches, grills and the bulwarks supporting the old submarine net.

9. Cribs

Figure 27 Cribs

A crib is a marine structure built of heavy wood members with large stones placed inside the frame to provide strength. The cribs near Wood Island are pinned together using steel elements. Cribs are normally used for supporting bridges or piers and can be coated with conservatives that protect against wood degradation. There are seven cribs near Wood Island. These cribs were used to support a submarine net as part of a harbor defense system during World War II.

Conditions Assessment

Five of the seven cribs appear to be stable. Two of the cribs appear to have collapsed. The structural integrity of each crib may be comprised by wood degradation by marine-borers. A full dive inspection would be required to determine the extent of possible degradation.

Figure 28 Cribs near Wood Island (Courtesy of Google Earth)

II. Town of Kittery Stewardship

A. History of Ownership

In 1827, the Maine State Senate and House of Representatives signed a bill ceding Wood Island to the Federal Government. The bill claimed the State would have concurrent jurisdiction of the land; however, some evidence exists that the State of Maine gave title of Wood Island to the Federal Government in 1869. During the turn of the century, jurisdiction of the island was transferred to the USLSS. (1)

In 1915, the USLSS and the United States Revenue Cutter Service (USRCS) merged to form the modern USCG. During the period from 1909 to 1941, a lifesaving station operated on Wood Island. In 1941, the USCG relinquished jurisdiction of the island to the U.S. Navy. (1, 7)

The U.S. Navy used the island as a defensive position during World War II. Following the war in 1945, jurisdiction of the island was transferred back to the USCG. In the mid 1950s the island was listed as military surplus property. In 1955, the U.S. Navy stated two parcels, Parcels "A" and "B" "shall be reserved for the use and benefit of the U.S. Dept. of the Navy." Any disposition of the surplus land is subject to a Right of Way for Access for these parcels, 0.9 acres and 0.6 acres, respectively. A topographic map showing the two parcels is located in Appendix C. (1)

In 1971, President Nixon announced the "Legacy of Parks" Program and offered Federal surplus land available for parks and recreation use. The U.S. Department of the Interior (U.S. DOI) was given jurisdiction of the site. In 1973, the island was deeded to the Town of Kittery by the Federal Government under several conditions.

The conditions include:

1. Used and maintained for recreational purposes involving the general public
2. Erect a permanent sign stating "Recreational Facility"
3. Not sold or leased
4. Submit ten biennial reports with further reports as per request and maintain a Program of Utilization for the property
5. Reversion of deed if land required for national defense
6. Covenants, etc.
7. Breach

There were instances where the Department of the Interior further defined the conditions described in the deed. In 1973, a discussion between the town and the Department of the Interior about the use of Wood Island for educational purposes led to the condition that the University of New Hampshire could

be categorized as "public" and therefore within the deed requirement for recreational purposes. In another discussion in 1984, the Department of the Interior stated that the "permitted recreation range of possible uses is broad." It added additional conditions including: any business replacing the [lifesaving station] structure must spend all of its revenue for maintenance and/or operation of Wood Island or another grantee site. Concessionaire agreements can be arranged but must obtain approval from the Department of the Interior. Approval for such agreements is required to satisfy historic importance and safety aspects of the site and the structures. (6)

B. Biennial Compliance Reports

The deed stipulates that the town must submit reports every two years on the status of developments and improvements to recreational activity on Wood Island. The deed also required a Program of Utilization to be maintained.

The original Program of Utilization for the site was for boaters to actively use the island for cookouts and picnics, with tables and grills provided. An upgraded boat dock was to be constructed.

The following are summaries of the eleven reports written by Kittery officials and submitted to a branch of the U.S. Department of the Interior from 1975 to 2008. (6)

- **1975 Biennial Compliance Report I**
    - An estimated 100-150 people picnic on Wood Island during the summer.
    - No improvements and no plans for development. The town prefers to keep the island in its natural state.
    - The Department of the Interior replied to this report with a letter threatening reversionary actions of the deed if the town did not comply with the conditions specified in the agreement.

- **1975 Biennial Compliance Report II**
    - Ideas for development including: a survival program, a sailing program and/or a point of historic interest.
    - It suggested exploring historic preservation or outdoor recreation grants for the funding of building restoration.

- **1981 Biennial Compliance Report III**
    - Records indicate a report was completed; however; it was not found.

- **1983 Biennial Compliance Report IV**
  - No major improvements/no development.
  - Only litter control maintained.
  - Signs erected.
  - No visitor-use facilities provided.
  - No accurate financial records kept.
  - 250 persons per year (95% family, with few campers).
  - Docking needed.
  - Personal note included: from personal picnic trips to island, it is the "only public island one can visit and have no hesitation or reservation as to their propriety in landing a boat." Wood Island is a landmark controlled by the public.

- **1984 Biennial Compliance Report V**
  - This report is identical to the 1983 report without the personal note.

- **1985 Biennial Compliance Report VI**
  - Improvements/Maintenance/Development: "Limited visitor-use facilities being provided": picnic tables installed (cemented in), grills purchased (to be installed), work started for small boat landing system, second hand boat motor purchased, window door sizes kept with hope, wire mesh purchased & installed to keep pigeons out, regular trips for litter control, signs stolen, no public transport available.
  - Financial Statement: 1982-1983: $223.60, 1983-1984: $471.56, Total: $695.16. No admission charges, no donations or voluntary services.
  - Public Use: Estimated 250 persons per year, 95% families, occasional overnight campers, visitors regional (75% from ME and NH), island not overused, water access is poor, cove 300 yards away, area sea conditions: often very choppy & rough, safety cancels a work day at time, vandalism builds over years, poison ivy on over 50% of island limits potential for passive recreation uses.
  - Future Program: Work toward building restoration, better access – a dock, remove poison ivy, improve picnic facilities.

- **1986 Biennial Compliance Report VII**
  - Records indicate a report was completed.

- **1991 Biennial Compliance Report VIII**
  - Work done: Preserved structural integrity of the building, reduce/repair libelous hazards, clean grounds and beach areas.
  - Budget: $1,200.00 for routine maintenance.

- Plan: No major projects undertaken in last 2 years. Small boats visit (picnics, sunbathing, exploring and swimming.) "Lack of access regulates over use." "No plans for use expansion." "Building is to be removed!!" written in pencil on the document.

No Compliance Reports between 1991 and 2004

- **2004 Compliance Report IX**
  - This report contained a history of the events since 1991 (See Appendix A: Chronology for details).
  - It explained that the Wood Island Preservation Group (WIPG) failed to implement their proposed development of the site and that the organization was no longer in existence.
  - The report also explained that there was no funding in the town's 2004-2005 budget for any improvements of the island.

- **2006 Biennial Compliance Report X**
  - This report stated the town was pursuing moving preservation efforts forward on Wood Island.
  - The American Lighthouse Foundation (ALF) viewed the building but did not enter it on June 30, 2006. The building was described as in a greatly deteriorated state.

- **2008 Biennial Compliance Report XI**
  - By visual inspection, the seawall and roof need repairs.
  - The town council rescinded the Wood Island Preservation Group's (WIPG) designation to restore the station due to its inactivity.
  - A proposal has been made to develop a cost-effective plan to preserve Wood Island Station and the seawall including several options listed in the following section.

These reports represent Kittery's recreational development of the Wood Island site since 1973.

The Wood Island site has become overgrown and its structures have continually deteriorated from the effects of weather, vandals, wildlife and time. Efforts have been made periodically to reverse these effects; however, budget constraints have often prevented any significant progress.

C. Past Concepts and Proposals

The following is a list of the major alternatives considered for Wood Island by the Town of Kittery since the site was deeded by the Federal Government in 1973. (6)

- Joint agreement with the University of New Hampshire (UNH) to use the island for outdoor classrooms and research. 1973
  - ⇒ No action recorded.

- Keep the island in natural state. (US DOI: non-compliant) 1975
  - ⇒ Proactive Program of Utilization written to comply with U.S. DOI order.

- Raze Wood Island Station by controlled burning. 1975
  - ⇒ Denied permission by U.S. DOI and Kittery Town Council.

- Improve the building. 1975
  - ⇒ No action recorded.

- A survival program. 1973-78
  - ⇒ No action recorded.

- A sailing program. 1977
  - ⇒ No action recorded.

- A point of historical interest. 1977
  - ⇒ No action recorded.

- Block windows with materials painted black. 1978
  - ⇒ No action recorded.

- Leave the building on the island, clean and board up all entrances, provide limited access to the tower for sightseeing visitors, research island history and post informational sign. 1978
  - ⇒ No action recorded.

- Enter into a cooperative agreement with a school to rehabilitate the station over 5 to 7 years to ultimately create a youth conference center while maintaining recreational access. 1980
  - ⇒ Negotiations ended in stalemate.

- Continuation of existing use: minimal recreation development. 1984
  - ⇒ Presumed successful.

- Development of facilities for the study of marine biology and climatology. 1984
  ⇒ No action recorded.

- Development of restaurant and hotel facilities. 1984
  ⇒ No action recorded.
    - Ninety-one Wood Island area residents petitioned against any development and/or expenditure of town funds for Wood Island. (1984)

- Education facility like R.A.M.P at UNH, Voc.-Tech, or other schools. 1985
  ⇒ No action recorded.

- Bed and breakfast/commercial development for private sector. 1985
  ⇒ No action recorded.

- Take down building and use as recreation facility. 1985
  ⇒ No action recorded.

- Leave as is until further development can be organized. 1985
  ⇒ Presumed successful.

- No expansion, remove the building. 1991
  ⇒ No action recorded.

- Construction of commercial duty pier with float system. 1994
  ⇒ No action recorded.

- Use fundraising to develop a **maritime museum** on the island. 1999
  The plan included:

    1. A restored Station to contain a museum
    2. Dock facilities
    3. USLSS reenactment
    4. Food cabana/café
    5. Granite amphitheatre

  Access to the island via a walkway was to be provided from Fort Foster as part of Phase Two of the project. The plan was initiated by the Wood Island Preservation Group (WIPG) which was given designation by the Town of Kittery to preserve Wood Island (for full history of WIPG read 1992-2006 in Appendix A: Chronology).

- One known fundraiser held (1992)

- Carolyn Brit of Community Investment Associates (CIA) was contracted by the Wood Island Preservation Group to research funding options for improvements to the island. CIA's final report suggested the town apply for the Community Development Block Grant (CDBG) for $10,000.00. The report also suggested several other grants. The full report can be seen in Appendix C. (1999)

    - ❖ The Town of Kittery filed for and received the CDBG; details are noted in Section D of this report.

- The Boston architectural firm Finegold Alexander and Associates was commissioned to successfully create a development proposal and cost estimate. (See Appendix C) (1999)

    - ❖ The estimate without pedestrian access was $850,000.00.
    - ❖ Services rendered by the firm cost $7,500.00 and were paid using the CDBG and funds from the Kittery Town Council.

- The Kittery Town Council rejected WIPG's 2002 development proposal

    - ❖ An inquiry by Councilor Susan Emery disclosed the following information from Councilor Estes (for the original document see Appendix C):

        - Wood Island is considered a Shoreline Habitat by the Department of Inland Fisheries and Wildlife.
        - According to the Maine Department of Environmental Protection (DEP), the proposed design was not consistent with the Shoreland Zoning requirements.
        - Estes and other Town Council members in the WIPG were suggested to be in a conflict of interest by Councilor Emery.
        - Other evidence suggested the concept was not supported by the citizens of Kittery.

- Install one three Mega Watt wind turbine on the island. 2008
    - ❖ Recently proposed.

- Construct a sheltered marina for small boats behind the Island. 2008
    - ❖ Recently proposed.

- **UNH/Town of Kittery/Appledore Engineering Feasibility Study**. 2008
    - ❖ In progress. Funded by the 2008 Shore and Harbor Technical Assistance Grant. (See Appendix C for the complete document)

D. Past Grant Applications:

The following is the list of grant applications considered by the Town of Kittery as possible funding methods for improvements and developing of Wood Island. (6)

1. Proposed YCETA Grant, did not apply, not received (1978)

2. Proposed Defense Environmental Restoration Program, not received (1991)

3. Awarded FEMA disaster relief, $46,985.00 received. The funds were used to rebuild a 100' section of seawall. (1992)

4. Awarded Community Development Block Grant (CDBG). $5,000.00 received. The funds were used to partially pay for an architectural study by Finegold Alexander and Associates. (2000)

5. Proposed Maine DOT Transportation Enhancement Program Grant, requested $150,000.00, not received. (2004)

6. Proposed Shore and Harbor Technical Assistance Grant, requested $25,000.00, not received. (2005)

7. Awarded Shore and Harbor Technical Assistance Grant. $10,250.00 received. An additional $5,950.00 was matched by the Town of Kittery. The $16,200.00 total is funding the 2008 Feasibility Study. (2008)

E. Other Lifesaving Stations & Developed Sites

Biddeford Coast Guard Station, Biddeford Pool, Maine

Figure 29 Former Biddeford Pool USCG Station (Photo: K. Kozlowski)

Formerly Fletcher's Neck Lifesaving Station, the building is a Duluth-style station built in 1904. It has been completely restored and is now a private residence. The site has been on the National Registry of Historic Places since 1974. (2,7)

According to a local resident, the buildings and property were purchased for $1,000,000.00 approximately seven years ago. Within the last five years, extensive renovations were done to the restore the exterior and modernize the interior living space. The wrap-around porch, two chimneys, the front dormer and widow walk were added to the structure. The boathouse doors (red) are believed to be the refurbished originals.

Figure 30 Former Biddeford Pool USCG Station (Photo: K. Kozlowski)

Wood Island Light Station, Biddeford Poole, Maine

Figure 31 Wood Island Light Station (Courtesy of Virtual Earth)

This restored and functioning lighthouse facility was established in 1808 and is currently licensed to the Friends of Wood Island Lighthouse by the USCG. The group is a chapter of the American Lighthouse Foundation and runs tours of the site beginning in June. The tours last 90 minutes and showcase the island on which the lighthouse is built as well as the surrounding seascape. There is no fee for the tour;

however, a $10.00 donation per person is suggested. The 17-18 passenger vessel departs three times per week at specified hours during the season. Special group trips can be arranged depending on availability of the crew and vessel. (3)

Wallis Sands State Park, Rye, New Hampshire

Figure 32 Wallis Sands State Beach (Courtesy of Virtual Earth)

The site is a former Lifesaving Station location built in 1890. It currently functions as a beach facility offering restrooms, changing areas, a food concession, lifeguards and parking. Admission to the park is currently $15 per vehicle. Van admission is $20.00. (4,7)

Resource List

Places and Organizations

ALF	American Lighthouse Foundation
CIA	Community Investment Associates
GSA	United States General Services Administration
Jerry's Point Station	Jerry's Point Lifesaving Station
LPS	Lighthouse Preservation Society
Town/Kittery	Town of Kittery, Maine
UNH	University of New Hampshire
USCG	United States Coast Guard
U.S. DOI	United States Department of the Interior
USLSS	United States Lifesaving Service
U.S. Navy	United States Department of the Navy
USRCS	United States Revenue Cutter Service
Wood Island/island	U-Me-449A, Wood Island, Kittery, ME
Wood Island Station	Wood Island Coast Guard Station, Wood Island Lifesaving Station, Old Portsmouth Harbor Lifeboat Station
WIPG	Wood Island Preservation Group

***Individuals* (In Order of Chronological Appearance)**

Kennedy	John R. Kennedy, former Kittery Town Manager
Senator Smith	Margaret Chase Smith, former US Senator
Pyle	Ronald M. Pyle, General Services Administration
Watt	James G. Watt, former Director, US Department of the Interior
Jones	Robert W. Jones, former Regional Director, Property Management & Disposal Services, General Services Administration
McEachern	Duncan A. McEachern, Attorney representing the Town of Kittery
Shellenberger	Edwin Shellenberger, former Director, US Department of the Interior
Harvell	Linda Harvell, State of Maine Coastal Island Registration
Alexander	James T. Alexander, New England resident
Weber	William J. Weber, Jr., former Director of Parks and Recreation, Town of Kittery
Kochis	Paul F. Kochis, US Department of the Interior
Stokes	John C. Stokes, US Department of the Interior
Lockman	Scot Lockman, Director of Parks and Recreation, Town of Kittery
Puffer	Loring Puffer, Rivendell School, Loudon, NH
Andrews	Raymond W. Andrews, US Department of the Interior
Rossiter	Richard E Rossiter, Public Works Commissioner, Town of Kittery
Whalen	Gregory W. Whalen, Real Estate Developer

Strahl	Eric A. Strahl, former Kittery Town Manager
Belleville	Presumed former Town of Kittery Official
Gift	Robert F. Gift, former Chief Environmental and Recreation Assistance Division, Dept. of the Interior
McCarthy	Philip O. McCarthy, former Town of Kittery Town Manager
Estes	Dennis S. Estes, Founder of WIPG and former Kittery Town Council Chair
Constance Small	Daughter of a former lighthouse keeper
Hyland	James W Hyland III, President/Founder Lighthouse Preservation Society
Lund	Joanne T. Lund (Town Clerk)
Colman	Frederick W. Colman, Director of Real Estate, Department of the US Army
Britt	Carolyn Britt, AICP (Community Investment Associates)
Shapiro	Aaron Shapiro (Program Manager, Maine Dept. of Economic and Community Development)
Emery	Susan Emery, Kittery Town Council
LaForest	Elyse R. LaForest, Program Manager National Park Service, US Department of the Interior
Webb	Webb, former Interim Kittery Town Manager
Jankowski	Peter M. Jankowski, former Kittery Town Manager
Reinauer	Tom Reinauer, Chairman, KACTS Committee
Mitchell	Christi Mitchell, Architectural Historian, Maine Historic Preservation Commission

Goodwin	Dr. Julia Goodwin
Carter	Jonathan Carter, Kittery Town Manager
Harrison	Timothy E. Harrison, President American Lighthouse Foundation
Robinson	George Robinson, National Park Service, US Department of the Interior

Appendix A

Chronology of Historical Events & Correspondences pertaining to Wood Island Site:

Chronology of Historical Events & Correspondences pertaining to Wood Island Site

(1827-1960's)

(Source: National Archives)

23 Feb 1827 Maine State Senate and House of Representatives sign a bill ceding Wood Island to the United States of America. The Bill claims the State will have concurrent jurisdiction of Wood Island.

1869 Some evidence exists that the State of Maine gave title of Wood Island to the Federal Government.

31 Jan 1956 General Services Administration (GSA) Report of Excess Real Property, within stated U.S. Navy reserves the rights to two parcels of land situated on the island after the property has been disposed of. (See Appendix C: Partial Topographic Map)

1 Jun 1956 USCG: Wood Island listed as surplus property and to be auctioned off to bidders by the GSA.

(1970's-2008)

(Source: Kittery Town Clerk)

8 Feb 1971 President Nixon announces the "Legacy of Parks" Program which offers Federal land deemed "excess" as available for parks and recreation use.

25 Sept 1972 A letter from John R. Kennedy (Kittery Town Manager) to US Senator Margaret Chase Smith, Kennedy mentioning Wood Island listed as government surplus, and asking for assistance.

29 Sept 1972 A letter from Senator Smith to Kennedy pledging support for the town's acquisition of Wood Island.

12 Oct 1972 A letter from Ronald M. Pyle (GSA) to Kennedy acknowledging the town's interest in acquiring Wood Island.

6 Oct 1972 A letter from James G. Watt (Dir., U.S. Department of the Interior) to Senator Smith regarding the application process.

20 Oct 1972 A letter from Kennedy to Pyle regarding the application process.

20 Oct 1973 A letter from Kennedy to Robert W. Jones (Regional Director, Property Management & Disposal Services, GSA) requesting to acquire surplus land from USCG.

14 Feb 1973 A letter from Duncan A. McEachern (Attorney) to Kennedy acknowledging the Quitclaim Deed looks OK.

15 Feb 1973 A letter from Kennedy to Edwin Shellenberger (Dir., U.S. DOI) stating the Kittery Town Council approved the deed and asked if educational uses could be added to deed if lawful.

27 Feb 1973 Quitclaim Deed – Wood Island, 1.25 Acres, from the Federal Government to the Town of Kittery. Conditions:

- Used and maintained for recreational purposes involving the general public.
- Erect a permanent sign stating recreational facility.
- Not sold or leased.
- Submit ten biennial reports with further reports as per request and maintain a Program of Utilization for the property.
- Reversion of deed if land required for national defense.
- Covenants, etc.
- Breach.

1 Mar 1973 A letter from Shellenberger to Kennedy stating UNH could be categorized as "public" and use the island for outdoor classrooms and research.

Kennedy requested clarification prior to this letter because Public Law 91-485 prohibited the use of public parks and recreation lands solely for educational purposes.

2 Mar 1973 A letter from Shellenberger to Kennedy stating that the deed is official.

4 Feb 1975 A letter from Shellenberger to Kennedy asking Kennedy to submit the Biennial Report.

18 Feb 1975 A letter from Kennedy to Shellenberger containing the first **Biennial Compliance Report I**. The report contains the following information: an estimated 100-150 people picnic on Wood Island during the summer. No improvements, no plans for development. "The town prefers to keep island in natural state."

21 Mar 1975 A letter from Shellenberger to Kennedy stating the town's non-compliance according to 1973-1975 Program of Utilization, and warned of reversionary proceedings to repossess

the property. Kennedy requested to cooperate for good outcome. The U.S. DOI may request further reports following the tenth report.

5 Jun 1975 A letter from Shellenberger to Kennedy stating the Biennial Report was late.

11 Jun 1975 A letter from Kennedy to Shellenberger stating the building is beyond repair. He wrote the birds inhabiting the building caused a health hazard and requested to destroy it by controlled burning.

23 Jul 1975 A letter from Shellenberger to Kennedy in response to June 11, 1975 request to raze Wood Island Station, after concurring with Frank A. Beard, a State of Maine historical preservationist, the U.S. DOI concurred with the Town of Kittery's proposal to improve building.

23 Apr 1976 A letter from Kennedy to Ms. Linda Harvell (Coastal Island Registration, State of Maine) enclosing payment and registration for Ram Island and Wood Island.

20 Jul 1977 A letter from James T. Alexander to Kittery Council to acquire and restore property for personal use.

26 Jul 1977 A letter from Kennedy in reply to James T. Alexander stating that Wood Island cannot be sold or used for non-recreational activities.

2 Sept 1977 A letter from William J. Weber, Jr. (Director Parks and Recreation, Town of Kittery) containing a brief **Biennial Compliance Report II** with ideas for Wood Island development. The ideas included: a survival program, a sailing program and/or a point of historic interest. Weber suggested exploring historic preservation or outdoor recreation grants for funding of building restoration.

21 Jul 1978 A letter from Kennedy to Paul F. Kochis (U.S. DOI) regarding his visit and inspection of Wood Island. Kennedy agreed with the suggestion to block windows and paint them black. Signs were replaced, a group of four was camping on the site for the past week, Parks and Recreation used the island in its sailing program, and benches were to be installed on the island.

18 Sept 1978 A letter from John C. Stokes (U.S. DOI) to Kennedy following an on-site inspection by Paul F. Kochis (U.S. DOI), Town of Kittery was found to be in non-compliance with the deed and the Program of Utilization; a revised Program of Utilization was requested.

19 Sept 1978 A letter from Scot Lockman (Dir., Parks and Recreation, Town of Kittery) to Stokes containing a revised Program of Utilization: leave the building on the island, using YCETA grant: clean inside and board up all entrances, limited access to tower only- sightseeing for visitors, using employed youth research island history and post sign with it, incorporate info into Fort Foster brochure, increased usage noted, next spring (1979) picnic tables and grills to be placed. Survival outdoor program (proposed fall 1973) to be considered.

Oct 1979 A cooperative agreement (lease) between the Town of Kittery and Rivendell School written, not signed.

Jan 1980 A letter from Lockman to the Town of Council stating Kittery to enter into concession agreement with a third party, the Rivendell School, of Loudon, NH, to restore the Wood Island station and continue recreation access at no cost to the town. The proposed plan was stated as being within the conditions of the deed. The school proposed a five to seven year rehabilitation plan to create a youth services conference center.

2 Jan 1980 A letter from Duncan A. McEachern (Town Attorney) to Kennedy stating that a lease should be written and signed with the Rivendell School.

3 Jan 1980 MEMO from Kennedy to the Town Council, cc. Lockman, stating that any Lease required an adoption by ordinance.

16 Jan 1980 A letter from Kennedy to Rivendell School, Council: no action taken, invited to next meeting to discuss school objectives and funding.

12 Feb 1980 A letter from Kennedy to Loring Puffer (Rivendell School, Loudon, NH) stating Council voted to indefinitely postpone any action.

2 Feb 1981 **Biennial Compliance Report III**

11 Jan 1983 A letter from Raymond W. Andrews (U.S. DOI) to Lockman reminding the Biennial report is due 2/27/83, an outline enclosed to assist. It stated that little had been accomplished of the town's original Program of Utilization and nothing materialized from the joint University research plan. A revised plan and plans for existing buildings and access was requested.

14 Feb 1983 A letter from Richard E. Rossiter (Public Works Commissioner) to Andrews (U.S. DOI) containing the **Biennial Compliance Report IV**. The report stated: no major

improvements, no development, only litter control, signs erected, no visitor use facilities provided, no accurate financial records kept, 250 persons per year (95% family, with few campers), docking needed. Personal Note: Personal picnic trips to island "only public island one can visit and have no hesitation or reservation as to their propriety in landing a boat." Wood Island is a public controlled landmark.

24 Feb 1983 A letter from Andrews to Rossiter acknowledging the town acting through parks and public works in joint effort. Andrews asked for a supplement progress report. No revised program of utilization required unless the town deviated from the original plan.

20 Aug 1984 A letter from Gregory W. Whalen (GW Whalen & Co. Real Estate Development) to the Town Council proposing the "revitalization of Wood Island by encouraging a partnership with the private sector." Whalen suggested a direct sale or long term lease at meeting.

27 Aug 1984 Kittery Town Council Meeting Minutes: G.W. Whalen spoke about Wood Island building deserving preservation and National Historic registration status.

5 Sept 1984 A letter from Eric A. Strahl (Kittery Town Manager) to Andrews asking for the definition of "public park and public recreation uses" referred to in the quitclaim deed. Strahl referred to the "Wood Island Study Committee" and offered several possible Wood Island uses including:

- Continuation of existing use; consisting of minimal recreation development.
- Development of facilities for study of marine biology and climatology.
- Development of restaurant and hotel facilities.

6 Sept 1984 A letter from Rossiter (Dir., Public Works, Town of Kittery) to Andrews containing the **Biennial Compliance Report V**. The report stated the following: no major improvements, no developments, only litter control had been continued.
This report is exactly the same as the 14 Feb 1983 Biennial Compliance Report IV.

10 Sept 1984 Town of Kittery Council Meeting Minutes: 91 signatures of Wood Island area residents on petition against any development and/or expenditure of town funds for Wood Island.

11 Oct 1984 A letter from Andrews to Strahl, containing a follow-up to correspondence of 5 Sept 1984 "Permitted recreation range of possible uses is broad." Past Program of Utilization should be revised to best serve town's recreation needs. A more active program would serve greater numbers of the general public. Signs should be posted per deed requirement, access should be reasonably improved. Schedule of development requested in next report.

Conditions stated:

- Any business replacing the structure must spend all revenue for maintenance/operation of Wood Island or another Grantee site.
- Concessionaire agreements can be arranged subject to Dept of the Interior approval. Present historic importance and safety aspects of the site and structures thereon should be taken into account.

8 Nov 1984 A letter from Gregory W. Whalen to Strahl regarding the appearance with associate Jesse Ware at the 27 Aug 1984 council meeting for preliminary discussion on availability and status of Wood Island.

26 Nov 1984 Town of Kittery Council Meeting Minutes, Town Manager's Report: encouraged Kittery Town Council to determine what should be done with Wood Island.

Jan 1985 MEMO "Wood Island Study Committee" (Belleville) to Town of Kittery Council
"Ideas presented to Council":

- Educational facility like R.A.M.P at UNH, Voc.-Tech.
- Commerical Development for private sector.
- Take down building and use as recreation facility.
- Leave as is until such time as further development can be organized.

24 Jan 1985 Letter Andrews to Strahl reminding the Biennial Report is Due 27 Feb 1985, a suggested outline enclosed.

16 May 1985 A letter from Gift to Strahl stating no Biennial Report received to date.

24 May 1985 A letter from Strahl to Gift explaining Biennial Report would be submitted within 20 days.

18 Jun 1985 A letter from Strahl to Andrews containing the
Biennial Compliance Report VI prepared jointly by Strahl and Rossiter.
Improvements/Maintenance/Development: "Limited visitor use facilities being provided": picnic tables installed (cemented in), grills purchased (TB installed), work started for small boat landing system, second hand boat motor purchased, window door sizes kept, wire mesh purchased & installed to keep pigeons out, regular trips for litter control, signs stolen, no public transport available.
Financial Statement: 1982-1983: $223.60, 1983-1984: $471.56, Total: $695.16
No admission charges, no donations or voluntary services.

Public Use: Estimated 250 persons per year, 95% families, occasional overnight campers, visitors regional (75% from ME and NH), island not overused, water access is poor, cove 300 yards away, area sea conditions: often very choppy & rough, safety cancels a work day at times, vandalism builds over years, poison ivy on over 50% of island: limits potential for passive recreation uses.
Future Program: Work toward building restoration, better access – a dock, remove poison ivy, improve picnic facilities.
Long term uses suggested (Town Council):

- Continued use as passive recreation, possible improvements to stop deterioration of station.
- Use for educational purpose (scientific research) pursued with UNH or UNE.
- Bed & breakfast facility with joint public/private sector financing – to attract travelers and tourists – town would continue with passive recreation. No third party currently involved.

17 Oct 1986 Window measurements taken of Wood Island Station. Most windows vary in size.

1987 The Lighthouse Preservation Society in cooperation with the Maine State Historic Preservation Commission, obtained a private grant to research all of Maine's life saving stations to place them on the National Register of Historic Places.

Maine Historic Preservation Commission decided the site could not be considered because of the deterioration of the building. See 9 Jul 1992 Light house Digest, and 12 Aug 1992 letter.

9 May 1989 **Biennial Compliance Report VII**

9 Jan 1991 A letter from Robert F. Gift (Chief Environmental and Recreation Assistance Division, U.S. DOI) to Strahl reminding Biennial Report due 27 Feb 1991. Also asked if any funds generated on site were spent only for developing/maintaining/operating recreation activities on Wood Island or other Grantee lands.

8 Feb 1991 A letter from Rossiter to Robert Gift (U.S. DOI) containing the **Biennial Compliance Report VIII**. The report contains the following information:
Work done: Preserved structural integrity of the building, reduce/repair libelous hazards, clean grounds and beach areas.
Budget: $1,200.00 for routine maintenance.
Plan: No major projects undertaken in last 2 years. Small boats visit (picnics, sunbathing, exploring and swimming.) "Lack of access regulates over use." "No plans for use expansion" "Building is to be removed!!" written in pencil on document.

Oct 1991 Flood damage to island infrastructure.

11 Dec 1991 FEMA inspection of flood damage to seawall on Wood Island.

13 Dec 1991 MEMO Rossiter to Philip O. McCarthy (Kittery Town Manager) stating Rossiter submitted application for FEMA reimbursement for flood damage. He noted that "FEMA will not consider damage to ramp and building" and that FEMA would leave the file open until boat access was arranged. The following notes were included:

- US Army Corps of Engineers contacted about possible restoration under the Defense Environmental Restoration Program- must be inspected.
- New Roof 7 Years ago.
- Vandals undo or destroy efforts to preserve structural integrity, Pigeons pile dropping on upper floors.
- Over past couple years materials/maintenance of building cut $ limited to trash/beach cleaning.
- Questions:
  A. If it is restored, will we afford to maintain it?
  B. Anyone have qualifying use for the building?
  C. Should the building be demolished and replaced?
  D. Should the seawall be rebuilt?
  E. Should the Town pursue deck construction for better access?

17 Dec 1991 MEMO McCarthy to Town Council including above 13 Dec 1991 Memo and asking for position on Wood Island Station.

14 Jan 1992 FEMA Damage Survey Report,
Part 1 – Project Description: Wave action destroyed 100' x 1.5' x 6' wall. Restore seawall to pre-flood design.
Part 2 – Estimated Cost of Proposed Work: Reinforced Concrete: 33.3 cubic yards, cost $11,655.00. Hazard mitigation: use of reinforcement.

14 Jan 1992 A letter from Dennis S. Estes (Founder of WIPG and Kittery Town Council Chair) to McCarthy requesting to meet and discuss fate of Wood Island Station.

12 Feb 1992 A letter from McCarthy to Estes agreeing to meet and discuss Wood Island Station.

13 Feb 1992 A letter from Constance Small to McCarthy describing Wood Island as an icon of seacoast.

14 Feb, 1992 A letter from McCarthy to Constance Small replying to her letter concerning proposed destruction of Wood Island Station.

18 Mar 1992 A letter from State of Maine Emergency Management Agency to McCarthy containing the approval for authorization of disaster assistance for flood damage Oct 1991. Fed.: $46,985.00, State: $15,059.00. Mandatory completion dates: emergency work: May 7th, 1992, permanent work: May 7th, 1993.

23 Mar 1992 A letter from Estes to Kittery Town Council regarding the formation of a committee to study alternatives to current use of Wood Island (outline form of organization included).

1 Jul 1992 A letter from James W Hyland III (President/Founder Lighthouse Preservation Society) to McCarthy, assistance offered for Wood Island Station restoration.

12 Aug 1992 A letter from Maine Historic Preservation Commission to Estes.

9 Jul 1992 Article in Lighthouse Digest – "…Town Threatens to Tear Down…"

6 Nov 1992 A letter from Estes to Kittery Town Council stating the Wood Island Preservation Group (WIPG) sponsoring a fundraiser on 17 November 1992 to raise money to explore alternatives for restoration. Intention: seek grant approvals over the winter and start work in the spring. Stated structure secure for winter months due to group's work.

1993 Estes obtained donated materials and boarded up Wood Island Station and cleaned up the area.

12 Apr 1993 A letter from Estes to Kittery Town Council stating that the Wood Island Preservation Group (WIPG) requested non-profit IRS status. Estes requested *official 13 April 1993 letter* and the creation of special bank account for restoration funds.

13 Apr 1993 A letter from Joanne T. Lund (Town Clerk) to Estes acknowledging the town has appointed the Wood Island Preservation Group as preservers of Wood Island on behalf of the Town of Kittery. Unanimous vote 6/0.

15 Dec 1993 Town of Kittery official statement: seawall at Wood Island completed to town's satisfaction and confirms to specifications. Project completed by Shotcrete Industries. Cost $40,720.00, paid with FEMA Disaster relief funds.

1994 Estes, WIPG, cleaned up the island in the spring and fall and continued to make periodic visits to remove material from the island.

7 June 1994 Pickering Marine Corp. estimate for 80' x 12' pier with ramp and float system included. $70,000.00 to $80,000.00. Commercial duty pier (capable of supporting fork lift & backhoe simultaneously).

1995 Estes, WIPG, cleaned up the island in the spring and fall and continued to make periodic visits to remove material from the island.

3 Aug 1995 ABB-ES/Army Corps of Engineering Site Investigation of Wood Island.

15 Aug 1995 61 Lobster Traps with fisherman's names found on Wood Island with an additional +/- 100 without names. Removal planned but details unknown.

1996 Dennis Estes cleaned up the island in the spring and fall and continued to make periodic visits to remove material from the island.

21 Feb 1996 U.S. Department of Defense determined site is eligible for Defense Environmental Restoration Program, Col. Earle C. Richardson, US Army Corps of Engineers.

24 Jun 1996 Frederick W. Colman, Director of Real Estate, Dept. of the Army, determined "no remediation project is appropriate at the site."

1997 Estes, WIPG, cleaned up the island in the spring and fall and continued to make periodic visits to remove material from the island with church groups volunteering.

5 Oct 1998 Kittery Town Council Public Hearing regarding Community Development Block Grant (CDBG) grant to fund Community Resources and News Assessment.

10 Nov 1998 A letter from Carolyn Britt, AICP (Community Investment Associates) to Estes.
Plan offered:

- Identify possible sources of funding.
- Plan content of applications.
- Submit applications for funding.

Britt suggests "reasonable fundraising goal 7k to 10k" for Wood Island restoration.
Service fee: $85/hr with estimated 24 to 100 hours required.

3 Dec 1998 A letter from Estes to Town Council mentioning WIPG goals:

- Locate funding sources for preservation and resurrection of the structures.
- Build a docking facility to allow better public access.

7 Dec 1998 Councilor Estes (represented WIPG and the citizens of Kittery) and Jay Hyland III (Lighthouse Preservation Society) spoke about "poor physical state" and "need for immediate remedy to this problem, for the benefit of the community" at a Kittery Town Council Meeting about Wood Island Station.

14 Dec 1998 Kittery Town Council Meeting Minutes: Vote to authorize $2,500.00 to defray study cost of alternatives for lifesaving station. Voted in favor (4/1).

14 Dec 1998 Portsmouth Herald, Article: "Kittery Council Ponders Wood Island Station"

15 Dec 1998 Portsmouth Herald, Article: "Building Funding Passes"

27 Dec 1998 Portsmouth Herald, Editorial: "Kudos to Kittery for Island Plan"

1999 WIPG cleaned the island several times.

25 Jan 1999 Community Investment Associates Summary "Preserving the Wood Island Lifeboat Station" listing the following reuse options:

- Remain vacant with stabilization and façade improvement
- Museum, lifesaving station or other displays
- Permanent educational/research facility/laboratory
- Educational facility for day/short term programs

CIA Summary suggests applying for a $10,000.00 Community Development Block Grant to fund a feasibility study of alternatives.

4 Mar 1999 Foster's Daily Democrat, Article: "Life Station in Need of Rescue"

8 Mar 1999 Kittery Town Council approved CDBG Application filing.

10 Mar 1999 Community Investment Associates: Complete Funding Research Project including options and possible funding sources.

10 Mar 1999 McCarthy files an application for the Community Planning Block Grant (CDBG).

10 Mar 1999 A letter from James Hyland to McCarthy asking for $2,500.00 from the town as agreed for CIA services.

29 Mar 1999 A letter from James Hyland (Lighthouse Preservation Society) to McCarthy containing the following information. LPS to add $900.00 to the town's $2,500.00 to cover the cost of the research done by Community Investment Associates. The LPS will cover the cost of an architectural study and cost estimate by Finegold Alexander & Associates ($7,500.00).

21 Apr 1999 A letter from Aaron Shapiro (Program Manager, Maine Dept. of Economic and Community Development) to McCarthy stating that Phase I of the CDBG has been approved and an invitation to Phase II but only offering $5,000.00 due to project eligibility.

13 Sept 1999 Kittery Town Council Meeting Minutes: Estes: Met with architect in Boston few weeks ago. Project to cost $743,000.00 without pedestrian access.

27 Sept 1999 Kittery Town Council Meeting Minutes: Status Report: Dennis Estes: intent to use island as maritime and lighthouse museum and education center. Spoke of presentation of storyboards for the public to "see positive impact." Lisa Bonci from Bonci Design to do marketing for the project. Fundraising project of $743,000.00 to include everything but phase two (pedestrian walkway). Proposed a public meeting to present plan at viewing area at Fort Foster.

5 Oct 1999 WIPG proposed website and informational brochure.

13 Oct 1999 Town of Kittery Council meeting minutes: town accepted Community Development Block Grant (CDBG) award of $5,000.00 for Wood Island. Vote in favor (6/0).

2000 WIPG became incorporated and cleaned the island several times.

16 Feb 2000 Community Development Block Grant awarded in the amount of $5,000.00.

28 Mar 2000 Invoice from Lighthouse Preservation Society (LPS) to Town of Kittery for services in the amount of $10,000.00.

2001 WIPG island cleanup effort.

2002 WIPG removed old materials and sealed building with new lumber.

28 Oct 2002 Wood Island Preservation Group presentation of Finegold Alexander and Associates design to Kittery Town Council, including concept and estimates. Project estimated to cost $850,000.00.

7 Nov 2002 Councilor Susan Emery's written questions to Dennis Estes on Wood Island concerning the WIPG proposed redevelopment of Wood Island.

21 Nov 2002 A letter from Estes (WIPG) to Kittery Town Council including a "final request for acknowledgment of our project." And stated "we want to move on, now."

2003 WIPG cleaned the island.

2004 Some added materials removed by wind. +/- 100 lobster traps scattered on the island.

18 Feb 2004 A letter from Program Manager Elyse R. LaForest (National Park Service, U.S. DOI) to Webb (Interim Town Manager) stating no compliance report since 8 Feb 1991.

14 Jun 2004 A letter from Webb to LaForest containing the **Compliance Report IX** covering the period from 1991 to 2004. Webb described what had happened since the last Compliance Report of 8 Feb 1991. Webb explained that the plan of Estes did not make it to implementation and that the WIPG is no longer in existence. Webb stated no money in the town's 2004-2005 budget for improvements.

15 Jul 2004 A letter from LaForest to Peter M. Jankowski (Town Manager) thanking him for the Compliance Report of 14 Jun, 2004 and stating the next was due 14 Jun 2006. LaForest wrote "Every effort should be made to maintain Wood Island as a safe and accessible body of land open to the public for recreational purposes."

28 Jul 2004 A letter from Jankowski to Maine DOT acknowledging that the Kittery Town Council voted to allow Rossiter to submit the application for the Transportation Enhancement Program for the restoration of Wood Island.

28 Jul 2004 A letter from Jankowski to Maine DOT including the Transportation Enhancement Application for funding. The application stated that Phase One involved a critically needed access dock to serve an estimated 25 people per day for 120 days of the year, 3000 people per year. Total project cost $1,000,000.00, funds requested $150,000.00 (for Pickering Marine), local share (30%) $30,000.00.

29 Jul 2004 A letter from Tom Reinauer (Chairman, KACTS Committee) to MDOT endorsing the town's application for the transportation grant.

20 Aug 2004 Letter Estes to Christi Mitchell (Architectural Historian, Maine Historic Preservation Commission) including an application to place Wood Island Station on National Historic Register.

Jul 2005 Dr. Julia Goodwin visits Wood Island and takes extensive photographs of the interior and exterior of the station. These photos are later enclosed in an application to the Maine Historic Preservation Commission for National Registry status of the station.

25 Aug 2005 An email from Dr. Goodwin to Jonathan Carter (Town Manager) about funding for a new roof.

6 Sept 2005 A letter from Rossiter to the Maine Coastal Program, State Planning Office containing the Shore and Harbor Technical Assistance Grant for "finished engineered plans, documents, and rail facilities for Wood Island Life Boat Station restoration project." Requested $25,000.00, Local cost share/match: $30,000.00, Total Project Cost: $1,000,000.00. Museum project administered by Kittery Public Works Dept. and monitored by WIPG.

13 Sept 2005 A letter from Christi A. Mitchell (Coordinator, National Registry of Historic Places). After viewing Dr. Goodwin's photographs of the station she wrote "we do not feel that it possesses these exceptional qualities of historic integrity which are required by the criteria established for nomination to the National Register." The property has "…lost a considerable amount of original materials…key to conveying the historic significance of the structure."

1 Dec 2005 A letter from Carter to Timothy E. Harrison, President American Lighthouse Foundation proposing a joint rehabilitation of the Wood Island Station.

5 June 2006 A letter from Carter to LaForest (National Park Service, U.S. DOI), Introductory.

23 Jan 2006 MEMO: Conversation with Elyse LaForest, Program manager (U.S. DOI) and George Robinson (U.S. DOI) with Jon Carter regarding U.S. DOI concern with Town's progress over last 30 years. Carter explained the following:

- The potential Memo of understanding with ALF to work jointly with Whaleback light and Wood Island Station (ALF contracted by USCG).
- Attempt to bring back the WIPG preservation committee from 1993.

- Establish a contact with Kittery Trading Post Outdoor Academy "Outward Bound Facility" School.
- Report would be forthcoming in June.

28 Feb 2006 A letter from Carter to Estes describing the cooperative effort between the town and the American Lighthouse Foundation on Wood Island. Carter asked Estes to confirm WIPG no longer actively pursuing Wood Island restoration.

10 Jul 2006 A letter from Carter to Robinson containing the **Biennial Compliance Report X.** The report contained the following information. Carter stated the status and momentum in moving preservation efforts forward on Wood Island. The ALF viewed the building but did not enter on June 30, 2006. The building was described as in a greatly deteriorated state.

19 Aug 2006 A letter from Dr. Goodwin to Mitchell, endorsing Estes request for National Registry status of Wood Island Station

1 Dec 2007 Portland Press Herald/York Edition, Article: "Is Harbor Icon Worth Saving?"

28 Feb 2008 Shore and Harbor Technical Assistance Grant Application.
Objective: Develop a course of action and implementation plan to assure Wood Island Lifesaving Station will remain standing for future generations.

2 Apr 2008 Grant Awarded in the amount of $10,250.00, with a local match of $5,950.00 for a total of $16,200.00.

26 Jun 2008 A letter from Carter to George Robinson (National Parks Service, U.S. DOI) containing the **Biennial Compliance Report XI**. The report contains the following information:

- By visual inspection, the seawall and roof need repairs.
- The town council rescinded WIPG designation to restore the station due to its inactivity.
- Proposed to develop a cost-effective plan to preserve Wood Island Station and seawall including the following options:
    A. Feasibility study to restore the building.
    B. Determine cost to remove the station and replace it with a scale version.
    C. Determine cost to remove the station and replace it with a steel or durable material skeleton in outline of original lifesaving station.
    D. Develop decision matrix to determine the appropriate cause of action by voters and town council to move forward with one option (to include timetable and possible funding sources).

E. Prepare a public awareness initiative to present options and alternatives to insure public input in any proposal brought forward.

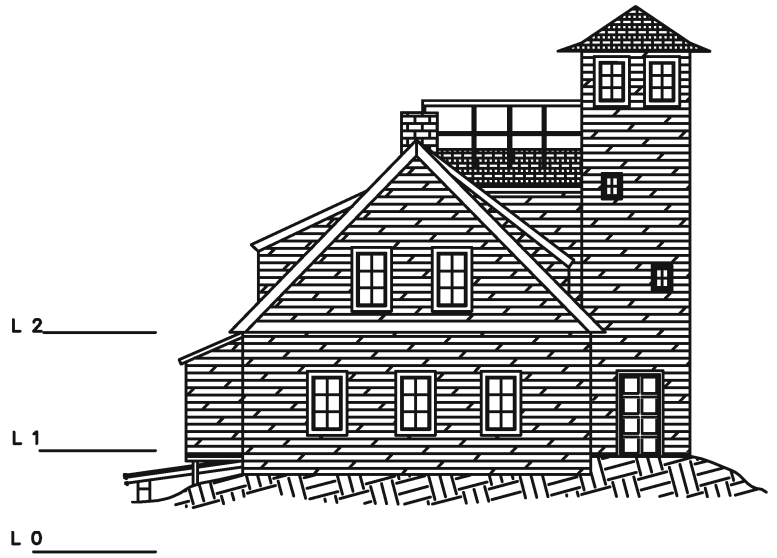
8 Jul 2008 A letter from LaForest to Carter requesting the next compliance report no later than 1 Jul 2009, the last date of all items identified in the project schedule presented in the last compliance report.

