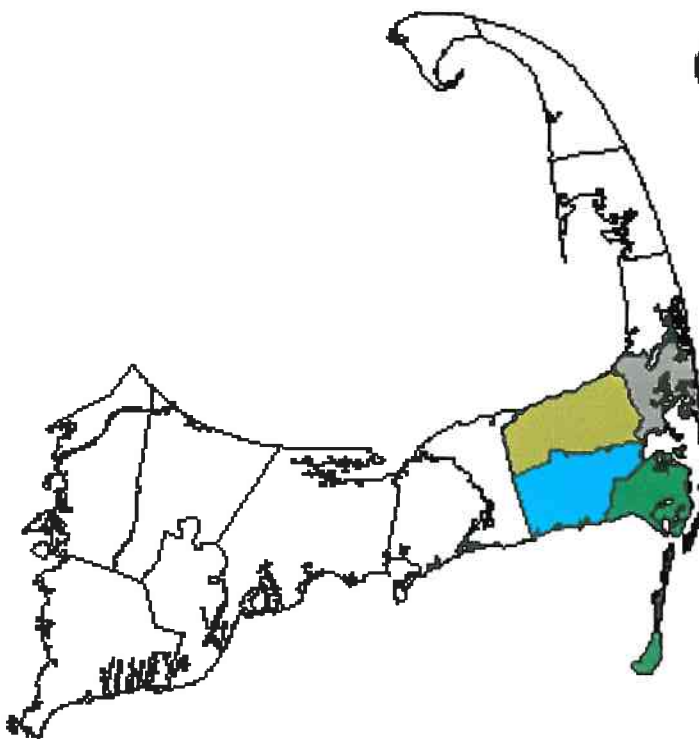


*Massachusetts Coastal Infrastructure
Inventory and Assessment Project
Massachusetts Department of Conservation and Recreation
Office of Waterways*

Outer Cape Cod - South

Orleans
Brewster
Harwich
Chatham



July 6, 2009

Prepared for:

**Massachusetts Department of
Conservation and Recreation
Hingham, Massachusetts**

Presented by:

**Bourne Consulting Engineering
Franklin, Massachusetts**

In Association With:

Applied Coastal Research & Engineering

Outer Cape Cod - South

TABLE OF CONTENTS

Section I – Coastal Hazards Infrastructure and Assessment Program

INTRODUCTION

PURPOSE

DEVELOPMENT OF MassGIS DATABASE ATTRIBUTES

DEVELOPMENT OF REPAIR / RECONSTRUCTION COSTS

Section II – Orleans

Part A – Community Findings

- COMMUNITY DESCRIPTION
- STRUCTURE INVENTORY
- SUMMARY OF FINDINGS

Part B - Structure Assessment Reports

Part C - Structure Photographs

Part D - Structure Documents

- TOWN DOCUMENT LIST
 - Document Table
- MA DCR – DOCUMENT LIST
 - Document Table
- MA DEP – CH 91 DOCUMENT LIST
 - Document Table
 - Copies of License Documents
- USACE – PERMIT DOCUMENT LIST
 - Document Table
 - Copies of Permit Documents

Outer Cape Cod - South

Section III – Brewster

Part A – Community Findings

- COMMUNITY DESCRIPTION
- STRUCTURE INVENTORY
- SUMMARY OF FINDINGS

Part B - Structure Assessment Reports

Part C - Structure Photographs

Part D - Structure Documents

- TOWN DOCUMENT LIST
 - Document Table
- MA DCR – DOCUMENT LIST
 - Document Table
- MA DEP – CH 91 DOCUMENT LIST
 - Document Table
 - Copies of License Documents
- USACE – PERMIT DOCUMENT LIST
 - Document Table
 - Copies of Permit Documents