Appendix B

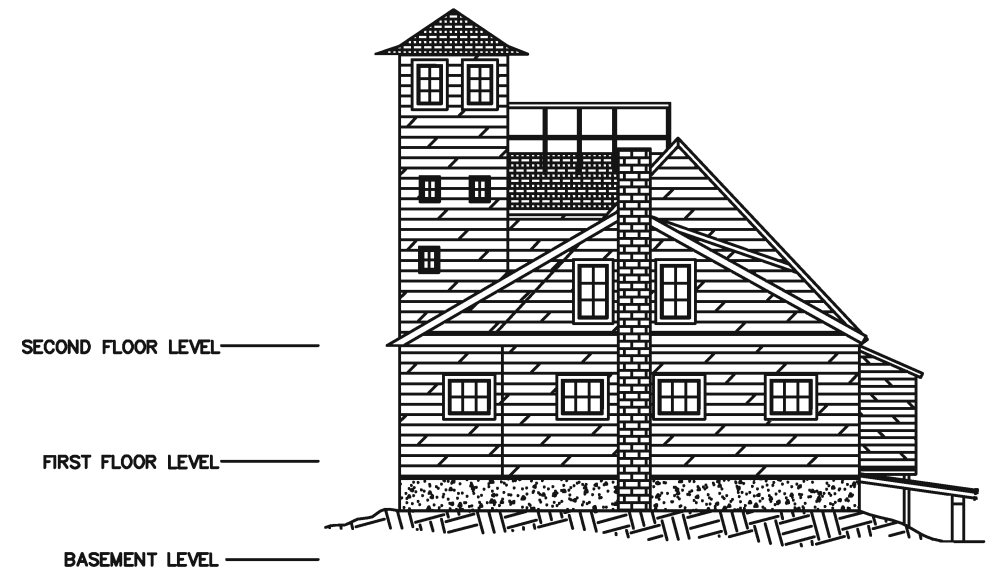
Building Drawings & Damage Summaries:

1. **Approx. Original Elevations circa 1944**
2. **Approx. Original Plans Circa 1944**
3. **Initial Assessment: Exterior Damage**
4. **Initial Assessment: Interior Damage**

SOUTH ELEVATION



WEST ELEVATION



EAST ELEVATION

NORTH ELEVATION

Reference Plan:
These plans are partly based on the Wood Island Maritime Museum plans by Finegold Alexander & Associates Inc., Boston, MA

APPROX. ORIGINAL ELEVATIONS CIRCA 1944

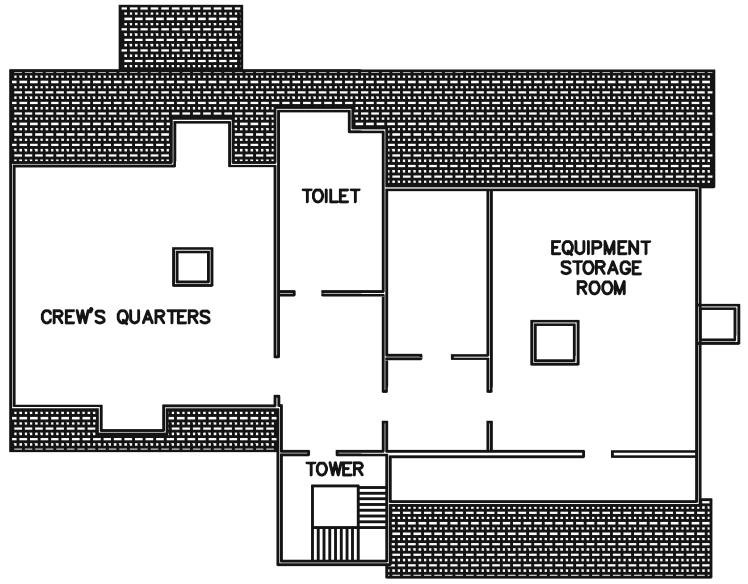
No.	Appd	Date
REVISIONS		
REVISIONS		

DATE: AUGUST 22, 2008
SCALE: 1:16
DESIGNED BY:
DRAWN BY: KEK
APPROVED BY:
PROJECT NO: 2362
FILE NO: 2362 EXISTSTRT
FILE NO: 2362 EXISTSTRT

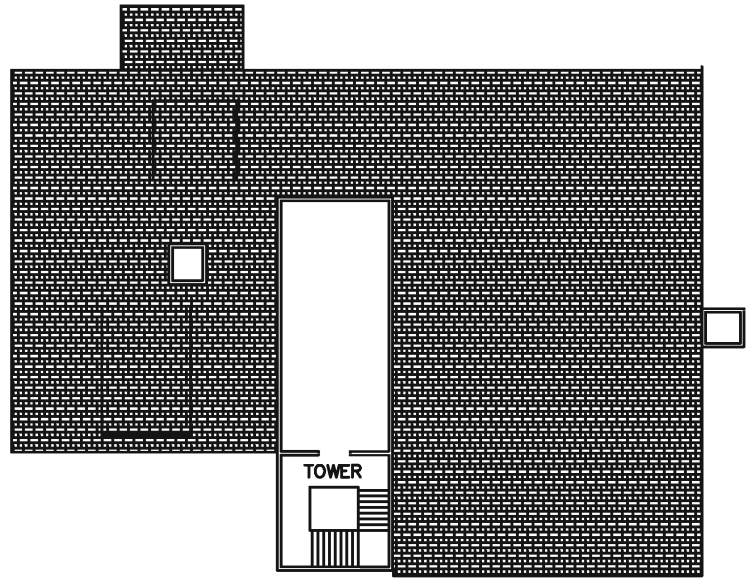
WOOD ISLAND MARITIME MUSEUM
FEASIBILITY STUDY
TOWN OF KITTERY
KITTERY, MAINE

APPLEDORE ENGINEERING, INC.
177 CORPORATE DRIVE
PORTSMOUTH, NEW HAMPSHIRE 03801
(603) 433-8818
aei@appledoreeng.com
(603) 433-8818
aei@appledoreeng.com

SECOND FLOOR PLAN

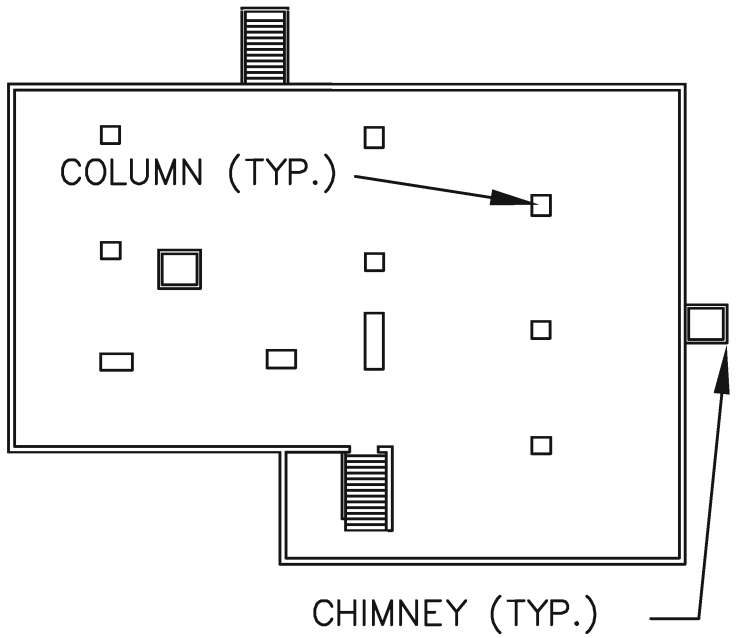


THIRD FLOOR PLAN

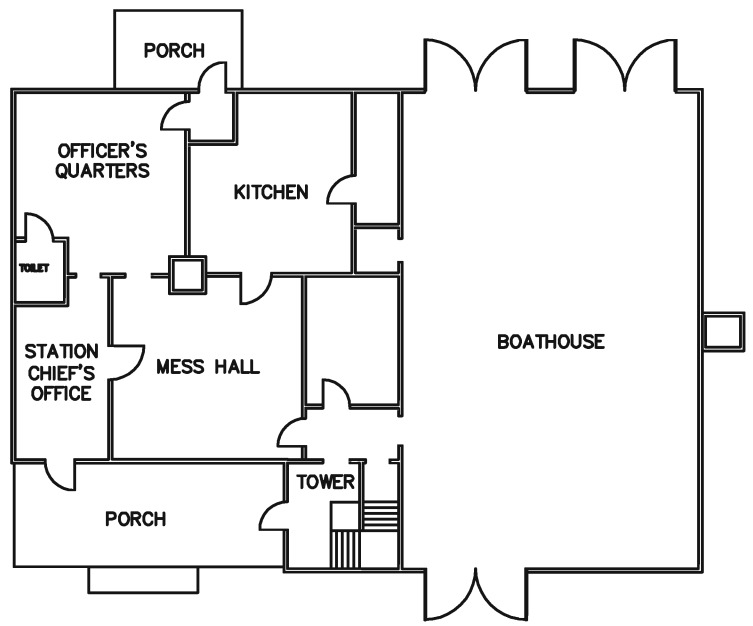


FOURTH FLOOR PLAN

BASEMENT PLAN



FIRST FLOOR PLAN



Reference Plan:
These plans are partly based on the Wood Island Maritime Museum plans by Finegold Alexander & Associates Inc., Boston, MA

APPROX. ORIGINAL PLANS CIRCA 1944

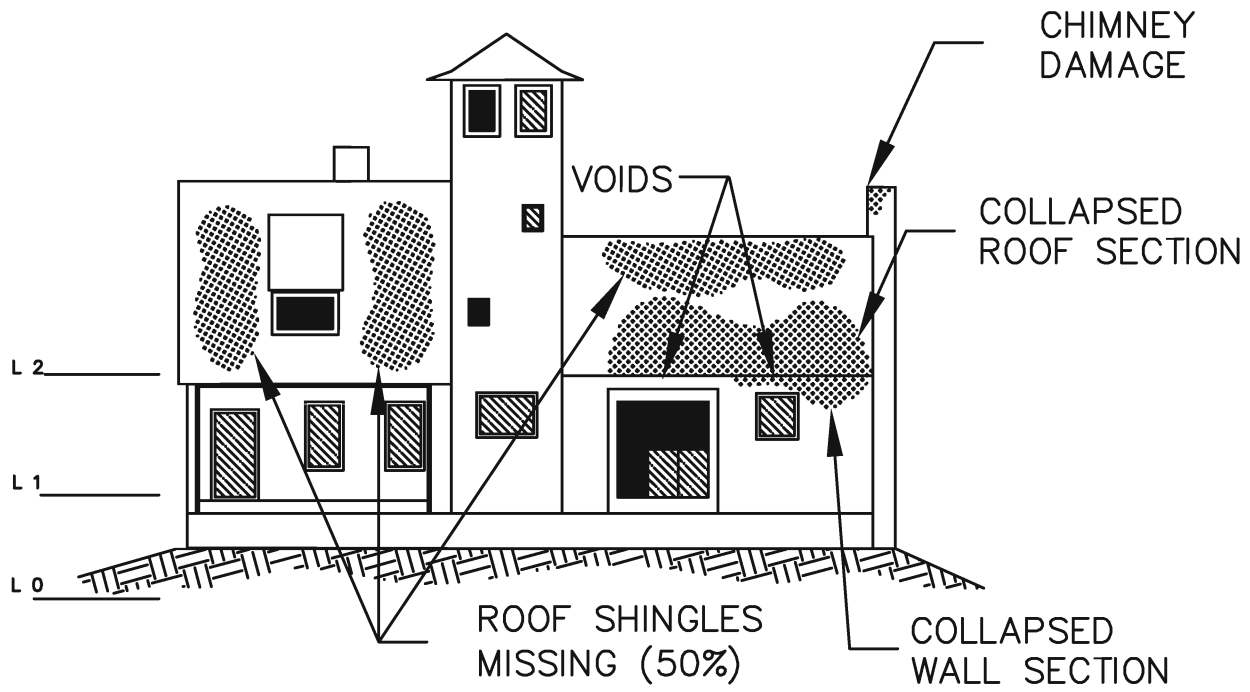
No.	Appd	Date
No.	Appd	Date

REVISIONS

DATE: AUGUST 22, 2008
SCALE: 1:16
DESIGNED BY:
DRAWN BY: KEK
APPROVED BY:
PROJECT NO: 2362
PROJECT NO: 2362
FILE NO: 2362 EXISTSTRT

WOOD ISLAND FEASIBILITY STUDY TOWN OF KITTERY KITTERY, MAINE

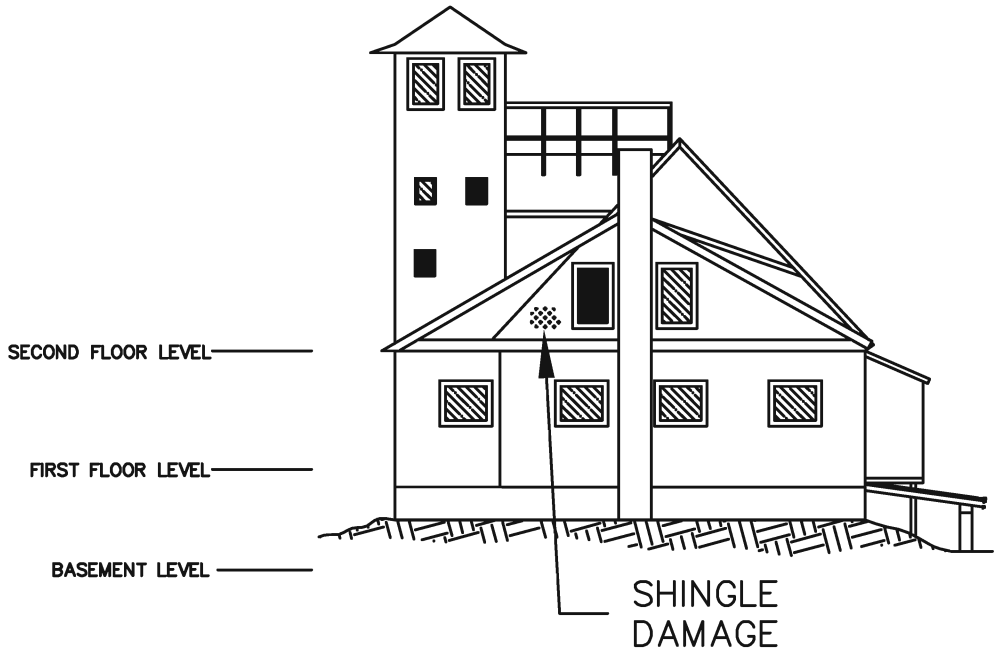
APPLEDORE ENGINEERING
177 CORPORATE DRIVE
PORTSMOUTH, NEW HAMPSHIRE 03801
(603) 433-8818
PORTSMOUTH, NEW HAMPSHIRE 03801
(603) 433-8818
aei@appledoreeng.com



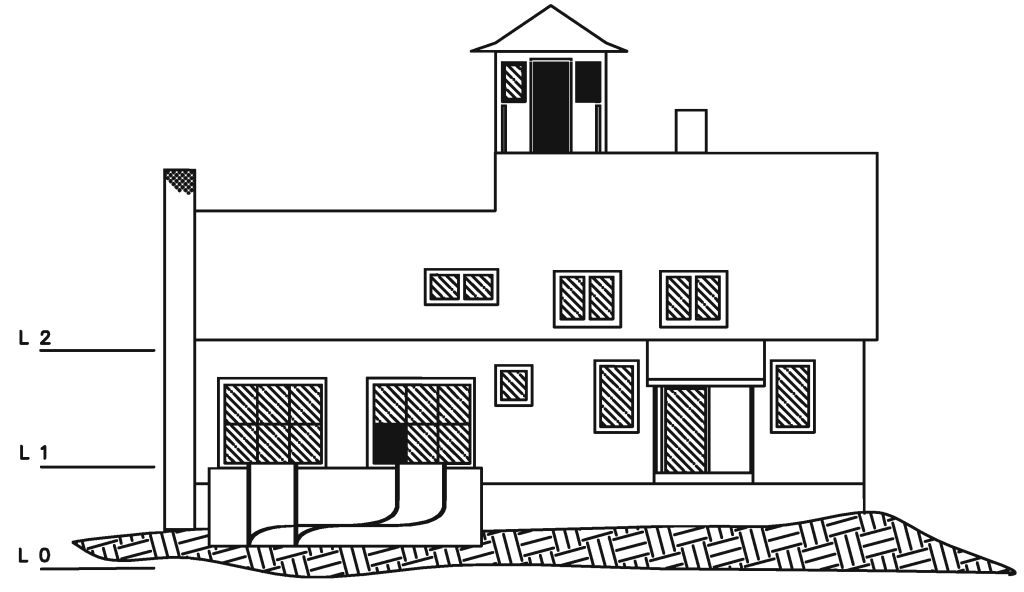
SOUTH ELEVATION

ATLANTIC OCEAN EXPOSURE

WEST ELEVATION



EAST ELEVATION



NORTH ELEVATION

PORTSMOUTH HARBOR EXPOSURE

LEGEND

- EXTERIOR DAMAGE
- WINDOW/DOOR BLOCKING MATERIAL
- OPEN WINDOW/DOOR FRAMES

Reference Plan:

These plans are partly based on the Wood Island Maritime Museum plans by Finegold Alexander & Associates Inc., Boston, MA

INITIAL ASSESSMENT: EXTERIOR DAMAGE

No.	Appd	Date
No.	Appd	Date

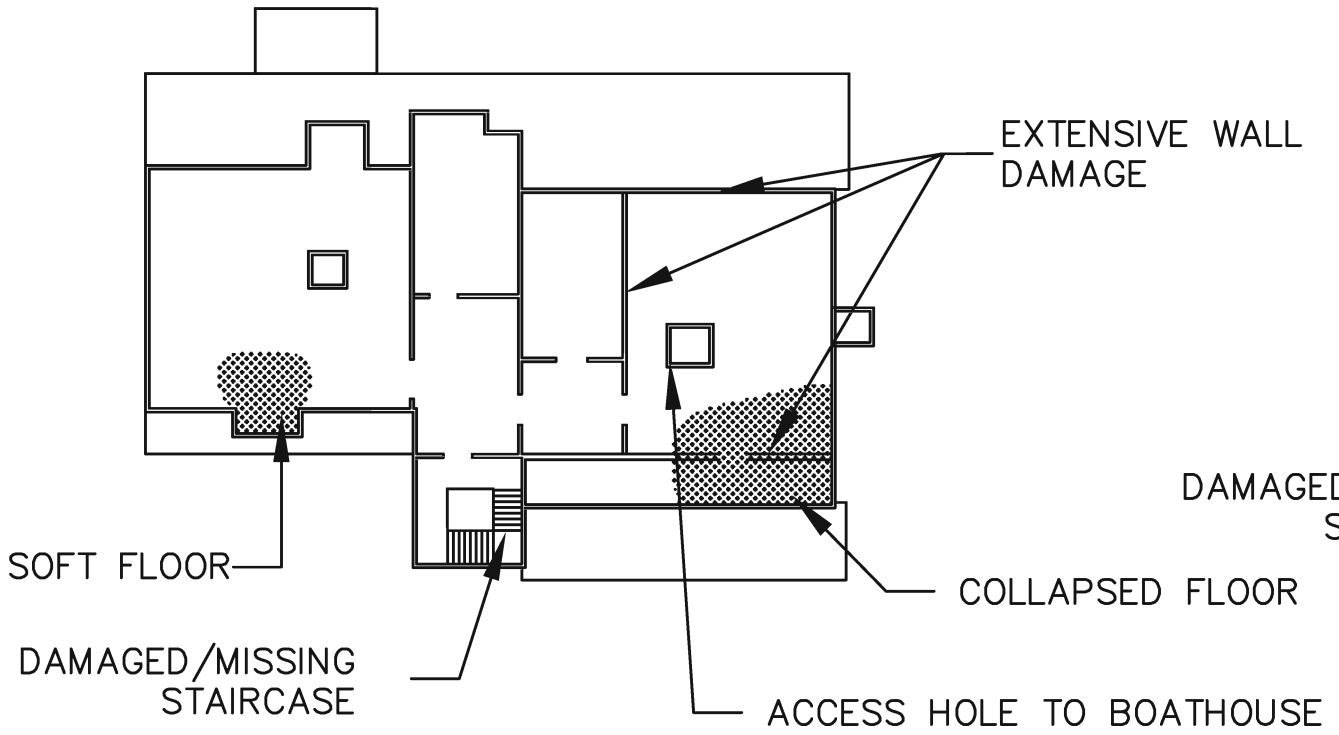
REVISIONS

DATE: AUGUST 22, 2008
SCALE: 1:16
DESIGNED BY:
DRAWN BY: KEK
APPROVED BY:
PROJECT NO: 2362
APPROVED BY:
PROJECT NO: 2362
FILE NO: 2362 EXISTSTRT

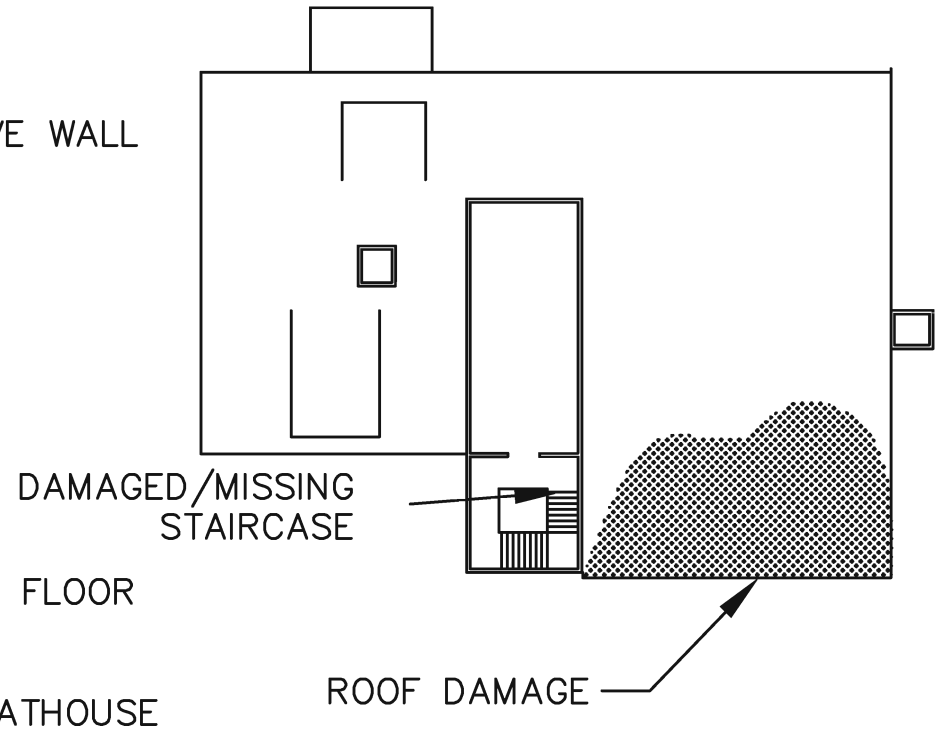
WOOD ISLAND
FEASIBILITY STUDY
TOWN OF KITTERY
KITTERY, MAINE

APPLEDORE ENGINEERING
177 CORPORATE DRIVE
PORTSMOUTH, NEW HAMPSHIRE 03801
(603) 433-8818
PORTSMOUTH, NEW HAMPSHIRE 03801
(603) 433-8818
aei@appledoreeng.com

SECOND FLOOR PLAN



THIRD FLOOR PLAN

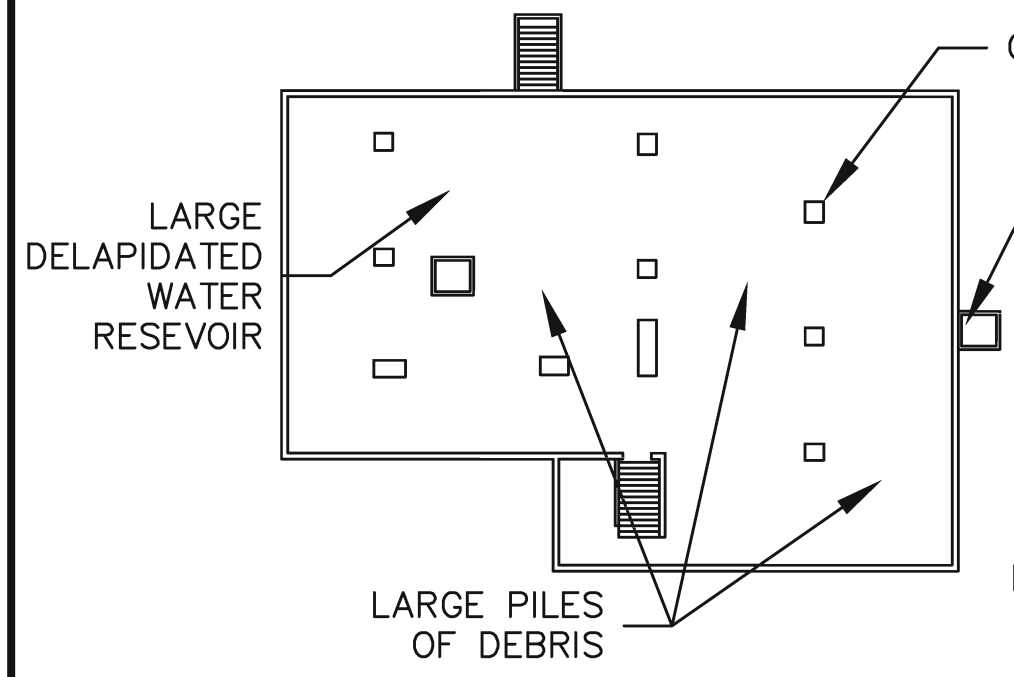


LEGEND

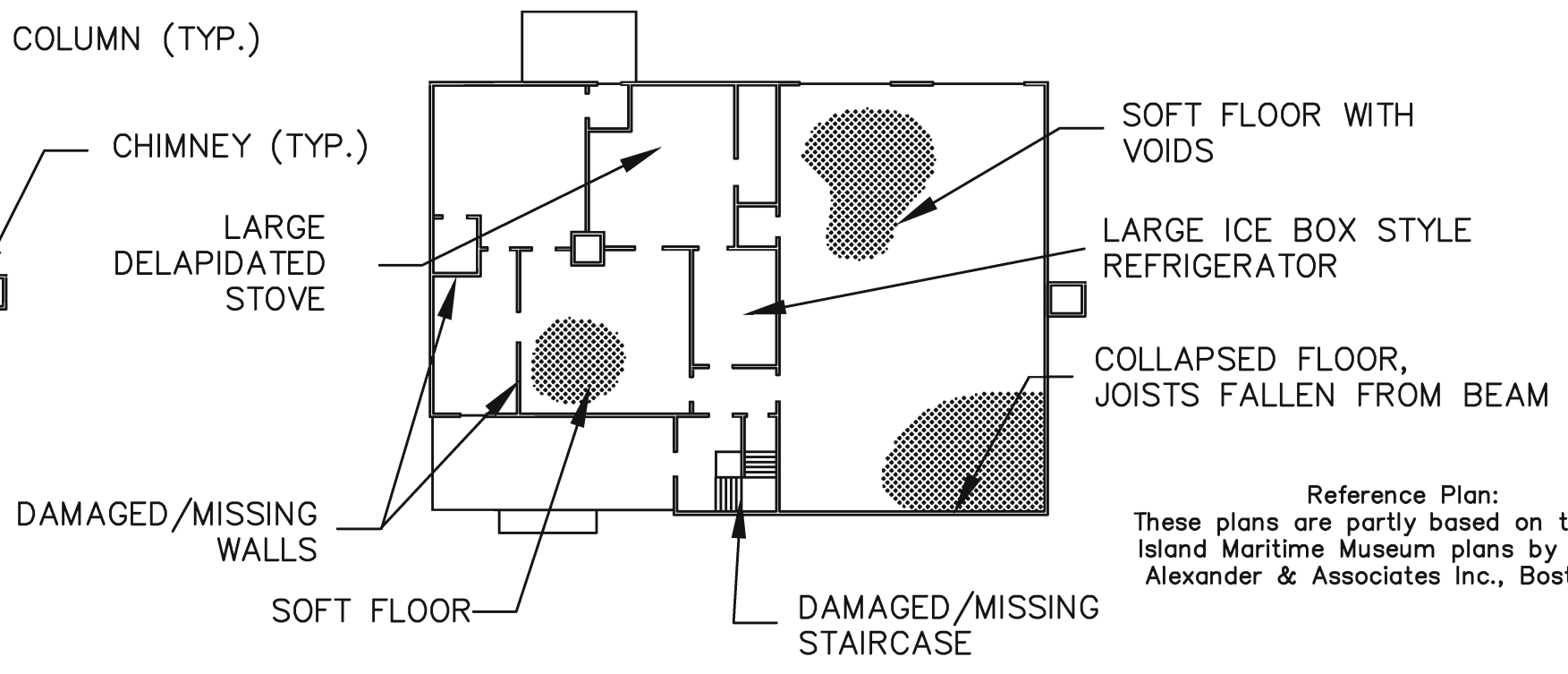
INTERIOR DAMAGE

Notes:
1) Seagull droppings form large piles in all rooms in the building. Most piles are several inches deep.
2) No doors or original windows remain.
3) Asbestos insulation covers pipes in the basement.

BASEMENT PLAN



FIRST FLOOR PLAN



Reference Plan:
These plans are partly based on the Wood Island Maritime Museum plans by Finegold Alexander & Associates Inc., Boston, MA

INITIAL ASSESSMENT: INTERIOR DAMAGE

No.	Appd	Date
No.	Appd	Date

REVISIONS

DATE: AUGUST 22, 2008
SCALE: 1:16
DESIGNED BY: KEK
DRAWN BY:
APPROVED BY:
PROJECT NO: 2362
REVISED DATE:
PROJECT NO: 2362
FILE NO: 2362 EXISTSTRT

WOOD ISLAND
FEASIBILITY STUDY
TOWN OF KITTERY
KITTERY, MAINE
KITTERY, MAINE

APPLEDORE ENGINEERING
177 CORPORATE DRIVE
PORTSMOUTH, NEW HAMPSHIRE 03801
(603) 433-8818
PORTSMOUTH, NEW HAMPSHIRE 03801
(603) 433-8818
aei@appledoreeng.com

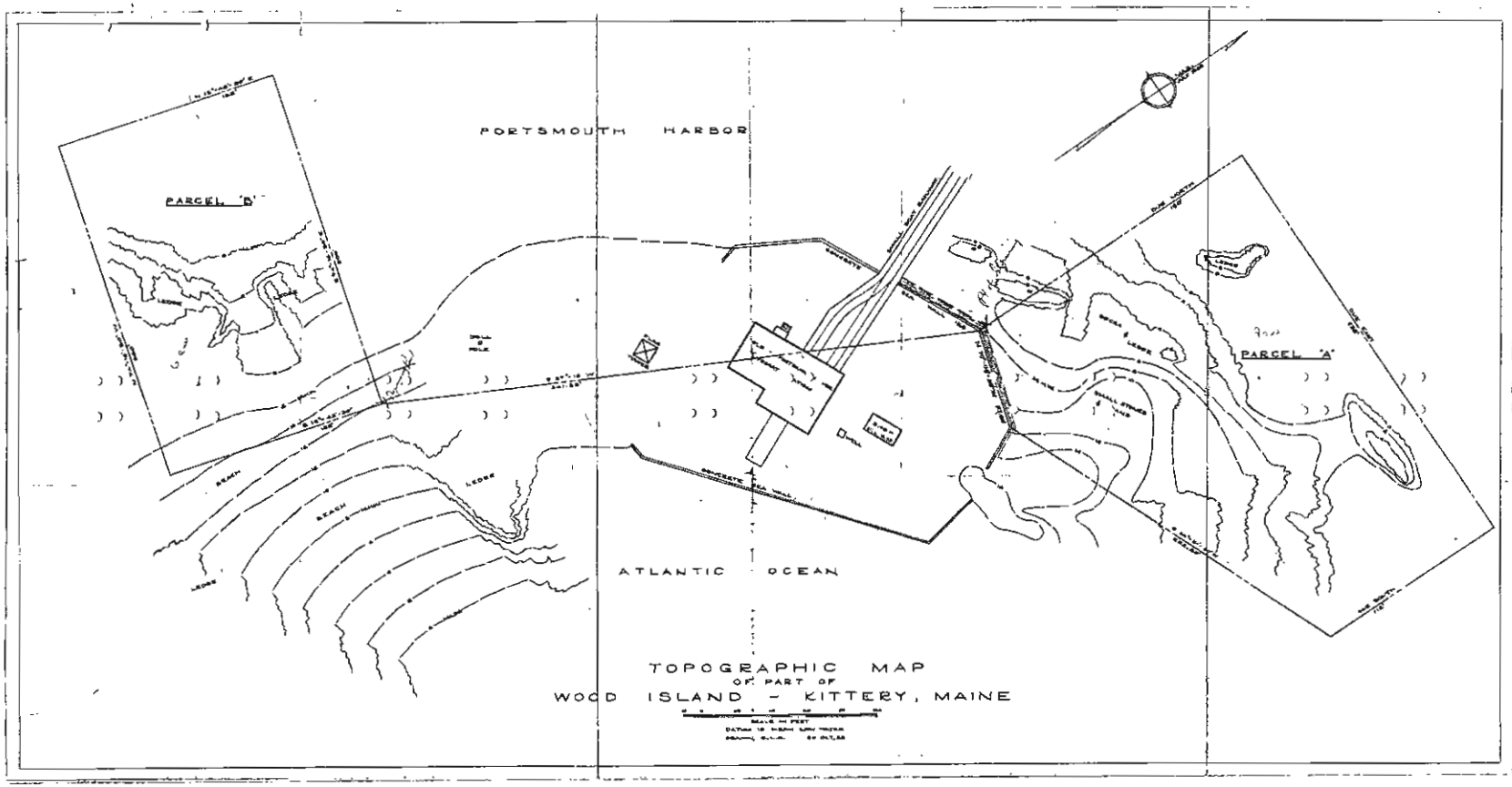
Appendix C

Related Documents:

1. **1955 Partial Topographic Map of Wood Island**
2. **1999 Community Investment Associates Report**
3. **2002 Wood Island Preservation Group Project (WIPG) Proposal**
4. **2002 Questions to Dennis S. Estes regarding the WIPG Project Proposal**
5. **2008 Town of Kittery Shore and Harbor Technical Assistance Grant**

Partial Topographic Map: Wood Island, Kittery, Maine

Shown are Parcels 'A' and 'B' reserved for use by the U.S. Navy in 1955 as part of the Wood Island surplus status proceedings by the General Services Administration (GSA).



This drawing is a reproduction of the original located at NARA-Northeast Region-Boston.

3/4/99

Preserving the Wood Island Lifeboat Station

A Project of the Lighthouse Preservation Society, the Wood Island Preservation Group, and the Town of Kittery, Maine

I. RECOMMENDATIONS

1. Apply for a Community Planning Grant from the Maine Department of Community Development this year, as encouraged by the Department, to undertake basic planning work required for this project.
2. Maintain contact with the Maritime Heritage Program for appropriate, eligible work at the point that applications can be submitted for funding which may be available in the future. This Program currently has no funds, but is seeking other sources. It is well targeted for assisting projects like Wood Island and should be contacted occasionally for funding status.
3. Fundraise from private sources to 1) develop architects plans for emergency repairs, including a condition analysis , 2) implement emergency stabilization of the building, 3) plan and design rehabilitation of the building, and 4) implement the rehabiliation work (perhaps using federal matching funds as noted above)
4. After work is underway on emergency repairs and stabilization, place emphasis for analysis and fundraising on alternative uses and design feasibility.
5. Review the Town of Kittery Harbor Plan prepared in 1990 to update the variety of recommendations which would affect access and improvements to Wood Island. Ensure that these updated recommendations are reflected in current planning efforts. The inclusion of Wood Island preservation in local plans is important to its eligibility for state and federal funding.
6. Participate in encouraging passage of the Maine Communities in the New Century legislation, providing funding for a state program to support preservation of historic properties.
7. Reconsider the Town's decision not to participate in the coastal planning effort through the Southern Maine Regional Planning Commission. Participation could be beneficial to future planning for Wood Island and elsewhere.

II. PROJECT REPORT

A. Project Background

The project being proposed is to provide access to Wood Island, Kittery Point, Maine and the restoration of the facilities on the Island. Wood Island is a 1.25 acre island located near the mouth of the Piscataqua River, and directly adjacent to Whaleback Island with its lighthouse. Wood Island and its lifeboat station was formerly known as the Old Portsmouth Harbor Lifeboat Station, under the administrative jurisdiction of the United States Department of Transportation. The Lifeboat Station remains on the Island. The Island was deeded to the Town of Kittery in 1972 to be maintained for recreation use open to the public.

Wood Island with its Lifeboat Station and nearby Whaleback Lighthouse comprise key elements of the view down the Piscataqua River of the Harbor entrance. It is also a significant element on the landscape visible from other developed recreation sites in the Harbor, including Fort Constitution Park and Fort McCleary. It is of great significance in the maritime and transportation history of the area, playing a key role in lifesaving during shipwrecks and boating accidents.

B. Project Purpose

The purposes of providing access to Wood Island and restoration of the facilities there are to:

1. Provide ready public access to a key island in Portsmouth Harbor. This will provide the small island experience in a quiet setting, with clear views of the activities of boat traffic and wildlife in the mouth of the Harbor.
2. Allow for the restoration and reuse of the historic Lifeboat Station for one of several purposes which are being researched for their desirability and feasibility. Without public access and use of the Island, it is unlikely that this key historic and visual element can be restored.
3. Implement the restoration of the Lifeboat Station and other facilities on the Island as a key enhancement of the maritime corridor of Portsmouth Harbor.

C. Work Items for Research/Evaluation/Implementation for the Wood Island Preservation Project

Reuse Options:

1. Remain vacant, with physical stabilization and facade improvement
4. Museum - life-saving station or other displays
5. Offices - non-profit, public, or private
6. Permanent educational/research facility/laboratory
7. Educational facility for day/short term programs
8. Renovated as a function facility, rented on a daily or overnight basis if feasible

Planning/Feasibility Studies:

1. General reuse planning for multiple purposes
2. Reuse planning for any of the specific uses listed above, including market studies, tourism study, etc.
9. Physical feasibility for renovation/reuse by a particular use or general use
10. Financial planning/feasibility for renovation/reuse by a particular use or general use
11. Physical planning/feasibility of access to Wood Island

Physical Planning/Design/Engineering Studies:

1. Assess improvements required to stabilize the building (including designs and specifications)
2. Assess physical feasibility for access options, including boat and docking requirements, bridge (using either cribs or dock), or cable access (including designs and specifications)
12. Assess improvements required to renovate the building, and construct any other necessary structures, for any individual use (including design and engineering for structural, exterior, and interior improvements)

Construction/Renovation Costs:

1. Funding for construction of any mode of access to Wood Island
2. Funding for renovations, stabilization of the existing building and any additional on-site facilities related to reuse of the site

D. Potential Sources of Funding for the State of Maine For the Planning, Preservation and

Development of Wood Island Life Boat Station

Interviews with a variety of state agencies, private non-profits, federal agencies, and others turned up only several sources of possible funding for any of the several issues for research, evaluation, and implementation of this project. As the project moves along, some other sources of funds, either public or private, may be found, but all elements of possible work activities have been explored at this time.

Work Item: Seven basic areas of Maritime Heritage - 1) preservation planning; 2) documentation of historic maritime properties; 3) protection and stabilization of properties; 4) preservation, restoration, or rehabilitation of properties; 5) reconstruction or reproduction of well-documented properties.
Source of Funds: National Park Service, Department of the Interior, National Maritime Heritage Grants
Special Issues:

- The project must have the potential for reaching a broad audience
- Requires a 1-to-1 match with nonfederal funds
- Either the Town of Kittery or the Lighthouse Preservation Society could apply for funds
- Assistance ranges from $2,500 to $50,000 (Total of $715,607 available in FY 99)

Work Item: General Planning (studies, analysis, data gathering, preparation of plans and maps, identification of actions to implement plans)
Source of Funds: Maine Community Development Block Grant Program - Community Planning Grants
Special Issues:

- Funded with federal Community Development Block Grant Funds
- Must be a national objective - in this case "prevention or alleviation of slums and blight"
- Maximum grant of $10,000
- Communities with previous CDBG grants must show progress in implementation and expenditure of funds

Application Due Date: March 12, 1999, 4:30pm at the Maine Office of Community Development, within the Department of Economic and Community Development

Work Item: Restoration of the Life Boat Station
Source of Funds: Preservation Grants for Historic Properties (now in the form of legislation introduced in the Maine Legislature to be funded at $575,000 of projects statewide)
Special Issues:

- Funds not currently available
- Proponents in Kittery may want to play an active role in seeking passage of this legislation
- Funds are limited to buildings and sites listed in or nominated to the National Register of Historic Places - a plan for restoration would have to be completed and submitted to show that the building will be restored maintaining the integrity of its historic features

Work Item: Restoration of the Life Boat Station, Construction of Transportation Infrastructure to access Wood Island

Source of Funds: Transportation Equity Act (TEA-21), Public Boat Access
Special Issues:

- TEA-21 funds are allocated on an annual basis from the Federal Highway Department to the Maine Department of Transportation.
- This project is in an area of Kittery which would receive funding for any projects directly from the Maine Department of Transportation in Augusta.
- The Maine DOT has just finished review of applications for the next two-year funding round. They will again begin to enter discussions for projects for the next funding round in the late fall of 1999 or early 2000 for applications due in late 2000 for funding to be awarded in early 2001.
- Work items noted above are apparently eligible. The emphasis this year is on funding construction for projects which are already designed. The Town and the Society will have to maintain contact as this project proceeds to determine if there are any changes in project guidelines and if work items in this project remain eligible.
- Bureau of Parks and Recreation has funds available on an ongoing basis for development of boat ramps and associated float systems on a cost-share basis. This may become of interest to this project should other options not prove feasible.

Work Item: Hiring consultants with expertise in architecture and graphic design
Source of Funds: National Trust for Historic Preservation
Special Issues:

- Small grants, ranging from $500 to $5,000
- Applications were due on February 1, 1999 for the current round - they can be contacted in March to see if any funds were not awarded. Applications for the next round of funding are due on October 1, 1999.
- The program requires a 50% match (some can be in-kind match)

E. Government Contacts for Wood Island Preservation/Reuse

Office of Congressman Tom Allen
Contact: Bill Johnson (207) 774-5019

Notes: Congressman Allen and his Chief of Staff, Jackie Potter, offered Mr. Johnson as the appropriate contact for this project as he regularly works with access to federal assistance. Mr. Johnson recommended review of the resources in the Catalogue of Federal Domestic Assistance and contact with Mr. Alden Turner of the Rural Development Program within the USDA. I have reviewed the Catalogue on-line, and found the information on the National Maritime Heritage Grants Program. Mr. Johnson will assist us with that, or other, issues which may exist with the federal government.

National Park Service, Department of the Interior
Contact: Kevin Foster (202) 343-5969

Potential Funding Source: National Maritime Heritage Grants. An estimated $715,607 is available for funding most of the work elements in planning for and restoring the facilities on Wood Island. It apparently will not fund access to Wood Island. The Program requires that the facility be widely accessible. In the absence of existing physical access, the case may need to be made on the basis of the prominent visual access. According to Mr. Foster, this Program currently has no source of funding, but they are actively seeking a source and should be available in the future.

Maine Department of Economic and Community Development

Office of Tourism - (207) 287-5711
Contact - Carolyn Manson

Potential Funding Source - All funds for tourist activities (primarily marketing) at the local level are funded through the regional entity, the Southern Maine Coast Tourism Council. The Town of Kittery does not participate in this organization, so is not eligible for any of these funds. These funds would be relevant if a museum were to be developed at the Wood Island Life Boat station.

Notes - Office produces data on tourist visitors by region of the state. She will provide this information to the project.

Office of Community Development - (207) 287-8485
Contact - Aaron Shapiro, Director

Potential Funding Source - The State of Maine allocates about $150,000 of its annual funds to Community Planning Grants (funding about 15 each year for a maximum of $10,000 grants). These funds can be used for planning activities including studies, analysis, data gathering, preparation of plans and maps, and identification of actions that will implement plans. While the CDBG Program funds a variety of funding areas, this is the only opportunity for this project at this time. Given the emphasis of this program on benefit to low and moderate income residents, and secondarily or alleviating blighting conditions, this is the program for which any elements of this project will likely be most eligible. (See discussion in Section D.)

Notes - Application for CDBG due on March 12. Kittery planner has CDBG experience. A

maximum of $10,000 is available for each planning activity, up to 3 with a tourism focus. Could meet spot blight national objective, would prefer planning activity directly address blighting of bldg., but other planning at site (ie. Impact assessment) could qualify. Planning not very competitive, with 25 applications for 15 funded projects.

State Planning Office (207) 287-3261 (The Coastal Program 287-3261)
Contact: Beth Della Valle

Funds research projects, protection of marine habitat. Research and mapping of vulnerable areas(storms and sea level rise) Provided valuable background information, but local planning efforts are assisted primarily through the Regional Planning Commissions.

Maine Historic Preservation Office - (207) 287-2132
Contact - Kurt Mohney, National Register Coordinator

Potential Funding Source - A bill, entitled "Maine Communities in the New Century", has been introduced in the current legislative session and is designed to rebuild the cultural infrastructure in the state. The bill requests $575,000 for preservation grants for historic properties on a matching basis. This bill is worth tracking for possible sources of future funding for work on the restoration of the building. (See Recommendation 6)

Notes - This Office has reviewed this site and structure as part of a thematic nomination to the National Register for Historic Preservation. Mr. Mohney noted that, given the current loss of integrity, the site may not be eligible for the National Register, and thereby not eligible for funding assistance based on either current listing on the National Register or possible future listing. Bill currently in legislature to fund cultural preservation, development.

State Bureau of Parks and Lands -287-4953
Maine Department of Conservation
#22 State House Station
August, ME 04333
Contact - Mr. Skinner

Potential Funding Source - The Boating Facilities Division uses 1.5% of the Maine tax on gasoline for assisting municipalities with developing public boat launch sites. The Program will develop launch ramps and float systems associated with them, primarily to service trailered boats. Facilities must be cost-shared with the Town (the State may pay up to $150,000 for their share), and must be open to the public. This set-up could be considered for access to Wood Island from Fort Foster. The existence of a state-funded boat launch in Elliot could make this site unattractive to the state for development. Mr. Skinner should be contacted should the Town of Kittery consider a boat ramp as a desirable option.

Maine Department of Transportation - 287-2055
State House Station 16
Augusta, ME 04333
Contact - Al Belz, Jr. (albert.belz@state.me.us)

Potential Funding Source - Dennis Estes of the Wood Island Preservation Group, Jay Hyland of Lighthouse Preservation Society, and Carolyn Britt of Community Investment Associates, met on January 26, 1999 with Al Belz Jr. and John A. Balicki of the Maine Department of Transportation to discuss the eligibility of this project for funding under the TEA-21 Program as an enhancement project. This Program can fund design and construction of categories of enhancement projects which include the Wood Island project. The Department of Transportation will not be considering new applications for another year as they are just concluding analysis and funding for the current two year cycle. We were told to move forward with project activities to determine the appropriate mode of access and to decide that access, and we can return in the winter of 1999/2000 to continue discussions of the eligibility for this project to receive funding.

Southern Maine Regional Planning Commission (207) 324-2952

Contacts - Kate Albert - Transportation
John Kachmar - Beach Planner
Chuck Morgan - Economic Development Planner

Potential Funding Source - the RPC doesn't fund regional plans and tourism development. DOT doing statewide transportation plan for coast to get high speed ferry from Boston to Bar Harbor, with intermediate stops. Big market for high speed ferry. Check with ME DOT regarding other monies associated with this.

Regarding regional coastal issues, the SMRPC asked all coastal towns to participate in regional plans developed with the state level - stakeholder meetings were held in 1997. Many recommendations, including restoration of beaches, etc. Kittery is not participating. Kittery does not have a lot of issues regarding heavy tourist use of its beaches, so the Town is not eligible for some coastal resources. The program provides technical and financial assistance. The SMRPC has a grant from SPA, matched by share from towns - for beach management. Mr. McCarthy participated in the original stakeholders discussion group. SMRPC understood that Kittery was not that interested in the process. The Town risks giving up input in regional plan by not participating in regional process.

Island Institute - (207) 594-9209
Rockland, ME

Contact: Hilary Smith

Notes: Has worked on the Maine Lights effort, transfer of ownership of lighthouses.They primarily work with island residential communities. Hilary offered to check regarding what is available through the Institute and get back to me.

Southern Maine Coast Tourism Association 985-1766
207 Brown St.
Kennebunk, ME 04043

Contact - Greg Burke, Coordinator

Notes - Kittery is not a member and thereby not eligible for the state grant funds which are funneled through this office. (See Notes under the Maine Office of Tourism) The $10,000 of state funds which are available through this Tourism Association are for marketing activities - not development - and require a 50/50 match.

Gateway to Maine Chamber of Commerce (207) 384-3338
Contact- Doug Porter

Notes - We discussed possible assistance to the Wood Island project, the existence of other waterfront historic properties requiring boat access, and the existence of tour boats in Portsmouth Harbor other than the ferries to Isle of Shoals. Mr. Porter noted that there are no sources of funds to assist this project, and no smaller tour boats working in the Harbor that might add a stop at Wood Island to their itinerary.

WOOD ISLAND PRESERVATION GROUP INC.
P.O. BOX 265
KITTERY, ME 03904

PHONE AND FAX:
207-439-2603
WWW.WOODISLAND.ORG

October 28, 2002

Dear Town Council Members,

It is with great pleasure that we introduce you to our project for the restoration of the historic Wood Island Life Saving Station, and the island on which it sits.

The Wood Island Life Saving Station [see attached photo], located at the entrance to Portsmouth Harbor, lies just a few hundred yards off the coast of Kittery's Fort Foster Park. The station, built in 1908 and commissioned for service in 1909, is but one of hundreds of stations that once dotted both the east and west coasts of the United States, as well as the shore areas of the Great Lakes. A good number of these stations alone were located along the rugged coast of Maine, to help insure the safety of the many vessels that plied the coast in trade. Not only were commercial ships constantly under the watchful eyes of the lifesaving surfmen, but pleasure boaters took assurances that they too could rely on the assistance of these men and their rescue boats.

The history of the Life Saving Service was as romantic and symbolic to Maine coastal life as were the great schooners that once plied these waters in trade. Today, most of the stations have either been torn down, or renovated into private residences. We at Wood Island Preservation want to change that direction and move forward with the preservation of a part of history that played such an important role in the development of our town and neighboring coastal communities. Ships and boats lost in the night, grounded on the ledges, short on fuel or caught in some god-awful storm all relied on the men of the Life Saving Service for assistance. Today, boaters and ocean going vessels alike call on the new 'life saving service'...the United States Coast Guard.

The Town of Kittery, oldest of all incorporated towns in the State of Maine, is the epitome of coastal Maine. The great Piscataqua River, the watery line that divides the States of Maine and New Hampshire, has served as the "road" for development of the towns and cities on both her banks. The ships that carried cargo from port to port all had to traverse the fierce currents of the Piscataqua. All of this after having sailed the rugged coasts of both states. To these sailors, Wood Island Life Saving Station served as a symbol of sanctuary and safety.

The goal of the Wood Island Preservation Group will be explained in detail through this

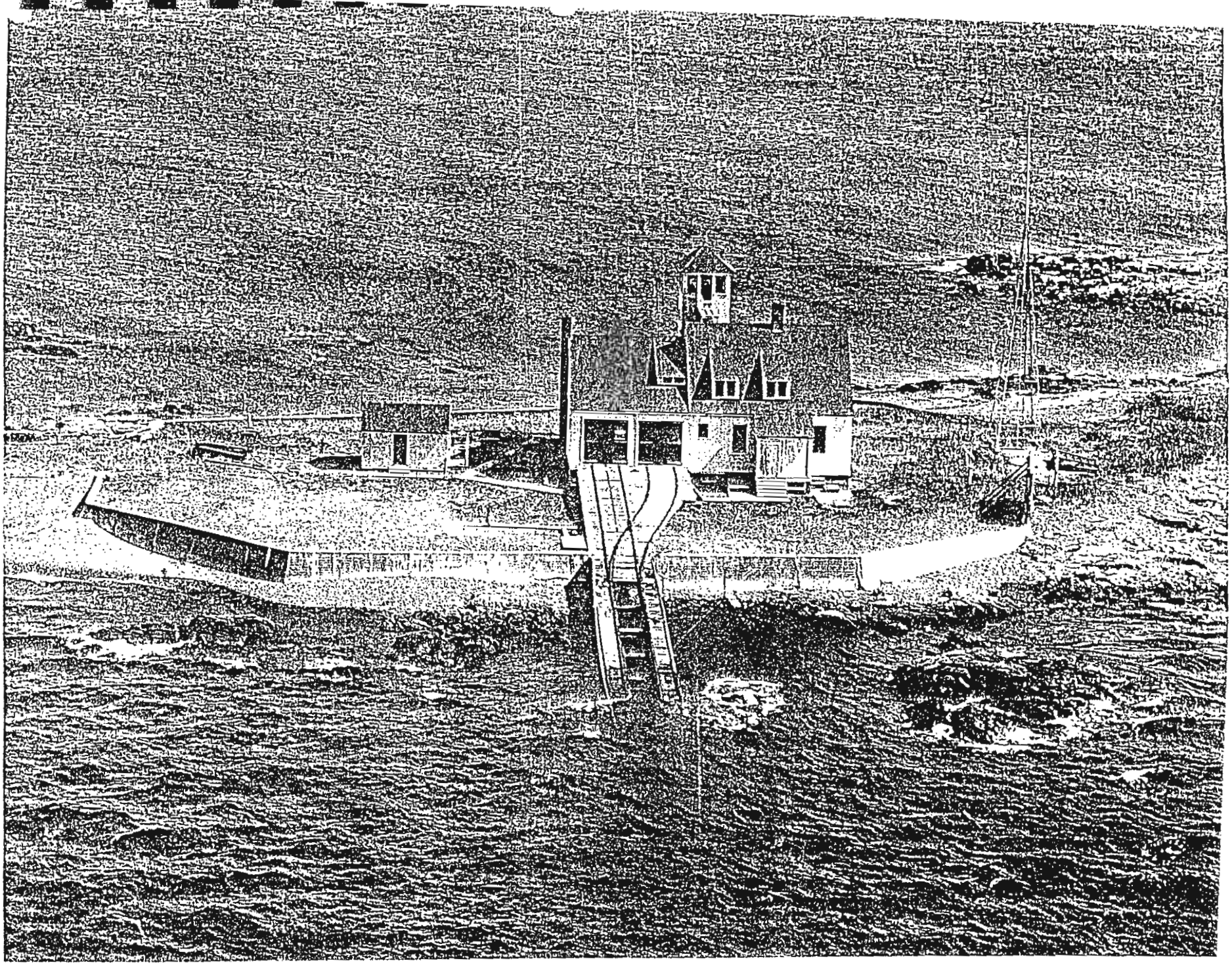
P.O. BOX 265
KITTERY, ME 03904

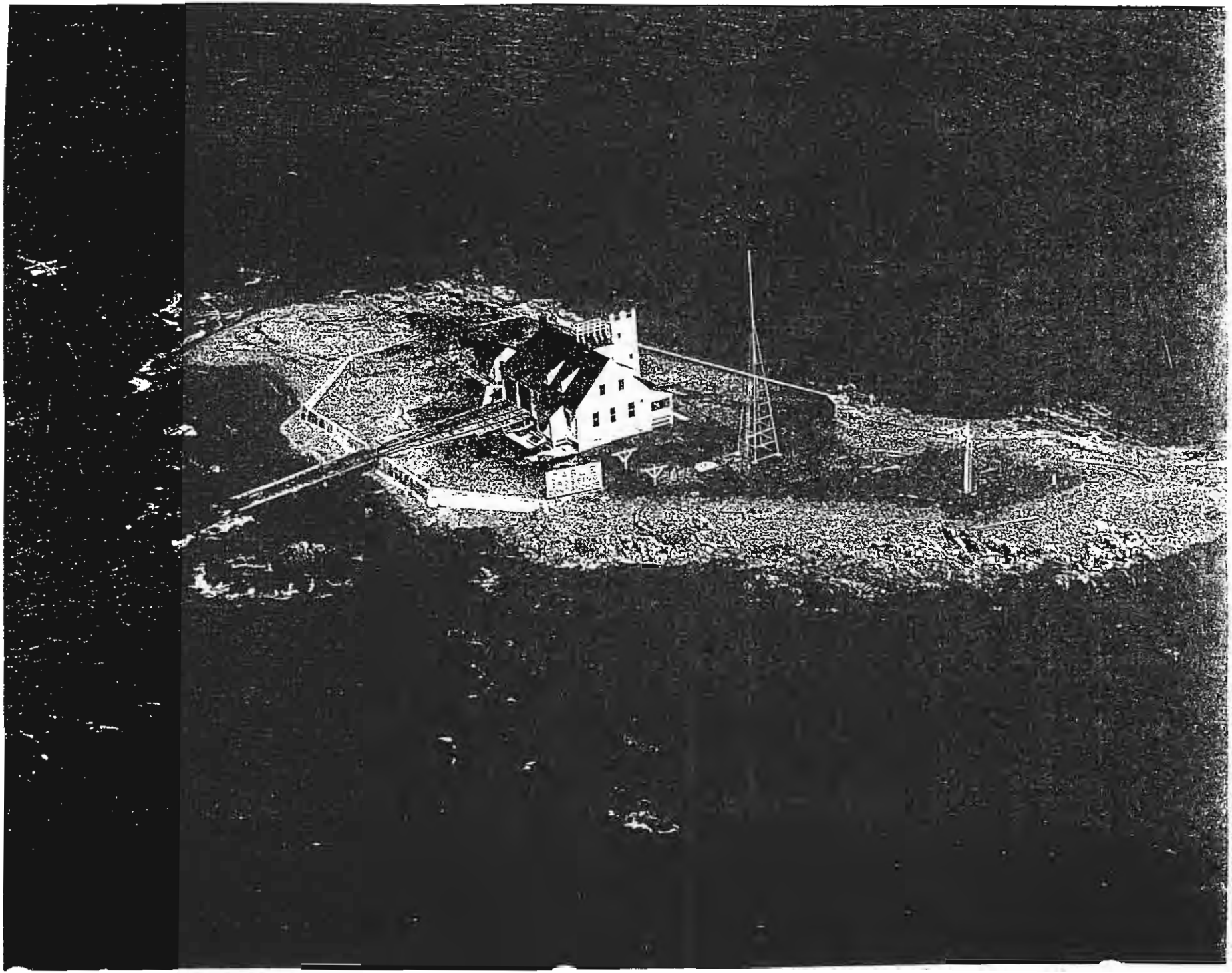
PHONE AND FAX:
207-439-2603
WWW.WOODISLAND.ORG

Dear Town Council Members,

It is with great pleasure that we introduce you to our project for the restoration of the historic Wood Island Life Saving Station, and the island on which it sits.

The Wood Island Life Saving Station [see attached photo], located at the entrance to Portsmouth Harbor, lies just a few hundred yards off the coast of Kittery's Fort Foster Park. The station, built in 1908 and commissioned for service in 1909, is but one of hundreds of stations that once dotted





THE TURNING POINT FOR WOOD ISLAND
1972-1993

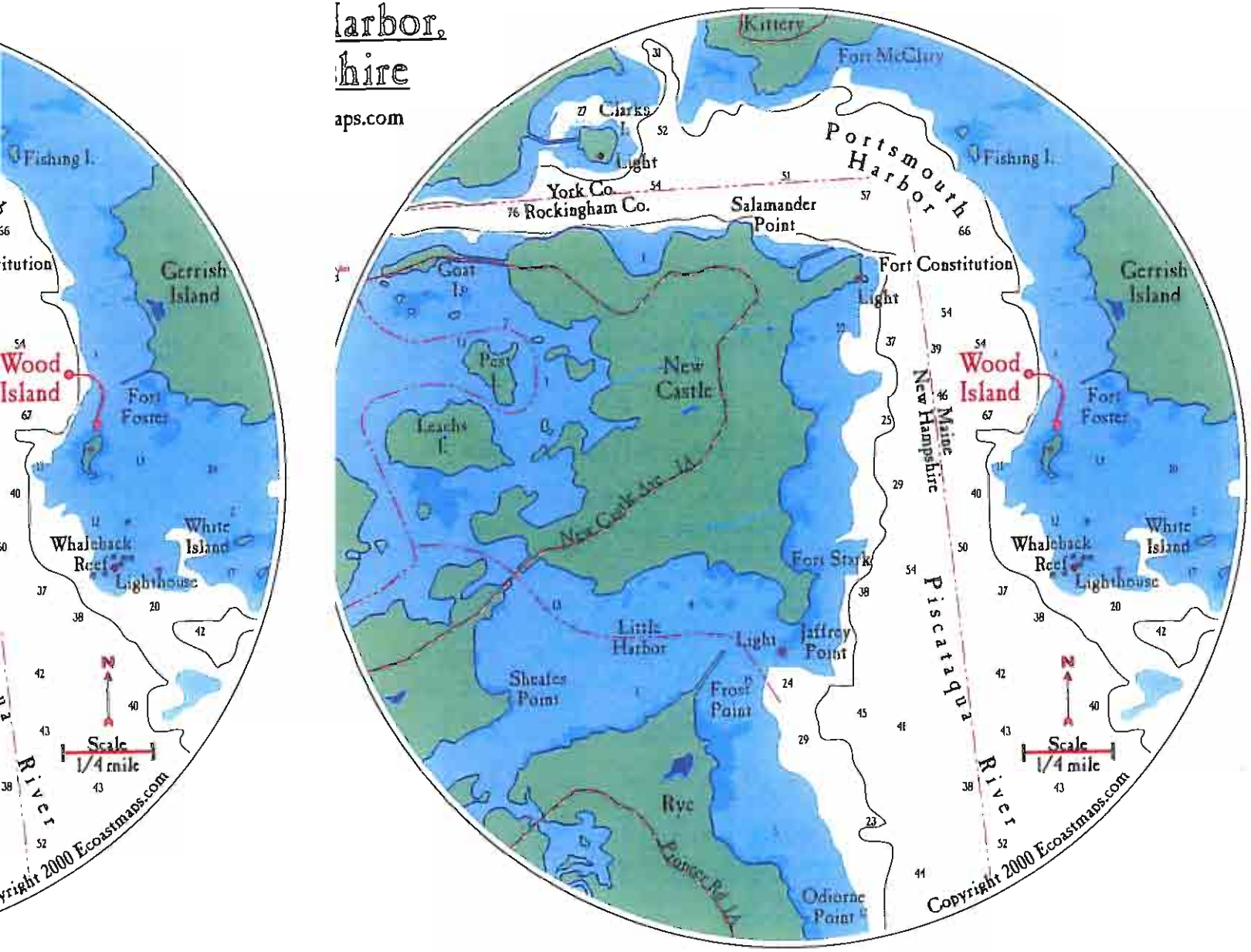
The station, as noted earlier, was built in 1908 and Commissioned in 1909. It served her purpose until 1944, when it was decommissioned. The Life Saving Service was the forerunner of the United States Coast Guard. Taking over the duties of Wood Island Life Saving Station, a new Coast Guard facility was built in New Castle, New Hampshire, just across and up river from the old station,. Under the control of the Department of the Interior, the Wood Island Station sat unused until 1972. **At that time, through the offering of the Federal Government, it was acquired by the Town of Kittery through a Quitclaim Deed. Specific stipulations of this deed required the Town of Kittery to maintain the island and facilities for use by the general public for recreational purposes. Minor maintenance by the Town was done over the years, but in 1993, because of budget restraints and other financial reasons, the Town Council spoke of what to do about and with Wood Island, including the idea of destroying the facility and relieving the Town of the responsibilities of maintaining the island.**

Most all of Kittery's heritage revolves around the sea. Its' maritime history is made up of shipbuilding and the transporting of goods from across the ocean and along our coast. Sir William Pepperrell came from England during the mid 1600's, choosing Kittery Point as his place to live, and set up his shipping business here. In the 1700's John Paul Jones watched over the construction of the U.S.S. Ranger, built on the shores of Badgers Island in Kittery. The Kittery Naval Shipyard, 200+ years young and located on Seavey's Island, has carried on this fine tradition of building military vessels and submarines to protect our shores. For years, boat-builders from our neighboring town of Eliot built and delivered the surfboats used by the lifesavers of Wood Island. Coal for heat and the food supplies needed to sustain the station crews were secured at historic Frisbee's Market, located at the mouth of Pepperrell Cove in Kittery Point. [see map]

And here we are today, **The Wood Island Preservation Group, Inc**. After hearing what the Town of Kittery ***didn't*** want to do with Wood Island, a group of citizens, led by Dennis Estes, stepped forward and offered a plan to take on the responsibilities of resurrecting and maintaining the station and island. Through a unanimous vote of the Town Council [see attached] the WIPG was authorized to make and carry out plans for what could be done to save the island and structures. Thus, maintenance and upkeep of the island was turned over to the Wood Island Preservation Group. **WIPG was born in 1993, but not until 1999 did we grow into the project we are today.** Over time, ideas had been tossed around on what to do, and how to do it. After many meetings and much brainstorming, we became organized, set up a board of directors, became incorporated and gained our non-profit status. [see enclosures] Not only do we have a board of directors with great collective vision for this project, we have dozens of volunteers of various backgrounds, to help us carry out our plan.

larbor,
hire

aps.com



Town of Kittery, Maine

P.O. Box 808, Kittery, Maine 03904
439-1633 - 439-0452

April 13, 1993

Dennis Estes, Sr.
Wood Island Preservation Group
5 Goodwin Road
P. O. Box 9
Kittery Point, Maine 03905

Dear Mr. Estes:

Thank you for your presentation at the Council meeting last night. The Town of Kittery is appreciative of your committee's endeavors to save this valuable resource for our residents and community.