Section IV – Harwich

Part A – Community Findings

- COMMUNITY DESCRIPTION
- STRUCTURE INVENTORY
- SUMMARY OF FINDINGS

Outer Cape Cod - South

Part B - Structure Assessment Reports

Part C - Structure Photographs

Part D - Structure Documents

- **TOWN DOCUMENT LIST**

- Document Table

- **MA DCR – DOCUMENT LIST**

- Document Table

- **MA DEP – CH 91 DOCUMENT LIST**

- Document Table
- Copies of License Documents

- **USACE – PERMIT DOCUMENT LIST**

- Document Table
- Copies of Permit Documents

Section V – Chatham

Part A – Community Findings

- **COMMUNITY DESCRIPTION**

- **STRUCTURE INVENTORY**

- **SUMMARY OF FINDINGS**

Part B - Structure Assessment Reports

Part C - Structure Photographs

Part D - Structure Documents

- **TOWN DOCUMENT LIST**

- Document Table

- **MA DCR – DOCUMENT LIST**

- Document Table

- **MA DEP – CH 91 DOCUMENT LIST**

- Document Table
- Copies of License Documents

Outer Cape Cod - South

• USACE – PERMIT DOCUMENT LIST

- Document Table
- Copies of Permit Documents

Section I

Coastal Hazards Infrastructure and Assessment Program

INTRODUCTION

PURPOSE

DEVELOPMENT OF MassGIS DATABASE ATTRIBUTES

DEVELOPMENT OF REPAIR / RECONSTRUCTION COSTS

***Massachusetts Coastal Infrastructure
Inventory and Assessment Project
Coastal Hazards Commission***

Section I – Coastal Hazards Infrastructure and Assessment Program

INTRODUCTION

The Project and Client

The Commonwealth of Massachusetts has initiated a Coastal Hazards Commission (CHC) to identify the vulnerability of the state to coastal hazards. As one of five working groups working under the CHC, the 20-Yr Infrastructure Plan was to establish a prioritization for the repair of coastal structures. The focus areas of the Working Group include:

- Publicly owned infrastructure
- Infrastructure for which State is responsible
- Inventory of public hazards infrastructure
- Evaluation on conditions
- Development for a prioritization of work
- Estimation of capital and maintenance costs

The 20-Yr Infrastructure Working Group is led by Representative Frank Hynes with CZM as the lead State Agency overseeing the management of the project. The Massachusetts coastline has been broken up into 4 major regions consisting of the North Shore, Boston, South Coast, and the Cape and Islands. The South Shore (the Towns of Hull, Cohasset, Seekonk, Hingham, Plymouth, Kingston, Scituate and Duxbury) was previously evaluated by Bourne Consulting Engineering as a demonstration project in 2006.

Consultant Team

The consultant team that performed the demonstration project was led by Bourne Consulting Engineering (**BCE**) of Franklin, MA who was responsible for overall project management, specified areas of field assessments, and research. Assisting **BCE** was Applied Coastal Research and Engineering Inc. of Mashpee, MA, Childs Engineering Corporation, of Medfield, MA., and Waterfront Engineer LLC of Stratham, NH.

PURPOSE

Study Purpose

CZM seeks to identify the capacity of Massachusetts coastal structures to resist major coastal storms and prevent storm damage. In working toward this goal, CZM has initiated a program to perform an assessment of Commonwealth owned and/or maintained coastal structures. The first phase of this program was the performance of a demonstration project for coastal structures located on the South Shore. The demonstration project identified existing structures, their general conditions, ability to provide coastal protection and the probable cost for repairs. The information collected and developed has been incorporated into the MassGIS system to allow use for developing a 20 Year Coastal Infrastructure Plan.

The demonstration project served as a basis for the current statewide inventory assessment of all Commonwealth coastal structures and the needs for their maintenance and/or repair.

Goals of Study

The goals of the Massachusetts Coastal Infrastructure Inventory and Assessment Project include:

- To identify all the coastal structures the state either owns or has responsibility to maintain for the 4 regions included within the study
- Of the structures identified, determine the structure location and characteristics, the structure condition relative to providing coastal protection and the structure importance in relation to what it is protecting.
- To the degree possible, identify the structure elevation and the FIRM mapping flood elevation and category.
- To the degree possible, identify structure owner and available documents from local, state and federal agencies.
- To establish an estimated cost to rehabilitate the coastal structures to provide the level of project established in the structure's original design.
- Provide the information in a format compatible for incorporation into the MassGIS system

Limit of Study

Due to the time constraints and the amount of effort necessary to collect, process and compile the information, the following are identified as limitations of the information presented:

- All property ownership was taken as presumed. No legal investigation of ownership was performed during the project. Property ownership is based on town assessor maps. Where structures were located outshore of assessor map defined property lines, it was assumed to be Town land unless other information indicated otherwise. Where structures were located outshore of Mean Low Water, property is assumed to be State owned.
- The structure ownership was based on assessor maps and research at the local, state and federal levels. Where there was indication of public work on a structure on Town land or on private property, the structure was presumed to be Town owned. Where the structure was on state property, the structure was presumed to be state owned. Where ownership of the structure was not clear but was located on private property, the structure ownership was defined as unknown.
- The study included town and state owned structures as it was assumed that most town owned structures received state funding at some level for construction and/or maintenance.
 - Structures that were determined to be private were not included.
 - Undocumented structures considered to be on private land, but having the potential to have been publicly built and/or maintained, were identified as having an "unknown ownership".
- The prioritizing of structures was based primarily on risk to general infrastructure and density of housing. Infrastructure included was buildings. The study did not consider all infrastructure issues including:
 - No consideration on utility impacts – water, electrical, sewer, gas
 - No consideration of roadway and bridge protection
 - Evacuation routes were not considered within the investigation
 - Location of Emergency Shelters were not included in priority assessments
- Research was performed at the local, state and federal levels. The local research was limited to location and documenting available coastal structure contract drawings. Research at DCR was restricted to available historic construction plans for coastal structures at the MA-DCR Waterways office in Hingham, MA, and MA-DCR Division of Urban Parks and Recreation in

Boston, MA. No investigation of state archives was performed. Research at MA DEP Chapter 91 and USACE was limited to recorded permits and licenses found in their files. No investigation was performed at the Registry of Deeds.

DEVELOPMENT OF MassGIS DATABASE ATTRIBUTES

The specific attributes that would be incorporated into the MassGIS system were developed based on the scope of work and the goals to be achieved. The following was established to standardize the data collection and presentation and to allow total flexibility for sorting by attributes in the final GIS database. The attributes identified below were input into a MS Access database which was used to manage the data from all eight communities within a single file.

Database Attributes

- Attribute Descriptions/Definitions

Structure Number: A unique structure number was given to each coastal structure. The number was based on existing numbering systems that include the State Department of Environmental Protection community number followed by the local community assessor's parcel numbering system. The last three digits of the number represent the structure within the parcel. Where structures extend over several parcels, the structure is referenced to a parcel that is approximately in the center of the structure. Where Town assessor's references include letters, those are also included within the structure number. Some communities have block numbering within their numbering system and these are included. Communities without block numbering still have the block numbering included but these are illustrated as all zeros for that specific segment.

Structures that are on Town property, which would otherwise not have a parcel number, are referenced to a parcel that is in the immediate vicinity of the coastal structure.

On this basis, the following is the general numbering convention:

CCC-MMM-BBB-PPP-SSS

Where:	CCC	DEP Community Number
	MMM	Community Map Number
	BBB	Block Number (000 if no block numbering system)
	PPP	Community Parcel Number
	SSS	Structure Number

Property Ownership: All property ownership was on a "presumed" basis as no legal verification of ownership was performed. The ownership of the property was classified under four basic areas which were private ownership (Private), Town ownership (Local), Commonwealth of Massachusetts ownership (State), federal government ownership (Federal) or unknown. Property ownership was based on Town assessor's maps. Where the location was located above Mean Low Water, and not within a defined parcel, the property ownership was presumed to be the Town unless documentation was found to indicate otherwise. Where a structure was located offshore of Mean Low Water, the property ownership was presumed to be federal.

Structure Ownership: The ownership of all structures is presumed as no verification of ownership was performed. Ownership of the structure was determined by research into historic state and federal

permits and the entity indicated on the permits as the applicant. Where no other information was found, the following was utilized:

- Structures located on private land but appearing to be significant structures were identified as owned by the Town or as "Unknown". Unknown was used where there was a question of local or private ownership.
- Structures on Town property were assumed to be owned by the Town
- Structures that were located off-shore were presumed to be federally owned
- Structures that were identified as being privately owned were eliminated from the database

Basis of Ownership: The basis of structure ownership was provided to give rationale to the structure ownership and identified the research resource that identified the ownership or the methodology otherwise used. The responses utilized were limited to the following:

- DPW – DPW Employee Interview
- DCR - Contract Drawings
- DEP – Ch 91 License
- USACE – Permits
- Property Ownership
- Offshore Structure

Structure Owner's Name: Ownerships names reflect the presumed owner of publicly owned structures. As this was for public structures only, the ownership was restricted to the community name, the state agency or the federal agency.