At its regular meeting of April 12, 1993, the Kittery Town Council motioned to appoint the Wood Island Preservation Group responsible for the preservation of Wood Island. The motion was moved by Councilor Barth and seconded by Councilor Skidgell. The Motion read "We the Kittery Town Council authorize the Wood Island Preservation Group to be the preservers of Wood Island on behalf of the Town of Kittery." Council passed the stated motion on a roll call voted with all voting in favor.

Attest:

A true motion of the Kittery Town Council

Joanne T. Lund, Town Clerk

Dated at Kittery, Maine the thirteenth day of April, 1993.

BOARD OF DIRECTORS
WOOD ISLAND PRESERVATION GROUP, INC.

Dennis S. Estes President, Founder
Kittery Town Council 1983-1989, 1999-2002, 2002-2004
York County Municipal Association, President 2000, 2001, 2002
Southern Maine Regional Planning Commission, Board of Governors
Property Management and Maintenance, Owner
Residence Kittery Point, Maine

Ned Savoie
Harbour Light Production
President & Creative Director
Portsmouth, New Hampshire
Residence Kittery, Maine

Daniel Ricciarelli Vice President
Finegold+Alexander and Associates
Associate, Associates Manager
Historical Architectural Preservation
Boston, Massachusetts
Architect, Planner for Wood Island Preservation
Residence Salem, Massachusetts

Stephen C. Estes
Teacher of History, Robert W. Traip Academy
Maine House of Representatives, 120th Maine Legislature
State Senate, 113th, 114th, 115th Legislature
Residence Kittery Point, Maine

Lisa Bonci Assitant Secretary
Bonci On Design, Owner
Marketing and Advertising
Kittery Point, Maine
Residence Kittery Point, Maine

William Savoie
CEO, Managing Director,
Harbour Light Productions
Residence Greenland, New Hampshire

Linda M. Estes Treasurer
Certified Public Accountant
Richard M. Donhauser CPA
Residence Kittery Point, Maine

Patrick S. Bedard Secretary, Clerk
Attorney at Law
Eliot, Maine
Counsel to Wood Island Preservation Group, Inc.
Residence Kittery, Maine

Sara Hamilton
2Q Design, Harbour Lights Productions
Portsmouth, New Hampshire
Residence Portsmouth, New Hampshire

Form **1023**
(Rev. September 1998)
Department of the Treasury
Internal Revenue Service

Application for Recognition of Exemption
Under Section 501(c)(3) of the Internal Revenue Code

OMB No. 1545-0056

Note: If exempt status is approved, this application will be open for public inspection.

Read the instructions for each Part carefully.

A User Fee must be attached to this application.

If the required information and appropriate documents are not submitted along with Form 8718 (with payment of the appropriate user fee), the application may be returned to you.

Complete the Procedural Checklist on page 8 of the instructions.

Part I **Identification of Applicant**

1a Full name of organization (as shown in organizing document) Wood Island Preservation Group	**2** Employer identification number (EIN) (If none, see page 3 of the **Specific Instructions**.)
1b c/o Name (if applicable) Patrick S. Bedard	**3** Name and telephone number of person to be contacted if additional information is needed Patrick S. Bedard (207) 439-4502
1c Address (number and street) — Room/Suite 3 Bradstreet Lane, P.O. Box 366	
1d City, town, or post office, state, and ZIP + 4. If you have a foreign address, see **Specific Instructions** for Part I, page 3. Eliot, Maine 03903	**4** Month the annual accounting period ends December **5** Date incorporated or formed 12/22/99
1e Web site address	**6** Check here if applying under section: **a** ☐ 501(e) **b** ☐ 501(f) **c** ☐ 501(k) **d** ☐ 501(n)

7 Did the organization previously apply for recognition of exemption under this Code section or under any other section of the Code? . . . . . ☐ **Yes** ☒ **No**
If "Yes," attach an explanation.

8 Is the organization required to file Form 990 (or Form 990-EZ)? . . . . . ☐ **N/A** ☐ **Yes** ☒ **No**
If "No," attach an explanation (see page 3 of the **Specific Instructions**).

9 Has the organization filed Federal income tax returns or exempt organization information returns? . . ☐ **Yes** ☒ **No**
If "Yes," state the form numbers, years filed, and Internal Revenue office where filed.

10 Check the box for the type of organization. ATTACH A CONFORMED COPY OF THE CORRESPONDING ORGANIZING DOCUMENTS TO THE APPLICATION BEFORE MAILING. (See **Specific Instructions** for Part I, Line 10, on page 3.) See also Pub. 557 for examples of organizational documents.)

a ☒ Corporation— Attach a copy of the Articles of Incorporation (including amendments and restatements) showing approval by the appropriate state official; also include a copy of the bylaws.

b ☐ Trust— Attach a copy of the Trust Indenture or Agreement, including all appropriate signatures and dates.

c ☐ Association— Attach a copy of the Articles of Association, Constitution, or other creating document, with a declaration (see instructions) or other evidence the organization was formed by adoption of the document by more than one person; also include a copy of the bylaws.

If the organization is a corporation or an unincorporated association that has not yet adopted bylaws, check here ▶ ☐

I declare under the penalties of perjury that I am authorized to sign this application on behalf of the above organization and that I have examined this application, including the accompanying schedules and attachments, and to the best of my knowledge it is true, correct, and complete.

Please Sign Here ▶ _____ (Signature) _____ (Type or print name and title or authority of signer) _____ (Date)

INTERNAL REVENUE SERVICE
P. O. BOX 2508
CINCINNATI, OH 45201

DEPARTMENT OF THE TREASURY

Date: MAR 14 2000

WOOD ISLAND PRESERVATION GROUP
C/O PATRICK S BEDARD
PO BOX 366 3 BRADSTREET LN
ELIOT, ME 03903

Employer Identification Number:
31-1693409
DLN:
17053053052030
Contact Person:
ZENIA LUK ID# 31522
Contact Telephone Number:
(877) 829-5500
Accounting Period Ending:
December 31
Foundation Status Classification:
509(a)(1)
Advance Ruling Period Begins:
December 22, 1999
Advance Ruling Period Ends:
December 31, 2003
Addendum Applies:
No

Dear Applicant:

Based on information you supplied, and assuming your operations will be as stated in your application for recognition of exemption, we have determined you are exempt from federal income tax under section 501(a) of the Internal Revenue Code as an organization described in section 501(c)(3).

Because you are a newly created organization, we are not now making a final determination of your foundation status under section 509(a) of the Code. However, we have determined that you can reasonably expect to be a publicly supported organization described in sections 509(a)(1) and 170(b)(1)(A)(vi).

Accordingly, during an advance ruling period you will be treated as a publicly supported organization, and not as a private foundation. This advance ruling period begins and ends on the dates shown above.

Within 90 days after the end of your advance ruling period, you must send us the information needed to determine whether you have met the requirements of the applicable support test during the advance ruling period. If you establish that you have been a publicly supported organization, we will classify you as a section 509(a)(1) or 509(a)(2) organization as long as you continue to meet the requirements of the applicable support test. If you do not meet the public support requirements during the advance ruling period, we will classify you as a private foundation for future periods. Also, if we classify you as a private foundation, we will treat you as a private foundation from your beginning date for purposes of section 507(d) and 4940.

Grantors and contributors may rely on our determination that you are not a private foundation until 90 days after the end of your advance ruling period. If you send us the required information within the 90 days, grantors and contributors may continue to rely on the advance determination until we make a final determination of your foundation status.

If we publish a notice in the Internal Revenue Bulletin stating that we

DOMESTIC
NONPROFIT CORPORATION

STATE OF MAINE

ARTICLES OF INCORPORATION

Filing Fee $20.00
File No. 20000234ND Pages 6
Fee Paid $ 20
DCN 1993631300013 ART1
FILED
12/22/1999

Julie L. Flynn
Deputy Secretary of State

A True Copy When Attested By Signature

Julie L. Flynn
Deputy Secretary of State

Pursuant to 13-B MRSA §403, the undersigned, acting as incorporator(s) of a corporation, adopt(s) the following Articles of Incorporation:

FIRST: The name of the corporation is Wood Island Preservation Group

SECOND: The corporation is organized for all purposes permitted under Title 13-B, MRSA, or, if not for all such purposes, then for the following purpose or purposes:

To support the preservation of Wood Island, Kittery, Maine as an educational and historical site.

THIRD: The name and registered office of the Registered Agent who must be a Maine resident, whose office is identical with the registered office; or a corporation, domestic or foreign, profit or nonprofit, having an office identical with such registered office:

Patrick S. Bedard
(name)

3 Bradstreet Lane, Eliot, ME 03903
(physical location - street (not P.O. Box), city, state and zip code)

P.O. Box 366, Eliot, Maine 03903
(mailing address if different from above)

THIS FORM *MUST* BE ACCOMPANIED BY FORM MNPCA-18 (Acceptance of Appointment as Registered Agent §304.3.)

FOURTH: The number of directors (not less than 3) constituting the initial board of directors of the corporation, if the number has been designated or if the initial directors have been chosen, is 7.

The minimum number of directors (not less than 3) shall be 3 and the maximum number of directors shall be 15.

FIFTH: Members: ("X" one box only)

☐ There shall be no members.

☒ There shall be one or more classes of members, and the information required by §402 is as follows:
SEE attached Exhibit B

THE WOOD ISLAND PRESERVATION GROUP, INC.

PRESENTS

THE CONCEPT

The CONCEPT is quite simple, really. The celebration of the history of the Life Saving Service, along with our maritime history all along the river banks of the Piscataqua River. A place to come explore and experience the marine life of the Piscataqua River and Portsmouth Harbor. An educational facility where people young and old alike can come to learn all about the history of the Seacoast. For instance, we have the Isles of Shoals to our South, the Seacoast Science Center and Odiorne's Point Fort to our Southwest, Historical New Castle New Hampshire and Fort Constitution to our West and the Kittery Naval Shipyard and Town of Kittery to the Northwest. As a backdrop to beautiful Pepperrell Cove and Kittery Point you can view historic Fort McClary Blockhouse and park to our North. And finally, to our East we have Fort Foster Park. Wood Island will become a place for folks to visit, relax, recreate and enjoy. The Wood Island Preservation project will become the stepping stone facility of history and education tied to the many other museums and exhibits along both sides of the Piscataqua River.

The location of Wood Island Lifesaving Station is unique compared to other stations around the country. Island bound, this facility would afford visitors unparalleled views of all sites mentioned. [see map]. And at the same time, our plan would afford visitors the opportunity to learn about the history and what life was like serving in the United States Life Saving Service. Our facility will allow for visitors to learn about marine life, our maritime heritage today and of years gone by, as well as allowing them the pleasures of the islands serenity.

THE PLAN

The PLAN itself is simple yet complicated at the same time. We (WIPG) have discussed and deliberated all sorts of ways to plan an attack to utilize this facility and island, all the while staying in line with the requirements of the Quit Claim Deed from the Department of the Interior.

How do we 'preserve' the structure and the island for public usage? How do we meet the requirements of the American Disabilities Act that would enable handicapped and disabled persons access and usage of this place? How do we maintain the fragile environment of Nature's graces out there on the island? How do we do all of these things, and at the same time, how do we make it so everyone has access to the island in the first place? It is, after all, an island surrounded by water, away from the mainland.

- Preservation: Vandalism and Mother Nature, over the course of the past 30 years, has made the true preservation of the structures impossible. Both the north and south seawalls have to be repaired or rebuilt to hold back storm waters. Because the south seawall has been broken down, waves and storm surges have distorted the original land pattern around the structures. [see exhibit of overlay land map during power point presentation]

- Accessibility: Access to the island and facility now can only be accomplished by people who have a watercraft of some sort. As the makeup of the island surface stands now, disabled or handicapped persons who could make it out to the island would be hard pressed to navigate the terrain.

- Environment and Nature: As the island sits unattended, anyone and everyone can now go out onto the island and do basically anything they want. All areas of the island are open and unprotected. There is currently no real guardianship of this island addressing these concerns. Fully aware of the fragility of this island and the marine life that make it their home, we want visitors to see, to hear and to learn about this aspect of the island, in a respectful way. As you view the proposed plans, you can see that the inclusion of decking and walks will enable us to maintain these concerns through controlled access.

- Land views of this facility: It would be hard to understand anyone who would be opposed to this project because of the impact it would have on the view from the shoreland. A totally historically restored facility could only accentuate the views and and add to the romance of this era.

GOVERNMENT WARNING: (1) ACCORDING TO THE SURGEON GENERAL, WOMEN SHOULD NOT DRINK ALCOHOLIC BEVERAGES DURING PREGNANCY BECAUSE OF THE RISK OF BIRTH DEFECTS. (2) CONSUMPTION OF ALCOHOLIC BEVERAGES IMPAIRS YOUR ABILITY TO DRIVE A CAR OR OPERATE MACHINERY, AND MAY CAUSE HEALTH PROBLEMS.

The First Annual Gala Event to Help Restore Wood Islan

Wood Island

I am a surfman in the United States Life Saving Service. I risk my life to try to save others'. Our work follows a pattern prescribed by the USLSS: Day watch from sunrise to sunset, and beach patrol during foul weather and at night. We drill daily, preparing for the eventual disasters which will meet us. Monday and Thursday we work the beach gear, pulling the boats, firing the Life gun and rigging the breeches buoy. Tuesdays are boat drills: launching, landing and capsizing the surfboats. Wednesdays we work on signals, and Fridays

WOOD ISLAND LIFE SAVING STATION APPROVED

Date: June 3 2001	Version: 1.0
Creator: Portsmouth Brewery	THE PORTSMOUTH BREWERY PORTSMOUTH NH
Authorized by: Jumeer Penrease Kimball	
Status: Approved	-Official Use Only-

Ale

One Pint, Six Fluid Ounces

we work on first aid and resuscitating
Saturdays we clean and do maintena
Sundays are considered a day of rest
beach patrol and lookout duty, just as on
On patrol, we are almost always alone. A
will see us with a lantern and a walking stick
us with a flare, you will know something is wr
be warning a ship in danger or signaling a ship
survivors that we are coming. Whatever the weat
the conditions, we will be there, risking our lives
Our regulations read that we "will not desist fr
until by actual trial the impossibility effecting
demonstrated," but our motto says it better:

"You have to go out, but you don't have to come

For more information on the restoratio
Wood Island Life Saving Station and how
help, please visit our web site at www.wood

The First Annual G

W

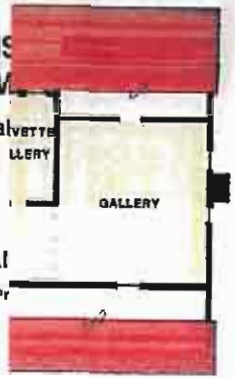
am a surfman in the United States Life Saving
risk my life to try to save others'. Our work follows
prescribed by the USLSS: Day watch from
sunset, and beach patrol during foul weather and
We drill daily, preparing for the eventual disasters
ll meet us. Monday and Thursday we work the
, pulling the boats, firing the Life gun and
he breeches buoy. Tuesdays are boat drills:
landing and capsizing the surfboats.
ays we work on signals, and Fridays

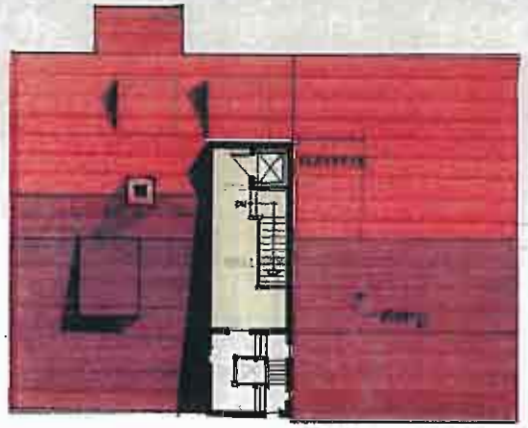
WOOD ISLAND LIFE SAVING STATION APPROVED

Date: une 3 2001	Version: 1.0
or: Portsmouth Brewery	THE PORTSMOUTH BREWERY PORTSMOUTH NH
orized by: Jumeer Penrease Kimball	
Status: Approved	-Official Use Only

WOOD IS
MARITIM
Kittery, Mai

Finegold Al
Architects and Pr

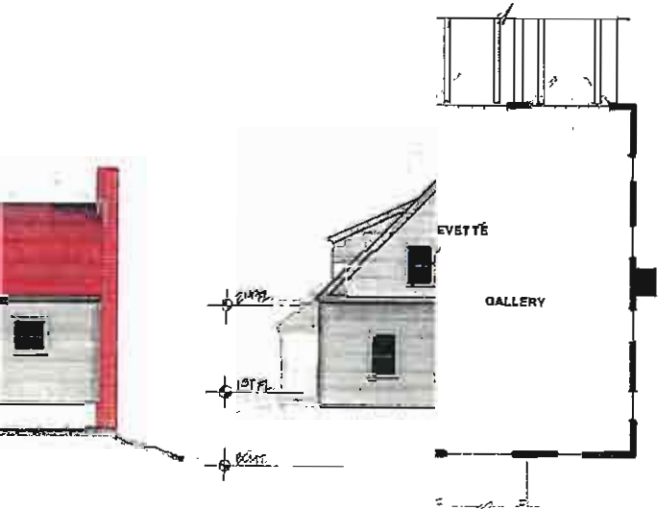


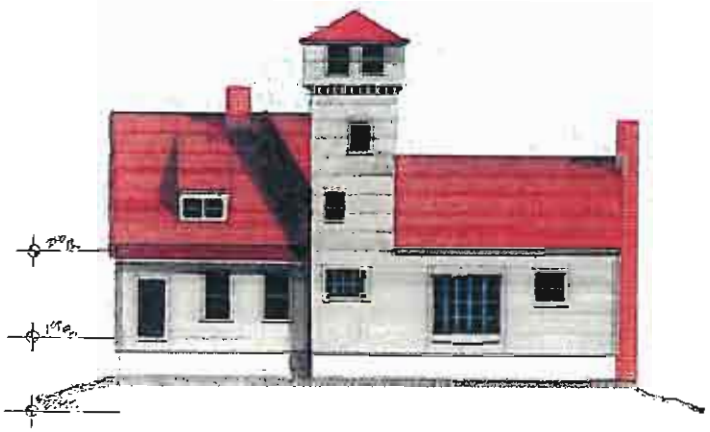


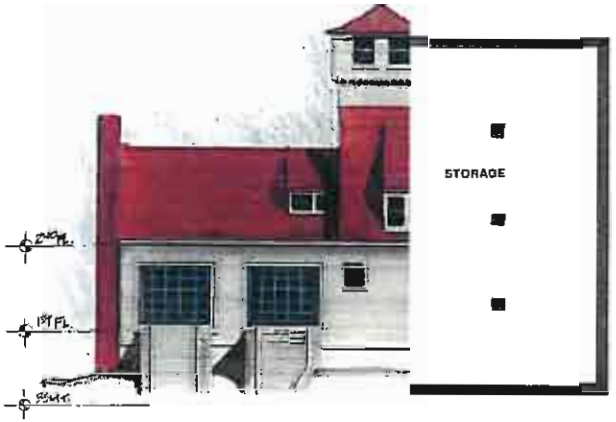
THIRD FLOOR PLAN

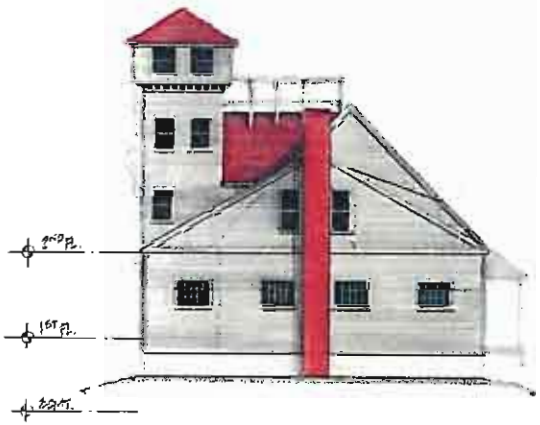
WOOD ISLAND
MARITIME MUSEUM
Kittery, Maine

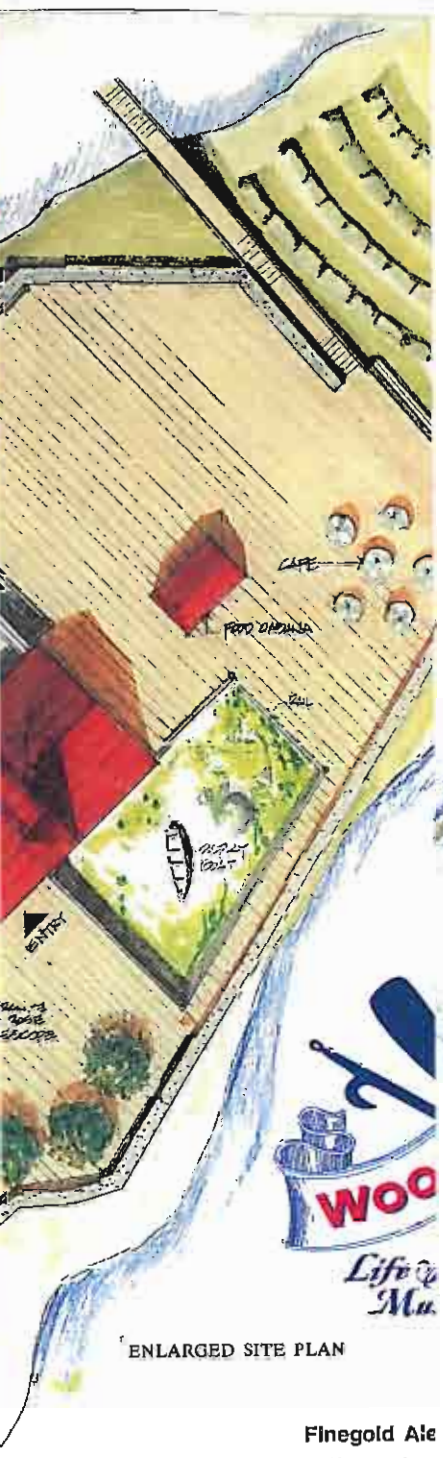
Finegold Alexander + Associates Inc
Architects and Preservation Planners Boston, Ma





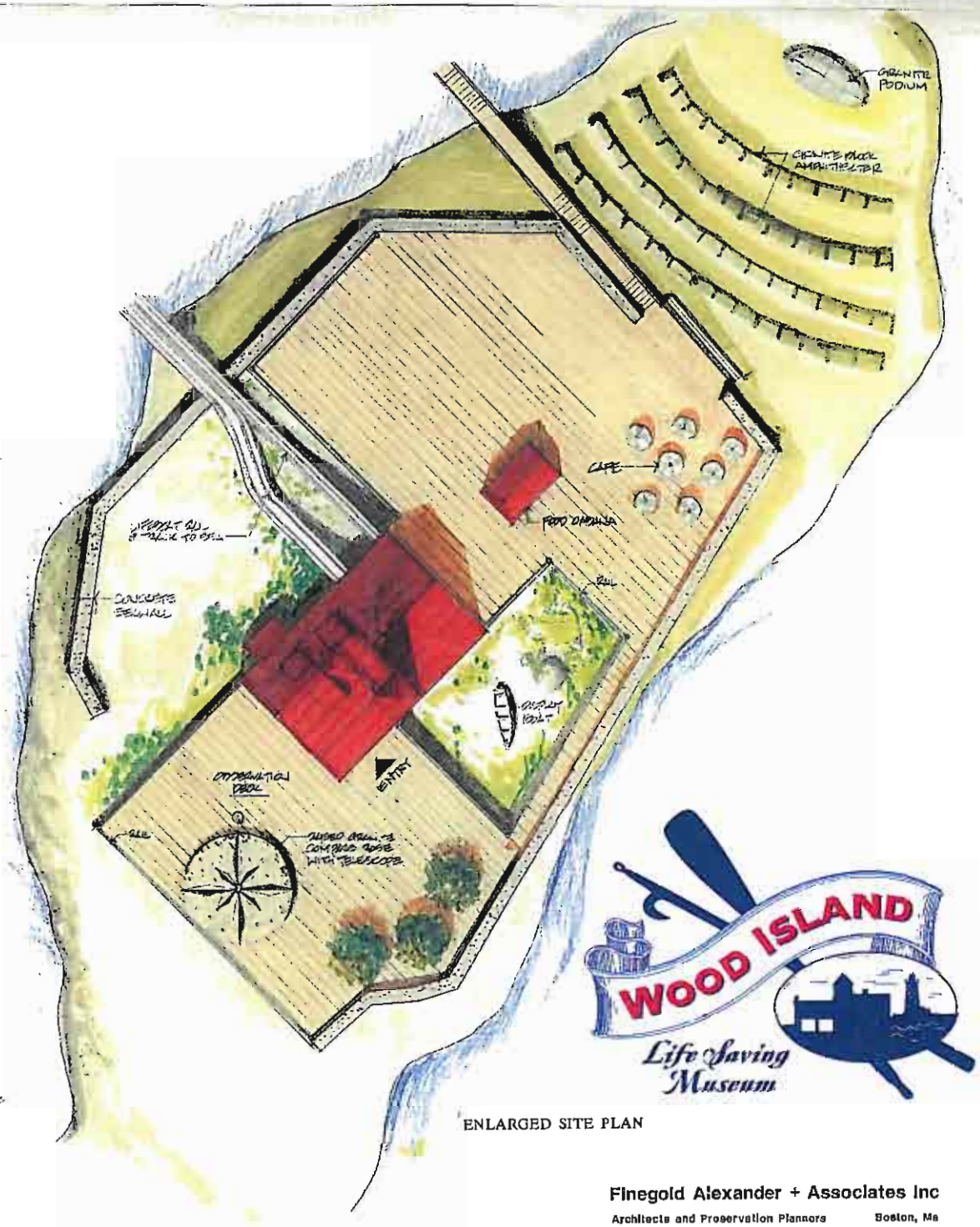






ENLARGED SITE PLAN

ELEVATED WALK SECTION



ENLARGED SITE PLAN

Finegold Alexander + Associates Inc
Architects and Preservation Planners Boston, Ma

COSTS AND REVENUES

The Wood Island Preservation Group has assured the Town of Kittery that this project will be carried out without the involvement of Town or taxpayers money. WIPG is the guardian of the Island, and will, on behalf of the Town of Kittery, carry out these plans and future maintenance of the facilities.

The estimated cost of Phase I of our project is $850,000.00+. [see attached plans]

Through much investigation, members of the Group have located a number of pieces of information pertinent to the project, including the original construction architectural plans, dated 1908, for Wood Island Station. The Northeast Regional Office of the National Archives, located in Waltham, Massachusetts, holds much of the information we will use for our restoration plans, as well as for our museum. Besides the very important architectural plans, other documented examples of what we have located to date include the day-to-day logs kept by the station crew dating from 1908 to 1944. An overlay map, date February 16, 1909, depicts the areas of the island that were brought to storm grade using the 'shingle' fill, which was once ballast stones taken from old schooners. A number of books written by area authors details life at the station, as well as at surrounding lighthouses. Over the course of the last 30 years, mother nature and vandals have tried their best to break down the structure, much to no avail. Age has raised it's weary head, though. This ambitious project includes work needed to be completed from the ground up.

We have completed the following:

-Incorporated, received non-profit status, formed a very prestigious Board of Directors and we have very many enthusiastic volunteers on board.

- Completed Architectural Plans [In-kind donation Finegold Alexander + Associates Inc.]

-Completed two (2) feasibility studies in conjunction with the project [available for inspection, Completed by Community Investment Associates].

-Completed and awarded a $5,000 grant through Small Community Block Grant Funding, used to pay costs of above mentioned feasibility study 2.

-Completed brochures, stationary etc. for promotional purposes.(In-kind donation by Bonci on Design) (enclosed)

- Memberships into both the Gateway Chamber of Commerce (Kittery/Eliot/the Berwicks) and the Greater Portsmouth Chamber of Commerce.

-We have received $15,000.00 plus in monetary contributions and in-kind contributions add to well over $60,000.00, since 1999.

-We planned and carried out a very successful major 'Gala' fundraising event on June 3, 2001.

-Web Site design @ www.woodisland.org. (Building and maintenance of Web Site, in-kind donation by Harbour Light Productions)

SPECIFIC PURPOSE OF THE PROJECT

As we have indicated throughout this presentation, **our goal is to preserve a historic facility, restore it to its original construction and complete the following:**

1) **Present a Life Saving Station and Maritime Museum**

Celebrate, through active and passive displays, the life of the surfmen and superintendents who served in protecting and rescuing seafarers and pleasure boaters. Upon restoration of the buildings, we hope to acquire important artifacts to display in the facility, including crew quarters equipment, superintendent office equipment, rescue equipment and, through our volunteer boat builders, display a working surf rescue boat.
At the same time we will tie into the exhibits of maritime life and historical aspects of how the seacoast of Southern Maine and New Hampshire evolved via maritime trade.

2) **Part of our plan is to offer opportunities for our visitors to explore the marine life of the island.**
   - By walking a guarded pathway across the ridge of the crescent beach on the south side of the island or along the rocky islands outer edges, visitors will be able to spot harbor seals, egrets nesting, gulls nesting and crabs and lobsters crawling on the sea bottom. From these vantage points, visitors will be able to watch lobstermen pulling and setting their traps, huge tankers and freighters entering or leaving the harbor along with the pleasure boaters, out for a day on the open sea.

3) **Another part of our plan is to offer Wood Island Life Saving and Maritime Museum as and Educational Facility.**
   - School children and adults alike will be able to utilize our facility to become more educated to all of the above mentioned purposes. School field trips, senior citizen outings and the such will be a major part of our overall programming plans. We anticipate cooperative programs of historical and educational purposes in conjunction with other existing historical entities from throughout the Seacoast region.

4) **The fourth part of our plan will offer a facility for functions by private groups and individuals.** [SEE NOTE]
   - Decking space, along with the natural granite amphitheater at the east end of the island (as per drawings enclosed) will allow us to rent usage of the island for weddings, anniversary celebrations, family reunions and the such.
   - Renting of the facilities to businesses and companies for day long (think tank) retreats and company outings.
   - Our plans will also allow us the opportunity to host fundraising events and initiate celebration events that coincide with historical aspects of the region, i.e. schooner races, sailing regattas, fishing tournaments etc.

SPECIFIC PURPOSE OF THE PROJECT
PAGE 2

*Please note that this section for usage will play a major part in our abilities to raise funds for continued operating capital for maintenance and upkeep of the island and buildings, outside of the fundraising that will be done through memberships and grant writings.

5) **This final part of the plan is to do exactly what the Quitclaim Deed from the Department of the Interior requires of the Town of Kittery.**
   - Upon completion of this project, the **general public** will be able to utilize the area for recreational purposes, along with the adjacent Fort Foster Park.

Our overall plan for this project is multipurpose, as one can see. We feel that the potential of Wood Island has so many important aspects to take advantage of, that all of these points listed must fit the objective.

Wood Island Preservation Group, Inc., on behalf of the Town of Kittery, will indeed have much to offer to the young and old alike!

COSTS AND BUDGET FOR THIS PROJECT

An enclosed copy of estimated cost for all of the Phase I construction has been enclosed. As indicated throughout this application, the dollar number we are working with is $850,000.00+. Knowing full well that construction costs have escalated over the past several years, we anticipate that some of the figures in this estimate will rise higher.

We would like to make one point, if we might, regarding this point, and the associated cost involved with said. We have to be honest in saying that the excitement this project has generated throughout the Seacoast area and beyond has become what we on the board would consider to be incredible. The history of this entire region is celebrated in many different ways in all of our surrounding communities, both here in Southern Maine, as well as across the river in our neighboring communities of New Hampshire. In the Town of Kittery alone we have a Historical Museum, a Historical Society, a Naval History Museum on the Shipyard, many celebrated 17th & 18th century homes and some dramatically wonderful views of the Atlantic Ocean. The excitement of this project we have planned touches upon everything we are about, in this region.
We are constantly receiving inquiries into this project, both by folks who want to volunteer, as well as people from all trades who want to be a part of the project. Craftsmen from all backgrounds will be a part of the rebuilding program, many whom have indicated a desire to participate either for free, or at substantially reduced rates. In spite of rising building costs, we believe the project can be completed close to the above indicated cost.

COMPLETION DATE GOAL

Once we have cleaned and secured the building (Part 1 of Phase I), we plan to progress with the next steps in Phase I as outlined prior. Our hopes for a completion goal date for Phase I in total is set as 2004/2005. We certainly would like to be prepared for the Centennial Celebration of this Station in 2008.

GEOGRAPHIC AREA SERVED BY THIS PROJECT

As indicated in the previous pages, Wood Island and station sits at the mouth of Portsmouth Harbor, in Kittery, Maine. Kittery, as I am sure you know, is the southern most town in Maine, and in York County. Kittery, bordered by the Piscataqua River, is neighbor to Portsmouth and New Castle, New Hampshire.

The geographic location of Wood Island will enable us to draw from a significant population. The towns of Eliot, York, North and South Berwick, Wells and Ogunquit will play an important role in our plans for visitation. We are sure that other towns from York County will find our facility worthy of a visit as well. In New Hampshire, we expect to draw on the populations of Portsmouth, Dover, Rye, New Castle, Dover, Exeter and Newington. We anticipate that once our project is completed and up and running, we will have many visitors from other areas of the State of Maine as well as from surrounding New England States.

ESTIMATED NUMBERS OF PEOPLE SERVED

The numbers of people served from this project range from 3000 to over 25000 on a yearly basis. The finished product we will present will indubitable draw more and more people, year after year. Also, by tying into programs of surrounding museums and historic facilities, as well as educational institutions, the number of visitors will likely increase significantly.(Feasibility Study 2)
We envision the use of the facility for education and marine life studies as a major draw for area school field trips. There is no doubt that towns and cities from all surrounding areas will take advantage of this wonderful opportunity.
The Route 1 corridor of Kittery, with its many shopping malls, draws an estimated 3,000,000 visitors a year. Through our Chamber of Commerce involvement, as well as our in-house advertising campaigns, we anticipate the ability to draw significant numbers from this resource. We will also have the advantage of drawing more visitors to our site via the harbor and island tour boats that operate along the harbor. Our Web site will add as another feature for drawing visitors. The Board of Directors truly feel and believe that once this project is complete, it will become an important part of tourism and education for Southern Maine. We will embellish the State slogan of "Welcome to Maine, the Way Life Should Be!"

KVAssociates, Inc.
210 South Street
Boston, MA 02111

9/1/99

~~Goat~~ Wood Island Life Saving Building
Kittery, ME

	ITEM	TOTAL	NOTES (See Below)
1	Asbestos Abatement	$45,450	
2	Demolition	$23,850	
3	Sitework	$62,500	
4	Marine Work	$55,000	
5	Foundations	$7,580	
6	Masonry	$2,430	
7	Structural Steel/Misc. Metal	$7,500	
8	Rough Carpentry	$64,740	
9	Finish Carpentry	$28,205	
10	Thermal and Moisture Protection	$26,125	
11	Doors, Frames, Hardware	$28,750	
12	Windows/Glazing	$14,250	
13	Interior Finishes	$40,373	
14	Interior/Exterior Painting	$17,785	
15	Specialties	$1,000	
16	Elevator	$30,000	
17	Fire Protection	$0	
18	Plumbing	$14,750	
19	HVAC	$17,500	
20	Electric	$36,600	
21	Security System	$10,000	
22	**Subtotal**	**$534,388**	
23			
24	Premium for Boat Transportation (10%)	$53,439	
25	**Subtotal**	**$587,826**	
26			
27	Contractor General Conditions (8%)	$47,026	
28	Contractor OH and Profit (5%)	$29,391	
29	**Subtotal**	**$664,244**	
30			
31	Design/Construction Contingency (10%)	$66,424	
32			
	TOTAL	**$730,668**	

KVAssociates, Inc.

210 South Street

Boston, MA 02111

Estimate for: ~~Goat~~ Wood **Island Life Saving Building** 9/1/99

Kittery, ME

Ref: Drawings:

Architect: Finegold Alexander and Associates

	ITEM	QUANTITY	UNIT	UNIT COST	TOTAL	NOTES (See Below)
1	Asbestos Abatement:					
2	Plaster	8,500	sf	$ 4.50	$ 38,250.00	
3	Pipe Insulation	1	allow	$ 1,000.00	$ 1,000.00	
4	Vinyl Flooring (Minimal)	1	ls	$ 200.00	$ 200.00	
5	Contaminated Debris	1	allow	$ 5,000.00	$ 5,000.00	
6	Misc.	1	allow	$ 1,000.00	$ 1,000.00	
7	**Subtotal**				**$ 45,450.00**	
8						
9	Demolition:					
10	Interior Gut	3,800	sf	$ 2.00	$ 7,600.00	
11	Remove Shingles and Sheathing	3,280	sf	$ 1.50	$ 4,920.00	
12	Remove Roof Walkway	1	allow	$ 500.00	$ 500.00	
13	Remove Piping	1	allow	$ 2,000.00	$ 2,000.00	
14	Remove Flooring	3,800	sf	$ 1.00	$ 3,800.00	
15	Remove Rail Support System	1	allow	$ 3,000.00	$ 3,000.00	
16	Remove Front Deck	1	allow	$ 300.00	$ 300.00	
17	Remove Rear Deck	1	allow	$ 100.00	$ 100.00	
18	Remove Roofing	3,260	sf	$ 0.50	$ 1,630.00	
19	**Subtotal**				**$ 23,850.00**	
20						
21	Sitework:					
22	Clean Up Scrub/Debris	1	allow	$ 2,000.00	$ 2,000.00	
23	Stepping Stone Walks	1	allow	$ 10,000.00	$ 10,000.00	
24	Boulder Ampitheater	1	allow	$ 20,000.00	$ 20,000.00	
25	Site Lighting	1	allow	$ 10,000.00	$ 10,000.00	
26	Landscaping	1	allow	$ 5,000.00	$ 5,000.00	
27	Rake Beach	1	allow	$ 1,000.00	$ 1,000.00	
28	Flagpole	1	ea	$ 2,500.00	$ 2,500.00	
29	New Well	1	ea	$ 10,000.00	$ 10,000.00	
30	New Conduit on Site for Electric Service	1	allow	$ 2,000.00	$ 2,000.00	
31	**Subtotal**				**$ 62,500.00**	
32						
33						

KVAssociates, Inc.
210 South Street
Boston, MA 02111

Estimate for: ~~Goat~~ Wood **Island Life Saving Building** **9/1/99**
Kittery, ME

Ref Dwgs:

Architect: Finegold Alexander and Associates

	ITEM	QUANTITY	UNIT	UNIT COST	TOTAL	NOTES (See Below)
1	**Marine Work:**					
2	Boat Dock	1	allow	$ 15,000.00	$ 15,000.00	
3	Foundations for Rail System	1	allow	$ 10,000.00	$ 10,000.00	
4	Repair North Seawall	1	allow	$ 5,000.00	$ 5,000.00	
5	Rebuild South Seawall	1	allow	$ 25,000.00	$ 25,000.00	
6	**Subtotal**				**$ 55,000.00**	
7						
8	**Foundations:**					
9	Excavate for Deck Footings	8	ea	$ 100.00	$ 800.00	
10	New Deck Footings (Sonatube)	8	ea	$ 250.00	$ 2,000.00	
11	Repair Foundation Walls	1	allow	$ 2,000.00	$ 2,000.00	
12	Grade Basement Floor	4	md	$ 240.00	$ 960.00	
13	Add 4" Stone for Basement	26	cy	$ 20.00	$ 520.00	
14	Footing for Stair to Basement	1	ea	$ 300.00	$ 300.00	
15	Pad for Propane Tanks	1	ea	$ 1,000.00	$ 1,000.00	
16	**Subtotal**				**$ 7,580.00**	
17						
18	**Masonry:**					
19	Rebuild Top of Chimney	1	allow	$ 750.00	$ 750.00	
20	Repointing	270	sf	$ 4.00	$ 1,080.00	
21	Chimney Caps	2	ea	$ 300.00	$ 600.00	
22	**Subtotal**				**$ 2,430.00**	
23						
24	**Structural Steel/Misc. Metal**					
25	Misc. Brackets/Angles	1	allow	$ 2,500.00	$ 2,500.00	
26	Boat Rails	1	allow	$ 5,000.00	$ 5,000.00	
27	**Subtotal**				**$ 7,500.00**	
28						

KVAssociates, Inc.
210 South Street
Boston, MA 02111

Estimate for: ~~Goat~~ wood **Island Life Saving Building** 9/1/99
Kittery, ME

Ref Dwgs:

Architect: Finegold Alexander and Associates

	ITEM	QUANTITY	UNIT	UNIT COST	TOTAL	NOTES (See Below)
1	**Rough Carpentry:**					
2	Repair Structure	1	allow	$ 5,000.00	$ 5,000.00	
3	Frame for New Decks	580	sf	$ 8.00	$ 4,640.00	
4	Interior Framing	140	lf	$ 25.00	$ 3,500.00	
5	Strapping	3,800	sf	$ 0.50	$ 1,900.00	
6	Wall Sheathing	3,300	sf	$ 1.50	$ 4,950.00	
7	Shingle Siding	33	sq	$ 350.00	$ 11,550.00	
8	Exterior Trim	950	lf	$ 6.00	$ 5,700.00	
9	Install Windows and Exterior Doors	44	ea	$ 100.00	$ 4,400.00	
10	Install Boat Doors	2	pr	$ 500.00	$ 1,000.00	
11	Stair Framing	3	flts	$ 700.00	$ 2,100.00	
12	Decking	580	sf	$ 5.00	$ 2,900.00	
13	Deck Rails	100	lf	$ 20.00	$ 2,000.00	
14	Floor Plywood Substrate	3,800	sf	$ 2.00	$ 7,600.00	
15	Frame for Boat Rails	1	allow	$ 7,500.00	$ 7,500.00	
16	**Subtotal**				**$ 64,740.00**	
17						
18	**Finish Carpentry:**					
19	Install Interior Doors	13	ea	$ 100.00	$ 1,300.00	
20	Door Trim	600	lf	$ 3.00	$ 1,800.00	
21	Wood Base	900	lf	$ 3.00	$ 2,700.00	
22	Chair Rail	370	lf	$ 3.50	$ 1,295.00	
23	Window Trim	700	lf	$ 3.00	$ 2,100.00	
24	Wainscoting-Beadboard	1,300	sf	$ 5.00	$ 6,500.00	
25	Stair Treads and Risers	37	ea	$ 40.00	$ 1,480.00	
26	Skirt Boards	50	lf	$ 15.00	$ 750.00	
27	Newel Posts	16	ea	$ 80.00	$ 1,280.00	
28	Railing	50	lf	$ 30.00	$ 1,500.00	
29	Gift Shop Cabinetry	1	allow	$ 7,500.00	$ 7,500.00	
30	**Subtotal**				**$ 28,205.00**	
31						

KVAssociates, Inc.
210 South Street
Boston, MA 02111

Estimate for: ~~Goat~~ wood **Island Life Saving Building** **9/1/99**
Kittery, ME

Ref Dwgs:

Architect: Finegold Alexander and Associates

	ITEM	QUANTITY	UNIT	UNIT COST	TOTAL	NOTES (See Below)
1	**Thermal/Moisture Protection:**					
2	Cedar Shingles	33	sq	$ 375.00	$ 12,375.00	
3	Felt Underlayment	3,300	sf	$ 0.20	$ 660.00	
4	Valley Flashings-LCC	20	lf	$ 15.00	$ 300.00	
5	Ice and Watershield	180	lf	$ 3.00	$ 540.00	
6	Drip Edge-LCC	450	lf	$ 5.00	$ 2,250.00	
7	Dormer Flashings	3	ea	$ 200.00	$ 600.00	
8	Tower Copper Finial	1	ea	$ 750.00	$ 750.00	
9	Window/Door Flashing	43	ea	$ 50.00	$ 2,150.00	
10	Wall Insulation	3,300	sf	$ 0.50	$ 1,650.00	
11	Floor Insulation	2,200	sf	$ 0.70	$ 1,540.00	
12	Roof Insulation	3,300	sf	$ 0.70	$ 2,310.00	
13	Misc. Caulking/Scalants	1	allow	$ 1,000.00	$ 1,000.00	
14	**Subtotal**				**$ 26,125.00**	
15						
16	**Doors/Frames/Hardware:**					
17	Screen Door	1	ea	$ 400.00	$ 400.00	
18	Entry Door	1	ea	$ 1,200.00	$ 1,200.00	
19	Exterior Doors	2	ea	$ 1,000.00	$ 2,000.00	
20	Exterior Pair Door	1	ea	$ 2,000.00	$ 2,000.00	
21	Boat Doors	2	ea	$ 4,000.00	$ 8,000.00	
22	Dutch Door	1	ea	$ 2,000.00	$ 2,000.00	
23	Single Doors (Reproductions)	7	ea	$ 1,200.00	$ 8,400.00	
24	Single Doors (Standard)	5	ea	$ 750.00	$ 3,750.00	
25	Bulkhead Door	1	ea	$ 1,000.00	$ 1,000.00	
26	**Subtotal**				**$ 28,750.00**	
27						
28	**Windows/Glazing:**					
29	Wood ADL with EP	465	sf	$ 30.00	$ 13,950.00	
30	Foundation Vents	2	ea	$ 150.00	$ 300.00	
31	**Subtotal**				**$ 14,250.00**	
32						

KVAssociates, Inc.
210 South Street
Boston, MA 02111

Estimate for: ~~Goat~~ wood **Island Life Saving Building** 9/1/99

Kittery, ME

Ref Dwgs:

Architect: Finegold Alexander and Associates

	ITEM	QUANTITY	UNIT	UNIT COST	TOTAL	NOTES (See Below)
1	**Interior Finishes:**					
2	Veneer Plaster	11,500	sf	$ 1.00	$ 11,500.00	
3	Ceramic Tile Floor	315	sf	$ 8.00	$ 2,520.00	
4	Ceramic Tile Base	60	lf	$ 6.00	$ 360.00	
5	Ceramic Tile Wainscot	240	sf	$ 7.00	$ 1,680.00	
6	Quarry Tile Floor	170	sf	$ 12.00	$ 2,040.00	
7	Carpet	83	sy	$ 20.00	$ 1,660.00	
8	Pine Plank Flooring	2,425	sf	$ 8.50	$ 20,612.50	
9	**Subtotal**				**$ 40,372.50**	
10						
11	**Painting:**					
12	Paint Walls and Ceilings	11,500	sf	$ 0.45	$ 5,175.00	
13	Stain Doors	16	ea	$ 75.00	$ 1,200.00	
14	Stain Trim	2,570	lf	$ 1.50	$ 3,855.00	
15	Stain Windows	41	ea	$ 75.00	$ 3,075.00	
16	Seal Exterior Trim	1	allow	$ 2,000.00	$ 2,000.00	
17	Seal Wood Deck	580	sf	$ 1.00	$ 580.00	
18	Seal Boat Doors	2	pr	$ 300.00	$ 600.00	
19	Stain Waincotting	1,300	sf	$ 1.00	$ 1,300.00	
20	**Subtotal**				**$ 17,785.00**	
21						
22	**Specialties:**					
23	Toilet Accessories	2	baths	$ 300.00	$ 600.00	
24	Mirrors	2	ea	$ 200.00	$ 400.00	
25	**Subtotal**				**$ 1,000.00**	
26						
27	**Elevator:**					
28	Limited Access-3-Stop	1	allow	$ 30,000.00	$ 30,000.00	
29	**Subtotal**				**$ 30,000.00**	
30						
31	**Fire Protection:**					
32	Not Required				$ -	
33						

KVAssociates, Inc.
210 South Street
Boston, MA 02111

Estimate for: ~~Goat~~ Wood Island Life Saving Building 9/1/99
Kittery, ME

Ref Dwgs:

Architect: Finegold Alexander and Associates

	ITEM	QUANTITY	UNIT	UNIT COST	TOTAL	NOTES (See Below)
1	**Plumbing:**					
2	Toilets	2	ea	$ 2,000.00	$ 4,000.00	
3	Lavs	2	ea	$ 2,000.00	$ 4,000.00	
4	Kitchen Sink	1	ea	$ 2,000.00	$ 2,000.00	
5	Propane Piping	1	allow	$ 2,500.00	$ 2,500.00	
6	Exterior Sill Cocks	2	ea	$ 750.00	$ 1,500.00	
7	Electric HWH	1	ea	$ 750.00	$ 750.00	
8	**Subtotal**				**$ 14,750.00**	
9						
10	**HVAC:**					
11	Propane Tanks	2	ea	$ 750.00	$ 1,500.00	
12	Furnace	1	ea	$ 4,000.00	$ 4,000.00	
13	Fin Tube Radiation	4	zones	$ 2,500.00	$ 10,000.00	
14	Temperature Controls	1	allow	$ 1,000.00	$ 1,000.00	
15	Bath Exhausts	2	ea	$ 500.00	$ 1,000.00	
16	Air Conditioning	Excluded			$ -	
17	**Subtotal**				**$ 17,500.00**	
18						
19	**Electric:**					
20	New Service	1	allow	$ 3,500.00	$ 3,500.00	
21	Power Distribution	3,800	sf	$ 2.50	$ 9,500.00	
22	Telephone/Data	1	allow	$ 1,000.00	$ 1,000.00	
23	Fire Alarm	3,800	sf	$ 0.50	$ 1,900.00	
24	Lighting	3,800	sf	$ 4.00	$ 15,200.00	
25	Power for Mechanical Equipment	1	allow	$ 1,000.00	$ 1,000.00	
26	Façade Lighting	1	allow	$ 3,000.00	$ 3,000.00	
27	Power for Elevator	1	allow	$ 1,000.00	$ 1,000.00	
28	Misc. Basement Electric	1	allow	$ 500.00	$ 500.00	
29	**Subtotal**				**$ 36,600.00**	
30						
31	Security System:	1	allow	$ 10,000.00	$ 10,000.00	
32	**Subtotal**				**$ 10,000.00**	
33						

WOOD ISLAND QUESTIONS

(12a)

(1) Please bring copy of deed as you indicated you would do in the 9/9/02 minutes.

(2) Have you checked with the Department of Inland Fisheries and Wildlife to determine if the proposed plan is appropriate for an island considered to be significant Shoreline habitat?

(3) What did Richard Baker of the DEP say about the plan?

(4) Is the plan consistent with our Shoreline Zoning?

(5) Is the extensive ramping/decking (versus a plan with accessibility only for historical/educational aspects) primarily for the recreation parts of the plan?

(6) Have you investigated funding mechanisms which would enable it to remain historical/educational only, such as is the case with Cape Neddick lighthouse?

(7) Your brochure says you plan to restore the landmark and it's structurally sound. Have you considered getting a second opinion as to whether it can be restored, rather than rebuilt, as only one opinion from a board member seems a conflict of interest.

(8) A general concern is, it seems there are many people on the board also providing services. Do you see this as a conflict of interest? Why? Why not?

(9) Have you considered using an environmental consultant?

(10) Where will the 3,000 to 25,000 yearly users (and more and more, year after year) park?

Additionally, there are eight questions from a citizen I would like answered.

Thank you!

Councilor Susan Emery

1) He stated in his presentation that the first wave of volunteers from the 1993 era are no longer involved. I am concerned about the project getting partway done - or fully completed and not being viable financially - and the volunteers getting fed up and therefore dumping this back into the town's lap. We know who the board is but I heard nothing to indicate if there were other people who were involved. I am also concerned that much of the board is related to each other either by birth, marriage or by employment. If one person decides to leave, it could result in 2 or 3 people leaving. They decided in 1999 to do this but have only raised $16000. to date. I am concerned that this organization has bitten off more than it can handle. Since the property is owned by the town, everything would fall back on them.

2) Have they done a feasibility study on the number of people they would need to attract per year to be self-supporting? If they need thousands of people to go there to be self-supporting, that could effect the environment. Also, if a high number of visitors is

needed and they don't get it, then the move to non-recreational use (weddings, office rental, etc. as noted on the
website) is going to be much more necessary. I know that many small museums are really struggling financially. What happens if this isn't self-supporting?

3) Who is going to provide the boat transportation? Was the intent of the Department of the Interior to have this developed into a project that would benefit for-profit businesses? And who decides who gets any contract? WIPG or the Town Council?

4) I do not agree that the pedestrian bridge is an item not to be discussed at this time. This is shown on their website as part of phase 2. I have not spoken to one person who believes the bridge to be a good idea. I am concerned that they show up before the council when it is completed to say that they need the bridge to be self supporting because they are not getting the kind of visitor numbers they need to survive and if the town doesn't go along with it, they will have to pick up the costs. It would be much better to know upfront and not have it forced on us.

5) Dennis mentioned the problem with Vandalism several times. Improving this would only make it more attractive to vandals. What are their intentions regarding this area? It is a secluded location and I would imagine that it would not be open during much of the winter.

6) Why does preservation only mean preservation of the building? I believe that they can fix the seawalls, etc. for protection without having to develop the island.

From the citizen:

(7) Have they done a business plan and provided it to the Town Council? This should include a timeline of the phases and include operating information for the museum once it is completed. I am concerned because the website indicates a completion date of 2003 and Dennis indicated 2008. That is quite a difference! If they haven't done a business plan, how can anyone decide?