Earliest Structure Record: The year of the oldest document located for the structure. The information is determined from the document research performed on the structure from local, state and federal agencies. If no documents could be found than this entry is denoted as 'Unknown'. Where documentation of the structure could be found, the date from the oldest document was utilized.

Primary Structure / Secondary Structure: Many of the coastal structures consisted of combined structures which were rated separately. It was typically found that one structure was significantly more predominant (Ex. Bulkhead/Seawall) and was therefore identified as the Primary Structure while a smaller structure might exist in front (ex. Revetment) of it. The type, height and material of each structure are identified separately. The condition of each structure was based on the Primary Structure. Where there was no secondary structure, the fields were left blank.

Structure Type: The structure type was categorized into five basic coastal structure categories which were Bulkhead/Seawall, Revetment, Coastal Beach, Coastal Dune, and Jetty/Groin.

Structure Material: The identification of the coastal structure's material of construction was performed and represents the primary material. Stone structures consisted of both mortared and non-mortared conditions.

Structure Height: Each type of structure was categorized by its visible height in feet which was broken into four specific ranges which are:

< 5 feet 5 to 10 feet 10 to 15 feet >15 feet

Structure Condition: A preliminary assessment of the condition for each structure was performed by the field teams. This was by visual observation only and no detailed investigation was performed. The condition assessments were based on a predefined five level rating system that ranged from Rating A for Excellent Condition to Rating F for Critical Condition. A detailed listing of the conditions and their definitions can be seen in Exhibit A.

Priority Rating: In order to account for the need for protection at any one site, a five level priority rating system was established. This allowed for consideration of public infrastructure protection, density of residential housing for development of structure overall importance for coastal protection. The ratings range from Level 1 for no infrastructure or residence protection to Level 5 for critical inshore infrastructure protection and/or high density residential. The detailed listing and definitions for the priority categories can be seen in Exhibit B.

Structure Repair / Reconstruction Cost: A preliminary estimation of construction costs to maintain or repair structures was made based on the preliminary field assessment of the structures. A Repair Cost Matrix was developed based on structure type, condition, height and material and can be seen in Exhibit C. Once each structure's type, height, and material classifications were determined, the cost per foot for the structure was determine from the Repair Cost Matrix and multiplied by the length of the structure to obtain the estimated repair/restoration cost. The cost matrix repair costs include a 20 percent construction cost contingency as well as 10 percent costs for engineering and permitting.

Structure Length: The length of each structure is provided and utilized in the development of the repair/reconstruction costs. The lengths are given to the nearest foot and taken as the linear distance along the structure, as determined by the GPS location, which takes into account structure angles and curvature.

Structure Elevation: The elevation of structures was determined in feet from existing information where available. The datum used is NAVD 88 and elevations are to the nearest foot. From a previous study much of the south shore coastal structures had elevations defined based on LIDAR mapping data. Where available structure documentation with elevations was found, in areas with no LIDAR data, the information was included within the structure information. Where there was no LIDAR information or existing documentation, the item has been left blank.

LIDAR (Light Detection and Ranging) is technology that is currently being used for high-resolution topographic mapping by mounting a LIDAR sensor, integrated with Global Positioning System (GPS) and inertial measurement unit (IMU) technology, to the bottom of aircraft and measuring the pulse return rate to determine surface elevations.

FEMA Zone and Elevation: For each structure the FEMA Flood Insurance Rate Maps (FIRM) were researched for their Flood Zone designation and their Base Flood Elevation from the most recent FIRM maps for the specific Town. The elevations are provided in feet on the same datum as the FIRM maps (NGVD) with no adjustments or conversions.

Structure Comments: The engineering team provided a brief description and comment on the structure at the time of the field assessments which is provided in support of the condition rating that was given for the structure.

Pictures: At the time of the field assessments, digital photographs were taken to provide a general overview of the structure. The number of pictures was limited to a maximum of six. The first photograph for each structure is shown on the Structure Assessment Form. The list of all photographs is provided on the form.

Town Documents: Town documents represent the structure information that could be found in the Town's DPW/Engineering Department records. Where particular records could be found, a table of document information was developed and included within the database with limited descriptions.

MA - DCR Documents: MA-DCR documents represent the structure information that could be found within DCR – Waterways office in Hingham. Where particular records could be found, a table of document information was developed and included within the database with limited descriptions.