8) I would like a listing of past and future events planned where they took input from the residents of Kittery regarding what the people want for the island. Is this what the residents want or is this what less than 10 residents want?

ANSWERS TO COUNCILOR EMERY
WOOD ISLAND CONCERNS

1) We have met with State DEP, State Conservation and State Recreation Department Officials. Explaining that in it's current state, Wood Island has no possible protection regarding the Shoreland Habitat (designation). Until dialogue was started with these Departments, representatives were not even familiar with Wood Island, nor it's status. All have concluded that our plan for controlled access far more outweighs current non-control.

2) Richard Baker, prior to meeting with then CEO Sig Albert and myself, was not familiar with Wood Island. Plans (same as in package) his office received, without proper descriptive page included, brought him to the conclusion that the plans received were actually for a private residence. As I presented to Council on the 28th, I invited him down to Kittery for an informal presentation. We met and discussed, in chambers (Sig, Mr. Baker and myself) and talked about the plan. Mr. Baker, as a DEP representative, felt the plan made good since, and actually became very anxious to add to the dialogue being had. Question about the Shoreland zoning designation was discussed, and he suggested that the Town consider changing the zoning to a proposed Historical Zone, so that the project would fall outside of the restrictive Shoreland Zone.
3) No, it is not consistent with the Shoreland Protection Zone designation.
4) The decking, as seen in the drawing, is for numerous reasons as I explained in the presentation. First, for all aspects of our plan, to include Education/Historical/Museum/Recreation as well as functional, the decking is both access available as well as control.
5) The Board, as well as some of our volunteers, has explored numerous funding mechanisms, involving all aspects of our plan.
6) I (we) have had probably three engineers, several volunteer architects, State and local officials, as well as numerous builders out to the site. Where your idea of 'conflict of interest' comes into play with this project is something I will not even discuss. If you want to reach for something, do it somewhere else. Do not insult me, nor the integrity of any of my board members. All board members have given a lot of time, energy and effort to this project thus far.
7) The Wood Island Preservation Group, in it's two plus years of Incorporation, has held numerous informational meetings, several of which have been held at Town Hall, our High School, as well as for some 12 organizations throughout the Seacoast area. Never once, until your question, has this "general concern" been raised. Conflict of Interest for providing services for a project the Board Members feel is of great importance to our Town and the Seacoast area? The services are FREE, NO CHARGE, IN KIND, OUT OF REGARD TO THIS PROJECT. Where, pray tell, can you find conflict there? If this is such a 'general concern', why am I hearing this for the first time from you. Perhaps, during question and answers at the Adult Education Presentation one year ago, you could have raised all of these questions.
8) We have met with Environmental folks who we actually brought in by Mr. Ricciarelli, the architect mentioned in your conflict question. This is part of what I consider to be the assets of all of my Board Members....the expertise and connections to folks who can answer questions and give good advice.
9) I addressed this during the presentation.

The Wood Island Board of Directors gave full presentation to Council and the community on October 28, 2002. As stated previously in these answers, we have conducted many presentations and held numerous informational meetings for Kittery Citizens and Seacoast residents. Concerns outside of Council Members have been addressed at these events. You presented questions from a 'citizen' with no name. I would be happy to speak directly with this person. Reviewing the list of questions presented by you indicates that most, if not all, questions raised were discussed during presentation on the 28th.

Dennis

TOWN OF KITTERY, MAINE

Phone: 207-475-1329
Fax: 207-439-6806
Email: jcarter@kitteryme.org
Website : www.kittery.org

February 28, 2008

Shore and Harbor Technical Assistance Grant
Maine State Planning Office

Town of Kittery Project Grant Scope:

Goal: Maintain Wood Island Lifesaving Station as the Icon of the Piscataqua River and Harbor Region.

Objective: Develop a course of action and implementation plan to assure Wood Island Lifesaving Station will remain standing for future generations.

Problem Statement: The Wood Island Lifesaving Station is located on a 1.25 acre island at the entrance of Piscatqua where Kittery, Maine and Portsmouth and Newcastle, NH harbors meet and is in front of Whaleback light and adjacent to Forts Foster and McClary and the Newcastle Lighthouse. Since its construction in1887, it has served as a symbol of strength and reliability for those entering the river from the Atlantic or viewing it from land. It and the other live saving stations along the US coast are the forerunners of today's Coast Guard.

In 1973, the Town of Kittery took over the Life Saving Station, which was decommissioned in 1944, from the Federal Government with the deed restriction to use the island and facility for public recreational use. Unfortunately, Wood Island, other than the occasional boater landing there, has seen little public use or maintenance over the years.

The Town has debated its future (Appendix #1 Chronology) in addition to identifying it in the 2001 Comprehensive Plan as a facility and infrastructure of importance which should be maintained (Appendix #2 –Comprehensive Plan citation). Most Kittery residents want the Life Saving Station preserved. Some wish it to be a functioning facility with infrastructure to allow boats to land and visits to the island and the Station. A recent proposal to preserve the Life Saving Station included a museum, function room and a retail operation along with a pier large enough for the local steamship authority to use. The scale and associated cost drew little support, which led the Kittery Town

Council rejected formally that initiative in late 2007. The response also suggested that preservation of the structure rather than development of it and the island was the preferred use. But how that preservation is accomplished and the associated costs need to be carefully delineated for the town to may any decision about Wood Island's future. Further, whichever option the Town pursues, the seawall needs to be restored to preserve the structure from the effects of storms.

Currently, the island is overgrown with vegetation, and the Lifesaving Station boarded up. While its unique architectural design is intact from a distance, both the interior and interior are deteriorating because of storm damage and vandalism. Kittery is at the point where it could lose this unique reminder of its maritime past as well as a symbol so long associated with the community.

.

Program of Work.

Develop a cost-effective plan to preserve the Wood Island Life Saving Station structure and the island's seawall

A) Undertake a feasibility study of the Island infrastructure and Life Saving Station to determine present structural condition rating and cost estimates to bring the infrastructure (seawall, pathways, boat ramps and establishment of a pier) up to reliability standards and restore the Life Saving Station to its original exterior and minimum interior condition. This phase is to include an environmental regulatory review and consultation with State and Federal agencies to determine requirements to undertake repair and rehabilitation work and review with the Department of the Interior possible alternatives to maintaining the Lifesaving Station.

B) Determine the cost to remove the Life Saving Station and replace it with an identical scale size metal or other highly durable material building with dimensions and exterior façade mimicking the exterior appearance of the present and original Lifesaving Station.

C) Determine of the cost to remove the Life Saving Station and replace it with a steel or other durable material frame skeleton outline of the original Lifesaving Station at its original scale.

D) Develop a decision matrix to determine the appropriate course of action by the voters and Town Council to take in moving one of the rehabilitation re-use options forward, including a timetable and funding sources.

E) Prepare a public awareness initiative to present options and alternatives to insure public input in any proposal brought forward.

Program of Work detailed:

The Town of Kittery will undertake the program of work with the assistance from Appledore Engineering in Portsmouth, New Hampshire, assisted by college interns. The overall project will be overseen technically and managed by Gregg Mikolaities, P.E., President of Appledore Engineering Inc. with that company undertaking different aspects of the project and study. The Town will establish a working committee under the Town Manager to advise, review and comment on the project as it proceeds and to assist with public relations and coordinate with the Town Council.

Gregg Mikolaites and Appledore Engineering will provide their expertise on a pro bono basis. With the exception of project expenses and subcontractors, the cost of the program of work is expected to be kept at a minimum but produce a professional written report and accompanying materials, which can be used to implement and determine the course of action.

Project Schedule:

Task	Start	End	Responsible
A) Feasibility study of the Island infrastructure and Life Saving Station to determine present structural condition rating and cost estimate to bring the infrastructure (seawall, pathways, boat ramps and establishment of a pier) up to reliability standards and determine the cost to restore the Life Saving Station to its original exterior and minimum interior condition. The study to include an environmental regulatory review and consultation with State and Federal agencies to determine requirements to undertake repair and rehabilitation work and review with the Department of the Interior possible alternatives to maintaining the existing Lifesaving Station.	**8/08**	**2/09**	**Appledore with Subcontractors as necessary and student interns**
B) Determine the cost to remove the Life Saving Station and replace it with an identical scale size metal or other highly durable material building with dimensions and exterior façade mimicking the exterior appearance of the present and original Lifesaving Station	**11/08**	**3/09**	**Appledore with Subcontractors as necessary and student interns**

C) Determine the cost to remove the Life Saving Station and replace it with a steel or other durable material frame skeleton outline of the original Lifesaving Station at its original scale.	**11/08**	**3/09**	**Appledore with Subcontractors as necessary and Student Interns**
D) Develop a decision matrix to determine the appropriate course of action by the voters and Town Council to take in moving one of the rehabilitation re-use options forward, including a timetable and funding sources.	**10/08**	**5/09**	**Town Working Committee, Appledore Engineering, and Student Interns**
E) Prepare a public awareness initiative to present options and alternatives to insure public input in any proposal brought forward. Minimum of two public forums will be held.	**8/08**	**5/09**	**Town Working Committee, Appledore Engineering, and Student Interns with assistance of professional marketing professional**
F) Presentation to Town Council of the Study and identified course of action	**4/09**	**5/09**	**Town Working Committee, Appledore Engineering and Student Interns**

Project Budget:

Task	Budget Amt.	State Funds	Local Funds	Local In-Kind	Total
A-D	**$12,400** University Civil Engineering Intern to provide file research, compile base plan and package of info for project start-up. 1) Assume 4 weeks x 40 hrs/wk x $15/hr=$2,400 University Intern & misc. expenses (mileage, copies, etc)=$500	**$2,175**	**$725**		**$2,900**
	2)One day of field survey, if necessary. (Survey consultant has not been contacted)=$1,800	**$1,350**	**$450.**		**$1,800**
	3) Waterfront				

	Engineering (40 hrs of PE oversight for structural and waterfront issues x $100/hr plus misc. expenses)=$4,500 4)Appledore misc. Expenses and PE Oversight=$2,000 5) Boat rental (assume 3 trips x $400/trip)=$1,200	**$3,375** **$1,500**	**$1,125** **$500**	 **$1,200**	**$4,500** **$2,000** **$1,200**
E	Public hearing materials (in-house brochures, copying cost, white easel pads=$ 1500 and Legal Advertisements =$ 300. Marketing Professesional @ $800	**$1,350**		**$1,250**	**$2,600.**
F	Writing and publishing final written & electronic reports and Power Point Presentation by committee = **$1,200** (Marketing Professional & Report writer =$450 & 1,000 copies @ $.50 ea.(40 pgs) =$500 ; Town Manager final Grant report= $250 & Final Presentation to Town Council)	**$500**	**$450**	**$250**	**$1,200**
	Total	**$10,250.**	**$3,250**	**$2,700**	**$16,200**
	%	**63.27%**	**20.06%**	**16.67%**	**100%**

Appendix #1 –Chronology of Wood Island Activity

WOOD ISLAND SUMMARY 1991-2004

1991 – February 8 Biennial Compliance Report.

1991 – October – Flood damage.

1991 - December 13 – Commissioner of Public Works, Richard Rossiter submits the Station for consideration of reimbursement by FEMA for storm damages that occurred October 30, 1991. FEMA will not consider damages to building or rail system, but the retaining wall i.e. storm wall may receive consideration.

1991 - December 17 – Town Manager Philip McCarthy asks Council for direction as to the future of the building.

1992 – January 14 – FEMA project description/damage report on Sea Wall = $11,665 @ 75% = $8,741.

1992 – January 14 – Letter to Phil McCarthy, Town Manager from Dennis Estes requesting a discussion with Phil about the station after reading an article in "Fosters".

1992 – February 12 – Phil McCarthy agrees to meet with Dennis Estes to discuss the Island.

1992 – March 18 – Letter from FEMA authorizing disaster assistance as a result of flooding in October of 1991.

1992 – March 23 – Dennis Estes wrote a letter of thanks following his meeting with the Council in which he discussed the formation of a Committee to study alternatives for the use of Wood Island Coast Guard Station.

1992 – July 9 – Article in LIGHTHOUSE DIGEST- "town Threatens to Tear Down".

1992 – August 12 – Letter to Dennis Estes from Earl Shettleworth stating Wood Island was not listed in the Historic Register because of poor shape etc.

1992 – November 17 – Wood Island Preservation Group Kick Off Fund Raiser – got building secured for the winter months. Per Mr. Estes, money was used to purchase some materials, develop a brochure and establish a web-site.

1993 – Per Dennis Estes - Obtained donated, materials, boarded up the facility and cleaned up the area.

1993 – April 12 – Request by Dennis Estes to Council for support to allow Wood Island Preservation Group to become a "non-profit" and also request that funds for the group be channeled through the Town Treasurer.

WOOD ISLAND SUMMARY 1991-2004

1993 – April 13 – Council voted on April 12 "We the Kittery Town Council authorize the Wood Island Preservation Group to be the preservers of Wood Island on behalf of the Town of Kittery". On September 4, 2002 Town Attorney, Duncan McEachern was asked if 1993 vote was proper - Attorney McEachern said OK.

1993 – October 13 – SEA Consultants, Inc. (engineering firm) evaluated bids for replacement/restoration of Sea Wall. Certification Form signed by Town Manager Philip McCarthy 12/18/93 for the approved amount of $42,924,000.

1993 – December 18 – Sea Wall complete – see 10/13/93.

1994 Per Dennis Estes – Cleaned up the Island in the spring and fall by removing trash, debris and at least one old boat.

1994 – June 7 – Estimate from Pickering Marine for a docking facility - pier $55,000 to $60,000 with an additional $15,000 to $20,000 if a ramp and float system are included.

1995 – Per Dennis Estes – Cleaned up the Island in spring and fall and continued to make periodic visits to remove material from the Island.

1995 – August 3 – Letter from Jerry Raweliffe, a Government Program Geologist with ABB Environmental Services (office in Portland) setting up a visit to the Island for ABB and the US Army Corps of Engineers, New England Division.

1995 – August 16 Letter from Richard Rossiter, Commissioner, DPW to Marine Warden Jonathan Wright with a list of lobsterman names and tag numbers for 61 traps with the comment that there are +/- 100 without nametags.

1996 – Per Dennis Estes, made usual spring and fall trips to clean up.

1996 – June 24 – Letter to Richard Rossiter from Frederick W. Coleman, Director of Real Estate from the Department of the Army stating that the Department of Defense has determined that no remediation project is appropriate at this site.

1997 – As per Mr. Estes, Wood Island Preservation Group was starting to have visibility. Had groups, like church people, volunteer to clean the area.

1998 – Per Dennis Estes, the group appeared before the Kittery Town Council and made a presentation on their ideas for rehabilitating the facility. The Council was aware they could not turn the Island over to the group, but again supported the idea of having the Wood Island Preservation group work on behalf of the town.

1998 – October 5 – Council public hearing for CDBG that will fund a Community Resources and Needs Assessment.

1998 – December 3 – Dennis Estes prepared a document for 12/7/98 Council meeting.

2

WOOD ISLAND SUMMARY 1991-2004

1999 – Group cleaned the Island several times.

1999 – January 25 – Community Investment Associates – suggests a way to preserve the Wood Island Lifeboat Station – a collaborative effort of the Lighthouse Preservation Society, the Wood Island Preservation Group and the Town of Kittery. March 4th, another version

1999 – March 8 – CDBG public hearing on Community Planning Grant to study the reuse of Wood Island Life Boat Station.

1999 – March 10 – Community Planning Grant Program Cover Sheet.

1999 – March 10 – Community Investment Associates Report from the Lighthouse Preservation Society with an invoice for $3,400 with $2,500 from Kittery and the difference from the Society.

1999 – March 12 - $2500 out of contingency for "Lighthouse Preservation".

1999 - March 29 – The Lighthouse Preservation Society letter hoping for $10,000 from CDBG and an agreement that Society will cover $7,500 for an architectural study etc.

1999 – April 21 – CDBG invitation to go to Phase II of Community Planning Grant Program, but since some of project is not eligible; CDBG is reserving only $5,000.

1999 – October 13 – Council voted to receive and accept the CDBG Grant award in an amount of $5,000 to continue the feasibility study - $2500 (3/12/99) paid for the first part of the study.

1999 – October 25 – Proposed Web site for Wood Island Preservation Group and Development of brochure (see attached).

1999 – December 13 – CDBG Application.

2000 - Per D. Estes - Wood Island group became incorporated; again cleaned the area.

2000 – February 16 - Executed copy of contract between Town and DECD - $5,000 -- January 25, 2000 to December 30, 2000.

2000 - March 28 - Invoice from The Lighthouse Preservation Society for one year's worth of work - $10,000

2000 – May – RFP for Wood Island Lifesaving Station – Historical Adaptive Reuse Study – anticipated cost $7500.

2001 – Per D. Estes, volunteers aided in the clean up effort.

3

WOOD ISLAND SUMMARY 1991-2004

2002 Per D. Estes, removed the donated material, erected earlier to secure building and replaced them with 2x4's 4x6's and ½ inch plywood. Also shored up the south end of the Boat Room and boarded it in. Held first fundraiser.

2002 – October 28 – Booklet to Council on the restoration of the Island.

2002 – November 7 – D. Estes memo to the Council that he would like to "move forward".

2003 – Per Mr. Estes, volunteers did what they could do to maintain the Island.

2004 – Some boarded material removed by the wind. Island now the home of +/- 100 lobster traps that have washed up.

2004 – February 18 – Department of Interior letter stating no Biennial Report since February 8, 1991.

2004 – May 17, 2004 – see Milton Hall's observations (copy attached).

2004 – June 14 – per discussion with Dennis Estes, the Wood Island Preservation Group is still in existence, albeit not active. There is hope, using the Town of Kittery's Comprehensive Plan as a guide, that a Wood Island Life Boat Station Rehabilitation Plan can be developed.

November / December 2007- Town Council recinds authorization to Wood Island Preservation Group to be the lead with the planning and rehabilitation efforts on Wood Island. A small subcommittee of the Town Council and Town Manager begin a new planning initiative for Wood Island.

Appendix Two

Revised 11/10/00

Local Goals: To preserve the community's historic buildings, sites, and neighborhoods.
To assure that the community's archaeological resources are identified and protected from inadvertent damage or destruction.

To preserve and promote Kittery's historic and archaeological resources.

Pursuant to these goals, the Town's policies are:

1. The Town will establish a volunteer program in conjunction with local historic groups and the Maine Historic Preservation Commission to document historic sites, buildings, and structures in the community and to guide property owners in applying for inclusion on the National Register of Historic Places if appropriate.

2. The Town should undertake a program to educate the owners of identified historic properties about the significance of these sites and the importance of maintaining the character of the structures.

3. The Town will create a review process requiring a waiting period before an identified historic structure can be demolished or relocated.

4. As part of its development review process, the Town will require applicants for subdivision or site plan approval to document any identified historic resources that may be impacted by the project and to address the impact of the project on these resources

5. The Town should consider creating a local Historic Commission. This Commission should establish voluntary design standards and educate property owners about the importance of conforming to these provisions. In the long term, this may be expanded to requiring that all new construction activities including additions and significant modifications to existing historic buildings obtain approval demonstrating that the project is compatible with the visual environment of the neighborhood.

6. The Town should work in conjunction with the Maine State Historic Preservation Commission to conduct professional surveys of the Town's identified and potential prehistoric and historic archaeological sites/areas as funding from the Commission is available.

7. As part of its development review process, the Town should require applicants for subdivision or site plan approval to investigate the potential archaeological significance of the site and to protect, as appropriate, any identified archeological resources.

The Town currently provides very weak protection for historic and archaeological resources beyond that provided by state and federal requirements. The only local protection is a requirement in the Town's land use regulations that the Planning Board determine that subdivisions and other development proposals do not have an undue adverse impact on historic sites before the project is approved. There are no current provisions dealing specifically with archaeological resources except in the Shoreland Zoning provisions.

4. ISSUES AND IMPLICATIONS

An analysis of the inventory of historic and archaeological resources suggests that the Town should consider the following:

1. While the Town has many identified historic archaeological sites, no systematic evaluation of these resources has been undertaken. The Town should consider how it can facilitate additional work to evaluate and protect these sites.

2. There may be other unidentified, prehistoric archaeological sites along Kittery's shoreline especially Spruce Creek and the Isles of Shoals (based on inventory). These sites are in danger of accidental disruption or destruction from development and other construction activity. The Town should consider how it can protect these potential resources.

3. The Town has a number of properties listed on the National Register of Historic Places. There are no local provisions for the protection of these properties. The Town should consider what role it should play in protecting these resources.

4. While the Town has several properties listed on the National Register of Historic Places, there are other historically valuable structures that have not been identified. No systematic evaluation of older properties has occurred. The Town should consider how it can facilitate further evaluation of the community's older buildings to identify and protect those with historic or architectural significance.

5. The Town has a number of neighborhoods such as the Kittery Point neighborhood that have special historic environments. The Town should consider if some level of local protection is desirable to maintain the character of these neighborhoods.

6. The Life Boat Station on Wood Island is owned by the Town and is deteriorating. There is local interest in preserving this site. The Town should explore the appropriate use and management of this facility and Wood Island in general.

5. GOALS AND POLICIES

State Goal: To preserve the State's historic and archaeological resources. (Growth Management Act)

8. The Town will continue to support efforts to investigate the restoration/preservation of the life boat station on Wood Island.

Wood Island Feasibility Study

Part Two: Site Assessment and Recommendations

April 2009

Completed for the Town of Kittery, Maine in cooperation with the University of New Hampshire and Appledore Engineering, Inc.

Written by Katherine E. Andruchuk
Mary Ferguson
Krystian E. Kozlowski
Seth Lizotte
Kyle Urso
Lawrence Yassanye
University of New Hampshire, Department of Civil Engineering

Project oversight by Jennifer L. Viarengo, P.E., Appledore Engineering Inc.
and Duncan Mellor, P.E., Waterfront Engineers LLC

Funded by the 2008 State of Maine Shore and Harbor Technical Assistance Grant

Preface

The following report is the work of students completed under the guidance and supervision of professional engineers. This report should only be used by the reader for the purpose of conveying general information regarding Wood Island, Kittery, ME. The information in this document is based on several sources regarding the history of the site. These written and photographic sources are cited and credit is given for their reference and use.

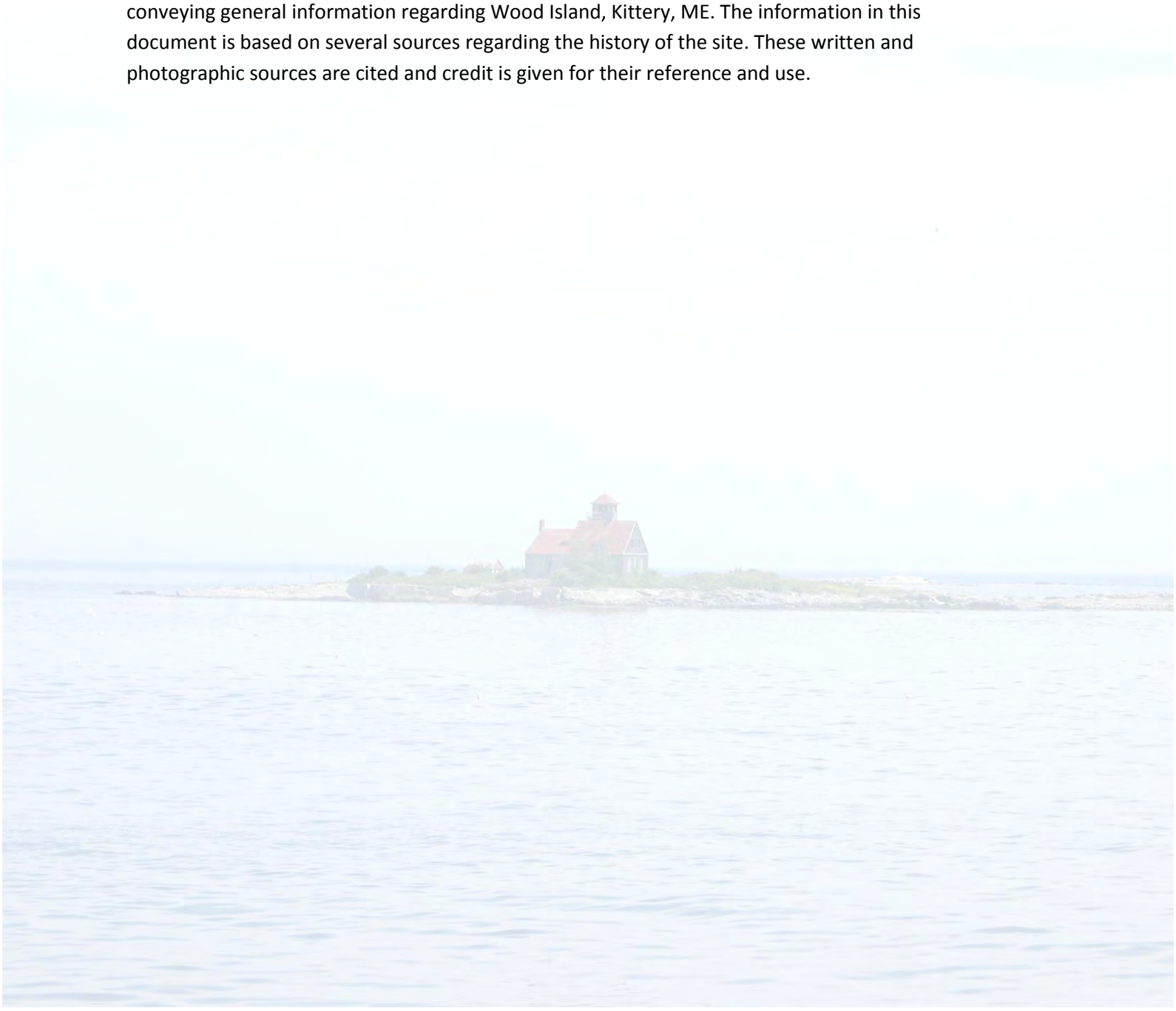


Table of Contents

I. Structure Assessment

Mary Ferguson, Krystian Kozlowski

Structure Assessment Contents

List of Figures

List of Tables

Introduction

The Wood Island Lifesaving Station is a historical icon of the seacoast. It is what makes the island important to the town of Kittery. For this, it is a great concern to keep the structure from slowly deteriorating under the harsh conditions of Portsmouth Harbor winters. This structure is experiencing a lot of rain and snow each year, and damage done to the roof has allowed water penetration to destroy some interior wooden elements. This damage has created unsafe conditions in the Lifesaving Station. Any visitors exploring the structure are in danger of falling through a floor board or slipping on loose wood.

Currently, efforts have been made to close off the structure to visitors. These efforts mainly involved boarding up windows and doors. Unfortunately, these boards have not been able to withstand the harsh wind and rain, as well as visitors, vandals and bird traffic. All of these factors have been able to take down these window and door boards one at a time. Currently, the structure is very much open to the elements and is serving as home for many local birds. These seagulls, as well as other coastal birds, have been further destroying the interior elements.

Figure 1: Boarded side of Lifesaving Station

Figure 2: Damage near openings

Action needs to be taken to end to the visible deterioration and potential dangers. Due to the historical significance, the structure does not fall to ruins under the close watch of the seacoast area. Also, it is extremely important that those visiting Wood Island are safe. The current state of the structure allows for visitors to easily access the inside of the Lifesaving Station, which, as previously mentioned, can be very dangerous. This report is meant to outline some the feasible options to remediate these problems.

The options described include:

- Preservation of the current structure with some improvements meant to stop further damage as well as closing off the dangers of the interior.
- Demolition of the current structure and replacing it with a steel frame mimicking the original dimensions.
- A scale model of the original structure.

These options solve both the on-going deterioration as well as preventing accidents within the structure. Some of the issues faced with these deigns include: asbestos and other “suspect material” abatement required for some construction and any demolition. Another issue is the visibility of a steel frame structure from Kittery and other points in the harbor. Of course, as the site is an island, construction costs and feasibility were of great concern.

Conditions Assessment

Abatement

An important aspect to this project is the presence of "suspect material" within the structure. This is material labeled as potentially dangerous to work near and poses a problem for disposal if the material were to be removed. As the structure was built in a time period that predates concerns for asbestos as well as lead-based products, the building is very likely to house many components containing these materials. OSHA considers any building constructed prior to 1981 to have some sort of suspect material present (Kindley, 2009). Due to this concern, an abatement specialist from Terracon Consultants, Inc. was brought to the island to take a closer look at some of the building materials that had been used.

Figure 3: Piping with suspect asbestos containing material used as insulation

Mr. David Oliver of Terracon, found that there indeed was a good deal of suspect material. His findings can only be considered professional opinion, as no laboratory tests were conducted to prove the existence of asbestos or other material.

One of the most important concerns Mr. Oliver had involved the insulation found on the piping in the boat house (Figure 3). He suspects that this material contains asbestos and would abatement if any type of construction were to occur. Mr. Oliver also stated that it could be dangerous to have out in the open as it is currently. This material would most likely require special removal as well as special landfill disposal procedures and/or costs. Again, this material is deemed suspect only. A laboratory test would need to be conducted to prove it contains asbestos.

Another suspect asbestos-containing material is the roofing shingles. The roof material was replaced sometime in the 1990s, but without proof of particular material that was selected and installed; the shingles will also need to be tested. If the town of Kittery can provide documentation to disprove the existence of asbestos in the material, this test may not be necessary. The investigation also revealed a paper liner which was used throughout the entire structure, including locations from under the siding to between the floor boards and joists (Figure 4). This paper was assumed to be used as insulation, and is suspected to contain asbestos.

Figure 4: Paper liner within the floors that has been deemed suspect material

In addition to asbestos, lead paint is suspected to have been applied to the walls within the structure. This paint, as it has been exposed to a good deal of moisture and time, is now chipping off the walls. Although not a hazard unless consumed, the material could require special training for removal. It also could require special disposal. Again, laboratory testing is required before specific remediation or abatement options are considered.

Figure 5: Lead paint chipping off interior walls

Water Infiltration

As this structure is situated on an island, harsh snow and rain are to be expected. The failed roof system over the boat hose portion of the structure, as well as the missing window and door boards meant to close off the building, have left the interior to be exposed to water infiltration. As it is a wooden structure, this has caused much damage to the interior flooring and floor supports. Constant wetting and drying has caused a good deal of the wood to rot. It has rendered some portions of the building un-navigable.

Water can destroy wood for many reasons. One such reason in older structures is lack of or failing trim or flashing elements (Historic Lighthouse Preservation Handbook). This can allow for water to slowly build up in locations. It can deteriorate the wood it is in contact with, and in the Wood Island Lifesaving Station's case, this led to failing surfaces that gave way to the water to infiltrate further and further into

the structure. Another important failure mode of wood in wet conditions is fungus, mainly mold, as well as insects (Historic Lighthouse Preservation Handbook).

It is of the upmost importance to the survival of the structure that the water damage be prevented. In addition to closing off the structure to prevent further water infiltration, measures should be considered to dry out the current condition.

Figure 6: Interior damage to wooden elements

Birds

Many structures in the Kittery-Portsmouth area struggle with bird damage. This structure is no different. In fact, as it is open and uninhabited, the structure serves as a seagull nesting area. The birds are breaking through boarded-up openings and creating some of the water infiltration problems previously discussed. It is well known that bird droppings are very acidic and can be very degrading to external surfaces of buildings (Wells, 2007). Many common roofing materials, including asphalt, are very susceptible to this degradation. After which, the material becomes more exposed to UV deterioration (Wells, 2007). This degradation may be a cause of some of the failure being experienced within the roof system.

In addition to damage, the birds' presence is causing an unhealthy situation within the building. On one site visit, several dead birds were found inside the structure. These birds had not made the winter, and their carcasses were most likely providing habitat for unwanted bacteria or potential scavenger creatures. Also, bird droppings are found to spread an array of diseases and in enough volume can be considered hazardous waste (Wells, 2007). This is not a healthy environment for Wood Island visitors or maintenance/construction personnel that might need to access the structure for any improvements.

Figure 7: Bird droppings

Snow and Wind Effects

As the structure is on an island at the edge of Portsmouth Harbor, it experiences a considerable amount of snow and wind. Both are creating a deterioration of the structure that cannot be easily avoided due to the age and condition of the building. The effects of these two components cannot be prevented, but some improvements could slow the process down.

Wind can cause and contribute to the failing of boards placed on windows and doors. It is also the probable cause of the structure's siding deterioration in some exterior wall sections. Wind also has the effect of whipping up and over the roof in such a way that is lifting the damaged roof materials off the structure. These effects are leading to the water infiltration that is deteriorating the interior of the Lifesaving Station. Wind effects have a tendency to make worse what is already damaged.

Snow has been taking a large toll on the structure. In particular, the boat house roof, which has been deteriorated by water infiltration, wind effects and bird droppings, is also suffering from increased snow loads. As the roof fails, the snow has more of a tendency to collect within the failed areas. Within the duration of this investigation, it has been evident the deterioration has increased. The increased damage within this past winter is evident in the photographs below.

Figure 8: Increased damage in March 2009

Figure 9: Damage to roof in July 2008

Analyses Conducted

Abatement Avoidance Options

A complete suspect materials survey and laboratory testing is required to make an appropriate decision regarding abatement options. Mr. Dave Oliver, of Terracon Inc., has indicated that the survey must be in accordance with NESHAP regulations for asbestos materials within buildings for renovation/demolition. The cost estimate to have an inspection performed by a State of Maine licensed asbestos inspector and the paint to be sampled for presence of lead would be approximately $2,800 to $3,500.

If work is required in a space contaminated by suspect materials, workers must be informed of the danger and risks present. Prior to any work, the asbestos suspect materials can be covered to prevent exposure to the workers instead of costly removal. Restrictions for people working in a lead paint environment are less than for those contaminated with asbestos.

Landfilling Options for "Suspect Materials"

Once the survey identifies the types and extent of asbestos and lead paint containments, the materials can be removed appropriately and disposed in hazardous waste receiving landfills. Research has indicated the cheapest asbestos landfills are located in Ohio. Athens County asbestos landfill will accept the materials at a per volume cost of $17.20 per cubic yard. However transport costs by a hazardous waste hauling company could be considerable. Alternatively, Waste Management Turnkey facility in Rochester, NH can take the material at a per weight cost of $75/ton for friable asbestos and $91/ton for non-friable asbestos. Requirements, testing, and other conditions apply for these disposal methods. (Appendix A)

Solutions Considered

Preservation of Current Condition

As mentioned, one of the goals of this report is to recommend ways in which the historic icon can be preserved. This could include either demolition of the structure and construction of some sort of commemorative structure or signage, or it could include a stabilization and preservation of the building's current condition. It is in the best interest of historical preservation to keep a structure as close to its original condition as possible, but may not always be feasible.

This stabilization and preservation option aims mostly to prevent current problems that are the cause for the existing deterioration. The structure's original design and orientation were sufficient enough to keep it standing up to the elements for 100 years. The structural elements that compose the Lifesaving Station have been doing precisely what they were meant to; however, the exterior protection elements are now failing to serve their purpose. Replacement and correction of some failing elements could keep the structure standing still.

An important aspect to preserving the current state of the structure is to block off access to the interior. As mentioned previously, already rotting wooden flooring and beams, as well as suspected asbestos-containing materials and large volumes of bird droppings are creating an extremely unhealthy environment within the building for any visitors or workers. The current use of wooden boards is not working. The findings of this investigation indicate that a sturdier blockade should be put in place. In particular, the south facing walls of the Lifesaving Station are particularly failing. At a minimum it is recommended that the blockades facing south be replaced and made sturdier to withstand the elements. The first floor and basement windows and doors could be blockaded by one of two options investigated in this report. The first option is steel plating. To withstand wind loads, 3/16" thick, A36 steel plating is suggested, at approximately $10 per square foot (calculations found in Appendix A). In places such as the garage-sized doors, once used for boat-launching, this steel could become quite heavy, and reinforcement "piers" from the basement may be necessary during construction to stabilize these blockades. The other option for closing off the lower levels of the structure includes replacing and reinforcing the wooden boards. With the use of ply-wood boards and a 2"x4", vertically-oriented, bracing element placed at foot intervals, these wood-board elements could be much more successful (cost breakdown tables found in Appendix A). These two options could also be used in conjunction with one another. The south-facing structural openings could be replaced with steel plating, and the other less-vulnerable walls could be replaced by ply-wood where needed and reinforced with vertical 2"x4"s.

Another important aspect of this option is the need to close off the upper level windows from both water infiltration and birds, while allowing for ventilation to keep the interior dry. This can be done with the use of louvers. This investigation found specifications for metal louvers that sit in windows,

protecting from rain and bird with outward sloping grates and screens. These can be installed as would a window and can be made for different sized windows. An example of an appropriate louver is the E4DS Model produced by Architectural Louvers, as shown here. This particular louver is hurricane-force wind rated as well as water resistant and bird proof. Its approximate cost, including installation is $37 per square foot. This does not include the cost to transport the materials to the island, included in the cost breakdown tables found in Appendix A.

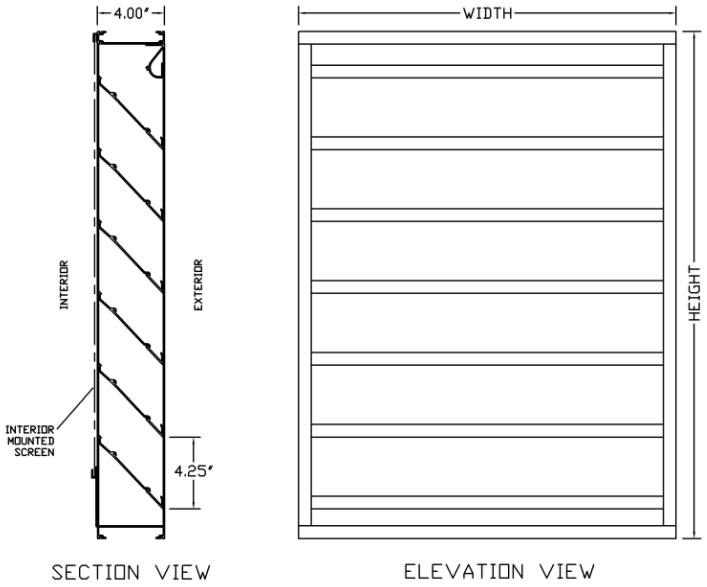


Figure 10: E4DS Model by Architectural Louvers Specification

The louvers and blockades described above will protect the structure against intruders, birds and the elements that are entering from the sides. There is also an extreme danger from above. The roof system is currently failing, in particular, the area of the roof located over the boathouse. There is a notable difference in interior deterioration on the boathouse side when compared to the rest of the building still protected by a roof. This is a depiction of how important a functioning roof is to the Lifesaving Station. This investigation leads to the suggestion of a replacement of the roof.

The costs for the different options are as outline in Table 1: Preservation Cost Analysis. These values assume a $1000 and $200 cost of boat and generator use per day of construction, respectively. They also assume 12.5% engineering and permitting cost, as well as a conservative 25% construction contingency, to allow for unexpected problems and changes. The different options each include: bottom floor barricading of various materials, upper level louver systems, full re-roofing, and limited re-siding of exterior walls. The costs assume all upper level windows will need to be fitted with a louver for maximum venting. Changing the smaller windows to steel plate changed the overall cost by only $2000,

so it is found to be slightly conservative to assume all will be louvered. This is likely to change in final design. It also must be noted that these costs do not include any possible abatement. It is uncertain as to whether or not one will be required for these mainly exterior changes, but it is a concern for this construction.

Table 1: Preservation Cost Analysis

Approximate Expected Costs for Preservation Options	
Using All Steel Plating	$104,000
Using All Ply-wood Boards and 2"x4" Reinforcement	$97,500

It can be noted that there is not a significant change in cost when a wood boarding is chosen over steel plating. This can be explained better by detailing the cost breakdown in terms of percentages, as shown in the figure below.

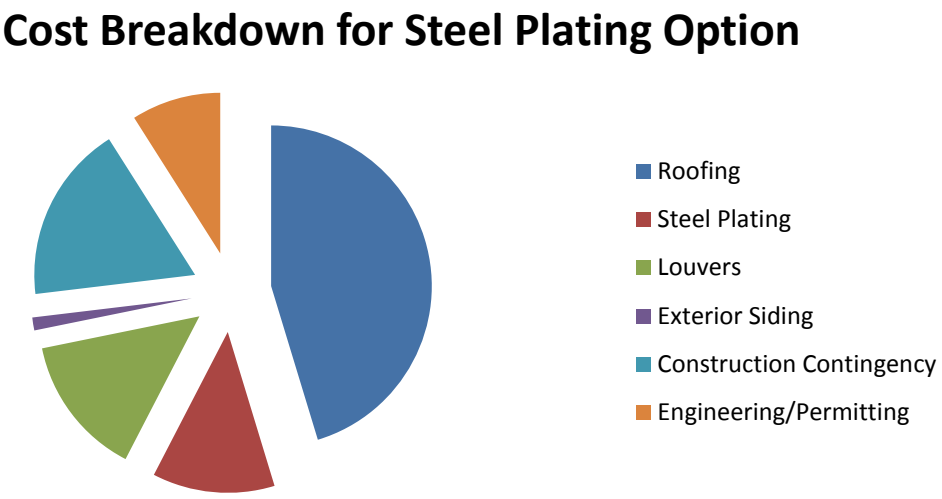


Figure 11: Sample Cost Breakdown for Preservation Options

The above pie chart displays how the costs of each part of this option compare to one another. It becomes obvious how big of a piece of this cost goes towards re-roofing the structure. It should be noted that upon further investigation into preservation of the structure, it may be found that not the entire roof needs to replaced. This cost analysis assumed that all roof surfaces will need replacement.

Structure Removal

An estimate for removal of the building was developed by Pickering Marine Inc., a local marine company based in Portsmouth, NH. The contractor estimates demolition and disposal will cost approximately $75,000.00 without abatement. Abatement costs associated with demolition are dependent on results from the suspect materials survey.

If the structure were removed, it would remove the safety hazard that the existing conditions pose to visitors. The station could then be replaced by another structure or the space could be allowed to return to its nature state.

Scale Model Replacement

The final option explored is the demolition and replacement with a scale model replica. The replica envisioned would be to the order of 10-15 feet tall, and could be placed either on the island or at a prominent public location, such as the Kittery Town Hall. As the weather on Wood Island is always a concern, maintenance and general protection of the scale model would be more difficult and perhaps costly. It is recommended that, were this option to be chosen, that the scale model be located within the Town of Kittery to commemorate the structure that stood on Wood Island, and historical plaques would be placed at the original site. These plaques would be very similar to those situated at other locations within in Kittery.

Steel Frame Structure Replacement

Figure 12: Steel Frame Structure Rendering

An option to immortalize the image and semblance of the Wood Island Lifesaving Station is to erect a durable steel frame. The frame would represent the building by matching the original size, shape, and colors. The original building would be demolished and removed completely.

The new foundation for the frame would consist of reinforced concrete columns with reinforcing steel grouted into the island's bedrock. The void caused by the original basement would be filled in with native or other material. The concrete columns would extend above ground and form a stable platform to build the frame.

The frame itself was designed with seven inch structural tubing and sixteen inch wide flange beams. These large sections allow people to clearly see the frame's shape from far distances. The design resists gravity, ice, and wind loads. It also resists vibration cause by lateral loads. Moment connections were used in the design to keep the appearance clean and uncluttered. No cross bracing was added to the design. The frame was designed according to the American Steel Construction Institute Manual.

All steel components would be hot dipped galvanized to prevent corrosion in the extreme ocean exposure. This is the only feasible alternative for a steel structure in the ocean environment. Weathering

steel is not appropriate in spraying-salt conditions. The galvanizing process adds a coat of zinc to the metal. The zinc acts as a sacrificial anode to prevent salt spray from attacking the metal structure directly. Galvanizing does not provide permanent protection; eventually the structure will experience corrosion. If there is a chip in the zinc coat, corrosion will occur at that location and salt ions will attack the steel from the inside completely. Depending on the thickness of zinc applied in the galvanizing process, the steel can be protected for several decades. Painting the galvanized steel is an option, however only exotic paints can be used. The galvanized layer can be painted with self etching primer that allows a chemical bond of the paint to the surface.

Loads

Wind loads were determined using ASCE 7-05 for the seacoast region of Maine and New Hampshire. A force distribution was determined using ANSI, the code preceding ASCE because the current standards do not have provisions for force distribution of wind loads on open frame buildings. Snow load was neglected for the design. However, a ½ inch ice load over the entire structure was estimated as the worst case. Dead loads for the trials sections were used: hollow structural square tubing and wide flange sections. The only live loads on the structure were estimated to be caused by birds. These loads were neglected. The seismic loading on the structure was not considered because of the nature of the preliminary design. The peak horizontal accelerations for the area are approximately 15% of gravity. These loads are non catastrophic and it is safe to assume the steel frame would respond well to this level of strong ground motion.

Table 2: Loads for Steel Frame Structure

Unfactored Loads ASCE 7-05	
Wind	21.29 lb/lft
Snow	11.13 lb/lft
Dead	41.91 lb/lft
	53.00 lb/lft
Live	Negligible
Seismic	Not considered

Design Loads AISC 2-8 Load Case 4		
Wind	34.06 lb/lft	
Snow	5.57 lb/lft	
Dead	50.29 lb/lft	HSS7x7x1/2
	63.6 lb/lft	W12x53
Live	Negligible	
Seismic	Not considered	

The steel frame was designed with the LRFD method (Load & Resistance Factored Design). The highest design load was determined using Load Case 4.

Structural Analysis

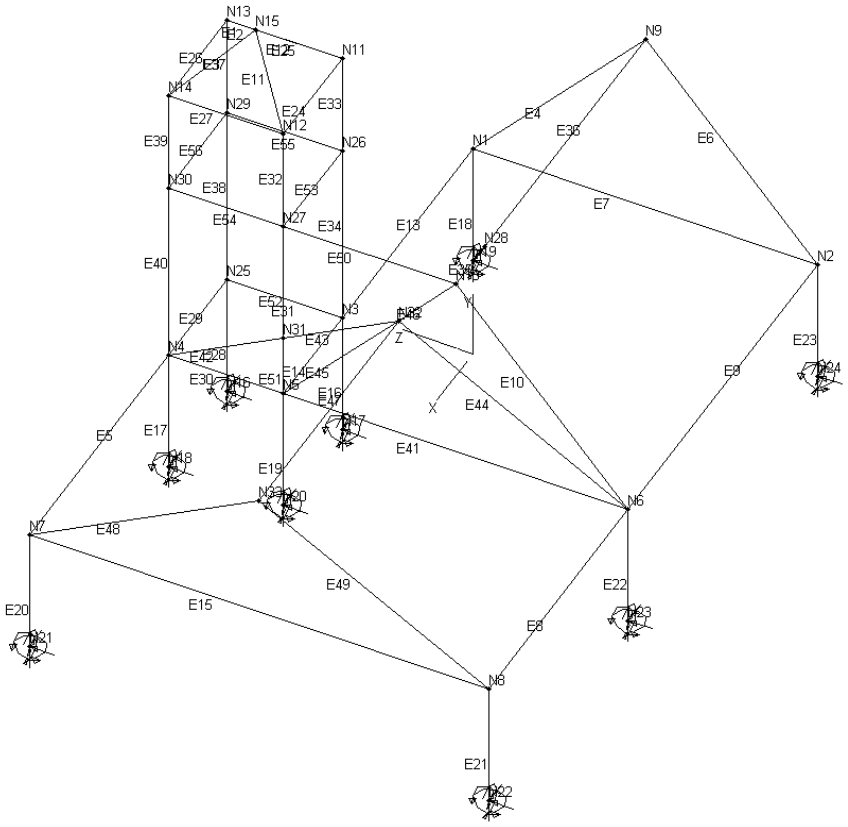


Figure 13: Frame nodes, elements, and fixities

A matrix structural analysis was performed using the program Mastan2. The analysis determined member forces and reactions under design loading of the frame. The analysis was also done to determine the deflections of the structure under maximum loading.

The frame was loaded with uniform distributions of dead and snow loads on every element. The wind analysis was more complicated due to the location and nature of the structure. ANSI stipulated that the worst case wind loads on an open steel frame would be at 10 and 45 degrees in the horizontal plane. It also stated that for analysis, full design load should be applied from one direction, and fifty percent of design load should be applied from the other direction. The purpose of this is not to overdesign the structure. The wind loads were applied as point loads at the connections as stipulated by the code.

A first order linear elastic analysis was done on the frame. The maximum deflection was 8.1 inches at the top of the structure (45 feet above ground level). This is a very large deflection for a steel frame structure. It is possible that the wind analysis is overly conservative. The current analysis may not

correctly distribute the wind forces. It may not accurately consider the effects of shielding by landscape and other members. A further analysis is required to confirm that such large deflections could actually be expected on this design.

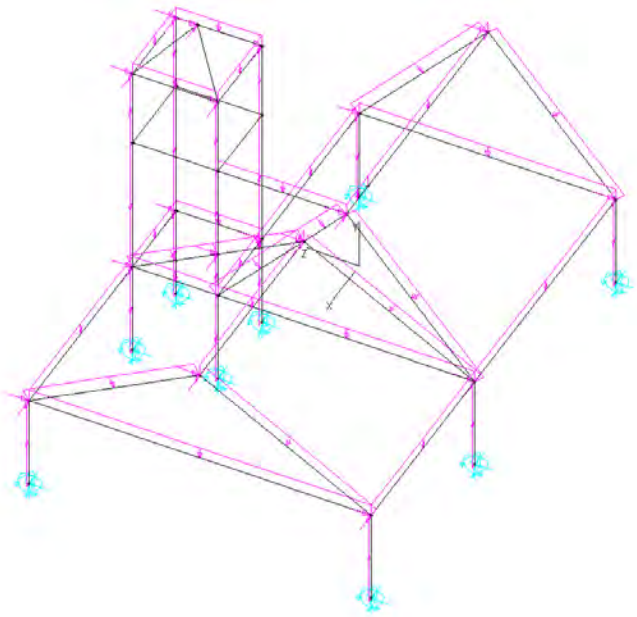


Figure 14: Steel Frame Loading Distribution

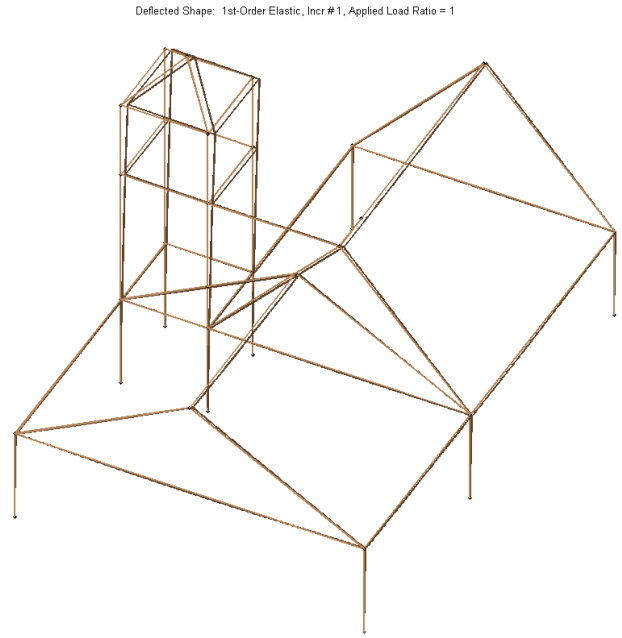


Figure 15: Deflections under Maximum Design Loading

Serviceability

Deflections

According to the American Institute of Steel Construction Manual, H/100 is the maximum permissible interstory drift for a building of height *H*. Therefore the maximum allowable drift is 5.4 inches for the top of the tower. The maximum 8.1 inch deflection estimated by the matrix analysis exceeds this design criterion. If these deflections are in fact the case, they could result in fatigue stresses in the moment connections at each joint. Over time, loading cycles could result in cracking and damage to these connections. Minimizing interstory drift reduces the effects of fatigue. If these movements are undesired or if further analysis relieves unsafe fatigue, the structure could be braced.

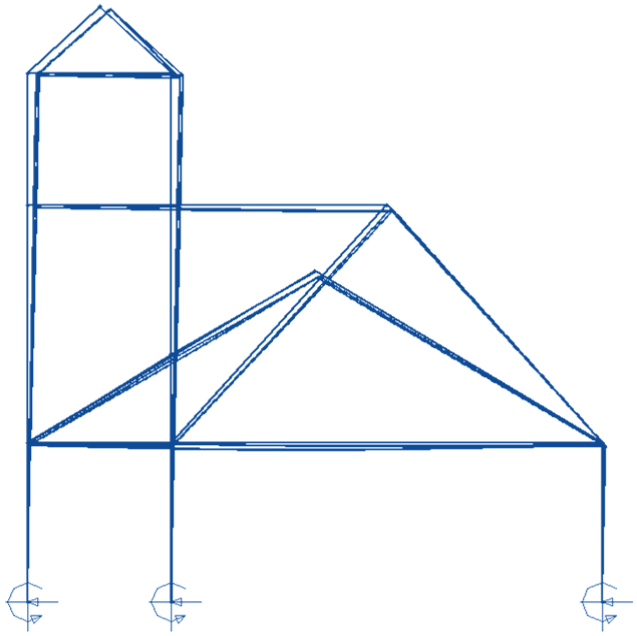


Figure 16: Lateral Deflection under Maximum Design Load

Corrosion

According to service life charts of HDG (Hot Dipped Galvanization) by the American Galvanizers Association (AGA), a 75 micron coat will protect steel structural integrity for 65 years in temperate marine conditions. A 75 micron coat, or 3.0 mils of zinc, is an average thickness. An addition 25 microns would protect the steel for an additional 20 years. These results are based on results from thousands of worldwide locations and heuristic mathematical modeling. At the end of this projected galvanizing lifecycle, red surface oxidation would affect 5% of the steel's structure. This rusty could then be removed and more zinc coating could be painted on in situ with self etching primers.

Cost Analysis

The estimated cost was found using a combination of RS Means, PE oversight, and information provided by vendors. A 25% contingency was incorporated in the analysis. This additional figure could cover transportation and staging costs to the isolated location as well as unforeseen costs. The 2009 cost for demolition of the existing building to construction of the steel frame is estimated to be $302,000.00.

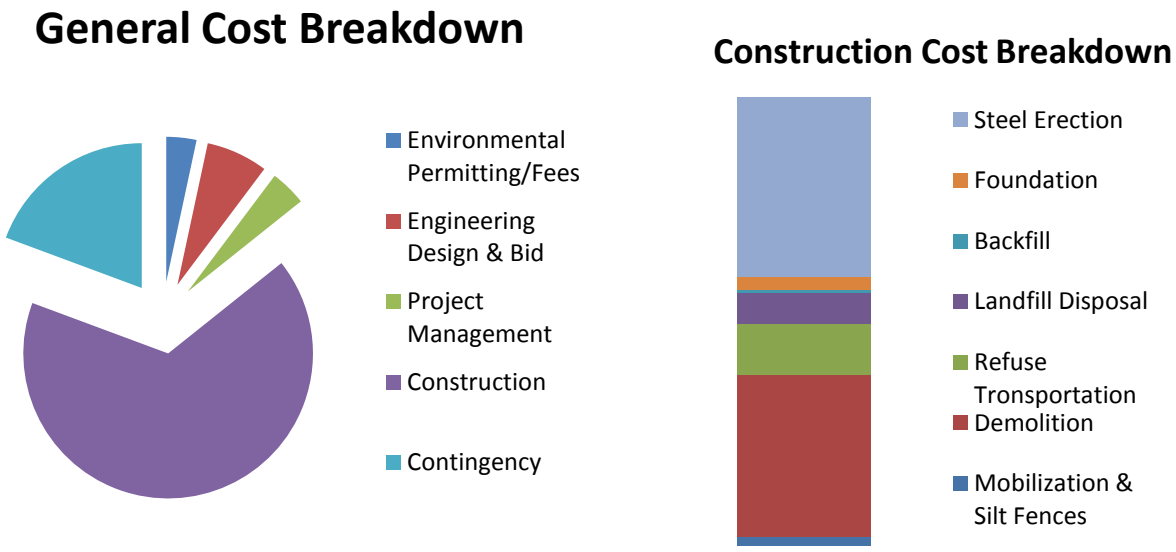


Figure 17: Steel Frame Option Cost Breakdown

Environmental Study Recommended

A study should be done on the effects of the acidity of seagulls waste on the galvanized coating prior to any construction. A demonstrative frame model of the suggested structural elements should be erected on the island. The amount of seagull waste, its chemical properties and its effect on the coated steel should be recorded. Analysis of these results will relieve if damage caused by seagull waste is serious enough to require preventive measures. Options for discouraging birds from landing on the structure include: installation of owl replicas and installation of bird deterrent surfaces along the tops of every member. Acoustic bird deterrent devices are also available on the market. An alternative to discouraging bird habitation is a maintenance program. Cleaning of the structure on a regular basis could protect the zinc coat from corrosion.

Works Cited

Historic Lighthouse Preservation Handbook. (n.d.). Retrieved April 11, 2009, from National Park Services, US Dept. of the Interior: http://www.nps.gov/history/maritime/handbook/wood1.pdf

Kindley, M. (2009). *Presumed Asbestos-Containing Material (PACM) vs. Suspect Asbestos-Containing Material*. Retrieved April 11, 2009, from Workplace Group: http://workplacegroup.net/articles/article-PACM-vs-Suspect.htm

Steel Construction Manual, 13th Edition (Book). New York: American Institute of Steel Construction, 2006.

Wells, J. (2007, March). *Enemies of the Roof*. Retrieved April 11, 2009, from RCI-online: http://www.rci-online.org/interface/2007-03-wells.pdf

II. Seawall Assessment

Katherine Andruchuk, Seth Lizotte

Seawall Assessment Contents

List of Figures

Introduction

The Wood Island Life Saving Station is protected by two concrete seawalls located on the north and south faces of the building. Over the past century the seawalls have been damaged repeatedly by tidal surge and wave action. The damage done to the seawalls has made it less of a protective barrier for the building and more of a potential hazard for those who visit the island. If the seawalls continue to be left alone, it's only a matter of time until full deterioration occurs. The south face seawall has previously been repaired by Shotcrete Systems International, Inc. as a temporary fix but continues to deteriorate. This report is meant to outline some of the feasible options to remediate these problems.

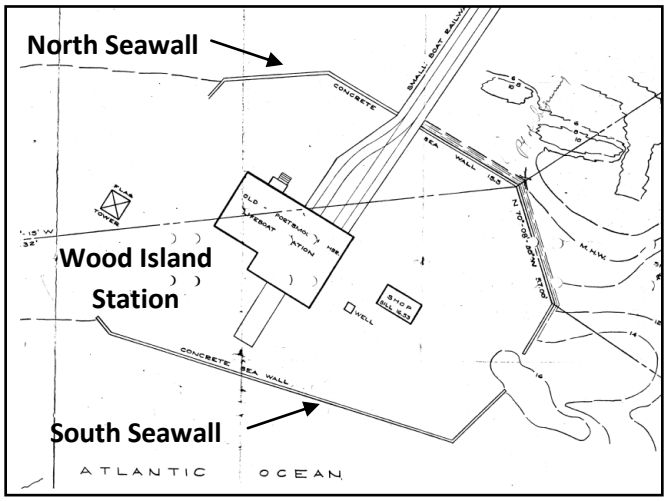


Figure 18 Seawall (Taken from a topographic map dated 1955)

The options described include: leaving the seawall in its current state and letting nature take control, removing the wall completely, or capping over the current wall. Other options include demolishing the wall and using it as backfill for a brand new cast in place seawall or as backfill for a precast wall. Some of the issues faced with these designs include getting the materials required for these options to the island. Another issue takes into account where to put the materials once removed.

Conditions Assessment

A site visit was performed on March 5, 2009 to determine the extent of damages to the existing seawall structures on Wood Island. During this visit, Duncan Mellor, P.E. helped in our observations and field tests performed on the existing structure. The following is a conditions assessment for both the north and south seawalls.

South Seawall

Undercutting

One of the initial observations made of the south seawall was the signs of undercutting by wave action.

Figure 19: Undercutting of South Seawall

Figure 20: Closer Image of Undercutting of South Seawall

Undercutting has occurred on the structure since no foundation was originally constructed for the seawall. As seen from visual inspection, it was rather cast in place on the island and anchored into the bedrock. As weathering occurs over time, waves come in contact with the bottom of the seawall and wear away at the base. Weathered segments of the wall are then carried away, undercutting the seawall as a whole and thus weakening the overall stability of the structure.

Shotcrete

By visual inspection, the entire two hundred and fifteen feet of wall have been previously covered with a shotcreted face. This cap consisted of sparse fiber reinforcement in the paste, a 1/8” mesh reinforcement cage which overtopped the existing wall, and ranged in thickness from less than half an inch in some areas to as much as 2 inches in others. From observation, it seems that the previous contractor filled holes present on the surface of the existing structure with gravel found on the island prior to capping, to fill in voids, see figure below.

The chain and hammer test was used on the cap to determine the bonding of the shotcrete cap with the original wall. The chain test is where a large chain is dragged over the horizontal surfaces to detect a change in pitch where voids would be present under the surface. From the chain test it was found that the top horizontal face of the wall was not bonded for the entire length of the wall. The hammer test is done on vertical faces of the wall, similar to the chain test. It can determine voids present under the surface through changes in pitch as one bangs on the outside of the wall. The area of concern for bonding was found to be between the two mid-level weepholes on the wall extending to 10 feet on either side of them. In this area, a hollow sound was heard which suggests the cap was not bonded.

Figure 21: Damaged Top Section of South Seawall

Figure 22: Un-bonded Shotcrete Cap of South Seawall with Gravel Fill

Figure 23: Shotcrete Cap Not Bonded along face near Weepholes

Weathering

To determine the internal state of the existing south seawall, a chisel and hammer were used to expose concrete further into the structure. Since the most noticeable signs of weathering had occurred surrounding the weepholes, it was determined this was the best location to see the full extent of the damages. Using the chisel and hammer, a hole was made into the face of the wall with minimal effort. During chiseling, visual signs were seen of the degradation of the paste which bonds to the aggregates and provides strength. The paste crumbled into a sandy mixture and thus provided no strength to the wall; see the figures below. To examine various portions of the south wall, other holes were made which revealed the same results. It seems that not only the exterior of the wall was susceptible to weathering

and conditions, but as freeze thaw and Alkali-Silica Reactions occurred, weathering moved internally and has severely weakened the structure.

Figure 24: Chiseling into Original Wall near Weephole Weathering

Figure 25: Weathering of Paste as seen through Chiseling

Drainage

Drainage is essential to release hydrostatic pressures behind the wall as waves and rainfall stagnate behind the structure. To provide drainage, seawalls have weepholes located along the structure to allow dissipation of stagnant water. Weepholes can be anything from designed cracks along the wall which allow water to flow through them, to piping which penetrates the width of the wall. When observing the

south seawall there was only four weepholes along the entire length. Two were located about 3 feet from the toe of the structure and two were located at the toe of the structure. Due to the inadequacy of the drainage, it conceivably led to the erosion of the backfill as well as further freeze thaw cycling as retained water would be in constant contact with the structure.

Under Duncan Mellor's guidance from experience on previous projects, it is recommended that weepholes be present in 8 foot intervals horizontally and with 3 foot vertical spacing along the entire length of the wall.

Figure 26: Weephole located halfway up on South Wall

Figure 27: Weephole at toe of South Wall

Backfill

Backfill is added behind seawalls to allow for structure support against wave action as well as providing adequate drainage of waters. It allows water retained behind the wall to migrate towards areas of drainage. Due to the inadequacy of the drainage on the south wall, it was observed that the backfill had significantly eroded along the entire length. Since the wall was shotcreted well after the initial structure had been constructed, a visible line could be seen where the shotcrete had once come to the interface of the backfill which resided behind the wall. Seen in the figure below is a distinct line which indicates the initial position of the backfill, and as seen, this line is now over a foot above the now residing backfill. This clearly shows that the backfill which is integral to the stability of the structure has and is continuing to erode.

Figure 28: Signs of Backfill Weathering

Tides

From collected tide data it suggested that high tide would not come within 5 feet of the toe of the existing structure. Upon the March 5, 2009 site visit, shortly after a recent snowfall, marks of the high tide could be seen in the melting of the snowfall. Seen in the figures below is that high tide does come into contact with the bottom of the wall and that this would warrant concern of continuing undercutting of the structure and weathering.

Figure 29: High Tide Marks on South Seawall (1)

Figure 30: High Tide Marks on South Seawall (2)

Nautical Maps

The color on a nautical map is a way of highlighting various features. Pale gold is used for land areas, white is used for water areas, pale blue is used for shallower waters, and green is used for areas that are submerged during some tidal stages and not submerged during others (Hoff, 2009). As seen in the figures below, Wood Island is primarily in the green area, having the Life Saving Station within the pale gold area. Having the majority of the island lying in the tidal area, and due to visual signs of the tidal

reaches, this shows the clear importance of a seawall in serving as protection for the building during these tidal stages and during large storm events.

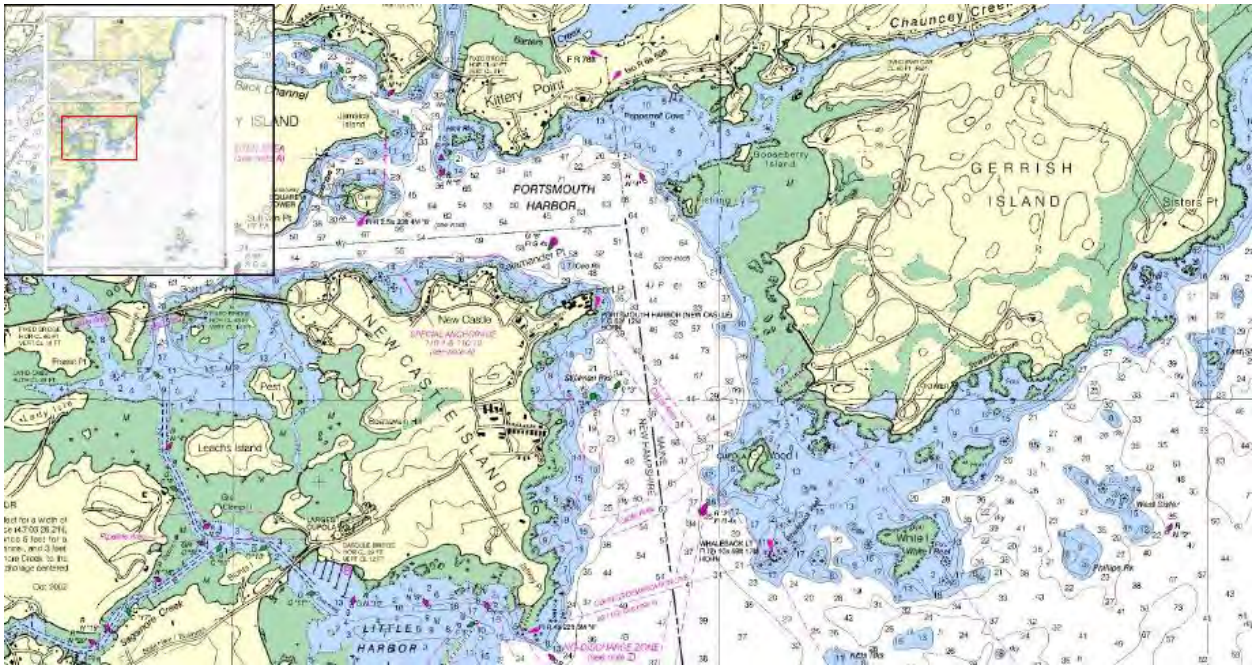


Figure 31: Nautical Map (1) (Administration, 2009)

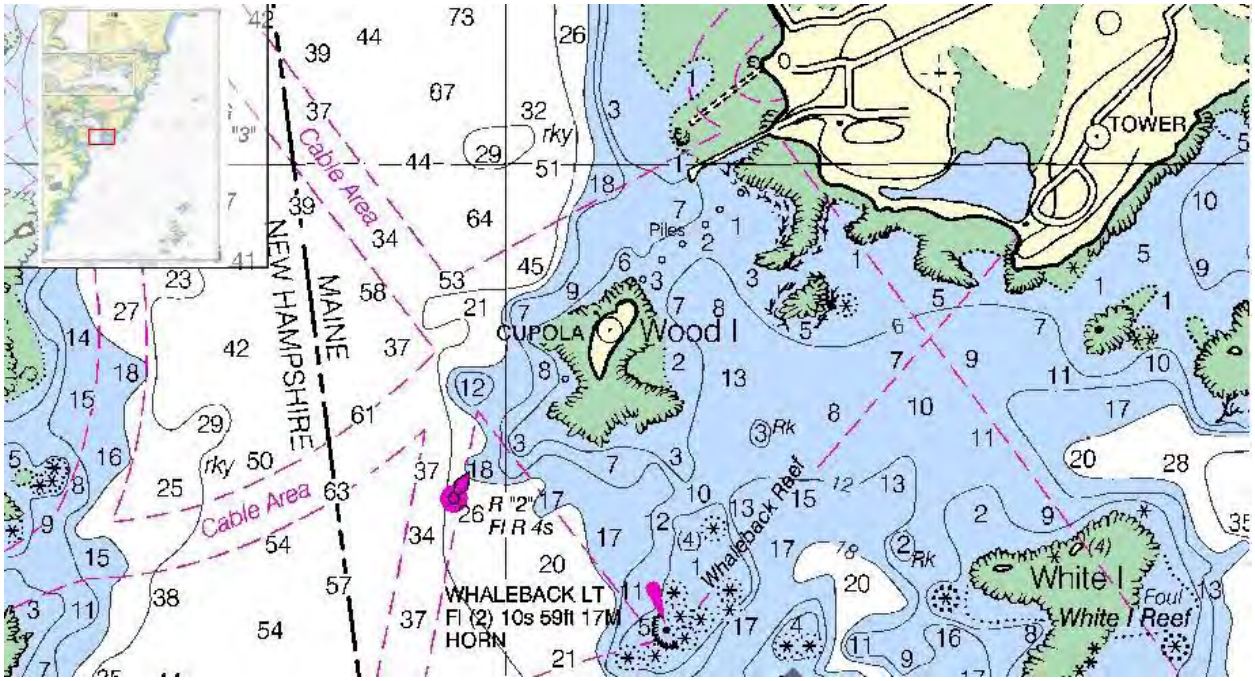


Figure 32: Nautical Map (2) (Administration, 2009)

Sulfate Attack

Seen in the figure below is the leaching of sulfates or salts, which were deposited from the seawater, from the face of the South Seawall. These sulfates may have contributed to the degradation of the paste of the wall, but furthermore have led to severe deterioration of the reinforcing steel mesh of the shotcreted cap. Further consideration must be paid to sulfate attack in the rehabilitation efforts due to reinforcement of a new structure as well as the use of tie anchors which would experience corrosion.

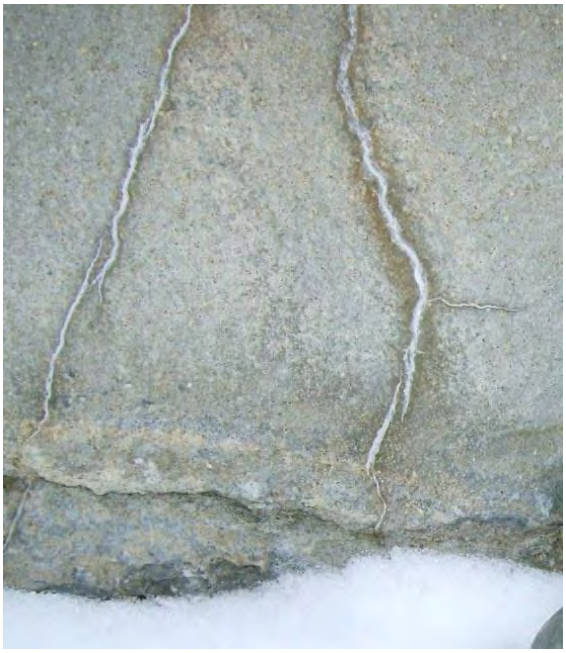


Figure 33: Leaching of Sulfates from South Seawall

North Seawall

Undercutting and Overturning

The north seawall shows significant signs of undercutting due to wave action. Since the seawall was originally placed directly on top of the exposed bedrock, and no footing exists, waves which come into contact with the toe of the seawall slowly erode and wash away the toe of the wall; undercutting the structure. Seen in the figures below are the combinations of undercutting at the toe and freeze thaw deterioration. As undercutting occurs, it poses large risks to the stability of the structure.

Figure 34: Undercutting of North Seawall (1)

Figure 35: Undercutting of North Seawall (2)

The combination of undercutting and other weathering events on the seawall cause a change in the stability of the structure. As the foundation wears away and wave force pounds at the structure, the wall begins to collapse due to its displaced center of gravity and continual battering. Seen in the figures below is a section of the seawall which is experiencing this local instability due to undercutting and wave action. As parallel freeze thaw cracks move across the face of the wall, the cracking allows for internal degradation of the concrete. As seen below, the top portion of the structure is independent of the bottom and has begun to overturn. Since the structure has cracked and acts in independent fashions, it

allows for the horizontal and vertical displacement of the structure as it fails and sooner or later will fall over.

Figure 36: Horizontal Displacement and Overturning of North Seawall (1)

Figure 37: Horizontal Displacement and Overturning of North Seawall (2)

Construction Joints

It seems that the north wall was constructed in segments. At locations approximately every 10 ft horizontally it was observed that construction joints lie where one section ended and another began. These construction joints may have served as expansion and contraction joints or rather as paths for drainage, but have since become a localized area for freeze thaw action. As water penetrates the cracks and then freezes, it expands and then puts stresses in between the segments. This pressure slowly forms cracks and as seen in the figure below is the primary region where the most severe weathering has occurred.

Figure 38: Weathering at Locations of Construction Joints along North Seawall

Freeze Thaw Cycling

Freeze thaw action seems to originate at the construction joints. From there, the water works its way into the internal structure of the wall and forms cracks parallel to the surface. These cracks are vividly seen in the figures below and contribute to the overall weakening of the stability of the structure. As the water expands internally, the induced internal stresses break apart the concrete. Freeze thaw is more obviously seen as the figures below show faces of the wall which are coated in ice from the nearby waters.

Figure 39: Freeze Thaw Action on North Seawall

Figure 40: Visible Freeze Thaw on North Seawall

As water penetrates into the wall, its stresses can expand around aggregates and in turn form voids around the aggregates. Since native aggregates on the island were most likely used in the walls construction, they were largely varying in size and posed larger areas for water to encompass. Seen below, the water infiltrated the surface of the wall at one point and went through freeze thaw cycling around the aggregate located in the picture. This in turn leads to un-bonding of the aggregate and a

sever decrease in the structures overall strength. The voids present around the aggregates also are typical of Alkali-Silica Reaction present in the structure as internal stresses develop from ASR.

Figure 41: Un-bonding of Aggregate due to Freeze Thaw in North Seawall

Alkali Silica Reaction

Alkali-Silica Reaction (ASR) occurs between the hydroxyl ions in the alkaline cement pore solution present in the paste of the concrete and reactive forms of silica in the aggregate. When this occurs, a gel-like substance is formed from the reacted paste and absorbs water; inducing internal stresses in the concrete (Consultants, 2005-2009). Duncan Mellor explained that the cracking seen from ASR is not parallel in structure similar to that of freeze thaw action, but forms spider web cracks similar to that seen in the figure below taken from the north seawall. These cracks were seen along the surface of the north seawall and gave reason for further testing to occur within the laboratory to confirm that ASR was occurring. Also, the geometry of the cracks which originated at the construction joints, due to freeze thaw, showed signs of ASR in that at the corners they would curve upward. This was noted as a sign of ASR by Duncan Mellor during a site visit.

Figure 42: Spider Web Cracking Signs of ASR along North Seawall

Drainage

Drainage paths were seen on the north wall as cast in place holes rather than weepholes as the south side had. The drainage holes were about 3 inch by 3inch and had one located at the bottom and one about halfway up the wall for every segment. As seen in the figure below, these were also sites for freeze thaw action to penetrate and form the typical parallel cracking across the walls face.

Figure 43: Cast in Place Drainage along North Seawall

Backfill

Backfill is used for two purposes with a seawall. It provides stability from overturning when waves come into contact with the structure and also serves as a free draining material so that water pressure does not build up behind the structure. In some areas it was observed that backfill had once been a few feet up behind the existing north wall, but due to weathering, most areas had no backfill present. This leads to further stability issues since there is no longer the mass of the backfill present behind the wall to resist the wave forces.

Tie Anchors

Vertical tie anchors were seen where sections of the wall had collapsed and been washed away. The tie anchors seen, extended about 2 ft vertically from the bedrock and were used to provide stability to the foundation of the original wall. In areas where large portions of the wall were missing, it was seen that tie anchors were spaced about 10 ft horizontally along the length of the wall. Seen in the pictures below are the tie anchors, and serious corrosion has occurred due to the sulfate content of the nearby seawater.

Figure 44: Corrosion of Tie Anchors along North Seawall (1)

Figure 45: Corrosion of Tie Anchors along North Seawall (2)

Analysis Conducted

Laboratory Studies

To determine the extent of weathering and other damages to the existing seawall on Wood Island, various laboratory tests were performed and observations made on a sample taken from the northern seawall which faces Portsmouth Harbor. The following sections include descriptions of the possible issues studied and a narrative of the observations made:

Alkali Silica Reaction

Alkali-Silica Reaction (ASR) is a reaction between the hydroxyl ions in the alkaline cement pore solution present in the paste of the concrete and reactive forms of silica in the aggregate. When this occurs, a gel-like substance is formed which expands in volume by absorbing water present in the concrete creating high expansive stresses usually ranging from 250 to 300 psi. This expansion results in failure, through cracking, in the concrete and in turn structural deterioration of the structure (Consultants, 2005-2009).

One of the more common tests to detect ASR involves the use of uranyl acetate, a radioactive uranium compound. To perform this test, a freshly fractured face must be used to take the uranyl acetate compound, and to do so a hydraulic compression testing machine was used to crush the sample. Once a fractured face was obtained, the sample was taken to the laboratory and uranyl acetate was added as a liquid solution to the fractured face. Excess solution was rinsed off, and then the sample was examined in a dark room with the use of black lights. Under a black light, the gel formed from ASR fluoresces much

more brightly than the cement paste due to the greater concentration of alkali and, therefore, the uranyl ion present in the gel.

From observations, ASR was present in the sample, yet to a degree which seemingly was of minimal concern to the integrity of the structure. ASR was also observed in a cut and polished section of the sample and was seen as dark rings which surround some aggregate faces showing the damage due to portland cement expansion.

Figure 46: Hydraulic Crushing Machine

Figure 47: Core Sample after Fracture

Figure 48: Addition of Uranyl Acetate Solution

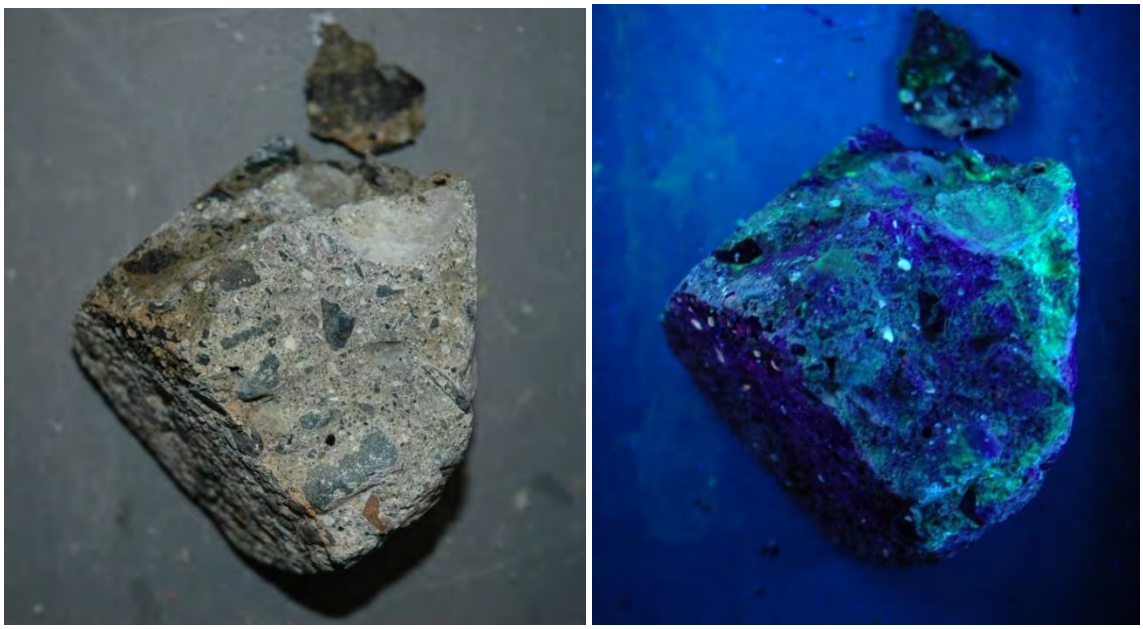


Figure 49: Sample Showing before and after with ASR Fluorescence under Black Lights

Since a sample was used, in considerably small volume compared to the entire structure, it is hard to correlate to the entire structure. More samples would be needed to determine the exact extent of the acceleration of ASR within the entire system, though observations suggest minimal threat.

Cutting and Polishing of Sample

To prepare the sample for other microscopic observations, it had to be cut into various sections using a concrete chop saw. From there, the faces were polished using a concrete polishing turntable. The following figures depict this process:

Figure 50: Concrete Saw

Figure 51: Cut Concrete Sample (1)

Figure 52: Cut Concrete Sample (2)

Figure 53: Polished Sample Concrete Face

Carbonic Acid

Carbonation is a process of weathering which reduces the alkalinity of the concrete it reacts with. During this process, carbon dioxide in the air dissolved in any moisture on or underneath the surface of the concrete forms carbonic acid. The carbonic acid then migrates into the structure of the concrete, forming cracking and reducing its alkalinity, and hence its ability to protect reinforcement from corrosion.

Though reinforcement is not present in the seawall being observed, it is important to note the observations for the possible addition of reinforcing bar in proposed rehabilitation efforts to determine the susceptibility of certain systems under the project conditions. Also noted, carbonation usually strengthens the concrete surfaces, increases wearing resistance, and makes it less permeable.

Evidence of carbonation during observation of the cut and polished sample can be seen with a detectable brownish haze which envelopes the exposed surface of the specimen. Cracking due to carbonation was not observed and it seems that the long term effects would be negligible for rehabilitation. It may actually serve to provide a water barrier if a capping system over the existing structure is chosen.

Freeze Thaw Cycling

Deterioration of concrete due to freeze thaw cycles may occur when the concrete becomes saturated as the pores fill with water. When the water filled pores are then exposed to low temperatures, it then freezes, and if there is no space for expansion, the water causes internal stresses within the concrete. If the stresses cannot be compensated by the concrete structure, the concrete forms cracking to allow for expansion. The cracking during freeze thaw cycling occurs parallel to the external face because as moisture penetrates the face, it does so in layers corresponding to the surface of the face. Each successive freeze thaw cycle buries deeper into the structure of the concrete and forms subsequent larger cracking and deterioration.

Evidence of freeze thaw cycling could be seen when a cut and polished section was examined under the microscope. While observing the sample, large cracks were seen extending across the plane parallel and close to the face of the sample. Though it exhibited signs of cycling, the damages seen within the sample seemed minimal with respect to the overall integrity of the structure. Other typical signs the sample exhibited during a site visit were small chunks which had come off of the structure. This could be probable freeze thaw cycling or even impact loads from waves.

To prevent concrete from freeze thaw damages, concrete is air entrained to allow air voids for moisture expansion. Upon observation, it was hard to detect that the sample was air entrained or if small voids were left due to not being fully compacted when placed. To prevent further freeze thaw damages, air entrainment will be examined for the rehabilitation proposal.

Internal/External Sulfate Attack

Internal/External Sulfate Attack occurs when water containing dissolved sulfate, such as oceanic saltwater, penetrates the concrete. Evidence of external sulfate attack can be seen on a cut and polished section under the microscope at the reaction front. This occurs near the face of the sample where moisture can penetrate. Internal sulfate attack can be seen as saltwater penetrates the pores of the

internal concrete structure. Sulfates attack the composition of the paste and results in an overall loss of concrete strength and bond between the cement paste and the aggregate.

Due to the environmental considerations of the seawall, it was important to search for signs of sulfate attack on the seawall. Under observation, no signs of sulfate attack were apparent, though considerations should be made to ensure rehabilitation efforts account for sulfate content in the accompanying waters as far as reinforcement.

Assumptions

The aforementioned laboratory studies do reveal quite a bit about the extent of weathering on the existing structure, though it is impractical to extrapolate the results from a small sample to the whole of the structure. If an alternative is chosen which integrates the existing seawall, it should be known that the studies in this assessment address a small piece of the entire wall and other sections of the wall may exhibit deterioration due to weathering that is of a much larger extent than appeared in the sample.

Solutions Considered

Precast

Precast alternatives were considered due to ease of construction, durability, and aesthetics.

Redi-Rock System

One option considered was Redi-Rock's Big Block ® seawall construction. This was the system recommended by the supplier for our environmental conditions and used blocks measuring 18" high, 46" wide, and 36" deep, and weighing 2,400 lbs each. To prevent hydrostatic pressure build-up and possible freeze thaw damages associated with water retention behind the wall, it was recommended to backfill with 3'-4' of porous fill (gravel and crushed stone). This system would need to be set upon a 8"-12" thick by 36" deep footing to be poured for a level working area and would need to be tie anchored back into the existing bedrock to prevent a sliding failure. The estimated cost for Big Block ® materials came to be $210,000 which included the delivery and placement. Demolition of the existing seawall, pouring of a new footing for the precast seawall, and backfill material was not considered in this cost estimation.

Tectonics, Inc.

A series of conversations were held with Robert G. Armando, President of Tectonics, Inc. regarding precast alternatives for the seawall rehabilitation efforts. During these conversations Mr. Armando assisted the Wood Island Group in determining relative costs and construction efforts needed to properly address the weathering, deterioration, and location constraints of the existing structure. A survey using Google Earth Pro measured the existing wall at 420 ft total, but it was under his recommendation to address a 600 ft wall. This would more effectively protect the Life Saving Station

from all directions from wave forces by encompassing the buildings perimeter. The 600 ft alternative was not considered due to permitting issues which would involve new construction of approximately 180 ft which is beyond the existing 420 ft that exist. Due to other permitting issues surrounding environmental impacts, it was decided that the best process for precast would be to place a new wall in the same location as the existing wall.

Construction Logistics

The ideal installation would have the existing wall grinded down for later use as backfill material which would save on the cost of demolition and removal of that material. In turn a new cast in place slab pinned to bedrock and a precast superstructure bolted to the slab would be used in the location of the existing wall. The precast superstructure can be plant cast in the area and transported to the site using amphibious barges for erection. Once the pre-casting is complete, the demolition of the existing wall and construction of the base slab can proceed together. The precast structure can be erected no sooner than 7 days following the base slab due to concrete curing time. The total estimated construction time, given moderate weather conditions, would take 6 weeks from the time the precast components are cast to the final placement of the seawall.

Once the existing seawall is grinded and placed out of the way for later use as backfill material, the construction of the new footing may proceed. The footing would consist of an 18” thick and 42” deep concrete slab cast in place with the precast wall sitting 8” back from the face of the slab. The footing placement will be superseded by grinding into the bedrock to provide a level surface for the cast in place footing to be anchored into. It is recommended that 4,000 to 5,000 psi concrete be used for all concrete components of the seawall and that waterproofing additives be used to prevent freeze-thaw damages. Concrete placement can be done through the use of amphibious barges and either mobile-mix concrete trucks or redi-mix concrete trucks utilizing a pumping system. Since amphibious barges are needed to be able to access the island, work must be scheduled around changing tides at the island for accessibility constraints. Placing the footing partially into the existing bedrock will effectively minimize the chance for undercutting and help in wave dissipation prior to coming in contact with the seawall face.

The footing will have 1” to 1 ½” tie bolts anchoring into the bedrock every 8 ft and made of high strength coil bolt inserts. Steel plates will tie into buttresses located at the base of the superstructure which will tie into the rebar present in the footing for later post-tensioning. All reinforcement which will be exposed to weathering would be epoxy coated and or covered with a bituminous material to reduce corrosion. Finally the Redi-Rock ® Big Block system would be erected upon the footing and post tensioned for stability, following the desired footing curing time. The desired wall height is 6 ft tall on the south wall and 8 ft on the north wall due elevations.

Figure 54: Redi-Rock ® Big Block System (Redi-Rock Retaining Wall Series, 2009)

With concern to drainage, weepholes will be cast integrally with the footing, every 8 ft horizontally. Vertical construction joints present in the precast block system provide for vertical drainage mode pathways. To direct water towards the weepholes present in the footing, perforated pipe will lie behind the wall and direct water toward the weephole locations. The perforated pipe will be covered with filter fabric to prevent clogging and then backfilled with the grinded existing seawall to act as a porous free draining media. With the entire proposed precast system in place, it is guaranteed a 50 year design life.

Cost

The conceptual costs associated with the precast alternative are representative of area suppliers and potential subcontractors as used by Tectonics, Inc. The cost is also a function of the weather and tidal surges in the area since work performed is dependent on tidal cycles when using the amphibious barges. The precast system is approximately $1500 per linear foot to cast in place the footing with tie anchors and bedrock grinding, grind the existing seawall for backfill material, and place the new precast seawall. This amounts to approximately 1/3 of the cost for the precast elements and 2/3 the total cost for demolition, an anchored base slab with drainage system, tie backs, and backfill.

The cost to construct a precast seawall in place of the existing 420 ft length of wall would be about $650,000, and to construct the entire 600 ft recommended would be $900,000. A 15% contingency to cover the possibility of extraordinary weather events and the possibility of storm damage during construction is recommended, bringing the 420 ft recommendation to $748,000.

Capping System

The option to place a reinforced cap surrounding the existing wall was researched and found to be ineffective due to the state of deterioration of the existing seawall. The option looked into was to chip away the outer deteriorated concrete and place a reinforced cage of stirrups which would be drilled and placed integrally with the existing wall then pour a concrete cap around this system. The option to spray a hydrophobic foam surrounding the face of the existing wall was also looked into which would prevent further weathering of the existing wall and allow the new cap to act independently from the existing seawall. Although this would help stabilize the existing wall, it was deemed ineffective to serve as a long term solution and thus was abandoned. Below are the recommended design components for a capping system:

Mix Design for Capping Solution

Determined from the American Concrete Institute (ACI) Code, it was found that if minimal steel was used for the reinforcing cage that a minimum of 1 ½" cover be provided for the reinforcing bars when exposed to weather (ACI 7.7.1) (Institute, 2008). This would give a minimum of 3" of concrete to be placed surrounding the existing structure to allow for proper protection for the reinforcing steel. Through the recommendation of Dr. Gress and from guidelines present in the Portland Cement Association Code, the concrete placed was recommended to be greater or equal to 4000 psi concrete with a water-cement ratio less than or equal to 0.4 . Due to sulfates present in the ocean, high quality Type II cement must be used. Air entraining admixtures must be added to have the air content be greater or equal to 6% (Steven H. Kosmatka, 1994).

Reinforcing Steel for Capping Solution

The reinforced cage which would surround the existing seawall would be composed of stirrups tied together by longitudinal reinforcing bars. For the stirrup and tie hooks it was recommended by the ACI Code to have them be embedded into the existing seawall at least 5 bar diameters. Since no. 5 bars were to be used, this would be to have them embedded 3-1/8" into the existing wall (ACI 7.1.3) (Institute, 2008). The maximum spacing of the stirrups in the horizontal direction would be determined from the actual volume of new concrete cast in place. The minimum ratio of horizontal reinforcement area to gross new concrete area must be 0.0020 for reinforcing bars 5 or smaller with a yield stress not less than 60,000psi (ACI 14.3.3). The vertical spacing of reinforcing bars to tie these stirrups together is determined from the volume of new concrete cast also. The minimum ratio of vertical reinforcement area to the gross new concrete area must be 0.0012 for reinforcing bars 5 or smaller with a yield stress not less than 60,000psi (ACI 14.3.2). Both the vertical and horizontal spacing is limited, however, to be a maximum of 18" (ACI 14.3.5).

The aforementioned criteria were guidelines considered for the capping system, and since it was found to not be feasible, further detail was not pursued.

Demolish Wall and New Wall Cast in Place

Tectonics, Inc.

A series of conversations were held with Robert G. Armando, President of Tectonics, Inc. regarding the logistics of a cast in place seawall. During these conversations, it was recommended to go with a battered wall to resist the wave forces associated with the area, since through his experience straight walls with tie backs were found to be more expensive and less effective. The recommended dimensions were to have a 36" base width tapering to a 12" top width with an overall height of 72".

Construction Logistics

The foundation would remain the same as aforementioned in the precast alternative, with the exception of the addition of weepholes spaced at 8 ft on center located 48" from the base of the seawall and weepholes located at 8 ft on center at 12" from the base. The weepholes proposed would not be formed but rather composed of PVC piping at least 1-1/2" in diameter. Due to the size of the wall, the base of the formwork would need to be heavily reinforced to prevent blowout. The formwork would allow for construction joints located approximately every 10- 15 ft and would be flexible joints with a water seal to protect against freeze thaw damage. It was recommended to use C or U shaped stirrup ties for the reinforcing cage and have the bar size be a minimum of a No. 5 bar. All reinforcing bars used would need to be epoxy coated to prevent corrosion from the sulfates present in the sea water. Since the structure would not be post tensioned as with the precast alternative, it was recommended to have the tie anchors present in the footing extend at least 18" from the footing slab to allow for appropriate stability. The tie anchors would be 1-1/2" diameter and would be grout anchored into the bedrock. The concrete used would need to be a 4-5 ksi mix with a low water cement ratio less than or equal to 0.4. This would be made of Type II cement to prevent sulfate interaction with the reinforcing bars and would have an additive for waterproofing. The cast in place wall, once formwork is removed, would later be backfilled with the grinded existing wall to provide for a free draining material to prevent hydrostatic pressure. The design life for the structure would double that of the precast structure due to corrosion issues with the post-tensioning steel used and would be nearly 100 years.

Cost

The conceptual cost associated with the cast in place alternative is representative of area suppliers and potential subcontractors as used by Tectonics, Inc. The cost is also a function of the weather and tidal surges in the area since work performed is dependent on tidal cycles when using the amphibious barges. The cast in place wall is approximately $1000 per cubic yard poured. This cost includes all transportation and a placement cost associated with the wall itself, and does not include the footing. Included in this cost are the formwork, labor, reinforcing bar, concrete, barges, and other associated cost with the placement of the concrete. The total volume of the recommended wall would be 207 cubic yards based off of the area dimensions of the battered wall and the 465 ft length of the wall. This would total

$207,000 for the wall, in addition to the cost of the associated costs with the footing and backfill as described in the precast alternative. The footing and backfill came to be approximately 2/3 of the relative cost for the precast alternative which would be $430,000. These two costs combined come to be $640,000 and with a 15% contingency built in, comes to a total of $736,000.

Leave As-Is

Depending upon other alternatives considered regarding the existing structure and accessibility of Wood Island, was the option to leave the seawall as it is. This option is being considered because rehabilitating the seawall would serve minimal purpose unless the Life Saving Station itself were to be renovated and the seawall would be used as protection for the renovated structure. Other situations, as discussed in the decision matrix, would deem leaving the existing seawall as it is as the most logical solution and are based upon the choices for accessibility and renovation of the existing structure.

Rip Rap Seawall Rehabilitation

The option for placing rip rap in areas where the existing structure needs stability was not researched due to permitting issues which would lie in impacting areas outside the existing seawall. For this reason it was not further looked into, but does heed some recognition as a possible rehabilitation option due to the ease of construction and the relative low cost in comparison to a cast in place or precast seawall.

Rip rap seawalls are comprised of varying sizes of stones which are placed in a way to dissipate wave energy and thus protect the structures behind it from storm damage. A rip rap wall could be placed in areas where the existing seawall is damaged and be used to support the existing wall or act in its place where the existing wall is no longer present.

Seawall Demolition

Depending on which accessibility and Life Saving Station renovation alternatives are chosen, the demolition of the existing seawall may be done to minimize the risk the deteriorating structure currently poses to island visitors.

Construction Logistics

To demolish the existing seawalls a grinder could be used on an amphibious barge and brought onto the island. The grinder consists of a head unit which has teeth which pulverize the existing wall which then uses a conveyor to deposit the material away from the wall. This would serve to eliminate the hazard posed by the wall, and could serve as gravel for pathways along the island or around the Life Saving Station. The option to remove the crushed material from the island was not pursued due to elevated costs associated with doing so. To complete the full demolition of the wall, it would take approximately five work days and would require a three man crew. One person would be to operate the crusher while

two laborers would assist the operator as well as use a torch to remove the tiebacks as they proceed as to not impact damage on the teeth of the grinder.

Cost

The conceptual cost associated with the demolition of the existing seawall would be about $1000 for mobilization and demobilization efforts for the grinder, and an additional $3000 for rental of the grinder and the associated crew. Using the five work days needed and adding the mobilization and demobilization costs it would cost approximately $16,000 total.

Recommendations

The seawall is crucial to protecting the Life Saving Structure. For this reason it is recommended to remove the current seawalls and replace them by either constructing a new wall or using one of the precast solutions. The sizes of the walls seem to have been appropriately built, but the walls themselves are in need of new designs. Once new walls are in place the structure should be relatively protected from the ocean's storms.

Work Cited

Administration, N. O. (2009, January 17). *Office of Coast Survey: Nautical Charts: Atlantic Ocean: Chart 13283*. Retrieved February 26, 2009, from NOAA: http://www.charts.noaa.gov/OnLineViewer/13283.shtml

Consultants, W. M. (2005-2009). *Alkali-silica reaction in concrete*. Retrieved February 09, 2009, from Understanding Cement: Cement Science Made Easier: http://www.understanding-cement.com/alkali-silica.html

Hoff, L. (2009, February 28). *Color Coding Makes Nautical Charts Easier To Read* . Retrieved February 28, 2009, from Mad Mariner: http://madmariner.com/tip/021608

Institute, A. C. (2008). *Building Code Requirements for Structural Concrete (ACI 318-08) and Commentary*. Farmington Hills, MI: American Concrete Institute.

Kamphuis, J. W. (2000). *Introduction to Coastal Engineering and Management: Advanced Series on Ocean Engineering - Volume 16*. River Edge, NJ: World Scientific Publishing Co. Pte. Ltd.

Kozlowski, K. (2008). *Wood Island Feasibility Study* . Portsmouth, NH: Appledore Engineering.

Portsmouth, NH Tide Charts. (2008, June). Retrieved March 01, 2009, from Maine Boats, Homes & Harbors: http://www.maineboats.com/tide-charts/tides?t=junpts09

Redi-Rock Retaining Wall Series. (2009). Retrieved April 12, 2009, from Redi-Rock: www.redi-rock.com

Steven H. Kosmatka, W. C. (1994). *Design and Control of Concrete Mixtures: Thirteenth Edition*. Skokie, IL: Portland Cement Association.

Wood Island Life Saving Station. (2009). Retrieved February 09, 2009, from Google Earth: http://earth.google.com/

Wood Island, ME. (2009). Retrieved February 09, 2009, from flickr.com: http://flickr.com/photos/marcn/956377147/

III. Access Assessment

Kyle Urso, Lawrence Yassayne

Access Assessment Contents

List of Figures

List of Tables

Introduction

The purpose of having access to the Life Saving Station on Wood Island is to provide a suitable and safe recreational landing site for kayakers, canoes, and small water craft. Located of the coast of Fort Foster, Kittery, Maine, this island is unattended with no access location points. The Department of Interior (DOI) has addressed the issue of the island having limited access with the Town of Kittery. The DOI would like to see recreational use of the Island increased. Recreational use of the island includes scenic views of; Whale Back Island, Portsmouth Harbor, Kittery (ME), New Castle (NH), Portsmouth (NH), Fort Foster (ME), Odiorne Point State Park (NH); observation of marine wildlife, water fowl, and to have the occasional picnic on the island. Increasing leisurely visits to the island provides liability issues because of the current condition of the Life Saving Station and the poison ivy rampantly growing on the island.

The proposal of a dock will address the issue of providing a set location for kayakers, canoes, and small water craft to land on the island. The removal of poison ivy will create usable area on the island.

Conditions Assessment

Poison Ivy

As required by the Department of Interior (DOI), Wood Island must be transformed and maintained in order to be considered a recreational area for the Town of Kittery, Maine. In order to fit this requirement certain tasks must be completed, first, of which is the island environment. Since the habitat poses a threat to all visitors in the spring and summer months all poison ivy should be removed. Currently 50% of the island is covered by the plant, affecting unaware explorers wishing to get a closer look at the life-saving structure.

Proper removal techniques should be employed when removing the poison ivy. Under no circumstances should poison ivy be burned.

Analyses Conducted

Site Obstacles

The Island is barren with the exception of a seawall and the lifesaving station. The coverage of poison ivy is a hazardous growth and the predominant site obstacle. Other obstacles include lead paint and asbestos coated pipes which pose a health threat. Another obstacle to overcome relates to getting material off to the island. Maintenance of the island and/or the structure is another problem which is made more difficult due to its location at sea versus on mainland.

Figure 55: Eastern Aerial View

Site Alternative Energy

The previously mentioned investigation reveals that the island's hazards should be mitigated in order to allow safe recreation on the site. At the time of this report it was unclear if the island is insured. In order to promote a safe environment for recreation, safety should be a prominent concern and injury situations should be minimized. An energy source such that enough watts could be produced in order to provide lighting to both the structure as well as the proposed dock in the event that a visitor extends their stay past dusk. Such a feature would assist in making the island safe and minimizing option for injury.

The Lifesaving Station serves as an icon to the surrounding public; however, this is only during the daytime hours. By providing an energy source to the island we can restore this structure's iconic significance providing more photo opportunities and a greater sense of historical unity within the town.

Wind Energy Option

As the world turns to more renewable energy sources to produce electricity, wind energy is at the forefront as stated by the DOE, “wind energy systems are one of the most cost-effective home-based renewable energy systems.”

There were two options for energy output, a wind energy option and a solar energy option, as the island’s location and environment allows both to be successful. More specifically, looking into the wind energy option, preliminary investigations were necessary.

Wind production is categorized in Classes, 1-7 with Class 7 indicating the highest wind speeds. The Department of Energy suggests that Class 4 and above are good resources and should be further explored. Initial investigation concludes there would need to be a 50m windmill in order to absorb the 6.4 to 7.5 m/s winds.

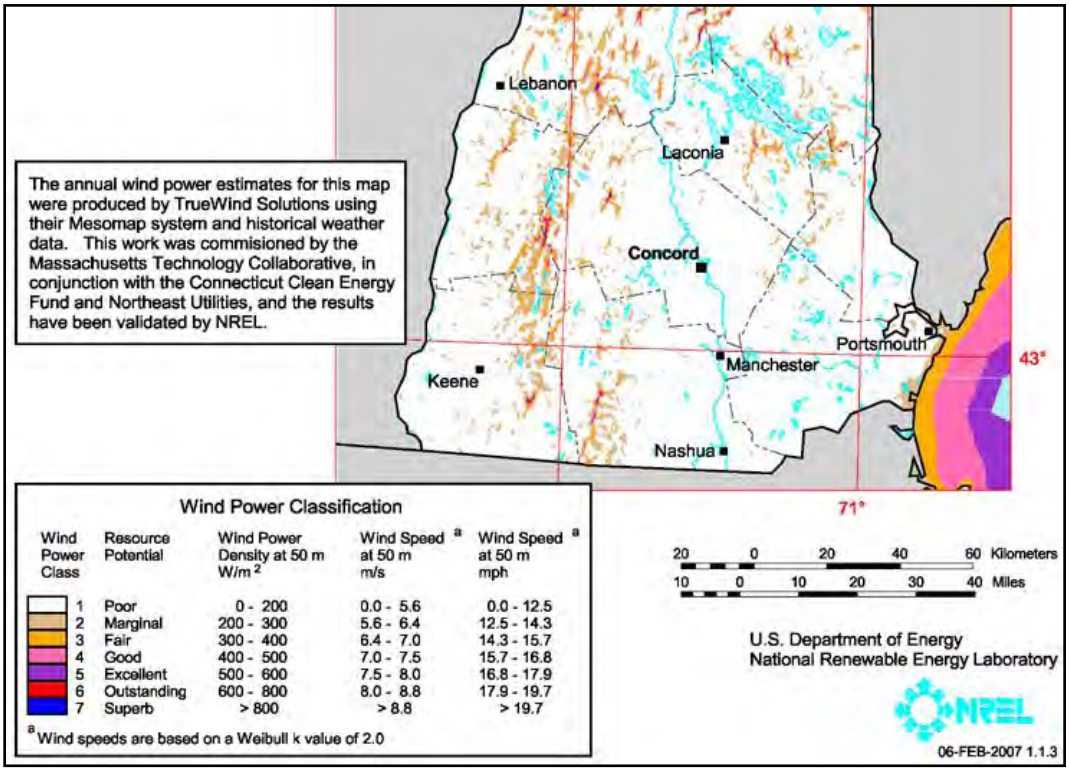


Figure 56: Seacoast Wind Power Classification

Figure 56: Seacoast Wind Power Classification, taken from the U.S. Department of energy, shows that Wood Island, located in the Portsmouth Harbor, would fall in the category of a fair/good power classification. However this data shows wind speed estimates at 50m above the ground and be useful for large wind turbines. Assumptions were made based on a comparison of Wood Island’s characteristics

to determine the appropriate wind turbine size. The analysis concluded that a 20 meter wind turbine is required to successfully harvest 5-6 m/s wind speeds (Appendix).

Wind Direction

Subsequently, following an initial investigation of wind production, data also needed to be found on which direction the wind was coming from and if or if not this changes throughout the course of the year.

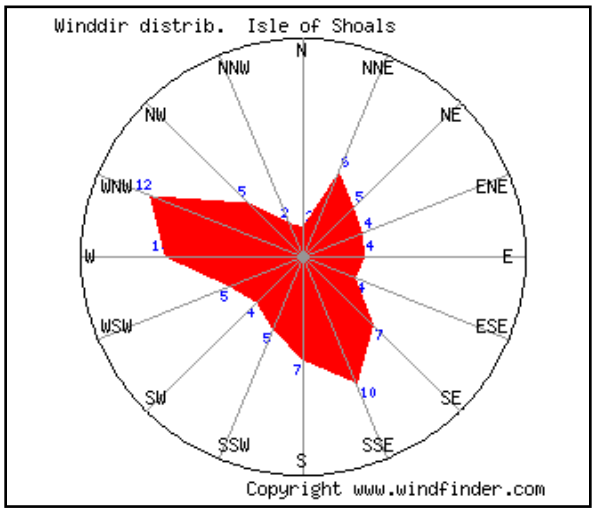


Figure 57: Average Yearly Wind Direction

There was limited data regarding wind direction and distribution for the exact location, which is why data was taken for the Isle of Shoals. Figure 57: Average Yearly Wind Direction shows that throughout the course of a year the wind direction is nearly 360 degrees, with an average of 7m/s. To get a feel for the environmental effect of specific wind speeds, refer to Table 1 in the Appendix (Windfinder). More specifically a breakdown by months taken from January 2007 to December 2008 can be seen in Table 3, showing the summer months with the lowest wind speeds of 5 m/s.

Table 3: Isles of Shoals Wind Directional and Speed Data (Windfinder, 2009)

Wind Statistic | Wave Report | Wind Report | Forecast | Super Forecast

Isle of Shoals (SHOALS)

Stats based on observations taken between 1/2007 - 12/2008 daily from 7am to 7pm local time.

Month of year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	SUM
	01	02	03	04	05	06	07	08	09	10	11	12	1-12
Dominant Wind Dir.													
Wind probability > = 4 Beaufort (%)	74	72	76	69	67	61	44	52	52	57	73	77	64
Average Wind Speed (kts)	16	17	17	15	14	13	11	11	12	13	16	17	14
Average Airtemp. (°C)	-2	-1	2	7	13	18	22	20	18	13	6	1	9

Wind Turbines

Wind turbines convert the kinetic energy from the wind into mechanical power that runs a generator which then produces electricity. The rotor (blades and hub) rotates as the wind hits, which spins the low-speed shaft along with the gear box, ultimately spinning the generator creating electricity, all of which can be seen in the figure. The electricity can then be put to use or stored in batteries on site.

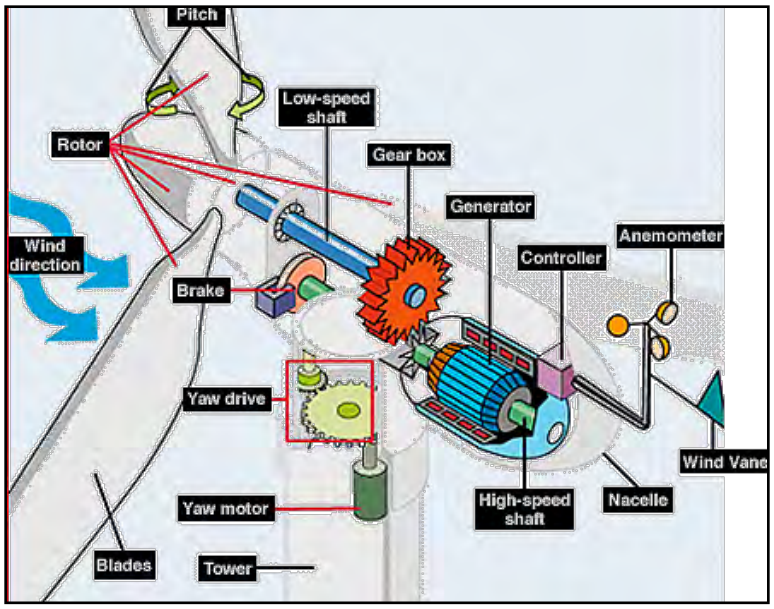


Figure 58: Mechanics of a Wind Turbine

Once the data was analyzed, a list was comprised noting the specific characteristics that would make wind energy a competitive alternative energy source on Wood Island:

- <20m height
- Minimum wind speed 5 m/s
- Utilize 360 degrees of wind direction
- Low maintenance
- Low cost
- 1 kW energy production
- Silent
- Aesthetic

With these specifications in mind, two turbines were found that would make the best fit: Quietrevolution and Windspire.