MA - DEP Chp. 91 Licenses: MA-DEP Chapter 91 license documents represent the structure information that could be found within MA-DEP Chp 91 records in Boston. Where particular records could be found, they were scanned as pdf files and attached to the structure through the GIS database information. In addition, a table of license document information was developed and included within the database with limited descriptions.

USACE Permits: USACE Permits represent the structure information that could be found within the Army Corp of Engineers regulatory office in Concord, MA. Where particular records could be found, they were scanned as pdf files and attached to the structure through the GIS database information. In addition, a table of license document information was developed and included within the database with limited descriptions.

DEVELOPMENT OF REPAIR / RECONSTRUCTION COSTS

A matrix to be used within the database has been developed to assess likely rehabilitation/repair costs to restore the coastal structures to their original design condition. No attempt was made to assess the level of exposure and associated level of protection that might be required to meet current design standards for these structures. These costs are only an estimation to bring these structures back to their original design intent based on 2006 construction costs.

The development of the cost matrix is based on the following:

Structure Condition Ratings – The condition of the coastal structures was determined in the field by the survey crew which was led by an engineer with waterfront structure assessment and design experience. The definitions of the rating criteria utilized for the assessments are presented elsewhere.

The cost implications for each rating condition are as follows:

- **A Rating** Structures not requiring any maintenance, repair or rehabilitation cost and would not be expected to experience damage if subject to a major coastal storm event
- **B Rating** Structures requiring limited or no repair and would be expected to experience only minor damage if subject to a major coastal storm event. The value of these maintenance costs is assumed to be 10 percent of the construction cost.
- **C Rating** Structures requiring moderate to significant level of repair or reconstruction and would be expected to experience significant damage if subject to a major coastal storm event. The structure is presumed to be effective under a major storm event. The value of the repair costs is assumed to be 50 percent of the construction cost.
- **D Rating** Structures requiring significant level of rehabilitation or total reconstruction and would be expected to experience significant damage or possibly fail if subject to a major coastal storm event. The value of the repair costs is assumed to be 100 percent of the construction cost.

- **F Rating** Structures requiring complete reconstruction and would expect to provide little or no protection from a major coastal storm event. The value of the repair costs is assumed to be 100 percent of the construction cost plus a cost for removal/disposal of the original structure.

Height of Structure – Height of a structure is a major factor in the structure cost and therefore was identified as a significant factor in assessing rehabilitation/repair construction costs. The structures were broken down into four major categories which were:

< 5'	Structures that were less than five feet in height
5'-10'	Structures five to 10 feet in height
10'-15'	Structures over 10 feet to 15 feet in height
> 15'	Structures greater than 15 feet in height – assumed 20 feet typical

Length of Structure – Length is based on field GPS location with measurements rounded to the nearest foot.

Bulkhead / Seawall Structures – These structures are assumed to be constructed out of concrete, steel, stone or wood with each having its own criteria for establishing costs. For each structure type the following was assumed:

- **Concrete Seawalls** – These walls were assumed to be gravity structures with the volume of concrete used based on the bottom width being one-half of the structure height. Costs of construction were based on a per cubic yard estimate that varied from \$350 to \$630 per cubic yard depending on the structure height. Values for excavation and demolition of existing structure were also included.
- **Stone Seawalls** - These walls were treated the same as concrete seawalls and assumed to be gravity structures with the volume of the structure based on the bottom width being one-half of the structure height. Costs of construction were based on a per cubic yard estimate that varied from \$350 to \$630 per cubic yard depending on the structure height. Values for excavation and demolition of existing structure were also included.
- **Steel Bulkheads** – Steel bulkheads were presumed to be constructed with steel sheet piling. Tie back systems were presumed for structures 10 feet or greater in height. Shorter walls were assumed to have a cantilever design. The total depth of sheeting was presumed to be two times the exposed height. The cost for construction varied from \$40 per square foot to \$60 per square foot plus the cost of excavation and demolition.
- **Timber Bulkheads** – Timber bulkheads were presumed to be constructed with timber piles at eight foot on center, horizontal wales and vertical four inch sheathing. The unit costs for installed materials used were \$1,500 per pile and \$7.50 per bfm.

Revetment Structures – Revetment structures were presumed to be constructed of dry placed (no concrete) stone with a two on one slope and a horizontal toe and crown equal to the thickness layer established for each height condition. The total thickness of the revetment layers varied from six to ten feet with the cost of armor and under-layer stone assumed to be \$50 per ton and the crushed stone base to be \$15 per ton.