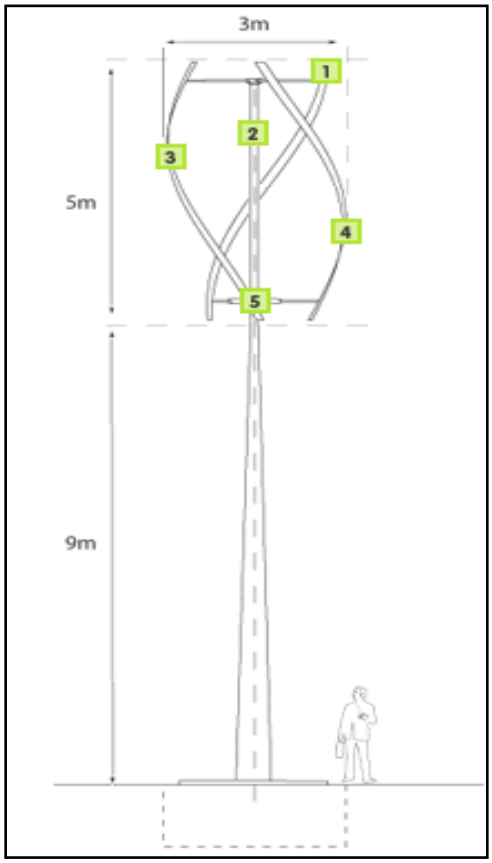


Figure 59: Quiet Revolution (Quietrevolution, 2009)

Figure 60: Windspire (Mariahpower, 2009)

Solar Energy Option

A second renewable energy source would make use of solar panels to create electricity. By harnessing the suns photons with semiconductors, in most cases silicon, within the solar panel atoms are set off. As an atom's excitement heightens it will eventually lose an electron. Once an electron is lost, it turns to a free movement role where it can be captured and turned to energy. Solar Panels can come in all sizes depending on a client's energy consumption. In this case since there would only be a need for a small production of energy in order to power lighting, an extravagant array of panels would be unnecessary.

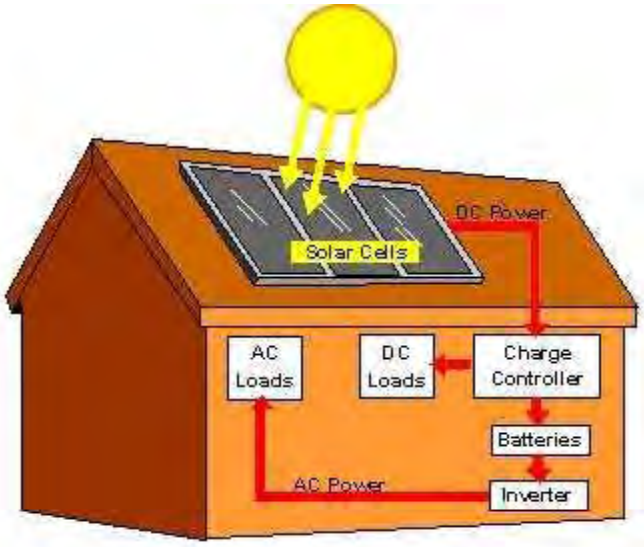


Figure 61: Solar Energy Diagram (Saferenvironment.wordpress, 2009)

Cost of Supplying Light

With today's push to better the world through the power of renewable energy, the Database of State Incentives for Renewable Energy (DSIRE) offers ways for Commercial, Industrial, Residential, Nonprofit, Schools, Local Governments, State Governments and Agricultural sectors to receive refunds, grants and/or rebates depending on eligible renewable technology, system size, system use, and fund availability.

The state of Maine has many funding opportunities for those interested in renewable technology, for instance, the Voluntary Renewable Resource Grant, supported by the state's Voluntary Renewable Resource Fund and administered by the Maine Public Utilities Commission (PUC) provides funding to a maximum of $50,000 for communities looking to educate the public on the benefits of renewable energy through small-scale demonstration projects (Appendix 1).

This however would require a complete change in the perception of Wood Island, because it would be turned from an uninhabited visit at your own risk, to more of an educational understanding of the steps communities are taking to "go green." The advantage of this scenario lies in the fact that the youth in the community would become closer and more aware of the history in their town, Wood Island in particular, while at the same time learning how electricity on the island is powered by none other than the wind and sun they feel outdoors.

Dock Analysis

Two types of docks were analyzed. The first is a traditional wooden dock. The second option is a modular dock system.

The initial wooden dock was designed having a 65psf live load and a dead load of 10psf. The length of the dock was 24 feet long and 8 feet wide. The piers are six by six descending into the drilled concrete piers. The beams had an initial size of two by ten inch. The girders were two by twelve inches. The surface of the dock was sized with 5/4 inch pressure treated boards. The total cost of the initial design was $15,000. However, this design would not fulfill the length requirement.

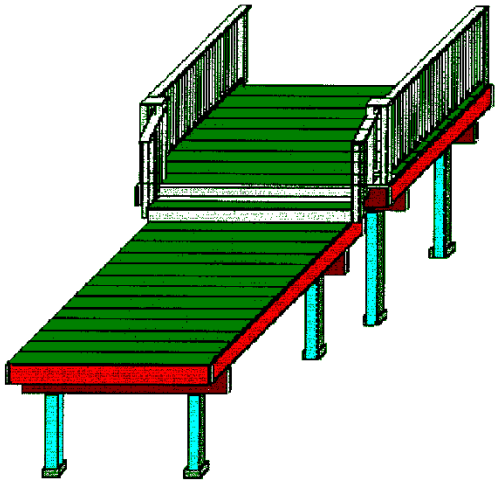


Figure 62: Initial dock design (see appendix for details)

The redesign changed the decking to three inches, twelve by twelve columns four by twelve inches joists and six by twelve inch girders. The length would have been increased 56 feet. The estimated cost for the redesign was over fifty thousand dollars. This type of dock was abandoned due to the extreme cost.

The second analysis consisted of two different manufactures of a modular dock system.

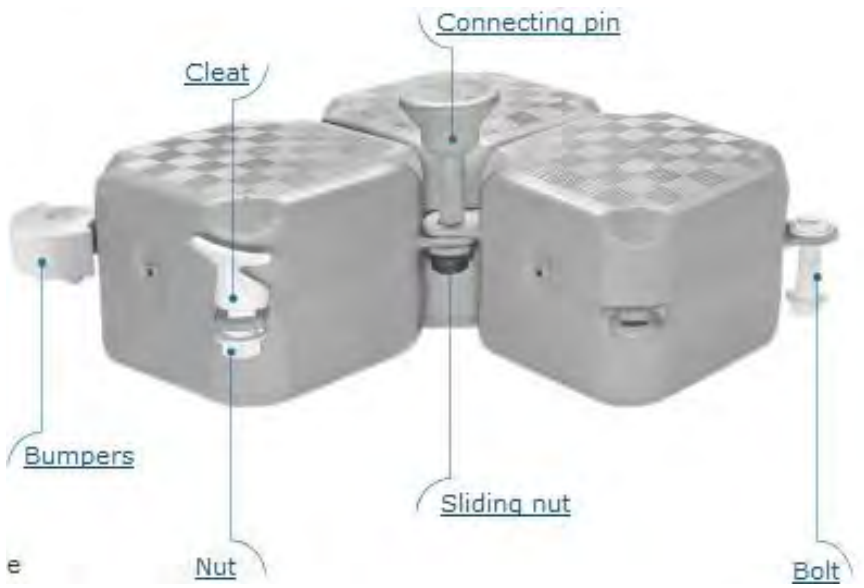


Figure 63: CanDock, Inc. image

The first manufacturer, CanDock, Inc. product is made from high density polyethylene, the weight of each cube is 14 lbs, the dimensions are 19”x19”x16” tall, it can support 200 pounds, has a non-skid surface, and comes with a lifetime warranty.

Figure 64: Proposed location

The Dock is four cubes wide, approximately 60 feet long with a height of the L greater than 15 feet.

This product is virtually maintenance free. It can be left unattended in the winter months. It can withstand waves of four to six feet.

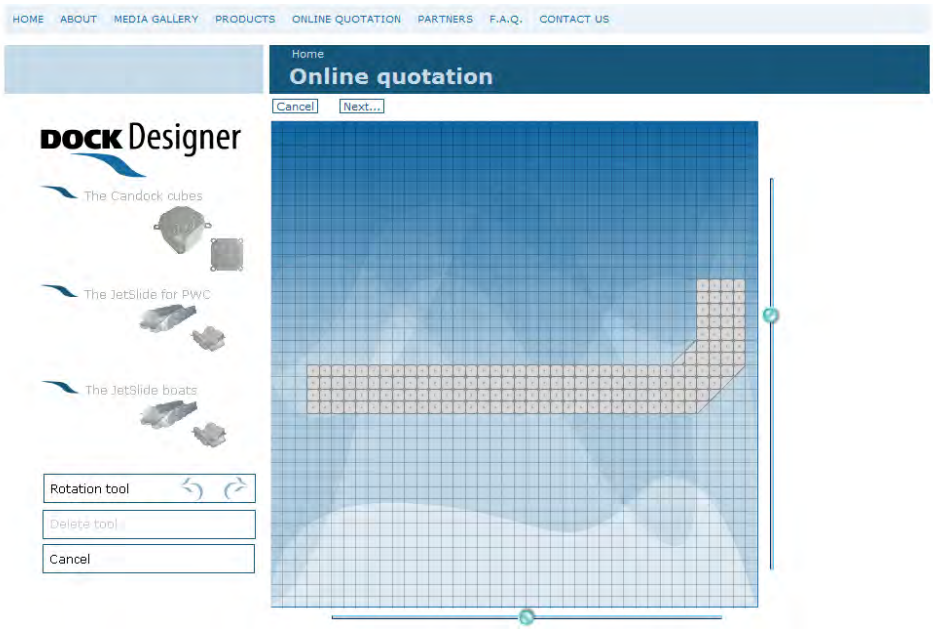


Figure 65: Modular Dock design

The anchoring structure will be constructed of the Seaflex mooring system. This is a unique system that is virtually maintenance free, dampens the effect of waves, and keeps the structure in place. The moorings are self-regulating and are specially designed for the area of where they will be used.

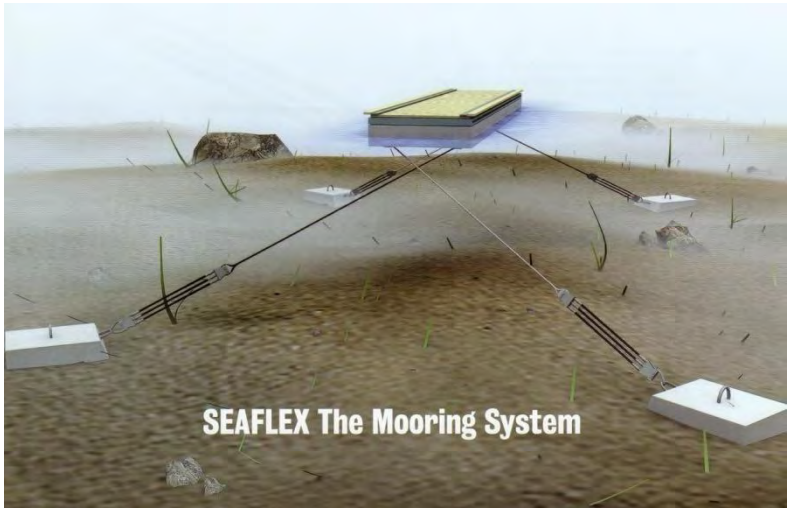


Figure 66: Seaflex Mooring System

The second manufacture studied was EZ Dock. This modular dock system boasts; Low maintenance, a variety of dock anchoring options, versatile modular design, secure connection couplers, strength and flexibility, slip resistant dock surface and four season accessibility.

The EzDock design is flawed, it cannot withstand rough seas (greater the two foot waves) without breaking. Therefore this product cannot be considered as a solution.

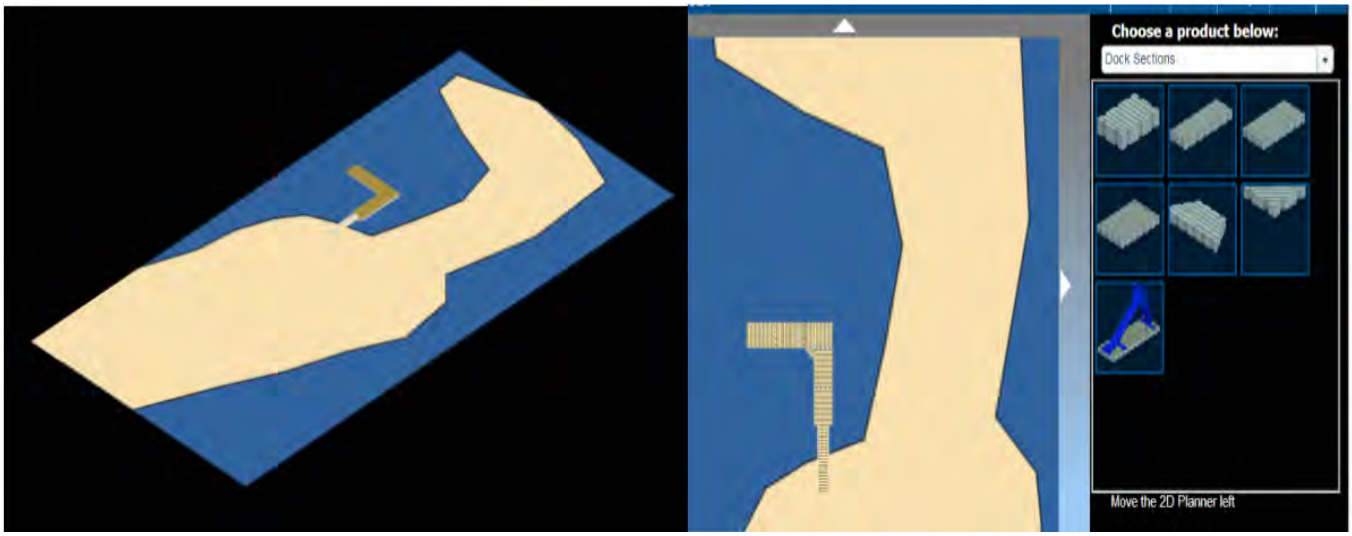


Figure 67: EzDock design

Solutions Considered

Alternative Energy

Wind Energy

Wind energy solutions were costed without the State incentives. Prices were obtained from quotes through direct conversation with the turbine manufacturers.

Since, the island would require a turbine capable of 360 degrees of wind direction, the two options were the Quiet Revolution and the Windspire. Though both were similar in size and price at approximately $25,000 as quoted by company dealers, much of the energy each would be able to produce would go unused. After analyzing and approximating possible energy consumption as a result of lighting the structure versus turbine energy production the conclusion was made that these systems are much too large for such a small-scale project. Though there is a way to send the surplus back to a grid system, this too was ruled out because the location would be out at sea.

Solar Energy

The solar energy solutions were not fully costed, because of the same issue as the wind turbines, which was more energy than necessary. Rather, an extremely low-scale option was researched and the result was a $54.99 Solar Flood Light (3-Pack). Such lights have the option to be nailed directly to the structure while at the same time moving the solar panel to another location within 20 feet if obstruction hinders solar consumption. Product Specifications can be seen in the Appendix.

Figure 68: Integral Solar Flood Light - 3 Pack

Dock

The Candock modular dock system with the seaflex mooring system is the most feasible solution to provide a safe access location point to the island. At sixty dollars per cube and thirteen dollars for the fasteners, the dock will cost approximately $10,600. The Seaflex mooring system is roughly $10,000. The other additional cost is transporting the material out to the island which is approximately $5,000. The modular dock option will cost roughly $25,600.

Recommendations

The Wood Island Feasibility Study was done with the assumption that the Department of Interior required improved access to the recreation site. Visitors provided with a place to dock their boats without having to struggle and worry about the tide affecting its location increases safety.

Wood Island Feasibility Study

Part Two Appendices

April 2009

Completed for the Town of Kittery, Maine in cooperation with the University of New Hampshire and Appledore Engineering, Inc.

Written by Katherine E. Andruchuk
Mary Ferguson
Krystian E. Kozlowski
Seth Lizotte
Kyle Urso
Lawrence Yassanye
University of New Hampshire, Department of Civil Engineering

Project oversight by Jennifer L. Viarengo, P.E., Appledore Engineering Inc.
and Duncan Mellor, P.E., Waterfront Engineers LLC

Funded by the 2008 State of Maine Shore and Harbor Technical Assistance Grant

Table of Contents

A. Structure Assessment Appendix

Mary Ferguson, Krystian Kozlowski

Structure Assessment Appendix Contents

Preliminary Abatement Analysis

Terracon

ASSUMED ASBESTOS-CONTAINING MATERIALS
Wood Island
Kittery, ME

Description	Material Location	Percent/Type Asbestos	NESHAP Classification	Condition	Estimated Quantity
Life Boat Station: Basement					
Pipe insulation	Main basement Boiler room	Assumed ACM	Friable ACM	Significantly damaged	260 LF 20 LF
Pipe fitting insulation	Main basement Boiler room	Assumed ACM	Friable ACM	Significantly damaged	50 Fittings 50 Fittings
Boiler insulation	Boiler room	Assumed ACM	Friable ACM	Significantly damaged	50 ft^2
Tank insulation	Boiler room	Assumed ACM	Friable ACM	Significantly damaged	60 ft^2
Gypsum board	Main basement Boiler room	Assumed ACM	Friable ACM	Significantly damaged	10 ft^2 12 ft^2
Stair tread cover	Main basement	Assumed ACM	Category I Non-Friable	Good	8 ft^2
Electric wire wrap	Throughout	Assumed ACM	Category II Non-Friable	Good	Unknown
TSI insulation debris	Main basement Boiler room	Assumed ACM	Friable ACM	Significantly damaged	2,300 ft^2 180 ft^2
Sheet flooring	Main basement:: Debris on floor at base of stairs	Assumed ACM	Category I Non-Friable	Significantly damaged	10 ft^2
Life Boat Station: 1st floor					
Pipe insulation	Boat house: Riser	Assumed ACM	Friable ACM	Significantly damaged	4 LF
Plaster with skim coat	Station	Assumed ACM	Friable ACM	Significantly damaged	5,440 ft^2
Sheet flooring: Canvas backed	Station: Throughout	Assumed ACM	Category I Non-Friable	Damaged	1,200 ft^2
Flooring paper	Station Boat house	Assumed ACM	Friable ACM	Damaged	1,450 ft^2 1,550 ft^2
Electric wire wrap	Throughout	Assumed ACM	Category II Non-Friable	Good	Unknown
Life Boat Station: 2nd floor					
Plaster with skim coat	Throughout	Assumed ACM	Friable ACM	Significantly damaged	3,600 ft^2
Flooring paper	Throughout	Assumed ACM	Friable ACM	Damaged	3,600 ft^2
Stair tread cover	Stairwell	Assumed ACM	Category I Non-Friable	Good	1 ft^2
Electric wire wrap	Throughout	Assumed ACM	Category II Non-Friable	Good	Unknown

Terracon

ASSUMED ASBESTOS-CONTAINING MATERIALS, continued
Wood Island
Kittery, ME

Description	Material Location	Percent/Type Asbestos	NESHAP Classification	Condition	Estimated Quantity
Life Boat Station: Exterior					
Siding Paper	Exterior	Assumed ACM	Friable ACM	Damaged	4,600 ft^2
Asphalt roof shingles	Exterior	Assumed ACM	Category I Non-Friable	Damaged	4,200 ft^2
Tool house					
Siding Paper	Exterior	Assumed ACM	Friable ACM	Damaged	480 ft^2

ft^2 = square feet
lf = linear feet
Friable: Includes materials that, when dry, may be crumbled, pulverized or reduced to powder by hand pressure.
Category I: Includes asbestos-containing packings, gaskets, asphaltic roofing products, resilient flooring, pliable sealants and pliable mastics.
Category II: Includes any non-friable materials other than Category I materials that contain more than 1% asbestos.
ACM: Asbestos containing material. Material that contains greater than 1% asbestos content.

Design Calculations

Preservation of Current Condition Option Calculations

MARY FERGUSON WOOD ISLAND RESTORATION OPTION

WINDOW STEEL PLATING

LOAD DEVELOPMENT:

1. V = 100 mph
   Ka = 0.85, SOLID SIGNS ASCE 7-05 TG-4
2. I = 1.00, CATEGORY II ASCE 7-05 T1-1 & G-1
3. $K_{0-15} = 1.03$, EXPOSURE D ASCE 7-05 TG-3
4. $K_{zt} = (1 + K_1K_2K_3)^2 = 1$ ASCE 7-05 FG-4
5. G = 0.85 ASCE 7-05 Sect G.5.8
6. ENCLOSED. ASCE 7-05 Sect G.2
7. $GC_{pi} = \pm 0.18$ ASCE 7-05 FG-5
8. C_f : CASE A ASCE 7-05 FG-20

b	s	h	b/s	s/h	Cf
3.00	3.40	9.90	0.88	0.34	1.80
3.60	6.00	10.30	0.60	0.58	1.70
3.90	7.20	8.10	0.54	0.89	1.60
9.00	7.50	14.00	1.20	0.54	1.75
3.40	5.50	9.80	0.62	0.56	1.75
4.40	3.80	7.80	1.16	0.49	1.75
5.00	3.70	13.00	1.35	0.28	1.80
9.10	10.40	13.30	0.88	0.78	1.65
3.50	3.90	12.90	0.90	0.30	1.80
3.90	7.60	11.60	0.51	0.66	1.70
3.20	5.70	12.20	0.56	0.47	1.75

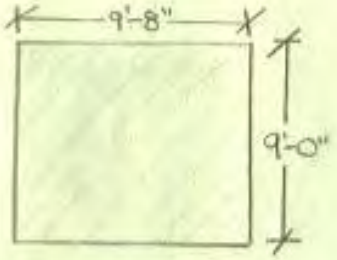
9. $q_z = 0.00256\ K_z K_{zt} K_d V^2 I$ ASCE 7-05 EQ G-15
   $= 0.00256(1.03)(1.00)(0.85)(100)^2(1.00) = 22.4$
10. $p = q_z \cdot G \cdot C_p = 22.4(0.85)(1.80) = 34.3$ psf ASCE 7-05 EQ G-17

MARY FERGUSON | WOOD ISLAND | RESTORATION OPTION

WINDOW STEEL PLATING:

THICKNESS DESIGN:

SOUTH GARAGE DOOR:



$P = 34.3$ psf

$P_u = 1.6(34.3\text{psf}) = 54.9$ psf $= 7.90$ KSI (AISC pg 2-8)

$t_{reqd} = \ell \cdot \sqrt{\frac{2P_u}{0.9F_y BN}}$ (AISC 14.5)

$\ell = MAX \begin{cases} m = [N - 0.95d]/2 \\ n = [B - 0.80\,b_f]/2 \\ \lambda_n' = [2\sqrt{db_f}]/4 \end{cases}$

$N = (9'-0") + 4" = 112"$

$B = (9'-8") + 4" = 120"$ (ASSUMING 4" OVERHANG)

$\lambda = \frac{2\sqrt{x}}{1+\sqrt{1-x}} \leq 1$ $\quad x = \left[\frac{4db_f}{(d+b_f)^2}\right]\frac{P_u}{\phi_c P_p}$ → NA: $\therefore \lambda = 1$ TO BE CONSERVATIVE

$m = [112" - 0.95(108")] = 9.4"$

$n = [120" - 0.80(116")] = 27.2"$

$\lambda = (1)\sqrt{(108")(116")}/4 = 28.0"$

$t_{reqd} = (28.0)\sqrt{\frac{2(7.90\,KSI)}{0.9(36KSI)(112")(120")}} = 0.1687" = \frac{3"}{16}$

USING A36 STEEL, $F_y = 36$ KSI (AISC T2-3)

APPROX COST: \$9.19 /SF + \$10/plate

APPROX WT: $0.284\frac{lb}{in^3}\left(\frac{3}{16}in\right)\left(144\frac{in^2}{ft^2}\right) = 7.68\frac{lb}{ft^2}$

$= (9'-8")(9')\left(7.68\frac{lb}{ft^2}\right) = 717\,lb.$

Metals Depot Shopping Cart - View the contents of your shopping cart http://www.metalsdepot.com/Cart3/viewCart1.phtml?LimAcc=$Lim...

MetalsDepot *The Small Quantity Source!* Online Metals Shopping!

Sunday March 29, 2009

Secured by VeriSign

or Call 1-859-745-2650

[redacted] Quick Quote Catalog Catalog View Order Enter Catalog Item # Find

Choose a Product ... Become a Dealer KAMA Band Saw Shipping Info Company Info NEW Discounts

Quantity Discounts Available! Call 1-859-745-2650 or click the Quick Quote button above.

Your shopping cart contains the following items:

Stock Number	Item Description	Length	Quantity	Status	Price Each	Totals	Change Quantity/Size
P1316	3/16 inch THICK A36 Steel Plate	1 X 4 Ft.	1	In Stock	$46.76	$46.76	Change
P1316	3/16 inch THICK A36 Steel Plate	1 X 2 Ft.	1	In Stock	$28.38	$28.38	Change
P1316	3/16 inch THICK A36 Steel Plate	1 X 1 Ft.	1	In Stock	$19.19	$19.19	Change
			Total:			$94.33	Empty Cart
Hot Tip! For maximum discount put all items in Cart before you Calculate Shipping! [redacted]			[redacted]				[redacted]

Get your MetalsDepot® Catalog FREE with any purchase, a $5.00 value.
Click here [redacted] to add our catalog to your shopping cart!

To delete an item from your order, click on the "Change" button and put a zero (0) in the quantity field. The item will be removed from your order.

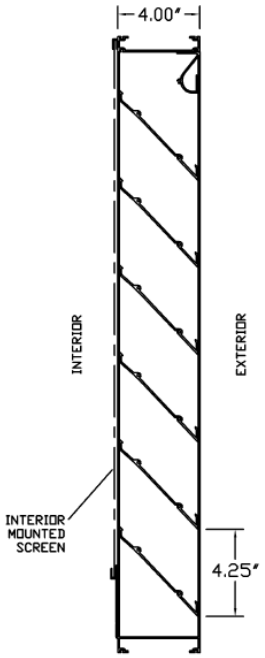
#$10 start
* $9.19/SF

It's a simple fact that anyone who uses the internet to purchase goods is concerned that their personal information may be compromised. Our site has been secured with a Verisign security key. What does that mean to you? It means that we have taken extra measures to protect contact and payment information that is passed from you to us. It's our way of assuring you that we are concerned about our clients, and that we take a professional attitude toward our business.

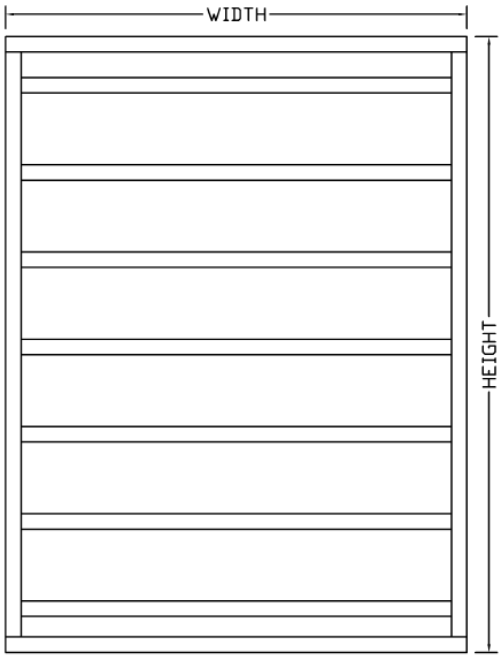
A LEDFORD STEEL COMPANY *Serving Industry Since 1971* Contact Us!

1 of 1 3/29/2009 10:41 PM

E4DS - 4" DEEP 45 DEGREE DRAINABLE D BLADE EXTRUDED ALUMINUM STATIONARY LOUVER



SECTION VIEW



ELEVATION VIEW

BLADE - 0.081" THICKNESS TYPE 6063-T5 EXTRUDED ALUMINUM

FRAME - 0.081" THICKNESS TYPE 6063-T5 EXTRUDED ALUMINUM

DESIGNED FOR 100 MPH WIND LOAD

SIZES 12" WIDE X 12" HIGH UP TO UNLIMITED SIZE AVAILABLE

OPTIONS:

MOUNTING FOR VARIOUS OPENING TYPES (SEE FRAME STYLES BELOW)

ARCHITECTURAL SHAPES (SEE SPECIAL SHAPES TECH SHEET)

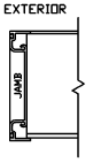
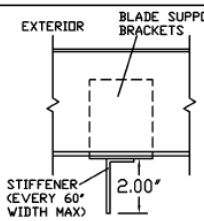
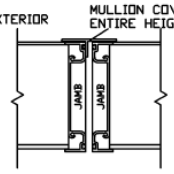
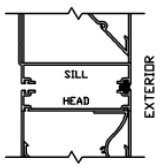
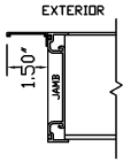
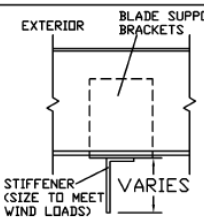
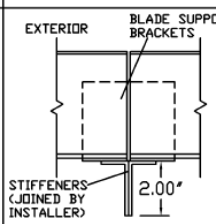
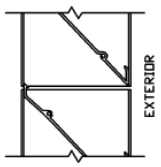
HIGHER WIND LOAD RATINGS

ARCHITECTURAL FINISHES

VARIOUS SCREENS

* SEE MOUNTING OPTIONS TECHNICAL SHEET FOR MORE FRAME STYLES:

1. J-CHANNEL FOR SIDING OR STUCCO
2. G-CHANNEL FOR GLAZING INTO STOREFRONT OR CURTAINWALL

CONSTRUCTION	FRAME STYLE *	STIFFENER	VERTICAL MULLION (MULTIPLE PANELS WIDE)	HORIZONTAL MULLION (MULTIPLE PANELS HIGH)
STANDARD	 CHANNEL "C" FRAME	 BLADE STIFFENER	 EXPOSED	 EXPOSED
OPTIONAL	 FLANGE "F" FRAME	 BLADE STIFFENER	 HIDDEN	 HIDDEN

ARCHITECTURAL LOUVERS
266 West Mitchell Ave - Cincinnati, OH 45232
PH: (888) 568-8371 Fax: (888) 568-8370

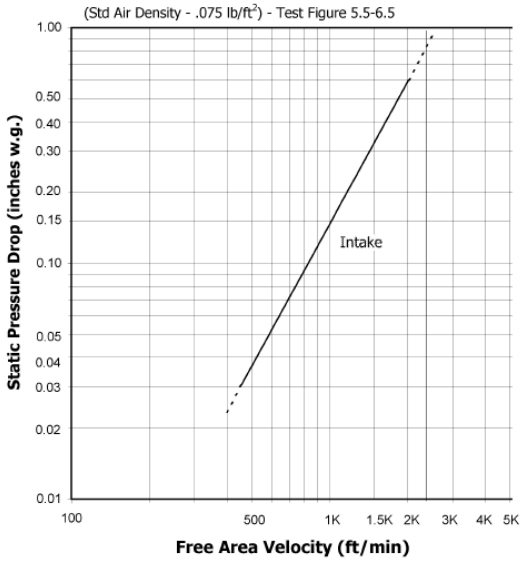
PROJECT			
CONTRACTOR			
ARCHITECT			
DRAWN BY: JRR	DATE: 08/2007	DRAWING TYPE: TECHNICAL SHEET	DRAWING TITLE: E4DS

MODEL: E4DS Louver Performance Data

The Architectural Louvers Model E4DS is tested in accordance with AMCA 500-L Laboratory Methods of Testing Air Louvers for Rating. The data presented are the results of these tests. Tested louver size is 48" wide x 48" high and does not include the effects of bird screen.

Airflow Resistance

(Std Air Density - .075 lb/ft^2) - Test Figure 5.5-6.5

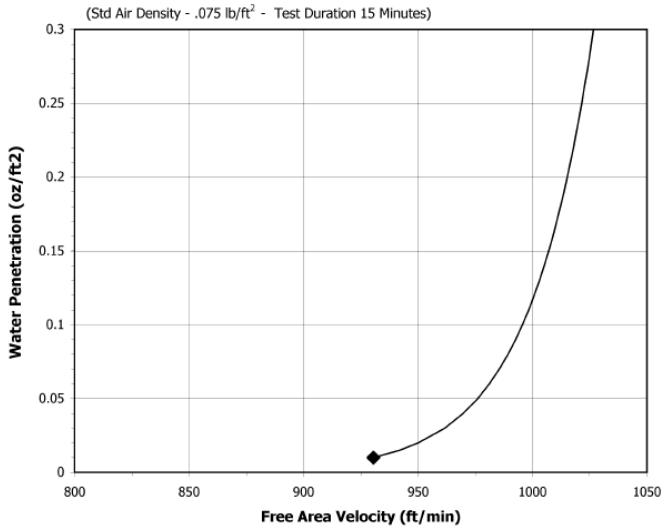


Model: E4DS resistance to airflow
Free area velocities (shown left) are higher than average face velocity or duct velocity. See louver application information.

Architectural Louvers certifies that model E4DS louver shown herein is licensed to bear the AMCA seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 511 and comply with the requirements of the AMCA Certified Ratings Program. The AMCA Certified Ratings Seal applies to air performance ratings and water penetration ratings only.

Water Penetration

(Std Air Density - .075 lb/ft^2 - Test Duration 15 Minutes)



The AMCA Water Penetration Test provides a method for comparing various louver models and designs as to their efficiency in resisting the penetration of rainfall under specific laboratory test conditions. The point of zero water penetration is defined as that velocity where the water penetration curve projects through .01 oz. of water (penetration) per sq. ft. of louver free area. The beginning point of water penetration for this Model E4DS is 930 fpm free area velocity. These performance ratings do not guarantee a louver to be weatherproof or stormproof and should be used in combination with other factors in selecting louvers (i.e. prevailing wind direction, weather patterns for the building location area, desired safety factor, etc.).

November 2007

MODEL: E4DS Louver Application Guide

Application of air louvers involves selecting an airflow velocity through the louver free area (free area velocity in fpm) that produces an acceptable pressure drop and for intake applications minimizes carry-over of normally occurring rain. Architectural Louvers does not warrant our louvers to prevent water penetration under all combinations of wind and rain. Water penetration through Model E4DS begins at 930 fpm free area velocity. Intake air louver selection using a free area velocity below 930 fpm is recommended. Louver selection involves the following steps, and depending on the information provided, either step may come first.

Select Free Area Velocity - Fan Forced Intake:

Using the Airflow Resistance Chart, select a free area velocity that produces an acceptable pressure drop with minimal water penetration. (Water penetration is not typically considered when selecting exhaust louvers.)

Determine Louver Free Area:

Using the free area velocity from previous step and total cfm, determine the louver Free Area required. Using louver Free Area Chart, select a louver with the required free area. If louver size is given, determine free area from chart and work backwards to determine maximum airflow. See examples below.

Free Area Chart (ft^2)

Louver Height (Inches) \ Louver Width (Inches)	12	24	36	48	60	72	84	96
12	0.38	0.82	1.26	1.70	2.13	2.52	2.95	3.39
24	0.89	1.90	2.92	3.94	4.95	5.84	6.86	7.87
36	1.52	3.25	4.99	6.72	8.46	9.97	11.71	13.44
48	2.02	4.34	6.65	**8.96**	11.27	13.30	15.61	17.92
60	2.53	5.42	8.31	11.20	14.09	16.62	19.51	22.41
72	3.04	6.50	9.97	13.44	16.91	19.95	23.42	26.89
84	3.54	7.59	11.64	15.68	19.73	23.27	27.32	31.37
96	4.17	8.94	13.70	18.47	23.24	27.41	32.17	36.94

Louver Selection Examples - Fan Forced Intake:

Example 1:
Airflow given as 6000 cfm (fan volume)– select louver size.

A. Determine louver free area by dividing airflow by free area velocity (do not exceed 930 fpm on intake louver applications).

cfm / fpm	= ft^2
6000 / 930	= 6.45

B. Select a louver with at least the required louver free area from Free Area Chart above.

Width x Height	Free Area from Chart
48 x 36	6.63

(Other selections available – See Free Area Chart above)

C. Calculate Free Area Velocity

fpm = cfm / ft^2 free area of louver
905 = 6000 / 6.63

D. Check the pressure drop of the selected louver at the calculated airflow (Airflow Resistance Chart on Page 2).

in w.g. = 0.120 at 905 fpm free area velocity

Example 2:
Louver size given as 96 W x 48 H – determine maximum airflow.

A. Use Free Area Chart to obtain ft^2 for given size

Free Area = 17.92 sq ft

B. Multiply Free Area x Free Area Velocity (Do not exceed 930 fpm on intake louver applications).

ft^2 x	fpm	= cfm
17.92 x	930	= 16670

C. Check the pressure drop of the selected louver at the calculated airflow (Airflow Resistance Chart on Page 2).

in w.g. = 0.127 at 930 fpm free area velocity

November 2007

Steel Frame Option Calculations

Wind Load Development

1. Basic Wind Speed, V = 100 mph — ASCE 7-05 Figure 6-1C
   Wind Directionality Factor, Kd = 0.85
   For Open Signs and Lattice Framework — ASCE 7-05 Table 6-4

2. Importance Factor, I = 0.87 — ASCE 7-05 Table 1-1

3. Exposure Category: D
   Flat, Unobstructed Areas Exposed to
   Wind flowing over open water — ASCE 7-05 6.5.6.2

Height above ground, ft	Exposure D (Case 1&2)
0-15	1.03
20	1.08
25	1.12
30	1.16
40	1.22

4. Topographic Factor, k_{zt} = 1
   Structure is not on a hill — ASCE 7-05 6.5.7

5. Gust Effect Factor, G_f = 0.85 — ASCE 7-05 6.5.8

6. Enclosure Classification, OPEN — ASCE 7-05 6.5.9, 6.2

7. Internal Pressure Coefficient, GC_{pi} = 0.00 — ASCE 7-05 6.5.11.1 Figure 6-5

8. External Force Coefficient, C_f — ASCE 7-05 6.5.11.3

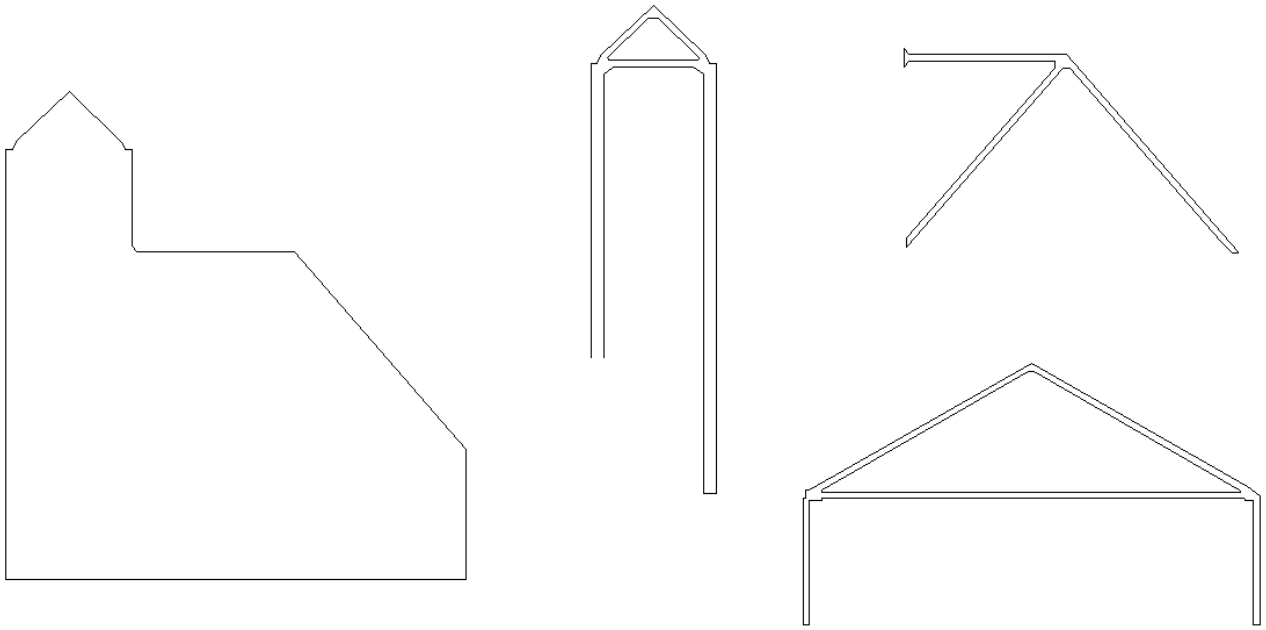
   Areas

   Tower:
   Nominal/Projected Normal Solid Area: 95.19 sq ft

   Boathouse:
   Nominal/Projected Normal Solid Area: 66.29 sq ft

   Station House:
   Nominal/Projected Normal Solid Area: 36.40 sq ft

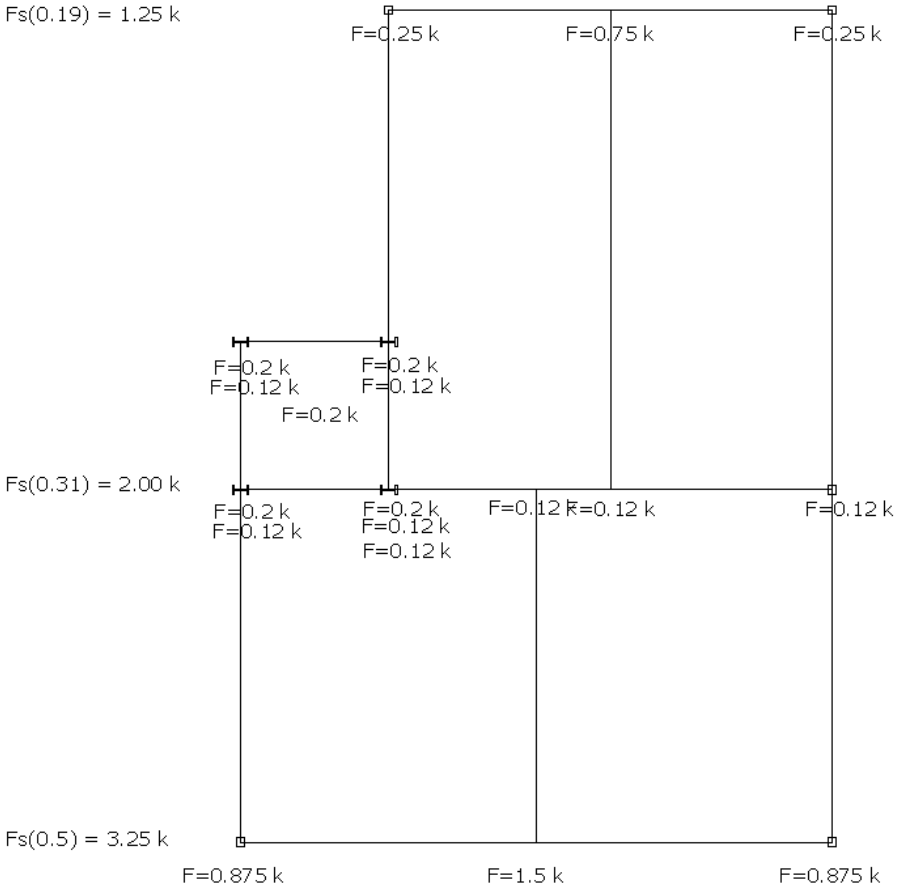
   Total Nominal/Normal Solid Area: 197.88 sq ft
   Gross Nominal/Normal Building Area: 1301 sq ft
   Epsilon: 0.152



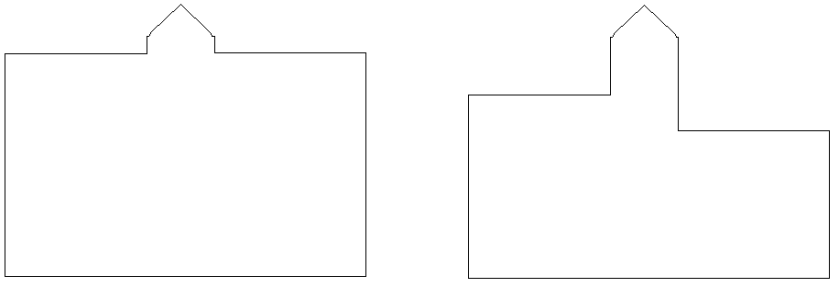
Force Coefficient, Cf = 1.8 ASCE 7-05, Table 6-22

Applied Wind Force = 6.50 kips ASCE 7-05, Eqn 6-28

Force Distribution Method adapted from ANSI A58-1

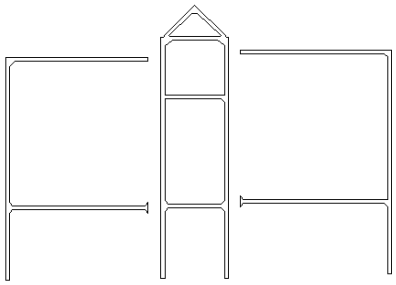


Areas



Tower:
Nominal/Projected
Normal Solid Area:
83.32 sq ft

Boathouse:
Nominal Solid Area:
50.50 sq ft
Projected Normal Solid
Area: 43.17 sq ft



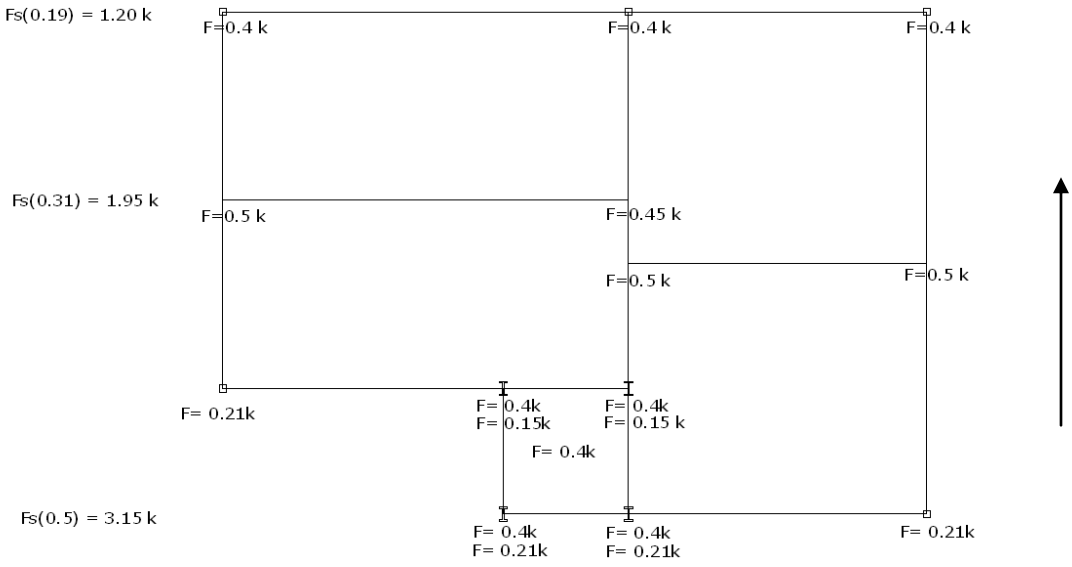
Station House:
Nominal Solid Area:
49.90 sq ft
Projected Normal Solid
Area: 45.29

Total Solid Area: 183.72 sq ft
Total Projected Normal Solid Area: 171.78 sq ft
Gross Nominal Building Area: 2255 sq ft
Epsilon: 0.0814

Force Coefficient, Cf = 2.0 ASCE 7-05, Table 6-22

Applied Wind Force = 6.30 kips ASCE 7-05, Eqn 6-28

Force Distribution Method adapted from ANSI A58-1



Dead Load Development

Initial Try Sections: HSS 7x7x1/2 and W16x50

Dead Load: HSS Section: 41 lb/lft

Dead Load: Wide Flange Section: 50 lb/lft

Snow Load Development

Neglect snow load

Consider worst case: 0.5" ice build up covering all members (entire surface area).

Assume: Density of ice: 57.25 lb/ft3

Total Surface Area:

(1000 lft)(0.583)(4)=2333 ft2

(2333ft2)(0.833ft)(5725lb/ft3)=11130lb

Total Ice Load: 11.13 lb/lft

Live Load Development

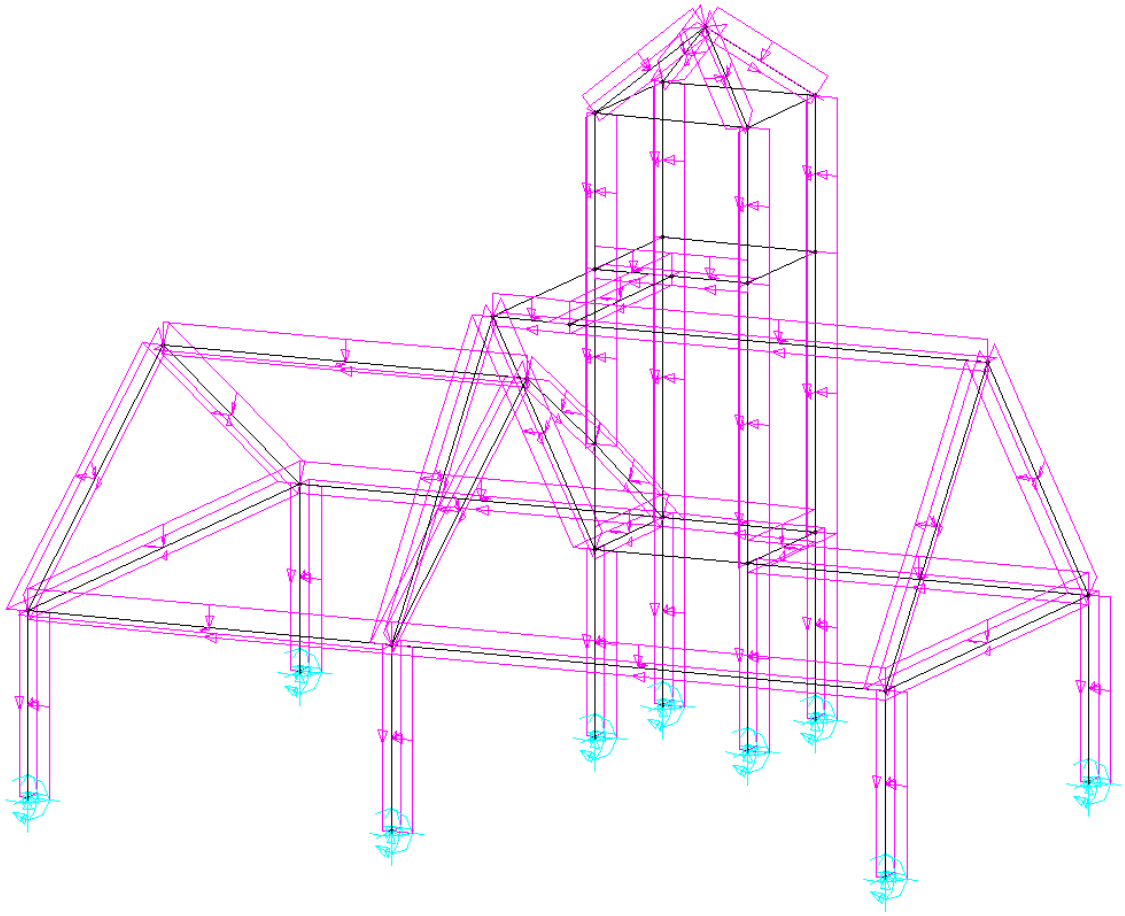
Assume only live load due to seagulls negligible.

Unfactored Loads ASCE 7-05	
Wind	21.29 lb/lft
Snow	11.13 lb/lft
Dead	41.91 lb/lft 53.00 lb/lft
Live	Negligible
Seismic	Not considered

Design Loads AISC 2-8 Load Case 4		
Wind	34.06 lb/lft	
Snow	5.57 lb/lft	
Dead	50.29 lb/lft 50 lb/lft	HSS7x7x1/2 W16x50
Live	Negligible	
Seismic	Not considered	

Structural Analysis

The design loads were used to perform a matrix structural analysis on the design frame. The analysis revealed the nodal deformations of the structure under maximum loading.



The following data represents the movements of the frame and the rotations that each moment connection must be designed for.

```
***********   MASTAN2 v3.2.0   ***********

 Time:  12:17:47      Date:  04/21/2009

Problem Title:   Wood Island Steel Frame
              **************
```

##############################
Results of Structural Analysis
##############################

General Information:
Structure Analyzed as: Space Frame
Analysis Type: First-Order Elastic

Analytical Results:

(i) Displacements at Step # 1, Applied Load Ratio = 1.0000

Deflections

Node	X-disp	Y-disp	Z-disp
1	-7.3263e-002	-1.2307e-001	-6.6883e-002
2	-1.1297e-001	-1.5624e-001	-5.8440e-002
3	-5.7315e-002	-1.8373e-001	-1.0155e-001
4	-5.9415e-002	-3.8954e-002	-1.0556e-001
5	-7.3320e-002	-1.4269e-001	-1.0613e-001
6	-1.3326e-001	-2.5390e-001	-1.2900e-001
7	-1.3102e-001	-9.1532e-002	-7.8685e-002
8	-1.7190e-001	-1.2084e-001	-5.3753e-002
9	-4.9841e-001	-2.7137e-001	-1.2045e-001
10	-4.8462e-001	-3.5906e-001	-2.8348e-001
11	-4.3811e-001	-3.4548e-001	-7.3746e-001
12	-4.4764e-001	-2.0355e-001	-6.5686e-001
13	-4.9720e-001	-1.8476e-001	-7.3723e-001
14	-4.9602e-001	-6.3450e-003	-6.7241e-001
15	-5.5479e-001	-1.8109e-001	-7.9088e-001
16	0.0000e+000	0.0000e+000	0.0000e+000
17	0.0000e+000	0.0000e+000	0.0000e+000
18	0.0000e+000	0.0000e+000	0.0000e+000
19	0.0000e+000	0.0000e+000	0.0000e+000
20	0.0000e+000	0.0000e+000	0.0000e+000
21	0.0000e+000	0.0000e+000	0.0000e+000
22	0.0000e+000	0.0000e+000	0.0000e+000
23	0.0000e+000	0.0000e+000	0.0000e+000
24	0.0000e+000	0.0000e+000	0.0000e+000
25	-6.0375e-002	-9.6966e-002	-1.0465e-001
26	-2.8010e-001	-3.0228e-001	-5.0730e-001
27	-3.1827e-001	-1.9256e-001	-3.5759e-001
28	-4.8675e-001	-4.3160e-001	-2.5510e-001
29	-3.1609e-001	-1.6797e-001	-5.0851e-001
30	-3.1187e-001	-2.2153e-002	-4.6233e-001
31	-1.5337e-001	-1.7371e-001	-1.8212e-001
32	-3.7245e-001	-3.1696e-001	-2.3470e-001
33	-5.1078e-001	-2.8228e-001	-1.1107e-001

Rotations (radians)

Node	X-rot	Y-rot	Z-rot
1	-1.2058e-002	7.4093e-003	5.2015e-003
2	2.5995e-003	-4.3462e-003	6.9624e-003
3	-1.0348e-002	-1.2659e-003	7.7390e-003
4	-1.2302e-002	-7.2938e-004	8.1229e-003
5	-1.2786e-002	4.9503e-003	9.9959e-003
6	2.2243e-004	-2.6785e-003	1.1782e-002
7	-1.7039e-002	5.0802e-003	1.3322e-002
8	7.0242e-003	-3.9842e-003	1.8093e-002
9	-1.3520e-003	2.8688e-003	4.9466e-003
10	-6.7980e-003	5.2985e-003	1.5661e-002
11	-1.6580e-002	-6.8230e-003	1.5672e-002
12	-2.2561e-002	-6.3074e-003	1.3201e-002
13	-1.6942e-002	-5.7410e-003	1.8036e-002
14	-1.7679e-002	-5.2552e-003	1.8273e-002
15	-1.6901e-002	-5.9771e-003	1.6512e-002
16	0.0000e+000	0.0000e+000	0.0000e+000
17	0.0000e+000	0.0000e+000	0.0000e+000
18	0.0000e+000	0.0000e+000	0.0000e+000
19	0.0000e+000	0.0000e+000	0.0000e+000

20	0.0000e+000	0.0000e+000	0.0000e+000
21	0.0000e+000	0.0000e+000	0.0000e+000
22	0.0000e+000	0.0000e+000	0.0000e+000
23	0.0000e+000	0.0000e+000	0.0000e+000
24	0.0000e+000	0.0000e+000	0.0000e+000
25	-1.1200e-002	3.4264e-004	9.0495e-003
26	-2.7093e-002	-4.8383e-003	1.5449e-002
27	-1.8447e-002	1.1934e-002	1.2899e-002
28	-5.9571e-003	5.4806e-003	1.1004e-002
29	-2.6630e-002	-3.5683e-003	1.7662e-002
30	-2.2997e-002	-3.6388e-003	1.7948e-002
31	-1.2856e-002	8.7769e-003	1.4795e-002
32	-9.6629e-003	6.5546e-003	1.2248e-002
33	-3.7894e-004	-2.8049e-003	1.3581e-002

```
####################################
End of Results of Structural Analysis
####################################
```

Critical Column Design

Wide Flange

Longest unbraced section with highest axial load: 18 ft, 2760 lbs

Design Procedure							
1)	**Pu**	2.760	kips				
2)	**Assume KL**						
	KxLx:	1					
	KyLy:	1					
	Lx	28	ft				
	Ly	28	ft				
	KLx := Kx×Lcol	14					
	KLy := Ky×Lcol	14					
3)	**Assume Fcr**						
	Fy	50	ksi				
	Fcr=(2/3)Fy	33.33	ksi				
4)	**Calculate Areq**						
	Areq	0.09	in2				
5)	**Trial Section**						
	Choose:	W16x50	Based on AISC Column Table				
	Area	14.7	in2				
	Ix-x	659	in4				
	rx	6.68	in				
	ry	1.59	in				
	$(KL/r)_x$	25.1	DOES NOT GOVERN				
	$(KL/r)_y$	105.7	GOVERNS				
	Slenderness Check		OK				
	KIrmax<200?	YES					
6)	**Kx Determination**			**Ky Determination**			
	Columns	W16x50		Columns	W12x65		
	I	659	in4	I	174	in4	
	L	18	ft	L	18	ft	
	Beams	HSS7x7x1/2		Beams	HSS7x7x1/2		
	I	80.7	in4	I	80.7	in4	
	L	10.5	ft	L	10.5	ft	
	Gelastic top	5.954		Gelastic top	1.572		
	Pu/A	0.19	ksi	Pu/A	0.19	ksi	
	SRF	1	LOOKUP	SRF	1	LOOKUP	
	Ginelastic top	5.954		Ginelastic top	1.572		
	Gbottom	1.000		Gbottom	1.000		
	Kx	1.7	Sidesway Uninhibited	Ky	1.35	Sidesway Inhibited	
			AISC Figure C-C2.4			AISC Figure C-C2.3	
	$(KL/r)_x$	55.0	DOES NOT GOVERN				
	$(KL/r)_y$	183.4	GOVERNS				
	Elastic/Inelastic Limit	113.43					
		ELASTIC					
	Inelastic:			Elastic:			
	F_e	8.50	ksi	F_e	8.50	ksi	
	F_{cr}	4.26	ksi	F_{cr}	7.46	ksi	
7)	**Capacity**	98.64	kips				
		Adequate Section					
8)	**Check Slenderness**						
	$(Kl/r)_{max}$<200?	YES					
9)	**Check Compactness**			Limit			
	Flange, b/t	5.61	COMPACT	13.49	AISC Table B4.1 Case 3		
	Web, h/tw	35.86	COMPACT	35.88	AISC Table B4.1 Case 10		

Hollow Structural Shape (Tubing)

Longest unbraced section with highest axial load: 12 ft, 7431 lbs

Design Procedure							
1)	**Pu**	7.431	kips				
2)	**Assume KL**						
	KxLx:	1					
	KyLy:	1					
	Lx	12	ft				
	Ly	12	ft				
	KLx := Kx×Lcol	12					
	KLy := Ky×Lcol	12					
3)	**Assume Fcr**						
	Fy	50	ksi				
	Fcr=(2/3)Fy	33.33	ksi				
4)	**Calculate Areq**						
	Areq	0.25	in2				
5)	**Trial Section**						
	Choose:	HSS7x7x1/2	Based on AISC Column Table				
	Area	11.6	in2				
	Ix-x	80.5	in4				
	rx	2.63	in				
	ry	2.63	in				
	$(KL/r)_x$	54.8	DOES NOT GOVERN				
	$(KL/r)_y$	54.8	DOES NOT GOVERN				
	Slenderness Check		OK				
	KIrmax<200?	YES					
6)	**Kx Determination**			**Ky Determination**			
	Columns	HSS7x7x1/2		Columns	HSS7x7x1/2		
	I	80.5	in4	I	80.5	in4	
	L	12	ft	L	12	ft	
	Beams	HSS7x7x1/2		Beams	HSS7x7x1/2		
	I	80.7	in4	I	80.7	in4	
	L	31.5	ft	L	25,34	ft	
	Gelastic top	2.618		Gelastic tc	1.198		
	Pu/A	0.64	ksi	Pu/A	0.64	ksi	
	SRF	1	LOOKUP	SRF	1	LOOKUP	
	Ginelastic top	2.618		Ginelastic	1.198		
	Gbottom	1.000		Gbottom	1.000		
	Kx	1.55	Sidesway Uninhibited	Ky	1.32	Sidesway Inhibited	
			AISC Figure C-C2.4			AISC Figure C-C2.3	
	$(KL/r)_x$	84.9	GOVERNS				
	$(KL/r)_y$	72.3	DOES NOT GOVERN				
	Elastic/Inelasti	113.43					
		INELASTIC					
	Inelastic:			Elastic:			
	F_e	39.70	ksi	F_e	39.70	ksi	
	F_{cr}	29.51	ksi	F_{cr}	34.82	ksi	
7)	**Capacity**	308.13	kips				
		Adequate Section					
8)	**Check Slenderness**						
	$(Kl/r)_{max}$<200?	YES					
9)	**Check Compactness**			Limit			
	Flange, b/t	12.10	COMPACT	13.49	AISC Table B4.1 Case 3		
	Web, h/tw	12.10	COMPACT	35.88	AISC Table B4.1 Case 10		

Critical Beam Design
Longest tubular steel beam with highest moment: 34ft, -9937 lb-ft

Flexural Check

AISC Table 3-13 Available Flexural Design Strength: 96.4 kip-ft

96400 lb-ft > 9937 lb-ft SECTION ADEQUATE

Plastic Moment

$M_p = (F_y)(Z) = 46 \text{ ksi} * 27.9 \text{ in}^3 = 1283.4 \text{ k-in} = 106.95 \text{ k-ft} = 106950 \text{ lb-ft}$

$\Phi M_p = 0.9*106950 \text{ lb-ft} = 96255 \text{ lb-ft}$

$\Phi M_p > M_u$ OK

Local Buckling

Flange Local Buckling: b/t = 12.10

$$\lambda_p = 0.38\sqrt{\frac{E}{F_y}} = 9.54$$

$$\lambda_r = 1.0\sqrt{\frac{E}{F_y}} = 25.1$$

$\lambda_p < \text{b/t} < \lambda_r$ Noncompact Section

$$M_n = \left[M_p - \left(M_p - 0.7F_yS_x\right)\left(\frac{\lambda-\lambda_{pf}}{\lambda_{rf}-\lambda_{pf}}\right)\right] = 1194\ k\ in$$

$\Phi M_n = 0.9*1194 \text{ k in} = 1074 \text{ k in} = 89557 \text{ lb-ft}$

$\Phi M_p > M_u$ OK

Web Local Buckling: b/t = 12.10

$$\lambda_p = 3.76\sqrt{\frac{E}{F_y}} = 94.37$$

$$\lambda_r = 5.76\sqrt{\frac{E}{F_y}} = 144.57$$

$\text{b/t} < \lambda_p$ Compact Section

Lateral Torsional Buckling

No lateral torsional buckling in HSS section because all cross-sectional elements are stiffened.

Cost Calculations

Preservation of Current Condition Costs

Window Size Chart							
		Width		Height			
	#	ft	in	ft	in	Area	
First Floor	1	5	0	3	0	17.78	SF
	2	2	7	6	0	18.47	SF
	3	2	7	6	0	18.47	SF
	4	3	2	6	0	22.17	SF
	5	2	10	6	0	20.06	SF
	6	3	2	6	0	22.17	SF
	7	3	2	6	0	22.17	SF
	8	3	2	6	0	22.17	SF
	9	2	7	3	0	9.72	SF
	10	3	8	3	0	13.33	SF
	11	3	8	3	0	13.33	SF
	12	3	8	3	0	13.33	SF
	13	3	8	3	0	13.33	SF
	14	3	8	3	0	13.33	SF
	15	3	0	1	7	6.39	SF
Second Floor	1	4	3	3	6	17.57	SF
	2	2	10	4	6	15.31	SF
	3	2	10	4	6	15.31	SF
	4	4	3	3	4	16.81	SF
	5	4	3	3	4	16.81	SF
	6	1	9	1	0	2.78	SF
	7	2	10	4	6	15.31	SF
	8	2	10	4	6	15.31	SF
	9	1	5	2	3.5	4.59	SF
	10	1	5	2	3.5	4.59	SF
Tower (Third and Fourth Floors)	1	3	0	7	0	24.44	SF
	2	1	5	2	3.5	4.59	SF
	3	1	5	2	3.5	4.59	SF
	4	1	5	2	3.5	4.59	SF
	5	1	5	2	3.5	4.59	SF
	6	1	5	2	3.5	4.59	SF
	7	2	0	3	0	7.78	SF
	8	2	0	3	0	7.78	SF
	9	2	0	3	0	7.78	SF
	10	2	0	3	0	7.78	SF
	11	2	0	3	0	7.78	SF
	12	2	0	3	0	7.78	SF
	13	1	5	3	0	5.83	SF
	14	1	5	3	0	5.83	SF
Total Area						476.34	SF

Door Size Chart							
		Width		Height			
	#	ft	in	ft	in	Area	
Small	1	3	0	7	0	21.00	SF
	2	3	0	7	0	21.00	SF
	3	3	6	7	0	24.50	SF
	4	3	7	5	0	17.92	SF
	5	3	0	7	0	21.00	SF
Garage	6	9	8	9	0	87.00	SF
	7	9	8	9	0	87.00	SF
	8	7	5	9	0	66.75	SF
Total Area						346.17	SF

Preservation Cost Estimate							
Item	**Approximate Quantity**		**Unit**	**Unit Cost**	**Labor Cost**	**Spec**	**Cost Estimate**
Roof Shingles	-		-	-	-		-
West Roof	855		SF	-	-	-	-
East Roof	1210		SF	-	-	-	-
Tower Roof	50		SF	-	-	-	-
TOTAL	2115		SF	10.92	24224	RS Means	$47,332
Windows	**Steel**	**LVR**	-	-	-	-	-
South Elevation	4	5	#	-	-	-	-
North Elevation	3	8	#	-	-	-	-
East Elevation	4	7	#	-	-	-	-
West Elevation	3	6	#	-	-	-	-
TOTAL AREA STEEL	246.22	-	SF	9.2	4802	RS Means	$7,207
TOTAL AREA LOUVERS	-	230.11	SF	37	6240	Arch Lvrs E4DS	$14,754
Small Doors	**Steel**	**LVR**	-	-	-	-	-
South Elevation	1	0	#	-	-	-	-
North Elevation	2	0	#	-	-	-	-
East Elevation	0	0	#	-	-	-	-
West Elevation	1	0	#	-	-	-	-
TOTAL AREA	105.42	x	SF	9.2	1372	RS Means	$2,382
Garage-Sized Doors	**Steel**	**LVR**	-	-	-	-	-
South Elevation	1	0	#	-	-	-	-
North Elevation	2	0	#	-	-	-	-
East Elevation	0	0	#	-	-	-	-
West Elevation	0	0	#	-	-	-	-
TOTAL AREA	240.75	x	SF	9.2	1029	RS Means	$3,244
Siding	-		-	-	-	-	-
South Elevation	30		SF	-	-	-	-
North Elevation	0		SF	-	-	-	-
East Elevation	10		SF	-	-	-	-
West Elevation	15		SF	-	-	-	-
TOTAL	55		SF	1.64	1.56	RS Means	$1,376
						Construction Contingency:	$18,730
						Engineering and Permitting:	$9,365
						Total:	$104,390

Preservation Cost Estimate							
Item	**Approximate Quantity**		**Unit**	**Unit Cost**	**Labor Cost**	**Spec**	**Cost Estimate**
Roof Shingles	-		-	-	-		-
West Roof	855		SF	-	-	-	-
East Roof	1210		SF	-	-	-	-
Tower Roof	50		SF	-	-	-	-
TOTAL	2115		SF	10.92	24224	RS Means	$47,332
Windows	**Steel**	**LVR**	-	-	-	-	-
South Elevation	4	5	#	-	-	-	-
North Elevation	3	8	#	-	-	-	-
East Elevation	4	7	#	-	-	-	-
West Elevation	3	6	#	-	-	-	-
TOTAL AREA WOOD	246.22	-	SF	0.875	3122	Ace Hardware	$3,477
TOTAL LENGTH 2"x4"	129.17	-	LF	5		ACE Hardware	$646
TOTAL AREA LOUVERS	-	230.11	SF	37	6240	Arch Lvrs E4DS	$14,754
Small Doors	**Steel**	**LVR**	-	-	-	-	-
South Elevation	1	0	#	-	-	-	-
North Elevation	2	0	#	-	-	-	-
East Elevation	0	0	#	-	-	-	-
West Elevation	1	0	#	-	-	-	-
TOTAL AREA	105.42	x	SF	0.875	892	Ace Hardware	$1,024
TOTAL LENGTH 2"x4"	66.00	-	LF	5		ACE Hardware	$330
Garage-Sized Doors	**Steel**	**LVR**	-	-	-	-	-
South Elevation	1	0	#	-	-	-	-
North Elevation	2	0	#	-	-	-	-
East Elevation	0	0	#	-	-	-	-
West Elevation	0	0	#	-	-	-	-
TOTAL AREA	240.75	x	SF	0.875	1029	Ace Hardware	$1,240
TOTAL LENGTH 2"x4"	216.00	-	LF	5		ACE Hardware	$1,080
Siding	-		-	-	-	-	-
South Elevation	30		SF	-	-	-	-
North Elevation	0		SF	-	-	-	-
East Elevation	10		SF	-	-	-	-
West Elevation	15		SF	-	-	-	-
TOTAL	55		SF	1.64	1.56	RS Means	$1,376
						Construction Contingency:	$17,471
						Engineering and Permitting:	$8,735
						Total:	$97,466

Demolition Disposal Costs

INDUSTRIAL TECHNICAL SERVICE CENTER
PO BOX 7065
30 Rochester Neck Road
Rochester, NH 03839
Phone: (800) 963-4776
Fax: (866) 723-5761

QUOTE LETTER

April 22, 2009

Mr. Kyle Urso
Unh

Durham NH

Dear Mr. Urso

Waste Management is pleased to present this proposal for the disposal and/or transportation of approximately 1000 Cu Yards of Friable and Non Friable Asbestos. Pricing is as follows:

Disposal of Wood Island Non Haz Friable And Non Friable Asbestos at Turnkey Landfill

Treatment/Disposal Pricing:

Disposal Rate - Non Friable	$75.00	Ton	with	10	Ton Minimum Per Load	
Disposal Rate - Friable	$91.00	Ton	with	10	Ton Minimum Per Load	
Disposal Fuel Surcharge	Subject to Weekly Change		Current rate at time of quote is			2.82%
Environmental Fee			Applied to Invoice Total			6.00%

Transportation Pricing: Customer to Provide

plus attached schedule of fees and surcharges, when applicable.

Terms and Conditions:

All pricing is contingent upon the review and approval of the Generator's Waste Material Profile Sheet. The Waste Profile and all supporting documents must be completed and signed by an authorized signatory of the Generator and approved by a Waste Management authorized Approval Chemist.

All profiles must be approved by WM Approval Chemist and all Confirmation Letters must be signed by the customer and returned to WM prior to any loads being shipped into the landfill.

Waste Management reserves the right to refuse any load or discontinue any waste stream should such waste pose a threat to human health or safety, prove to be operationally challenging, or is in violation of any WM permit. This proposal is good for thirty (30) days. If not accepted in the allotted time, all pricing will expire.

Upon acceptance of the proposal, please contact me at your earliest convenience for the paperwork required to begin the approval process.

Thank you for the opportunity to provide you with this proposal. If you have any questions, please feel free to contact me at (603) 330-2101 .

Best regards,

Bryan Dexter
Technical Service Representative

Attachments

SCHEDULE OF FEES

OPERATIONAL FEES

• RINSE OUT (LESS THAN 5 MINUTES)	$ 150.00 RINSE
• WASH OUT (1/2 HOUR MINIMUM)	$ 650.00 WASHOUT
• DIG OUT (1/2 HOUR MINIMUM)	$ 50.00 LOAD
• UNLOADING FEE (1/2 HOUR MINIMUM)	$ 350.00 HOUR
• SPECIAL HANDLING / BURIAL	$ 200.00 EACH
• WITNESSED DESTRUCTION	$ 100.00 EACH

(Washout fees apply to all vacuum trucks and tankers. Off-site truck washouts will be billed at cost plus 30%. Boxes / trucks will be washed / rinsed when applicable at customer's expense at the quoted above rates.)

MISCELLANEOUS FEES

• MANIFEST FEE	$ 2.00 EACH
• ADDITIONAL DOCUMENTATION-TICKET CC'S	$ 2.00 EACH

ABOVE RATES WILL BE CHARGED FOR THE ABOVE SERVICES WHEN REQUIRED. NO ESTIMATES WILL BE GIVEN BEFOREHAND, AS

SPECIAL CONDITIONS

- All loads are subject to Fuel Surcharge that is adjusted monthly to reflect the Department of Energy's monthly fuel prices for the last business day of the month.
- Non-conforming loads being rejected at the disposal facility will be charged a fee equal to the trip rate for returning the load.
- 24-hour notice for cancellation of scheduled transportation is required. A charge equal to the trip rate will be assessed for loads cancelled after the truck has been dispatched.

Waste must meet acceptability criteria at the site and comply with local, state and federal regulations, as well as the sites permit requirements. Pricing is contingent upon site and/or sample evaluation and approval.

Waste charged Per/Yard will be billed according to MANIFESTED VOLUME IN YARDS. In the case where the volume in yards is not recorded on the manifest you will be charged BASED UPON RATED CAPACITY OF THE CONTAINER.

Waste Management's Western Massachusetts Landfills strictly control capacity for soils that are utilized for daily cover needs. Projects will be accepted and approved on a case by case basis and awarded based on available capacity. Advanced scheduling of Loads is Required

Steel Frame Option Costs

	QUANTITY		MATERIAL COST		LABOR & EQUIP COST		INSTALLED COST	
ITEM DESCRIPTION	NUMBER	UNIT	UNIT COST	TOTAL	UNIT COST	TOTAL	UNIT COST	TOTAL
Environmental permitting & fees	1	LS	$4,500	$4,500	$6,000	$6,000	$10,500	$10,500
Engineering Design & Bid Documents	1	LS	$1,500	$1,500	$20,000	$20,000	$21,500	$21,500
Submittals & project management	1	LS	$600	$600	$12,000	$12,000	$12,600	$12,600
Construction								$207,305
Subtotal								$241,405
Contingency (25%)								$60,351
Subtotal								$301,756
Estimated Budget Amount								**$301,756**

CONSTRUCTION	QUANTITY		MATERIAL COST		LABOR & EQUIP COST		INSTALLED COST	
ITEM DESCRIPTION	NUMBER	UNIT	UNIT COST	TOTAL	UNIT COST	TOTAL	UNIT COST	TOTAL
1. Mobilization, demobilization, silt fence	1	LS	$1,000	$1,000	$3,000	$3,000	$4,000	$4,000
2. Demolition	1	CY						$75,000
3. Refuse Transport	800	CY						$24,000
3. Landfill Disposal	800	CY	$17.20	$13,760				$13,760
3. Backfill	1000	CY			$1.54	$1,540		$1,540
4. Foundation Installation	108	VLF	$13.1	$1,414.8	$42.5	$4,590		$6,005
5. Steel Erection	35470	LB	$1.9	$67,393	$0.44	$15,607		$83,000
Subtotal								$207,305
Page Subtotal								**$207,305**

B. Seawall Assessment Appendix

Katherine Andruchuk, Seth Lizotte

Seawall Assessment Appendix Contents

Communication Records

Communication Record

Date:	***January 20, 2009***
Time:	***4:30 pm – 5:00 pm***

Meeting with:	Professor Gress
Group Members Present:	Seth Lizotte, Katie Andruchek
Topic of Meeting:	Seawall Rehabilitation
Type of Communication:	Office Visit

Minutes

- Discussed the issues occurring with the seawall at Wood Island. Possible issues include effects of chemical action of seawater constituents on cement hydration products, alkali-aggregate expansion, crystallization pressure of salts within concrete if one face of the structure is subject to wetting and others to drying conditions, frost action in cold climates, corrosion of embedded steel in reinforced members, and physical erosion due to wave action.
- A core of the wall is needed to be cut and polished to determine the exact state of the existing seawall and in turn determine the effective rehabilitation
- Four distinct alternatives were determined, each dependant on the evaluation of the core sample (*please see attached sketches, in additional notes, for clarification):
  - Chip away deteriorated outer concrete, drill and place rebar into existing concrete to tie into newly formed rebar cage, pour new concrete around existing sound concrete, use chipped material for pathway construction.
  - Destroy existing seawall, use material for pathway construction, replace with a cast-in-place, pre-cast, or retaining wall with earthen back-fill seawall.
  - Chip away brittle outer damaged area, spray foam around existing seawall to allow for expansion due to existing chemical decay, form rebar cage around foam, pour new outer shell for seawall.
  - Leave structure as-is.

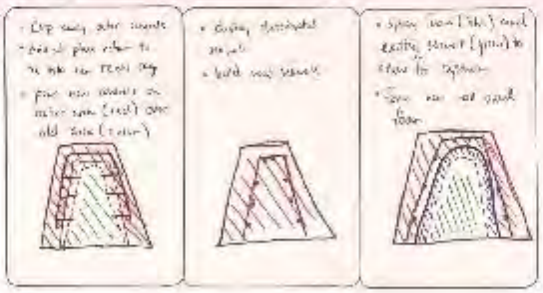
Other Information

Relevant Contact Information:

Name:	Professor David Gress
Email:	David.Gress@unh.edu
Phone:	603. 862. 1410

Additional Notes:

- Need to obtain sample from Krystian and follow-up with Professor Gress to evaluate sample
- Attached sketches for alternatives:



CIE 788 Project Planning and Design Wood Island Life Saving Station

Communication Record

Date:	***January 23, 2009***
Time:	***10:30 am – 11:00 am***

Meeting with:	Professor Gress
Group Members Present:	Seth Lizotte, Katie Andruchuk
Topic of Meeting:	Seawall Rehabilitation
Type of Communication:	Office Visit

Minutes

- A piece of core from the seawall was shown to Professor Gress and determined that from the looks of it, it was a still a good piece of concrete and might have had help being taken off the wall seeing it's relatively large size
- Discussed using interlocking concrete blocks as a seawall alternative and received company advertisements from a magazine in order to look further into this type of possibility
- The piece of core from the seawall was left with Professor Gress and discussion about getting one of his students to cut the core into three sections in order to polish the pieces of seawall occurred
- Once the core has been cut and polished the three of us will meet in order to closely look at the concrete under a microscope

Other Information

Relevant Contact Information:

Name:	Professor David Gress
Email:	David.Gress@unh.edu
Phone:	603. 862. 1410

Additional Notes:

- Received email from Professor Gress following the meeting to check out WWW.stonestrong.com and www.tensarcorp.com/ss9
- January 27th, was informed by one of Professor Gress' students that the core has been cut and is ready to be polished

CIE 788 Project Planning and Design Wood Island Life Saving Station

Communication Record

Date:	***February 08, 2009***
Time:	***2:30 pm – 4:00 pm***

Meeting with:	Professor Gress
Group Members Present:	Seth Lizotte, Katie Andruchuk
Topic of Meeting:	Seawall Rehabilitation
Type of Communication:	Laboratory Testing

Minutes

- Two pieces of seawall were cut and polished by Katie and myself and then examined under a microscope to determine the extent of weathering on the samples.
- It was determined that freeze-thaw cycles have caused cracking in the samples, parallel to the face of the concrete wall; causing cracks in the wall structure. Also, a brownish haze is seen at the face of the samples which indicates carbonation. Dark rings around the aggregate within the sample indicate Alkali-Silica Reaction taking place which is detrimental to the structure long term.
- To determine the extent of ASR within the samples, a sample was fractured to obtain an untouched face and then radioactive uranyl acetate was added. Under Ultraviolet Lighting, the radioactive uranyl acetate would glow a bright green, indicating ASR was present and active. The samples we examined did show signs of ASR, though it was not found to be a rapid condition.
- Alternatives, based on the results of testing, were discussed and it seems that the cheapest and easiest alternative would be to chip of the fractured areas of the seawall, and encase the existing structure with a series of stirrups and then cast at least 4 inches of new concrete onto the surface. Also, the amount of steel needed for the rehabilitation, under the assumption that the seawall is not in everyday use as a protective barrier, would be the minimum as required by the American Concrete Institute guidelines.
- Further research will be done to determine the extent of damages to the samples, and then a design will be provided to economically and effectively rehabilitate the seawall.

Other Information

Relevant Contact Information:

Name:	Professor David Gress
Email:	David.Gress@unh.edu
Phone:	603. 862. 1410

Additional Notes:

CIE 788 Project Planning and Design Wood Island Life Saving Station

Communication Record

Date:	***February 10, 2009***
Time:	***1:30 pm – 1:50 pm***

Meeting with:	Professor Gress
Group Members Present:	Seth Lizotte, Katie Andruchuk
Topic of Meeting:	Seawall Rehabilitation
Type of Communication:	Phone Conversation

Minutes

- Since laboratory testing is complete and results found, the next step for looking into capping the existing structure would be to develop a mix design for the proposed cap
- Upon talking to Professor Gress, various specifications pertinent to a cap were needed , such as:
  - Greater or equal to 4000 psi strength
  - Less than or equal to 0.4 w/c ratio
  - High quality Type II cement paste (sulfate exposure)
  - ¾" maximum aggregate size or 3/8" maximum aggregate size for a pump mix if needed (ASTM 33 reference and Appendices in EB001 for ASR)
  - High range water reducer if designed slump needed to increase for placement
- It was recommended to look through EB001: Portland Cement Association: Design and Control of Concrete Mixtures, to arrive at further specifications needed to be met for the capping process
- The idea of placing riprap from crushed seawall in a cage as a means for wave energy dissipation was discussed and will deem reason to look into

Other Information

Relevant Contact Information:

Name:	Professor David Gress
Email:	David.Gress@unh.edu
Phone:	603. 862. 1410

Additional Notes:

CIE 788 Project Planning and Design Wood Island Life Saving Station

Communication Record

Date:	***February 19, 2009***
Time:	***5:30 pm – 6:00 pm***

Meeting with:	Redi-Rock ® Representative
Group Members Present:	Seth Lizotte, Katie Andruchuk
Topic of Meeting:	Precast Alternatives for Seawall Rehabilitation
Type of Communication:	Conversation with Redi-Rock ® Representative

Minutes

- Received a product catalog with information pertaining to the various alternatives which we could use
- Representative said due to environmental conditions present at the site, it would be his recommendation that the product used would be the 2400 lb "Big Block."
    - The "Big Block" is 18" high, 46" wide, and 36" deep
    - This would require 3'- 4' of porous fill (gravel and pea stone) behind it to serve as a means for water to not build up behind the wall and pose further freeze-thaw action
- During the conversation, he called an individual out of his office and calculated that for materials alone (delivery and placement of "Big Blocks, "excluding the footings, demolition of the existing wall, and porous backfill), it would cost approximately $210,000 for a 6' tall, 420' wall to be constructed

Other Information

Relevant Contact Information:

Company Name:	Redi-Rock: a Carroll Company
Website:	www.REDIROCK.com
Phone:	603. 863.1000

Additional Notes:

- Due to the cost of the Redi-Rock ® alternative, it was decided to not look into that system further as a means for the seawall rehabilitation of Wood Island.

CIE 788 Project Planning and Design Wood Island Life Saving Station

Communication Record

Date: *March 10, 2009 to present*

Meeting with:	Robert G. Armando, President of Tectonics, Inc.
Group Members Present:	Seth Lizotte
Topic of Meeting:	Seawall Rehabilitation
Type of Communication:	Email Conversations

Minutes

- The following are excerpts from emails between Robert Armando and myself:

"I surveyed the project using Google Earth Pro and was able to measure the existing wall at 600 LF - if your 420 LF stated plans the exclusion of certain parts of the existing wall, I wouldn't recommend that - the ideal concrete installation would include a poured n place base slab pinned to the rock and a precast superstructure bolted together. All operations can be done using amphibious barges.

I think you have some data on the rock depth and composition in your report - if not, I would need that. Some pictures of the existing facility and the seawall would also be helpful.

Also the new structure could be installed in front of the existing wall - the existing could remain, but be knocked down to below the new back of wall grade saving the cost of demolition and removal of material.

After I review your study, I will send you some drawings and a 3-d model - download Sketchup 7 Free to be able to view my files. I will also do a conceptual cost estimate after I make some calls to suppliers and potential subs in the area for pricing."

"Got your report - the REDI-Rock system will be about $500per LF of wall - figuring a 6 foot height which is 4 layers of Redi-Block This would amount to approximately 1/3 of the final cost.
The demolition, anchored base slab, tie backs and fill in place would be the other 2/3 and the Means and Methods selected will make or break the project.

The cost to do the entire project right with a lasting value would be about $650,000 - if you do the entire 600 foot perimeter area to preserve the integrity of the wall system the cost would be about $900,000. This very preliminary cost estimate is using a poured in place base slab and a precast superstructure.

Cost can be a function of the weather and tidal surges - work would have to be performed at low tide cycles using amphibious barges.

I would carry a 15% contingency to cover possibility of extraordinary weather and the possibility of storm damage he the system while under construction.

CIE 788 Project Planning and Design Wood Island Life Saving Station

Communication Record

Date:	*March 23, 2009*
Time:	*3:30 – 4:00pm*

Meeting with:	Robert G. Armando, President of Tectonics, Inc.
Group Members Present:	Seth Lizotte
Topic of Meeting:	Seawall Rehabilitation
Type of Communication:	Phone Conversation

Minutes

- $1500 per linear foot to cast in place footing with tie anchors and bedrock grinding, place precast seawall, and grind existing seawall as backfill material behind new wall
- Footing will consist of an 18" thick concrete slab with the precast wall sitting 8" back from front of slab which will dissipate energy from breaking waves onto wall
- The footing will be placed partially into the existing bedrock and the bedrock will be of a constant elevation with one or two steps for each face (north and south)
- Recommended to do entire 600' length of wall to provide complete protection and will in turn have the seawall last up to 50 year design life
- Weepholes will be cast every 8' along the footing to allow for drainage. Perforated pipe will lie behind the wall and direct water towards the weepholes, with filter-fabric covering it and then covered with backfill of the demoed wall to allow for proper drainage.
- The footing, having been placed into the bedrock, will withstand a great amount of undermining forces, solving the existing problem
- Work can only be done in low tide and done with an amphibious barge
- 1" to 1 ½" tiebolts will be used every 8' and made of high strength coil bolt inserts with steel plates which will tie into buttresses and into slab, which tie into the rebar present in the footing
- Recommended 4000-5000 psi concrete for footing and precast seawall
- Grinder to be used for bedrock and existing seawall for use as backfill material and should be done prior to placement of footing
- Look into mobile-mix concrete trucks on an amphibious barge for footing placement

Other Information

Relevant Contact Information:

Name:	Robert G. Armando
Email:	rga@tectonicsystems.com
Phone:	631-220-1098

Additional Notes:

CIE 788 Project Planning and Design Wood Island Life Saving Station

Communication Record

Date:	*April 23, 2009*
Time:	*12:00 – 12:30pm*

Meeting with:	Robert G. Armando, President of Tectonics, Inc.
Group Members Present:	Seth Lizotte
Topic of Meeting:	Seawall Rehabilitation
Type of Communication:	Phone Conversation

Minutes

Cast in Place Seawall

- Would need a battered seawall
- 36" width at bottom tapering to 12" width at top, 72" height
- Formwork needs to be heavily barricaded to prevent blowout
- Would need C or U shapped tie reinforcing bar
- Foundation in the same fashion and size as the precast alternative
- Batter helps to resist wave force moment
- Cast in place concrete including formwork and reinforcing bar would be approximately $1000 per cubic yard, includes use of water proof cement
- Would need a 40-50 ton amphibious barge to transport 6 ft wide grinder for existing wall and then to transport concrete trucks
- Tie anchors would be grouted into bedrock and stick up at least 18" above foundation
- Would have flexible construction joints every 10-15 ft with water seal
- Epoxy coated reinforcing bar to be used
- 100 +/- year design life

Demolition

- Grinder cost about $3000 per day
- Demolition and grinding would take about 5 work days
- Would leave material on site and in place as gravel since transporting off-site would be very expensive relative to grinder cost
- Mobilization/ Demobilization cost $1000
- Would need to torch off tie backs as they are found to prevent grinder damage
- Could use material for sustainable pathway material

Other Information

Relevant Contact Information:

Name:	Robert G. Armando
Email:	rga@tectonicsystems.com
Phone:	631-220-1098

Additional Notes:

CIE 788 Project Planning and Design Wood Island Life Saving Station

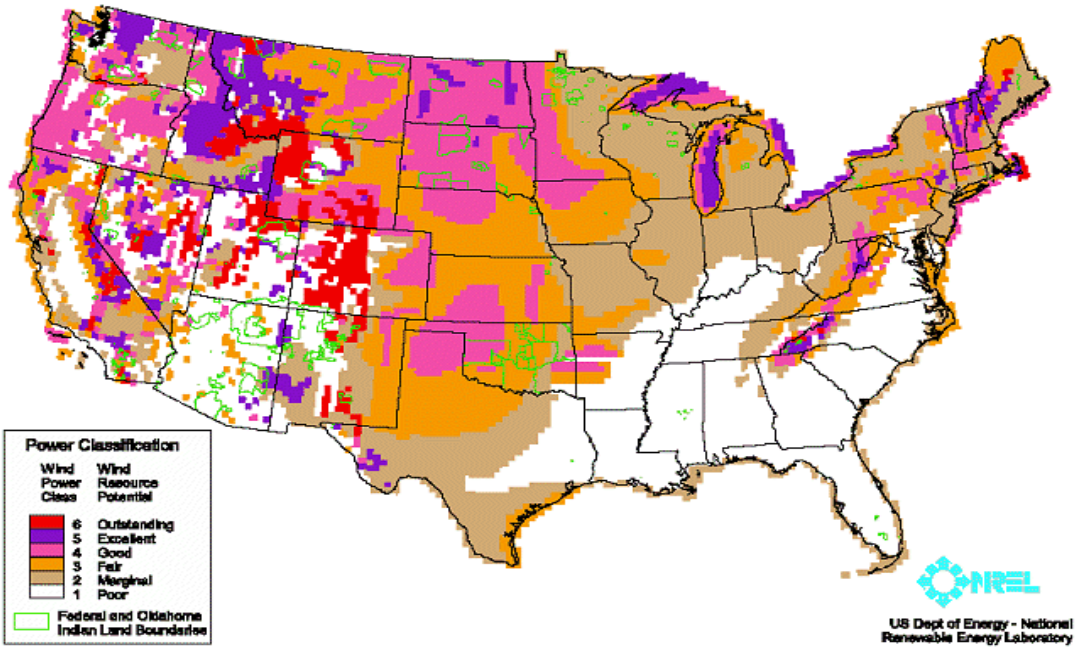
C. Access Assessment Appendix

Kyle Urso, Lawrence Yassanye

Access Assessment Appendix Contents

Solar & Wind Data

Figure 13. Wind Resource Potential



Above figure depicts the power classification throughout the United States. More specifically the US Department of Energy lists the Northeast coast ranging from a good to fair ranking.

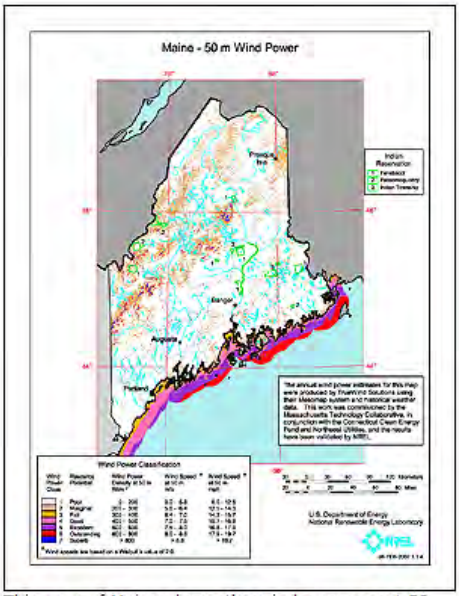
The British start-up Quietrevolution developed a vertical axis wind turbine which is not only more aesthetic but is also better at gathering wind near and around buildings, which frequently vary in direction. The Helical wind turbine is also quieter because the blade tip speed is lower. (http://www.quietrevolution.co.uk/qr5.htm)

Mariah Power offers a similar turbine, allowing 360 degree of wind direction.

Maine Wind Resource Map

The Department of Energy's Wind Program and the National Renewable Energy Laboratory (NREL) published a new wind resource map for the state of Maine . This resource map shows wind speed estimates at 50 meters above the ground and depicts the resource that could be used for utility-scale wind development. Future plans are to provide wind speed estimates at 30 meters, which are useful for identifying small wind turbine opportunities.

As a renewable resource, wind is classified according to wind power classes, which are based on typical wind speeds. These classes range from Class 1 (the lowest) to Class 7 (the highest). In general, at 50 meters, wind power Class 4 or higher can be useful for generating wind power with large turbines. Class 4 and above are considered good resources. Particular locations in the Class 3 areas could have higher wind power class values at 80 meters than shown on the 50 meter map because of possible high wind shear. Given the advances in technology, a number of locations in the Class 3 areas may suitable for utility-scale wind development.



This map of Maine shows the wind resource at 50 meters. You can view a larger version or download a printable map (PDF 1.4 MB) Download Adobe Reader.

More Viewing Options

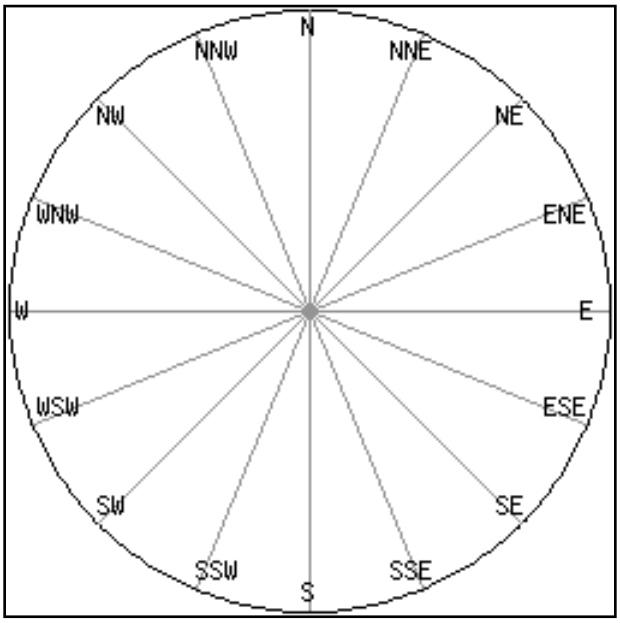
Interactive Map

Wind speed table for Conversion of Knots, Beaufort, m/s and km/h.

Knots	Beaufort	m/s	km/h	Label	Effect on sea	Effects on land
1	0	0 - 0.2	1	Calm	Sea like a mirror	Calm. Smoke rises vertically.
1-3	1	0.3-1.5	1-5	Light Air	Ripples with the appearance of scales are formed, but without foam crests	Wind motion visible in smoke.
4-6	2	1.6-3.3	6-11	Light Breeze	Small wavelets, still short, but more pronounced. Crests have a glassy appearance and do not break	Wind felt on exposed skin. Leaves rustle.
7-10	3	3.4-5.4	12-19	Gentle Breeze	Large wavelets. Crests begin to break. Foam of glassy appearance. Perhaps scattered white horses	Leaves and smaller twigs in constant motion.
11-15	4	5.5-7.9	20-28	Moderate Breeze	Small waves, becoming larger; fairly frequent white horses	Dust and loose paper raised. Small branches begin to move.
16-21	5	8.0-10.7	29-38	Fresh Breeze	Moderate waves, taking a more pronounced long form; many white horses are formed. Chance of some spray	Branches of a moderate size move. Small trees begin to sway.
22-27	6	10.8-13.8	39-49	strong Breeze	Large waves begin to form; the white foam crests are more extensive everywhere. Probably some spray	Large branches in motion. Whistling heard in overhead wires. Umbrella use becomes difficult. Empty plastic garbage cans tip over.
28-33	7	13.9-17.1	50-61	Near Gale	Sea heaps up and white foam from breaking waves begins to be blown in streaks along the direction of the wind	Whole trees in motion. Effort needed to walk against the wind. Swaying of skyscrapers may be felt, especially by people on upper floors.
34-40	8	17.2-20.7	62-74	Gale	Moderately high waves of greater length; edges of crests begin to break into spindrift. The foam is blown in well-marked streaks along the direction of the wind	Twigs broken from trees. Cars veer on road.
41-47	9	20.8-24.4	75-88	Severe Gale	High waves. Dense streaks of foam along the direction of the wind. Crests of waves begin to topple, tumble and roll over. Spray may affect visibility	Larger branches break off trees, and some small trees blow over. Construction/temporary signs and barricades blow over. Damage to circus tents and canopies.
48-55	10	24.5-28.4	89-102	Storm	Very high waves with long over-hanging crests. The resulting foam, in great patches, is blown in dense white streaks along the direction of the wind. On the whole the surface of the sea takes on a white appearance. The 'tumbling' of the sea becomes heavy and shock-like. Visibility affected	Trees are broken off or uprooted, saplings bent and deformed, poorly attached asphalt shingles and shingles in poor condition peel off roofs.
56-63	11	28.5-32.6	103-117	Violent Storm	Exceptionally high waves (small and medium-size ships might disappear behind the waves). The sea is completely covered with long white patches of foam flying along the direction of the wind. Everywhere the edges of the wave crests are blown into froth. Visibility affected	Widespread vegetation damage. More damage to most roofing surfaces, asphalt tiles that have curled up and/or fractured due to age may break away completely.
64-71	12	32.7-36.9	118-133	Hurricane	The air is filled with foam and spray. Sea completely white with driving spray; visibility very seriously affected	Considerable and widespread damage to vegetation, a few windows broken, structural damage to mobile homes and poorly constructed sheds and barns. Debris may be hurled about.

:: Wind directions

Abbreviation	wind direction	Degrees
N	North	0°
NNE	NorthNorthEast	22.5°
NE	NorthEast	45°
ENE	EastNorthEast	67.5°
E	East	90°
ESE	EastSouthEast	112.5°
SE	SouthEast	135°
SSE	SouthSouthEast	157.5°
S	South	180°
SSW	SouthSouthwest	202.5°
SW	Southwest	225°
WSW	WestSouthwest	247.5°
W	West	270°
WNW	WestNorthwest	292.5°
NW	Northwest	315°
NNW	NorthNorthwest	337.5°



Cost Of Supplying Light Reference

Maine

Voluntary Renewable Resources Grants

Incentive Type: State Grant Program

Eligible Renewable/Other Technologies: Solar Thermal Electric, Photovoltaics, Wind, Biomass, Hydroelectric, Geothermal Electric, Fuel Cells, Municipal Solid Waste, Tidal Energy

Applicable Sectors: Nonprofit, Rural Electric Cooperative, Quasi-Municipal Corporations and Districts

Amount: Varies by project

Maximum Amount: $50,000

Authority 1: 35-A M.R.S.A. §3210

Date Enacted: 1997

Effective Date: 3/1/2000

Authority 2: ME PUC 65.407, Ch. 312

Effective Date: 12/15/1998

Website: http://www.efficiencymaine.com/renewable_programs_voluntary.htm

Summary:

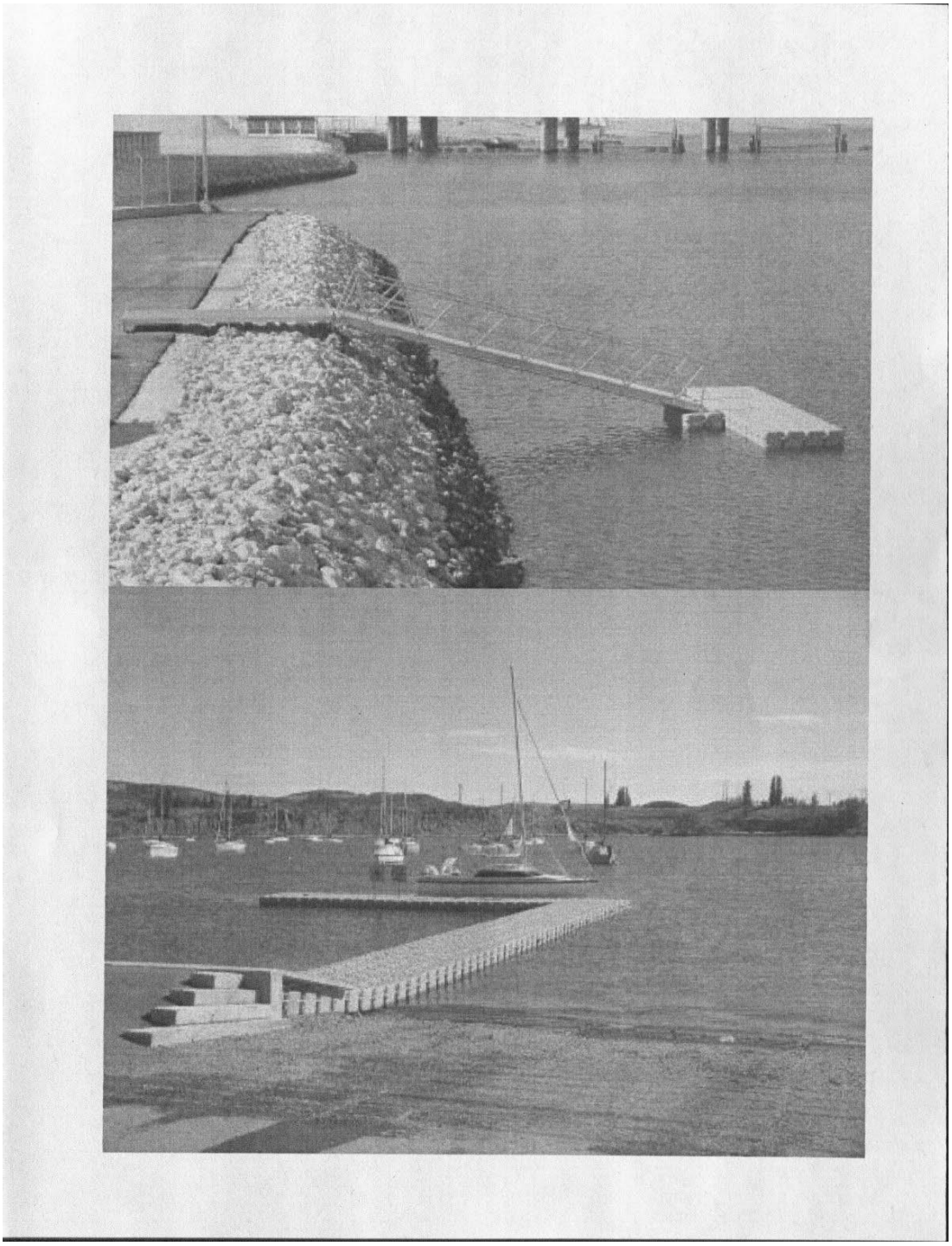
Maine's Voluntary Renewable Resources Grants, supported by the state's Voluntary Renewable Resources Fund and administered by the Maine Public Utilities Commission (PUC), provide funding for small-scale demonstration projects designed to educate communities on the value and cost-effectiveness of renewable energy. Maine's Voluntary Renewable Resources Fund, a public benefits fund, was established in 2000 and is supported by contributions made by consumers on their electric bills. Applications for Voluntary Renewable Resources Grants are available only during specified application periods; funding is made available when a certain amount has been collected as a result of voluntary contributions.

Grants of up to $50,000 are generally available to Maine-based nonprofit organizations (including community-based nonprofits), electric cooperatives, quasi-municipal corporations and districts, and community action programs. To qualify for grant funding, renewable-energy resources generally must (1) qualify as a small power production facility under Federal Energy Regulatory Commission rules or (2) must not exceed 100 megawatts in capacity and use one or more of the following resources to generate electricity: fuel cells, tidal power, solar energy, wind energy, geothermal energy, hydropower, biomass energy, and/or municipal solid waste used in a generator in conjunction with recycling.

Integral Solar Flood Light Specifications

- Cost
  - $54.99 (sale price) to $249.99 (regular price)
- Dimensions
  - 3.5L x 3.5W x 7H inches
- Material
  - Plastic
- Cord Length
  - 20 Feet - each
- Finish
  - Black
- Specialty
  - Flood Lights
- Type
  - Spot Lights
- Illumination Time
  - 8 - 10 Hours
- Light
  - White
- Brand
  - Intermatic / Malibu

Seaflex



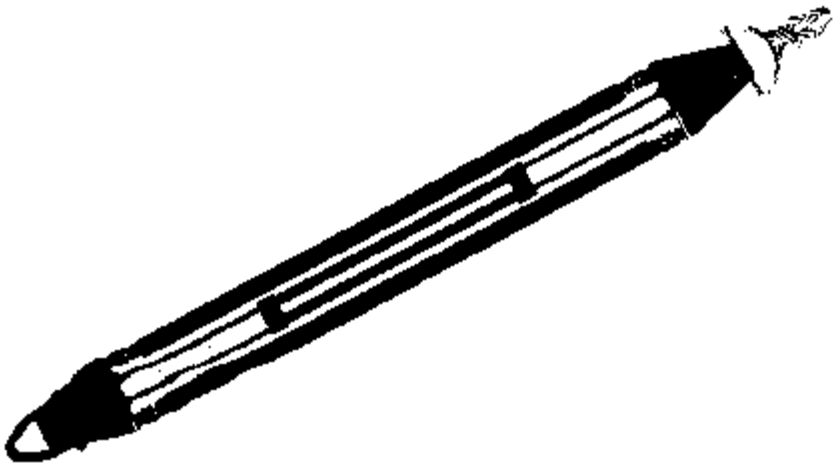
Seaflex®

Description

The extreme break load of the ByPass system together with the elasticity of the Seaflex rubber hawsers offers a mooring system prepared to handle any kind of environmental situations.
During normal conditions the Seaflex rubber hawsers will handle all the forces, the bypass will only come into play when unexpected forces such as higher wind speeds or heavier wave action than designed for occur.

ByPass Function

The ByPass system is mainly built from two individual cables of HMPE. The twin cables are looped around a reinforced Delrin spider. On Seaflex reaching the designed elongation the two spider blocks will interlock. The force will now be handled both by the Seaflex rubber hawsers and the ByPass.
The TPU retraction cables ensure separation of the spider blocks during normal working conditions.



Patents Pending

Cable Fibre	HMPE
Bungee Mount, Single Anchor Design	Delrin - Black
Support Plate - Keyed, Anchor Support	SS 2343 Stainless Steel
Retraction Cable	Thermoplastic Polyurethane

Seaflex AB Stöcksjö Kustväg 77 SE-90580 Umeå Sweden, Phone +46 90 160650, Fax +46 90 160651, info@seaflex.net, www.seaflex.net
Seaflex Inc 733 Arlington Ave. North Suite 211 St Petersburg FL 33701 USA Phone (310) 548 9100, Fax (321) 406 0612 seaflex.inc@seaflex.net

Seaflex®

11 March 2009

SEAFLEX is a strong, reliable, and flexible method for mooring floating docks and other related applications. Thousands of SEAFLEX have been installed in salt, brackish, and fresh water all over the world since we first introduced the concept of elastic rode mooring systems. SEAFLEX can handle the toughest weather conditions and the most exceptional water fluctuations.

The Seaflex Way

Quality is a key concept at Seaflex. Our commitment to quality gives our customers the best solutions in a wide variety of environments. Our solutions are based upon our own experiences drawn from thousands of installations, and these solutions are strengthened by widely accepted calculation models. Projects are well documented using software to store critical data in order to have easy access to the history of projects should that be necessary during the life span of those installations. Our distributors and partners play an important role in our delivery system. They know that SEAFLEX is the top of the line method for marina moorings and that working with Seaflex offers great benefits. We use well-defined methods from our industry and add our own expertise. By being the worldwide market leader in flexible mooring systems we get continuous feedback from around the globe allowing us to continuously improve our products and our delivery. Welcome to The Seaflex Way and to the quality we deliver!

The four defining factors of SEAFLEX

Technology

SEAFLEX provides secure moorings even under the worst weather conditions. The moorings are self-regulating, handle variations in water levels, and are effective with all water depths. The elasticity ensures that moored floating docks and boats are less exposed to unnecessary wear while also protecting marinas and boats in case of storms. Our choice of materials guarantees a minimal risk of corrosion.