Groins and Jetties – Groins and jetties were assumed to be the same materials and construction as the revetment structures but would have two sides and therefore double the quantities.

Coastal Beaches – Costs for restoration of Coastal beaches presumed the placement of beach renourishment sands at a 1-on-20 slope over the existing beach conditions. The cost for deposition of sand assumed relatively close source of material and utilized \$20 per cubic yard for the material installed.

Coastal Dunes – Restoration of coastal dunes assumed a cross section of renourished sand with a one-on-four slope on one side of a 25 foot width at the defined dune height. The cost for deposition of sand assumed relatively close source of material and utilized \$20 per cubic yard for the material installed.

Contingency – A contingency of 20 percent was added to all costs to reflect the unknowns associated with this level of rehabilitation/repair estimating.

Engineering and Regulatory Approvals – A ten percent increase to the cost matrix prices was assessed to represent the engineering design and regulatory approval requirements for the restoration of these structures.

EXHIBIT A

Structure Condition Table – 5 Level Rating System

Preliminary Condition Assessment		Definition Based Upon Perceived Immediacy of Action and Potential to Cause Damage if Not Corrected	Level of Action Required
A	Excellent	Like new condition. Structure expected to withstand major coastal storm without damage. Stable landform (beach, dune or bank). Adequate system exists to provide protection from major coastal storm	None
B	Good	Structure observed to exhibit very minor problems, superficial in nature. Minor erosion to landform is present. Structure / landform adequate to provide protection from a major coastal storm with no damage. Actions taken to prevent / limit future deterioration and extend life of structure	Minor
C	Fair	Structure is sound but may exhibit minor deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure adequate to withstand major coastal storm with little to moderate damage. Actions taken to reinforce structure to provide full protection from major coastal storm and for extending life of structure. Moderate wind or wave damage to landform exists. Landform may not be sufficient to fully protect shoreline during a major coastal storm. Actions taken to provide additional material for full protection and extended life	Moderate
D	Poor	Structure exhibits advanced levels of deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure has strong risk of significant damage and possible failure during a major coastal storm Structure should be monitored until repairs/reconstruction can be initiated. Actions taken to reconstruct structure to regain full capacity to resist a major coastal storm. Landform eroded, stability threatened. Landform not adequate to provide protection during major coastal storm. Actions taken to recreate landform to adequate limits for full protection from a major coastal storm.	Major
F	Critical	Conditions of structure/landform may warrant emergency stabilization as failure may result in potential loss of property and/or life. Landform eroded, loss of integrity Structure exhibits critical levels of deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure provides little or no protection from a major coastal storm. Actions taken to totally reconstruct structure to regain full capacity. Landform stability is severely compromised, rate of erosion/material loss may be increasing, and landform does not provide adequate protection from a major coastal storm. Actions taken to recreate landform to adequate limits for full protection from a major coastal storm.	Immediate

EXHIBIT B

Priority Rating System - 5 Level Rating System

Preliminary Priority Level Assessment		Level Based Upon Perceived Immediacy of Action and Presence of Potential Risk to Inshore Structures if Not Corrected	Level of Action Required
I	None	No Inshore Structures or Residential Dwelling Units Present	Long Term Planning Considerations
II	Low Priority	Inshore Structures Present with Limited potential for Significant Infrastructure Damage	Future Project Consideration
III	Moderate Priority	Inshore Structures with potential for Infrastructure Damage and/or Limited Residential Dwellings (<1 dwelling impacted / 100 feet of shoreline)	Consider for Active Project Improvement Listing
IV	High Priority	High Value Inshore Structures with Potential for Infrastructure Damage and/or Moderate Density Residential Dwellings (1-10 dwellings impacted / 100 feet of shoreline)	Consider for Next Project Construction Listing
V	Immediate / Highest Priority	Critical Inshore Structures Present with Potential for Infrastructure Damage and/or High Density Residential Dwellings Conditions of structure may warrant emergency stabilization as failure may result in potential loss of property and/or life. (>10 dwellings impacted / 100 feet of shoreline)	Consider For Immediate Action Due to Public Safety and Welfare Issues

**MASSACHUSETTS COASTAL INFRASTRUCTURE
INVENTORY AND ASSESSMENT DEMONSTRATION PROJECT**

CZM SOUTH SHORE COASTAL INFRASTRUCTURE INVENTORY AND ASSESMENT PROJECT

EXHIBIT C

September 14, 2006

REPAIR / REHABILITATION COSTING DATA

Cost per linear foot of structure

STRUCTURE TYPE	STRUCTURE MATERIALS	STRUCTURE HEIGHT	STRUCTURE CONDITION RATING				
			A	B	C	D	F
BULKHEAD/ SEAWALL	CONCRETE	Under 5 Feet	\$0	\$84	\$425	\$850	\$983
		5 To 10 Feet	\$0	\$152	\$759	\$1,518	\$1,782
		10 To 15 Feet	\$0	\$251	\$1,254	\$2,508	\$2,970
		Over 15 Feet	\$0	\$396	\$1,980	\$3,960	\$4,752
	STEEL	Under 5 Feet	\$0	\$54	\$273	\$546	\$680
		5 To 10 Feet	\$0	\$165	\$825	\$1,650	\$1,848
		10 To 15 Feet	\$0	\$251	\$1,254	\$2,508	\$2,772
		Over 15 Feet	\$0	\$343	\$1,716	\$3,432	\$3,795
	STONE	Under 5 Feet	\$0	\$84	\$425	\$850	\$983
		5 To 10 Feet	\$0	\$152	\$759	\$1,518	\$1,782
		10 To 15 Feet	\$0	\$251	\$1,254	\$2,508	\$2,970
		Over 15 Feet	\$0	\$396	\$1,980	\$3,960	\$4,752
	WOOD	Under 5 Feet	\$0	\$86	\$431	\$862	\$994
		5 To 10 Feet	\$0	\$127	\$632	\$1,265	\$1,463
		10 To 15 Feet	\$0	\$161	\$804	\$1,608	\$1,872
		Over 15 Feet	\$0	\$202	\$1,008	\$2,017	\$2,380
COASTAL BEACH	SAND	Under 5 Feet	\$0	\$26	\$132	\$264	\$264
		5 To 10 Feet	\$0	\$127	\$634	\$1,267	\$1,267
		10 To 15 Feet	\$0	\$224	\$1,122	\$2,244	\$2,244
		Over 15 Feet	\$0	\$396	\$1,980	\$3,960	\$3,960
COASTAL DUNE	SAND	Under 5 Feet	\$0	\$18	\$93	\$186	\$186
		5 To 10 Feet	\$0	\$48	\$238	\$476	\$476
		10 To 15 Feet	\$0	\$79	\$395	\$790	\$790
		Over 15 Feet	\$0	\$132	\$660	\$1,320	\$1,320
REVTMENT	STONE	Under 5 Feet	\$0	\$66	\$333	\$664	\$730
		5 To 10 Feet	\$0	\$120	\$601	\$1,201	\$1,300
		10 To 15 Feet	\$0	\$157	\$781	\$1,564	\$1,696
		Over 15 Feet	\$0	\$247	\$1,234	\$2,468	\$2,666
GROIN	STONE	Under 5 Feet	\$0	\$132	\$664	\$1,328	\$1,460
		5 To 10 Feet	\$0	\$240	\$1,201	\$2,402	\$2,600
		10 To 15 Feet	\$0	\$314	\$1,564	\$3,128	\$3,392
		Over 15 Feet	\$0	\$494	\$2,468	\$4,937	\$5,333

NOTE: Repair / Rehabilitation Costs include 10% for engineering and regulatory approvals and 20 % construction contingency.

Section II

Orleans

Section II – Community Findings – Town of Orleans

COMMUNITY DESCRIPTION

The Town of Orleans consists of a land area of 14.14 square miles out of a total area of 21.06 square miles and had a population of 6,341 in the 2000 census. The Town is located on Cape Cod of Massachusetts and its location can be seen on this report's cover. The estimated length of shoreline is 9 miles that are directly exposed to open ocean. The Town is protected from major coastal storms by both natural and man-made shoreline structures that require maintenance to insure the long term protection of its coastline. The man-made and publicly owned structures that protect the Town were investigated for their ability to provide adequate protection from major coastal storms. Structures have been identified as publicly owned, including coastal dunes and beaches, based on evidence of investment of public funds made to create/enhance/maintain these structures. The assessment did not include floating or pile supported structures as they are assumed not to provide any significant coastal protection from major storm event.