Quality

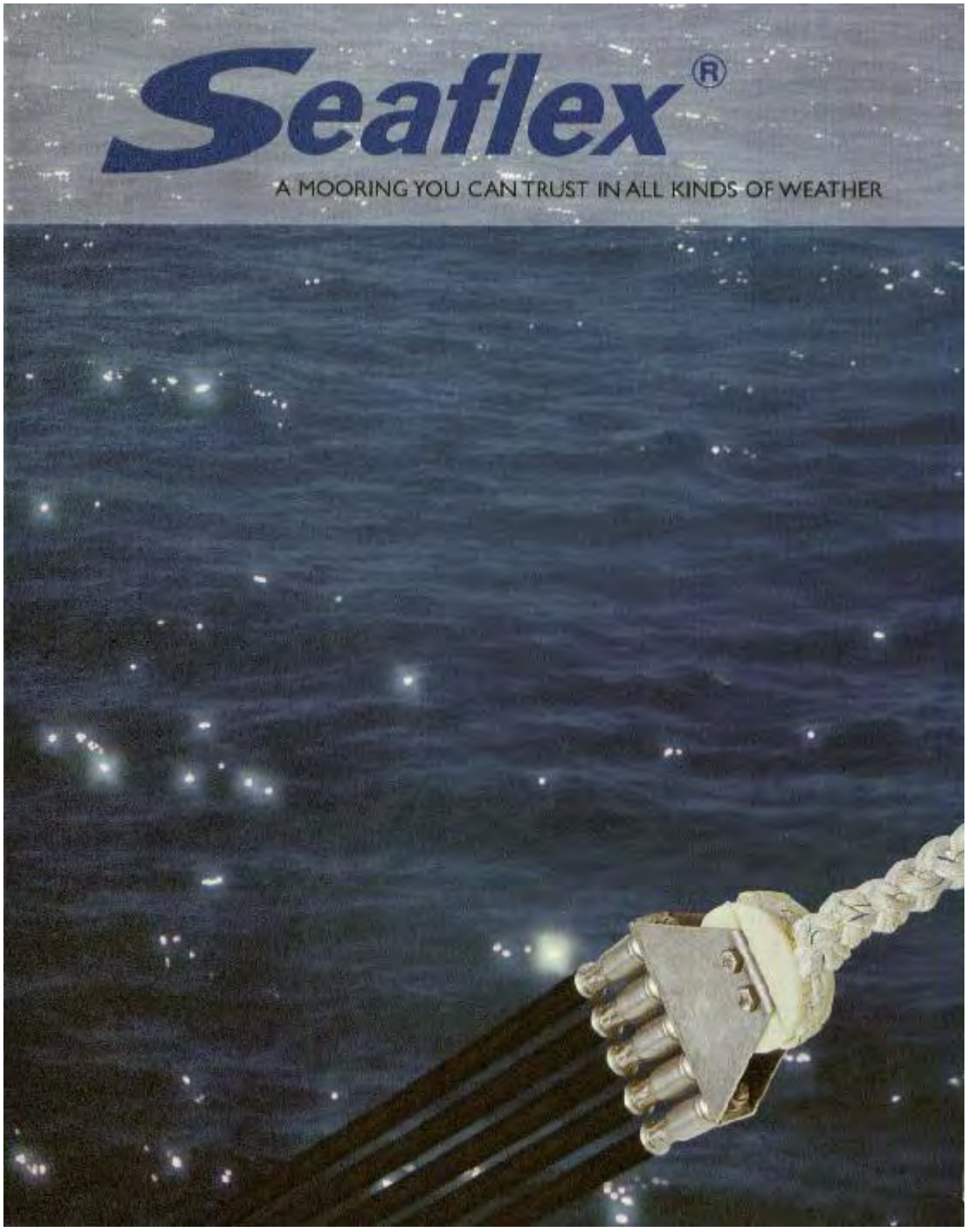
The size of each mooring is calculated from site and weather criteria provided by the client. Factors critical to these calculations are: variations in water level, wind speed, wave height and period, current, water depth, number and size of boats and overall size of the marina. This information is entered into our proprietary JFlex software to determine strength, length, and quantity of moorings needed. All interaction with our customers over the life of the installation follows structured procedures and is well documented.

Environment All SEAFLEX moorings meet the highest international standards for environmental protection. The moorings have minimal corrosion, do not release pollutants into the marine ecosystem, and do not harm the seabed or impact the surroundings. This makes SEAFLEX particularly well-suited for anchoring floating docks and buoys in sensitive marine areas, such as coral reefs, eel grass, and historic sites. A marina moored with Seaflex is naturally much freer from noise than any other marina.

TCO – Total Cost of Ownership

A marina moored with SEAFLEX requires substantially less maintenance than marinas with other mooring systems. One reason being the Seaflex technology itself, but this is also due to the exceptionally durable Seaflex components. Consider the difference compared with most cables and winches or chains. Those materials more often must be replaced due to corrosion, wear, and fatigue. Piles guides often require frequent repair or maintenance. Some other advantages with SEAFLEX include low installation cost, fast and easy installation, minimal transportation weight, and effectiveness in water depths not generally conducive to pile anchoring. A SEAFLEX moored marina can also be redesigned and reinstalled at a substantially lower cost than those anchored with most other methods.

Seaflex AB Stäcksjö Kustväg 77 SE-90580 Umeå Sweden, Phone +46 90 160650, Fax +46 90 160651, info@seaflex.net, www.seaflex.net
Seaflex Inc 735 Arlington Ave. North Suite 211 St Petersburg FL 33701 USA Phone (310) 548 9100, Fax (321) 406 0612 seaflex.inc@seaflex.net


Seaflex®
A MOORING YOU CAN TRUST IN ALL KINDS OF WEATHER

SEAFLEX CAN BE CONFIGURED TO WITHSTAND HURRICANES

Seaflex®

A SECURE WAY TO MOOR FLOATING DEVICES

A Seaflex mooring will withstand the worst imaginable weather conditions, it has good resistance to corrosive environments and has an unsurpassed ability to safely and securely resist all wave motion. A Seaflex moorirg does not affect sensitive sea beds and requires very low regular maintenance. Whether for entire marinas, wave attenuators, buoys, single pontoons or aquaculture farms, Seaflex is one of the safest mooring systems on the market.

Seaflex keeps pontoons and buoys in place, regardless of tides and wave movements.
The unique construction - which allows Seaflex to slowly stretch and then return in a smooth, calm movement - in combination with initial pretensioning, provides progressive resistance to both horizontal and vertical wave motion.
A pontoon anchored with Seaflex is never passive to the sea, but instead offers firm resistance that substantially reduces wave movements.
In harbors and marinas with heavy traffic, the effects of the swells are dampened and the risk of damage to moored boats is considerably reduced.
Navigation buoys anchored with Seaflex do not change position as much as those anchored with chains, a fact that considerably improves marine safety in harbors and narrow channels.
Mooring buoys anchored with the Seaflex system provide soft and secure mooring in all weather.

TECHNOLOGY OF THE HIGHEST LEVEL

A Seaflex hawser is built around a homogeneous rubber core. A specially braided cord is wrapped around the core, the outer layer consists of a durable rubber cover. When subjected to stress the cord tightens around the elastic rubber core, providing progressive resistance that dampens the motion from the water.

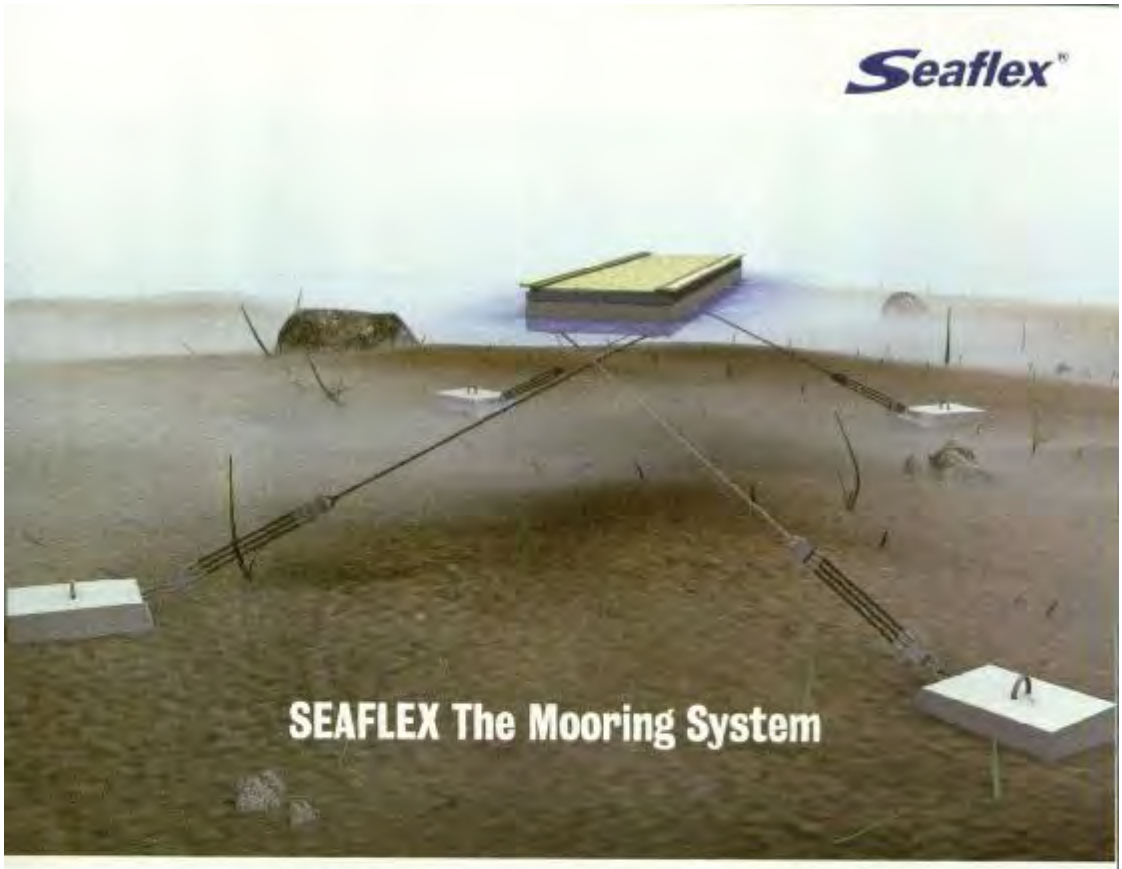
The Seaflex fittings are crimped around the rubber hawser. A single Seaflex hawser is designed to stand up to very high loads - the fittings are designed to withstand even more.
A specially manufactured stainless steel shackle fastens Seaflex to the anchor, an integrated thimble holds the polyester rope with a secure grip.

The number of Seaflex hawsers fitted in parallel is determined by the active forces.
The hawser lengths are determined by water level variations.

Specially manufactured stainless steel or galvanized iron shackle.

The figure shows the progressive curve of Seaflex.

Seaflex®



SEAFLEX The Mooring System

Safety First

The SEAFLEX unique construction as a progressive expanding or exponential mooring device serves to provide a smooth, damping effect of all movements in water. The number of SEAFLEX rubber hawsers used is dependent on the forces involved. The hawsers length is pre-determined in correlation to the variation in water level. SEAFLEX is extremely safe and maintains the position of the pontoon or buoy independent of water level variations or wave-induced movements. The SEAFLEX system can be dimensioned for application in the strongest hurricanes.

The Environmental Solution

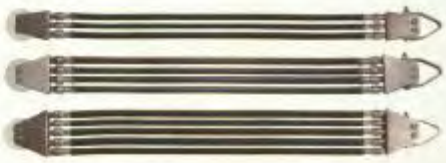
SEAFLEX has no harmful affects on the marine ecosystems and does not damage the extremely sensitive seabed. This is a consequence of SEAFLEX being in a constant state of tension between anchors and pontoon.

SEAFLEX requires little maintenance, is easy to install and remains strong year after year.

SEAFLEX proves to be the most cost effective mooring system on the market.

SEAFLEX 1 or 2 rubber hawsers
Standard model for smaller pontoons and buoys

SEAFLEX 3, 4 and 5 rubber hawsers
Standard model for average size pontoons



SEAFLEX 6, 8 and 10 rubber hawsers
Standard model for large pontoons and wave attenuators

SEAFLEX By-Pass
The By-Pass rope prevents SEAFLEX from being extended past its foreseen elongation point in extreme conditions. This model can also withstand extreme forces and loads.

SEAFLEX By-Pass 2 rubber hawsers
For smaller pontoons and swing moorings.

SEAFLEX By-Pass 4, 6, 8 and 10 rubber hawsers
For larger pontoons, wave attenuators, large swing moorings and navigation buoys.

SEAFLEX SPRING
SEAFLEX SPRING with its unique design is the most effective method of shock absorption mooring between land and pontoon. The SPRING can absorb the forces created by load variations. The construction consisting of shock elements made from special rubber and stainless steel fittings combines to create a silent spring with a long life expectancy.

SEAFLEX EE – Models
A slight variation in the SEAFLEX construction with specially developed end fittings in stainless steel. Designed for small jetties and buoys.

SEAFLEX Buoy
The tough swing mooring for the sensitive environment.

This SEAFLEX Buoy is part of the Gyuleau Project which is a European Environmental Project, a new initiative to minimise any impact swing moorings may have on our fragile environment. The project consists of running a test over 2 years where four pairs of moorings are surveyed to establish any differences and their impact on the environment. By comparing conventional chain moorings with the SEAFLEX system the study is designed to measure any of these differences.

SEAFLEX End fittings
MODEL EE
Single rubber hawser.

MODEL EE
Twin rubber hawser.

Stainless or galvanised SEAFLEX shackle.

Nylon SEAFLEX Thimble

Seaflex®

Seaflex AB, Stöcksjö Kustväg 77, SE-905 80 Umeå, Sweden
Phone +46 90 18 08 50, Fax +46 90 18 08 51, info@seaflex.net www.seaflex.net

AN ENVIRONMENTALLY SAFE ALTERNATIVE

Seaflex does not rust or introduce other pollutants into the marine ecosystem. Moreover, there is no chain drag or other bottom damage to the local environment with Seaflex. This makes Seaflex especially suitable for mooring pontoons and buoys in sensitive locations, for instance near coral reefs, vegetation and historic relics.

Sturdy bottom anchors are needed to hold large pontoons in place. During installation Seaflex is much more convenient and easier to handle than heavy, clumsy chains.

THE SEAFLEX MOORING SYSTEM REQUIRES VERY LOW MAINTENANCE

Seaflex requires considerably less maintenance than other mooring systems. System components are very resilient and do not need to be checked or replaced as often as the parts in other mooring systems.

Chains require a lot of maintenance. After a number of years chain links may be heavily corroded, worn and fatigued and must be replaced. What initially might have been the most economical alternative will in time incur sky-high maintenance costs.

Piles may require significant maintenance. Marine organisms which fasten onto the piles, are exposed at low tide and create an undesirable appearance. Piles damaged by bad weather must be repaired or replaced - measures that can prove very expensive over time.

Environmentally friendly, requires low maintenance, silent and with unsurpassed stability - Seaflex, a mooring you can trust in all kinds of weather.

There is a store and a gas station on the pontoon at Gräddö in Roslagen, Sweden. Despite high winds and the fact that the pontoon can be covered with 30 cm of ice in the winter, the Seaflex installation has functioned perfectly since 1990.

Like most inventions, the Seaflex mooring system came about by chance.

In the 1960s, Bertil Brandt, a Swedish innovator active within the mining industry, invented a very durable compound rubber for lining ore mills. In 1968, Brandt visited a fishing harbor in Cannes and witnessed the chaos that occurred when the fishing boats berthed. He came up with an idea and constructed a simple and secure rubber mooring arrangement. During his work in Cannes, Brandt realized that mooring single pontoons was an even bigger problem and back home in Sweden he continued to develop a secure mooring system. In 1975, a single pontoon was moored for the first time with Seaflex. Today, there are several thousand Seaflex systems in use throughout the world.

The first large installation was implemented in 1981 at Hammarviken in Stockholm, Sweden. Laboratory tests show that stability has remained at optimum levels despite the severe storms experienced over the years.

Seaflex®

MOORING FLOATING DEVICES ALL OVER THE WORLD

VESTMANNAEYJAR, ICELAND
The most famous installation is probably the pen that was constructed for the orca Keiko as one step in his return to freedom. In order to withstand the extremely severe conditions, the pen - which was the size of a soccer field - was moored with Seaflex. The installation was configured for hurricanes and in order to monitor the pen, advanced computerized measuring equipment, remotely controlled via GSM, was installed. The measuring equipment forwarded information about mooring forces, wind directions, wind speeds, wave heights and wave frequencies.

MESSINA, ITALY
In the Strait of Messina, Sicily, a Seaflex installation dampens the swell from the large ferries that traffic the channel to the mainland.

QUEBEC, CANADA
The Seaflex moored navigational buoy holds its position in the narrow channel, regardless of the water level and wave movements.

ROCKY FORK STATE PARK MARINA, HILLSBORO, OHIO
The mooring system of Seaflex and Helix anchors has served this 300 slip marina well. It has handled a couple of 65 knots blows while slips were full without incident and it handles water level variations.

STOCKHOLM, SWEDEN
Swells constantly plague the heavily trafficed channel near Trancberg. This Seaflex mooring, which was installed in 1983, has always worked exactly as expected.

SEAFLEX AB
Stöcksjö Kustväg 77, SE-905 80 Umeå, Sweden
Phone +46 90 16 06 50 Fax +46 90 16 06 51
info@seaflex.net www.seaflex.net

Residential Docks and Piers:

Inventory of Laws, Regulations, and Policies for the New England Region

NOAA Coastal Services Center
LINKING PEOPLE, INFORMATION, AND TECHNOLOGY

Tips for Using This Document

Acronyms and Abbreviations Used in Tables	
ac	acres
BPL	Bureau of Parks and Land
CGS	Connecticut General Statutes
CMR	Commonwealth of Massachusetts Regulations
COP	Certificate of Permission
CRMC	Coastal Resources Management Council
CRMP	Coastal Resources Management Program
CZM	Coastal zone management
DEM	Department of Environmental Management
DEP	Department of Environmental Protection
DES	Department of Environmental Services
DIFW	Department of Inland Fish and Wildlife
DMR	Department of Marine Resources
EPA	U.S. Environmental Protection Agency
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
ft	feet
GP	General Permit
MGL	Massachusetts General Law
MRSA	Maine Revised Statutes Annotated
NRPA	Natural Resources Protection Act
N/A	Not applicable
OLISP	Office of Long Island Sound Programs
PGP	Programmatic General Permit
SAV	Submerged aquatic vegetation
SDF	Structures, Dredging, and Fill
SDF/TW	Structures, Dredging, and Fill/Tidal Wetlands
USACE	US Army Corps of Engineers
U.S.C.	United States Code
US FWS	United States Fish and Wildlife Service

Document Layout
This document has been arranged in tabular format so that one can easily compare states' information according to topic. See the sample table below.

Sample Table

Introductory information

Table #: Table Title

State	Topic	Topic	Topic
CT			
ME			
MA			
Town of Falmouth			
NH			
RI			

Acronyms and Abbreviations
Because of space limitations, acronyms and abbreviations often appear in tables without definition. Refer to the table at left for those definitions.

Reference

U.S. National Oceanic and Atmospheric Administration. Coastal Services Center. 2006. *Residential Docks and Piers: Inventory of Laws, Regulations, and Policies for the New England Region*. NOAA/CSC/20622-PUB. Charleston, SC: NOAA Coastal Services Center.

Note: Information on Rhode Island was corrected in October 2006 following the initial August 2006 on-line release of this document.

Residential Docks and Piers: Inventory of Laws, Regulations, and Policies for the New England Region

Introduction

While the homes threatened by erosion and the developer illegally filling in marshlands are the projects that make the headlines, for many state regulatory programs, it's the residential docks and piers that take up the most time. When is a dock too long? What about crossing extended property lines? And at what point does a creek have too many docks?

There are no easy answers to these questions. At the request of the Georgia Coastal Management Program, the National Oceanic and Atmospheric Administration (NOAA) Coastal Services Center published in April 2003 an inventory of residential dock and pier management information for the southeastern U.S. This inventory builds upon that effort and includes five New England states and one municipality: Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and the Town of Falmouth, Massachusetts. Federal laws, state laws and regulations, permitting policies, and contact information are presented in a tabular format that is easy to use.

Disclaimer

This inventory summarizes residential dock and pier permitting information in general terms and should not be construed to cover every permutation possible under law. For greater detail on the information presented here, see Table 8 of this document, or contact the permitting authorities in Table 1.

Special Thanks to

- Connecticut Department of Environmental Protection, Office of Long Island Sound Programs
- Maine Department of Environmental Protection, Bureau of Land and Water Quality
- Massachusetts Department of Environmental Protection, Wetlands Protection Program and Waterways Regulation Program
- Falmouth Conservation Commission
- New Hampshire Department of Environmental Services, Wetlands Bureau
- Rhode Island Coastal Resources Management Council
- U.S. Army Corps of Engineers

Table of Contents

Table 1: State Summary

State	Federal Approval of State CZM Program[1]	Coastal Population[2]	Miles of Coast[1]	Acres of Tidal/ Coastal Marsh	Main Permitting Authority for Residential Docks and Piers	Agency Jurisdiction	Statutory Authority: Laws, Regulations, Policies, and Procedures
CT	1980	In 2000: 2,120,734 In 1990: 2,030,017	583	17,608	DEP, OLISP Phone: (860) 424-3034 Web site: http://dep.state.ct.us/olisp/	Activities occurring in tidal wetlands and/or activities waterward of the high tide line.	Structures, Dredging, and Filling Act (CGS Sections 22a-359 through 22a-363f) Tidal Wetlands Act (CGS Sections 22a-28 through 22a-35a) CT Coastal Management Act (CGS Sections 22a-90 to 22a-112)
ME	1978	In 2000: 944,847 In 1990: 885,703	3,478	Not available	DEP, Bureau of Land and Water Quality Phone: (207) 287-3901 Web site: www.maine.gov/dep/blwq/	Construction of permanent structures in, on, or over any protected natural resources (great ponds; coastal and freshwater wetlands; significant wildlife habitats; fragile mountain areas; and rivers, streams, and brooks). Also, construction within 75 ft. of certain protected natural resources.	Natural Resources Protection Act (38 M.R.S.A., Sect. 480A-480BB) DEP Rules, Chapter 310, Wetlands and Waterbodies Protection DEP Rules, Chapter 315, Assessing and Mitigating Impacts to Existing Scenic and Aesthetic Uses
MA	1978	In 2000: 4,783,167 In 1990: 4,494,398	1,519	45,480 ac. salt marsh	DEP Wetlands Protection Program Phone: (617) 292-5695 DEP Waterways Regulation Program Phone: (617) 292-5918 Web site: www.mass.gov/dep/water/	Wetlands Program Activities in wetland "resource areas" (inland swamps, marshes, bogs and wet meadows; coastal salt marshes; land under water bodies; banks of water bodies; floodplains; coastal beaches and dune fields; riverfront areas; fish runs; land containing shellfish). Waterways Program Structures in flowed and filled tidelands, great ponds, and navigable rivers and streams.	MA Wetlands Protection Act (MGL Chapter 131, Section 40), implemented by 310 CMR 10.00: Massachusetts Wetlands Protection Act Regulations MA Public Waterfront Act (MGL Chapter 91), implemented by 310 CMR 9.00: Waterways Regulations
NOTES	[1] Data from NOAA OCRM Web site at www.coastalmanagement.noaa.gov/mystate/welcome.html, except CT miles of coast from DEP OLISP, Falmouth miles of coast from Conservation Commission, and NH miles of coast from DES Wetlands Bureau. [2] Data from unpublished NOAA OCRM document "Population of Coastal Counties," except Town of Falmouth coastal population from official site of the U.S. Census Bureau at www.census.gov.						

Table 1: State Summary (continued)

State	Federal Approval of State CZM Program[1]	Coastal Population[2]	Miles of Coast[1]	Acres of Tidal/ Coastal Marsh	Main Permitting Authority for Residential Docks and Piers	Agency Jurisdiction	Statutory Authority: Laws, Regulations, Policies, and Procedures
TOWN OF FALMOUTH	N/A	In 2000: 32,660 In 1990: 27,960	70	112 ac. tidally restricted salt marsh	Falmouth Conservation Commission Phone: (508) 495-7445 Web site: www.town.falmouth.ma.us/depart.php?depkey=concom	Resource areas (see FWR 235-2), lands within 100 ft. of resource areas, lands and waters within the Black Beach/Great Sippewissett Marsh District of Critical Planning Concern, lands and waters within the Waquoit Bay Area of Critical Environmental Concern.	Falmouth Wetlands Regulations (Code of the Town of Falmouth, Chapter 235)
NH	1982	In 2000: 389,592 In 1990: 350,078	13	Approx. 6,200 ac. salt marsh	DES, Wetlands Bureau Phone: (603) 271-2147 Web site: www.des.state.nh.us/Wetlands/	In tidal areas, all submerged lands up to the highest predictable tide line; a buffer zone extending 100 ft. from the highest observable tide line; salt marsh; sand dunes; tidal flats. Also, nontidal wetlands and surface waters including freshwater wetlands, lakes, ponds, rivers, streams, and intermittent streams.	NH Revised Statutes, Chapter 482-A: Fill and Dredge in Wetlands NH Code of Administrative Rules, Chapters Wt 100-800
RI	1978	In 2000: 1,048,319 In 1990: 1,003,464.	384	4,066 ac. estuarine emergent and estuarine shrub-scrub wetlands	CRMC Phone: (401) 783-3370 Web site: www.crmc.ri.gov	Tidal waters, shoreline features, areas adjoining shoreline features up to 200 ft. inland; watersheds of poorly flushed estuaries; freshwater wetlands in the vicinity of the coast; statewide construction of certain facilities.	RI Coastal Resources Management Program, As Amended, Sections 100-300. Often referred to as "The Red Book" Special area management plans are also in effect for multiple areas.
NOTES	[1] Data from NOAA OCRM Web site at www.coastalmanagement.noaa.gov/mystate/welcome.html, except CT miles of coast from DEP OLISP, Falmouth miles of coast from Conservation Commission, and NH miles of coast from DES Wetlands Bureau. [2] Data from unpublished NOAA OCRM document "Population of Coastal Counties," except Town of Falmouth coastal population from official site of the U.S. Census Bureau at www.census.gov.						

3

U.S. ARMY CORPS OF ENGINEERS INTERACTIONS WITH STATE GOVERNMENTS

The U.S. Army Corps of Engineers (USACE) is the federal agency charged with oversight of the nation's navigable waters. Residential docks and piers are permitted pursuant to Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C 403) and Section 404 of the Clean Water Act (33 U.S.C. 1344). Section 404 permits are required only for projects placing dredged or fill material in navigable U.S. waters. To implement these laws, USACE has divided the nation into divisions and smaller districts based largely on watershed boundaries. The states included in this document are all part of the North Atlantic Division, New England District, but the way that USACE district offices and state governments work together differs from state to state.

Generally, USACE issues three types of permits:

- Individual permits—requires full public review.
- Regional permits—a form of general permit issued for a state, region, county, or other area. Regional permits are issued by the district engineer when permitted activities are similar in nature and cause minimal individual and cumulative environmental impact. A Programmatic General Permit (PGP), a type of regional permit, can be issued when it reduces duplication of regulator efforts among local, state, or federal agencies. The PGP grants permitting authority to a state, local, or federal government agency to act for USACE in certain circumstances. All states in this document currently have PGPs for permitting docks and piers.
- Nationwide permits—another form of general permit issued by the chief engineer through the federal rulemaking process.

Table 2: State–USACE Interactions

State	Summary of Office Interactions
CT	PGP expires May 31, 2011. Category 1 activities are not screened by USACE. Category 2 activities require application to USACE, as well as screening at a monthly "joint processing meeting" between DEP, USACE, FWS, EPA, and NMFS. Applicants for Category 2 activities must have written authorization from USACE. All agencies participating in the joint process meetings can push an application into Category III, which requires a USACE individual permit.
ME	PGP expires October 11, 2010. Category 1 activities are not screened by USACE, and the applicant may proceed if not contacted by USACE within 30 days. Category 2 activities require interagency screening by USACE, USFWS, EPA, and NMFS to determine if activities result in minimal impacts to the aquatic environment. Structures and floats in navigable waters are considered Category 2 projects. Screenings are held at USACE every three weeks, or as necessary. After interagency review, applicants are notified in writing that their projects are either authorized, authorized with special conditions, or that individual permit review is required.
MA	PGP expires January 20, 2010. Small docks and piers are considered Category 1 activities and require no notification to USACE, but USACE is notified of application when applicant fulfills state public notice requirements. Applicants sometimes provide structure plans to USACE to ensure Category 1 standards have been met. For non-Category 1 activities, state applications are screened at a bimonthly interagency meeting between USACE, USFWS, USEPA, NMFS, and the state CZM Office. After screening, the committee either grants written authorization to proceed or requires individual permit review.
NH	PGP expires June 2, 2007. Projects with impacts up to three acres may be considered under the PGP. Projects permitted by DES as "minimum impact" may proceed without authorization from USACE. Projects permitted as "minor impact" may proceed 30 days after DES permitting unless applicant receives notification from USACE stating otherwise. Projects permitted as "major impact" must await authorization from USACE, which is issued within 30 days of DES permit. In NH, any project in tidal area is considered "major impact." USACE and other relevant federal agencies meet weekly, if practicable, to review all projects approved by DES. If concerns exist, USACE may request more information, require modification to the proposal, or require individual permit.
RI	PGP expires February 11, 2007. Category 1 projects require no authorization or review by USACE. Category 2 projects must undergo interagency screening at monthly meetings between USACE, USFWS, EPA, NMFS, DEM, and CRMC. If any agency expresses concern within their area of expertise, projects require an individual USACE permit. For Category 1 and 2 activities, applicants apply to the appropriate state resource agencies only, and those agencies will incorporate the USACE PGP authorization into their permits.

4

Table 3: Permitting Framework and Process

State	Management Framework	Summary of Permitting Process	Permit Applications Received	Permits Issued
CT	• Dock construction requires one of three permits. • Streamlined GP exists for docks meeting specific criteria. • Public notice and comment is not required for GP but is required for a full permit. • A streamlined permitting process exists for dock maintenance, modification, and authorization of unpermitted structures. • Applicants are encouraged to have a pre-application meeting with OLISP to discuss dock design and determine the appropriate permit process.	One of three permits is required: • GP for structures meeting stringent size and location requirements. Typically issued within three months. GP docks also called "4/40 docks." • SDF Permit for structures not meeting GP standards. Typically issued in 6-12 months. SDF process includes public notice and public comment period. • SDF/TW Permit for structures near tidal wetland vegetation. Typically issued in 6-12 months. SDF/TW process includes public notice and public comment period. Public hearing held if 25 people petition.	2003 172 2004 177	 162 159
ME	• Structures must meet all standards within the NRPA. Standards interpreted with scenic rules, and wetlands and waterbodies protection rules. • Structures in place less than seven months per year require no permit. • Maintenance or repair of less than 50% of structure requires no permit. • Replacement of structure is eligible for streamlined Permit by Rule. • Permitted docks greater than 500 sq. ft. require a submerged land lease from BPL.	• Applicant submits NRPA permit application to DEP, usually with copy to town. • DEP transmits copies of application to USACE, BPL, DMR and DIFW as appropriate. • DEP decision can be appealed within 30 days. • Successful applicants must begin construction within two years and should finish within five years. • NRPA permits do not have to be renewed.	2003 235 2004 278	 234 278
MA	• MA Colonial Ordinance distinguishes "Commonwealth Tidelands" from "Private Tidelands." Private tidelands are privately owned, but the public's right to fish, fowl, and navigate there is maintained. • Two permits typically required for dock construction. • All dock applications require public notice. • State wetlands permitting is typically handled by local Conservation Commissions. • State waterways licenses are granted for up to 30-year terms and give applicants permission to build structure and occupy state lands.	<u>Wetlands Program</u> Permits issued by local Conservation Commissions. See Falmouth information. DEP coordinates application process and decides on permit appeals. <u>Waterways Program</u> • Applicant submits application for Waterways Permit. A simplified procedure is available for structures meeting criteria. • After license is issued, applicants must record license against deed of property within 60 days. • Applicant must request Certificate of Compliance within 60 days of completion of project but no later than five years from license issuance. • Waterways licenses valid for up to 30 years. • Simplified renewal process is being developed.	2003 Not available 2004 Not available	 Not available Not available

5

Table 3: Permitting Framework and Process (continued)

State	Management Framework	Summary of Permitting Process	Permit Applications Received	Permits Issued
TOWN OF FALMOUTH	• Falmouth implements state DEP Wetlands Program regulations and town regulations. • Town regulations are generally more stringent than state regulations. • Public hearing held within 21 days of receipt of permit application. • Town permits must be renewed every three years. • No permit required for routine maintenance, or replacement of destroyed structure within two years.	• Applicant submits application called Notice of Intent requesting permit called Order of Conditions, which gives permission to build structure in accordance with standard conditions. • Conservation Commission issues public notice and holds public hearing within 21 days of receipt of Notice of Intent. • Successful applicants must file Certificate of Compliance within three years of permit issuance. • Three years after permit issuance, Conservation Commission assesses project for adverse impacts. If impacts are found, mitigation is required within one year. If impacts are not found, a simplified process for a five-year renewal is available.	2003 18 2004 38	 18 38
NH	• Tidal docks typically include three components: a fixed pier, ramp, and float. Ramps and floats must be removed seasonally. • Construction of docks and piers in tidal waters requires a state permit and written authorization from USACE. • Streamlined Permit by Notification exists for maintenance of above-water components. • Permits for dock construction expire after five years. • Public notice is not required, but all abutting property owners must be notified of application.	• Applicant notifies all abutters in writing. • Applicant submits original and four copies of Standard Dredge and Fill Application to city or town clerk. • City or town clerk forwards application to DES and copies to appropriate local bodies. Local bodies may issue comment to DES, and DES must address each comment in permit decision. • If authorized by DES, USACE and other federal agencies review and issue written decision within 30 days. • Applicant must file certificate of compliance with DES upon completion of project.	2003 20 2004 11	 20 11
RI	• CRMC Assent acts as permit. • CRMC Assent includes USACE authorization and is the only permit required for PGP Category 1 and 2 projects. • Most Assents expire after 50 years, although some are issued for shorter periods. • Minor repairs require a maintenance permit, design changes require Certification of Maintenance, and repair to 50% or more of structure requires new Assent.	• Applicants submit application for CRMC Assent. "Category A" applications generally meet standards but may include minor variances. "Category B" applications, which may include more significant variances, must include written request for variance. • CRMC issues public notice and takes comments for 30 days for all dock applications. Category B projects must also undergo full council review. • Successful applicants are issued a registration plate, which must be displayed on structure. • If construction is not begun within three years, applicant may apply for up to four 1-year extensions. • After 50 years, owners must apply for new Assent or remove dock.	2003 72 2004 127	 65 124

6

Table 4: Environmental Concerns and Permit Enforcement

State	Environmental Impacts of Concern to State	Permit Enforcement
CT	• Visual impacts. • Direct, cumulative environmental impacts (e.g., impairment or destruction of tidal wetlands, intertidal flats, shellfish beds, and SAV). • Navigation. • Water quality impacts.	DEP has one staff member dedicated to permit enforcement, but all DEP permit analysts share enforcement duties. DEP sometimes works with municipal staff on enforcement. The public is also involved in enforcement and sometimes reports offenders. Permit analysts or municipal staff perform site inspections after the applicant files a start work notification. Field notice of violation and stop work advisories may be issued. After construction, applicant submits "as-built plans," which are compared to original plans submitted with permit application. Administrative orders for removal and remediation of violations may be issued. These orders include the right to an adjudicatory hearing. Fines can be levied only if violators enter into a consent order, or pursuant to litigation via the attorney general's office.
ME	DEP is equally concerned with all impacts addressed in the NRPA.	DEP has staff dedicated to enforcement. Abutters and other citizens can report concerns to designated "on-call" DEP staff. DEP attempts to check compliance of at least 50% of all permitted structures. Project managers initially check compliance after construction. Staff can then take formal action, such as consent agreements or litigation, against violators.
MA	Wetlands Protection Program • Water quality—from leaching, spillage, runoff, and turbidity. • Water circulation and sediments—from scouring, erosion, and sedimentation. • Disruption of growing areas and spawning habitat—for important vegetation (e.g., eelgrass) and shellfish beds. • Disruption of habitat or corridors of rare animal species and wildlife that depends on wetland habitat.	Wetlands Program Distributes enforcement duties among staff, but certain staff may undertake more enforcement than permitting or compliance according to program workload. Waterways Program One staff member focused on enforcement. DEP generally uses a deterrent model, selectively and strategically enforcing a limited number of high-profile violations every year. Enforcement decisions by DEP can be appealed by dock owners.
TOWN OF FALMOUTH	Impacts to shellfish habitats, water quality, and eelgrass habitat; erosion of coastal banks; damage to salt marshes and their overall productivity.	Manpower is limited. Conservation Commission rarely checks for unpermitted or noncompliant structures, but when these structures are found, commission issues an "enforcement order." A hearing is then held to determine the legal status of the dock. Fines are rarely used.
NH	Impacts to sand dunes, tidal marshes, eelgrass beds, wildlife habitats (e.g. nesting shore bird habitats), and fish spawning.	DES has dedicated enforcement staff members who occasionally perform field inspections. Most enforcement occurs after DES receives complaints from municipal bodies. DES may suspend, revoke, or modify permits, or may report irreversible unauthorized projects to attorney general's office.
RI	Impacts to wetlands, coastal habitat, eelgrass populations, and existing uses.	Two CRMC staff members make up enforcement team, which periodically checks for unpermitted structures. Citizens also assist in enforcement, reporting illegal structures and activities. CRMC may issue fines for violations: • Up to $500 for unauthorized construction or activity on tidal waters, shoreline features, and adjoining areas • Up to $250 for unauthorized activity elsewhere • Up to $100 for unauthorized maintenance

7

Table 5: Permit Specifications I

State	Property Restrictions	Dock Location	Maximum Dock Length	Maximum Walkway Width	Minimum Walkway Height	Maximum Square Footage
CT	One point of access per property. Docks should be centered along waterfronts.	GP docks cannot be located in areas of SAV or tidal wetlands. For other docks, when sensitive coastal resources (SAV, tidal wetlands, intertidal flats, shellfish areas) cannot be avoided, special guidelines apply.	GP docks cannot extend further than to a depth of -4 ft. mean low water or a distance of 40 ft. from mean high water, whichever is shortest. Other docks are generally limited to the length necessary to achieve reasonable access to navigable water.	GP docks cannot have any fixed pier component wider than 4 ft. All docks generally should not exceed 4 ft. in width.	5 ft. above ground at mean high water for lowest horizontal component of fixed pier. Otherwise, stairs or other accessway with appropriate signage is required to ensure pedestrian access to beach.	For GP docks, 220 sq. ft. waterward of mean high water. Floats should not exceed 100 sq. ft. unless larger size is justified. Shared docks are encouraged and can often be larger than individual docks.
ME	N/A	N/A	Permitted structures typically 50-150 ft., or the minimum length necessary to achieve intended use.	Permitted structures typically 4-6 ft. wide.	Permitted structures typically four times the height of existing emergent vegetation.	N/A
MA	Wetlands Program N/A Waterways Program Setback of 25 ft. from property lines where feasible.	Wetlands Program No residential docks and piers in Designated Port Areas. Waterways Program No residential docks and piers in state-designated Areas of Critical Environmental Concern, unless an approved resource management plan is in place.	Wetlands Program No longer than the distance necessary to reach navigable water depths. Waterways Program One-fourth width of the water body.	Wetlands Program Typical width is 3 ft. Waterways Program N/A	Wetlands Program N/A Waterways Program 5-ft. clearance between pier decking and high water mark, or alternative measures to ensure pedestrian access to beach.	N/A

8

Table 5: Permit Specifications I (continued)

State	Property Restrictions	Dock Location	Maximum Dock Length	Maximum Walkway Width	Minimum Walkway Height	Maximum Square Footage
Town of Falmouth	Setback of 10 ft. from property lines or extended property boundaries into intertidal or tidal zone.	Docks cannot prohibit or unreasonably impede legitimate passage along a beach, or navigation over waters for recreational or aquacultural purposes. No new docks or piers in FEMA V-Zone (areas subject to flood waters with great velocity) unless applicant demonstrates public benefit from project.	100 ft. beyond mean high tide, or 100 ft. beyond the landward edge of a salt marsh if present.	Typical width is 4 ft.	N/A	Terminal "T" or "L" of a residential dock cannot exceed 100 sq. ft.
NH	One structure per property. Setback of 20 ft. from adjacent property lines and imaginary extensions, unless applicant produces written, notarized permission from affected neighbor.	N/A	100 ft. for permanent pier, and maximum of 150 ft. for entire structure.	4 ft. for permanent pier.	Height above maximum salt marsh elevation cannot be less than width of walkway for permanent pier.	400 sq. ft. for permanent pier. Typically, 90 sq. ft. for ramp. Float area depends on allowable slip count, which is determined by shoreline frontage.
RI	Residential structures must exist on applicant's property. Setback of 25 ft. from extension of abutting property lines, unless affected owners do not object, or dock is shared.	Docks and piers must be 50 ft. from approved mooring fields, and three times the USACE-authorized project depth from federal navigation projects.	Lesser of 25% of distance to opposite shore (from mean low water) or 50 ft. seaward of mean low water. Docks in coves cannot exceed 2/3 the length of the cove. Docks in eelgrass areas must provide for 5 ft. between top of float and eelgrass.	4 ft. for docks, floating docks, and piers.	Stringers must be at least 3.5 ft. above grade of coastal wetlands. Walkway must be 5 ft. above mean high water to provide for public access.	150 sq. ft. for terminal floats. 80 sq. ft. for fixed terminal "T" or "L" sections.

9

Table 6: Permit Specifications II

State	Floats	Covered Areas and Storage Enclosures	Slip Allowance and Boat Hoists
CT	In intertidal flats and SAV areas, only fixed piers are recommended. If need for float is justified, floats are permissible if they include mechanisms to prevent resting on ground. Floats that rest on substrate are permissible in less sensitive areas.	Decks, gazebos and other structures unnecessary for boating access are not permitted waterward of the high tide line.	Slip allowance is based on structure use. Applicants should include berthing arrangements on plans included in the application package.
ME	Only temporary floats are usually permitted, but permanent slips are not prohibited.	New boathouses and other non–water-dependent uses are not permitted. Storage enclosures are permitted if water dependent.	Residential docks are usually permitted with temporary floats only, but permanent slips are not prohibited. Boat hoists not permitted.
MA	Wetlands Program Floats must be at least 1.5 ft. from bottom at low tide, 4 ft. from bottom at low tide if over eelgrass, and 2.5 ft. from bottom at low tide if over oyster beds. Waterways Program Temporary bottom-anchored moorings, floats, or rafts, and associated ramps, can be permitted annually by a municipal harbormaster, provided the city or town has an approved local permitting program.	Wetlands Program N/A Waterways Program Boat houses and covered areas generally discouraged but not banned. Storage enclosures allowed within reasonable limits.	Wetlands Program N/A Waterways Program Facilities with ten or more berths are regulated as marinas.
TOWN OF FALMOUTH	Floats must be at least 3 ft. above bottom at extreme low water and be fixed with a hoop roller or other approved fastening system.	Covered areas permitted but must be included in original structure plan and be in compliance with all other structure design specifications and performance standards. Oil or fuel may not be stored on the dock or pier.	For individual docks, only a single boat at the terminus of the dock is permitted. More slips are allowed for common docks (for two or more contiguous eligible properties) and community docks (for loading/unloading and tying up dinghies).
NH	Floats are allowed but must be removed seasonally.	New boathouses over water are not permissible, but seasonal canopies over boat slips may be permitted. Permanent containers are not permitted.	Slip counts determined by water frontage of parcel. Two slips allowed for first 75 ft. of frontage, plus one slip for every additional 75 ft.
RI	New structures cannot have both a terminal float and a fixed terminal T or L section. Floats must be in minimum water depth of 18 in., typically cannot cover SAV, and cannot rest on bottom.	Structures ancillary to residential boating facilities are prohibited.	Up to four recreational vessels permitted. Two boat lifts per dock permitted in specific water types only.

10

Table 7: Permit Specifications III

State	Planning Requirements	Maintenance and Reconstruction	Fees
CT	Projects must be consistent with any approved local Harbor Management Plan. If shellfish lease areas exist near the project, applicant must include names and addresses of those lease holders with application. Significant impacts to shellfish, interstate ramifications, or required approval from state siting council or FERC trigger pre-construction adjudication, including a public hearing and cross-examination.	COPs may be issued for substantial maintenance or repair of existing permitted structures, and authorization, maintenance or repair of unpermitted structures built before January 1, 1980. COP decisions typically issued within 90 days. Replacement of decking and replacement of up to 25% of piles in any given year does not require COP.	• General Permit: $700 • SDF or SDF/TW Permit: $525 plus $0.80 for each sq. ft. over 650 sq. ft. • COP: $400
ME	N/A	Streamlined Permit by Rule available for replacement of structures.	NRPA permit: $364 Submerged Land Lease (if required): $100, plus annual rental fee determined by legislature.
MA	Wetlands Program N/A Waterways Program Projects must conform with applicable zoning and Municipal Harbor Plans.	Wetlands Program N/A Waterways Program Routine maintenance and repair of licensed structures is required. This includes replacement of structure components with materials of the same size and quality, restoration of structures within two years of catastrophic events, and demolition and removal of unused structures.	Wetlands Program Included in local Conservation Commission application fees. Waterways Program • Application fee: $65 • Occupation fee: $2/square yard/year of license • License Renewal fee: $30 Application fees refunded if DEP fails to respond within required time frames.

11

Table 7: Permit Specifications III (continued)

State	Planning Requirements	Maintenance and Reconstruction	Fees
TOWN OF FALMOUTH	For community and common docks, applicants must demonstrate that the dock will remain as such for the life of the structure.	Normal maintenance and repair is allowed without notification, but any change to the original structure plan requires a modification to the permit. Destroyed docks can be reconstructed if owner can provide evidence to Conservation Commission that dock was previously there.	Application fee: $225 Advertising fee (for public notice): $16.00 Conservation Commission also has right to charge Consultant Fee during deliberations.
NH	Applicants must notify all abutting property owners in writing prior to submitting application.	Repairs to above-water components that do not change size, configuration, or location of structure require no permit. Repairs to components below the waterline that do not change size, configuration, or location of structure require Permit by Notification.	SDF Permit application fee: $100 plus: • $1/sq. ft. of permanent dock area • $.50/sq. ft. of ramp and float area • $.10/sq. ft. of jurisdictional lands impacted (excluding structure area) Permit by Notification: $100.00
RI	All state waters are zoned into 1 of 6 types based on adjacent land use, upland zoning, habitat types, and ecosystem analysis. Docks and piers are not allowed in Type 1 waters, which are designated as conservation areas.	Minor repairs require maintenance permit. Alterations to approved design of structure, expansion of facility, and work requiring heavy machinery require Certification of Maintenance. Repairs to 50% or more of structure require new Assent. Owners must remove structures or portions of structures that are destroyed in any natural or man-induced manner in Type 1 waters. CRMC also requires global positioning system coordinates for maintenance and new structures.	CRMC Assent: $500 CRMC Certification of Maintenance: $250 CRMC Maintenance Permit: $50

12

In addition to numerous interviews and correspondences with state, local, and federal managers, the resources below were used in developing this document. All provided links were active at the time of publication, but site content at the links may change, or the links may become inactive at any time.

Table 8: Resources

State	Reference
CT	CT DEP. 2002. *Connecticut's Coastal Permit Program: Residential Dock Guidelines*. Hartford, CT. September.
ME	Natural Resources Protection Act (M.R.S.A. Section 480). Available on-line at http://janus.state.me.us/legis/statutes/38/title38ch3sec0.html
MA	Commonwealth of Massachusetts Regulations (CMR), Sections 9.00, Waterways, and 10.00, Wetlands Protection. Partially available on-line at www.lawlib.state.ma.us/300-399cmr.html
	MA DEP, Bureau of Resource Protection, Wetlands/Waterways Program. 2003. *Small Docks and Piers: A Guide to Permitting Small, Pile-Supported Docks and Piers*. Boston, MA. November. Available on-line at www.mass.gov/dep/water/resources/smaldock.pdf
TOWN OF FALMOUTH	Falmouth Wetland Regulations (FWR) 10.00, Wetlands Protection. Available on-line at www.buzzardsbay.org/falmregs.htm
	Falmouth Wetland Bylaw (FWB), Code of Falmouth Chapter 235. Available on-line at http://www.town.falmouth.ma.us/depart.php?depkey=ConCom
NH	NH DES, Wetlands Bureau. Undated. Environmental Fact Sheet WD-WB-4: Identifying Department of Environmental Services' Wetlands Jurisdictional Areas. Concord, NH. Available on-line at www.des.state.nh.us/factsheets/wetlands/wb-4.htm
	NH DES, Wetlands Bureau. 2003. Environmental Fact Sheet WD-WB-15: Permitting of Tidal Docks. Concord, NH. Available on-line at www.des.state.nh.us/factsheets/wetlands/wb-15.htm
	New Hampshire Code of Administrative Rules, Chapters 100-800. Available on-line at www.des.state.nh.us/rules/wt100-800.pdf
RI	Coastal Resources Management Program, Sections 100-300. Available on-line at www.crmc.ri.gov/regulations/index.html
	RI CRMC. 2004. State of Rhode Island Coastal Resources Management Council Management Procedures. Wakefield, RI. February. Available on-line at www.crmc.ri.gov/regulations/programs/manageproc.pdf

Wood Island Feasibility Study

Part Three: Recommended Alternatives

May 2009

Completed for the Town of Kittery, Maine in cooperation with the University of New Hampshire and Appledore Engineering, Inc.

Written by Krystian E. Kozlowski
University of New Hampshire, Department of Civil Engineering

Project oversight by Jennifer L. Viarengo, P.E., Appledore Engineering Inc.
and Duncan Mellor, P.E., Waterfront Engineers LLC

Funded by the 2008 State of Maine Shore and Harbor Technical Assistance Grant

Preface

The following report is the work of students completed under the guidance and supervision of professional engineers. This report should only be used by the reader for the purpose of conveying general information regarding Wood Island, Kittery, ME. The information in this document is based on several sources regarding the history of the site. These written and photographic sources are cited and credit is given for their reference and use.

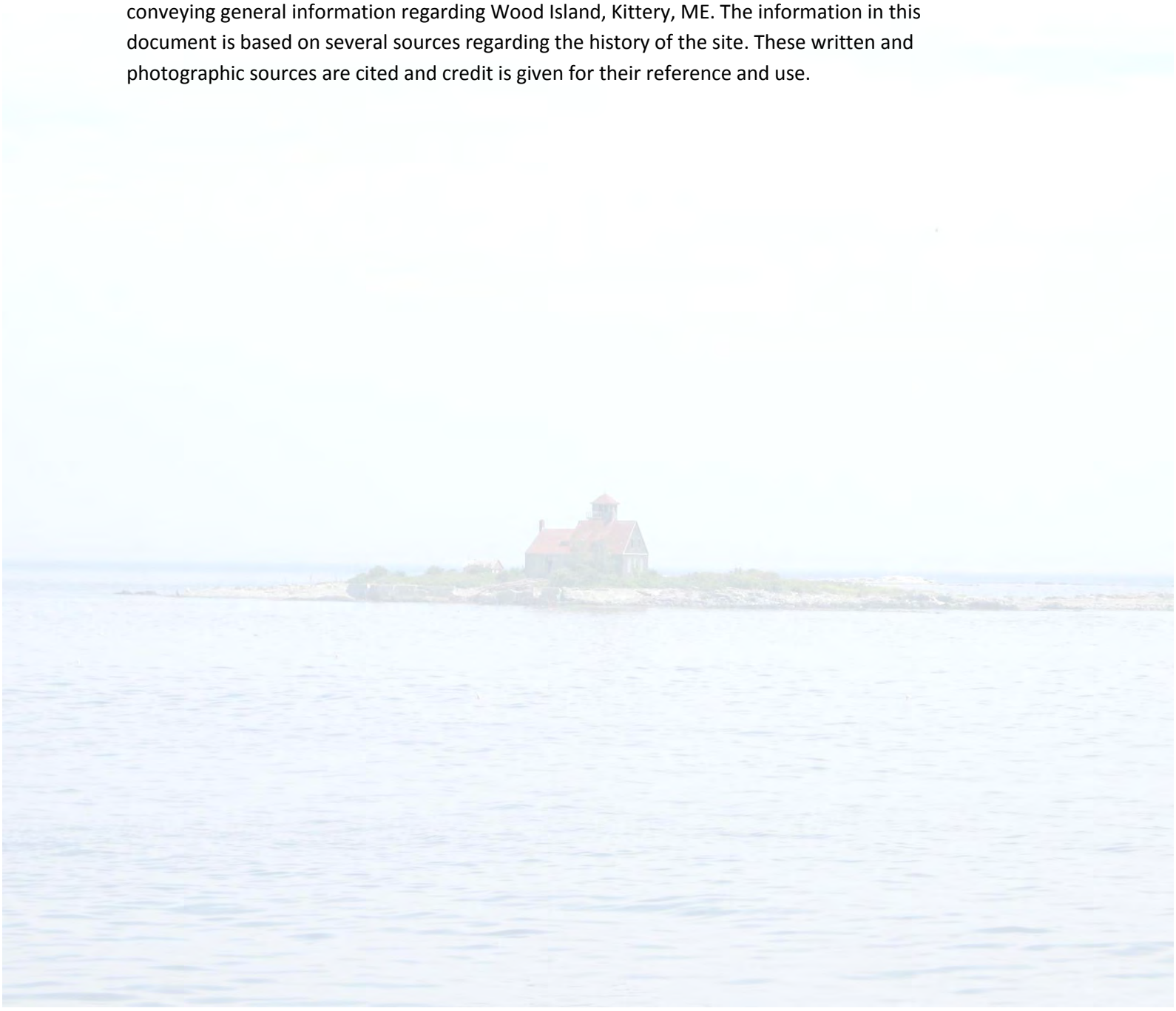


Table of Contents

Recommended Options

Three preliminary options were determined as possible courses of actions for the Town of Kittery. Each of these options combines alternatives from Part 2 of the 2009 Wood Island Feasibility Study.

Option A includes station stabilization & restoration with minimal seawall removal. The primary goal of this option is to immediately reduce existing hazards on the island. Implementation of this option could span over a period of time dictated by the availability of funding. This option protects the station structure from wind, rain, and wildlife. However, this option does not protect the building from flooding and wave action.

The total estimated cost for this option is approximately $145,600. This figure includes the installation of a modular dock with solar lighting. The estimate does not include the fees associated with hazardous material inspection, testing and abatement.

Option B includes station stabilization & restoration with complete seawall reconstruction. The goal of this option is to provide all the benefits of Option A and protection of the building from sea storm conditions.

The total estimated cost for this option is approximately $865,600. This figure includes the installation of a modular dock with solar lighting. The estimate does not include the fees associated with hazardous material inspection, testing and abatement.

Option C includes complete station demolition & steel frame replacement with seawall demolition. This option is designed to eliminate all current and potential hazards on the island. No seawall is required because the steel frame could be designed for wave action.

The total estimated cost for this option is approximately $342,600. This figure includes the installation of a modular dock with solar lighting. The estimate does not include the fees associated with hazardous material inspection, testing and abatement. The estimate also does not include an environmental study to determine the possible deterioration of zinc coated structural steel expose to low pH bird excrement combined with ocean water spray.

Making the Decision

Several options are possible to engage the Kittery residents in the Wood Island alternative discussion.

Public awareness options include:

- Town Hall meetings
- Informational mailings
- Town website posting
- Local Access Cable television airing of the Feasibility Study presentation.

These options should effectively present the findings of the feasibility study regarding the issues and conflicts associated with the Wood Island site.

Decision Process

Once the public is well informed, the best alternative must be chosen. An effective method to make a decision is to us a decision matrix. In a Pugh Matrix, each alternative is rated in several different categories. An example is shown below.

Example: Modified Pugh Matrix

Option	Cost	Constructability	Longevity	Maintenance	Historical/Cultural Value	Aesthetic Value	Total
A	1	1	3	3	2	1	11
B	3	3	2	2	1	2	13
C	2	2	1	1	3	3	12

The Wood Island Feasibility Study has determined the ratings of each option for categories like cost, constructability on the island, structural longevity, etc. However, the study has not determined each options ratings for subjective criteria like historical and cultural value or aesthetic value. The public's opinion could be determined on these subjective categories. The best alternative could then be determined based on its overall rating.

An optimal way to determine the public opinion would be using a town wide survey. The survey would be done by in-person ballot or on the Town's website.

Alternatively, a town vote could be conducted to directly choose the best option.