STRUCTURE INVENTORY

Within the Town of Orleans, there were 11 structures which had public or unknown ownership which provide significant coastal protection. The location of the structures can be seen in Sheets 1 through Sheet 8 in Section II-B of this report. The structures were categorized by their type and by their structural condition based on a preliminary field assessment. The distribution of structures by type and condition can be seen in the following table:

STRUCTURE TYPE AND QUANTITY - Town of Orleans

Primary Structure (1)	Total Structures	Structure Condition Rating				Total Length
		A	B	C	D	
Bulkhead / Seawall	3		2		1	985
Revetment	6		1	4	1	650
Breakwater						
Groin / Jetty	1		1			160
Coastal Dune	1		1			270
Coastal Beach						
	11		5	4	2	2065

Within the above table, the total length of each type of structure is also provided. The structures are listed by the type which is providing the primary coastal protection. Many sites have multiple structure types at the same location (i.e. revetment in front of seawall). These secondary structures, although not identified within these tables, are included in the development of repair/rehabilitation costs.

The development of repair costs has been included by structure type and by condition. In the Town of Orleans's case there are a total of 11 structures which would require approximately \$ 2.9 million to bring all the coastal structures to "A" Rating. Most critical will be the structures in the "D" and "F" classifications as those are assumed to undergo some level of damage or failure during the next major coastal storm event. To reconstruct these structures, identified in the preliminary survey as being in poor condition, an estimated \$ 2.5 million would be required to upgrade the Town's coastal protection.

STRUCTURE REPAIR / RECONSTRUCTION COST - Town of Orleans

Primary Structure (1)	Total Structures	Structure Condition Rating					Total Cost
		A	B	C	D	F	
Bulkhead / Seawall	3	\$	41,772		\$	2,471,040	\$ 2,512,812
Revetment	6	\$	1,320	\$	341,603	\$ 19,919	\$ 362,842
Breakwater							\$ -
Groin / Jetty	1	\$	38,400				\$ 38,400
Coastal Dune	1	\$	21,330				\$ 21,330
Coastal Beach							\$ -
	11	\$ -	\$ 102,822	\$ 341,603	\$ 2,490,959	\$ -	\$ 2,935,384

Based on the limited research within the scope of this project research, the presumed ownership of the structures was established on an initial basis and would be subject to more intense review in future tasks. Structures identified as being owned privately were excluded from further consideration. Although ownership of the land on which the structure was located was a factor, the structure ownership was treated as a separate issue from land ownership. For the Town of Orleans, the breakdown of structures by assumed ownership is as follows:

STRUCTURE REPAIR / RECONSTRUCTION COST - Town of Orleans

Primary Structure (1)	Total Structures	Structure Condition Rating					Total Cost
		A	B	C	D	F	
Bulkhead / Seawall	3	\$	41,772		\$	2,471,040	\$ 2,512,812
Revetment	6	\$	1,320	\$	341,603	\$ 19,919	\$ 362,842
Breakwater							\$ -
Groin / Jetty	1	\$	38,400				\$ 38,400
Coastal Dune	1	\$	21,330				\$ 21,330
Coastal Beach							\$ -
	11	\$ -	\$ 102,822	\$ 341,603	\$ 2,490,959	\$ -	\$ 2,935,384

The identification of presumed ownership was not based on the investigation of legal documents but relied on property ownership and from construction and regulatory documents that were found. A more detailed investigation of legal documents and agreements would be required where structure ownership is disputed. A more detailed identification of structure type, length, condition and location can be found in Section II-B which contains Structure Assessment Reports for each individual structure found.

SUMMARY

The enclosed reports and associated documents reflects the Town of Orleans's coastal structure information that will eventually be input into a state-wide GIS database and will be accessible through MassGIS. This data, when compiled state-wide, will be critical in the development of both short term and long term planning for maintaining and improving Massachusetts coastal protection.

This database will also provide relatively quick access to identify available documentation for these structures as well as the ability to be updated as coastal structure improvements are made.

Section II - Orleans

Part B

Structure Assessment Reports



COASTAL STRUCTURE LOCATION PLAN

TOWN OF ORLEANS
COASTAL INFRASTRUCTURE INVENTORY
AND ASSESSMENT PROJECT
NOVEMBER 2007



**BCE**

Bourne Consulting Engineering
1 Paul Drive
Bourne, MA 01939
TEL (508) 833-0000 FAX (508) 833-0000



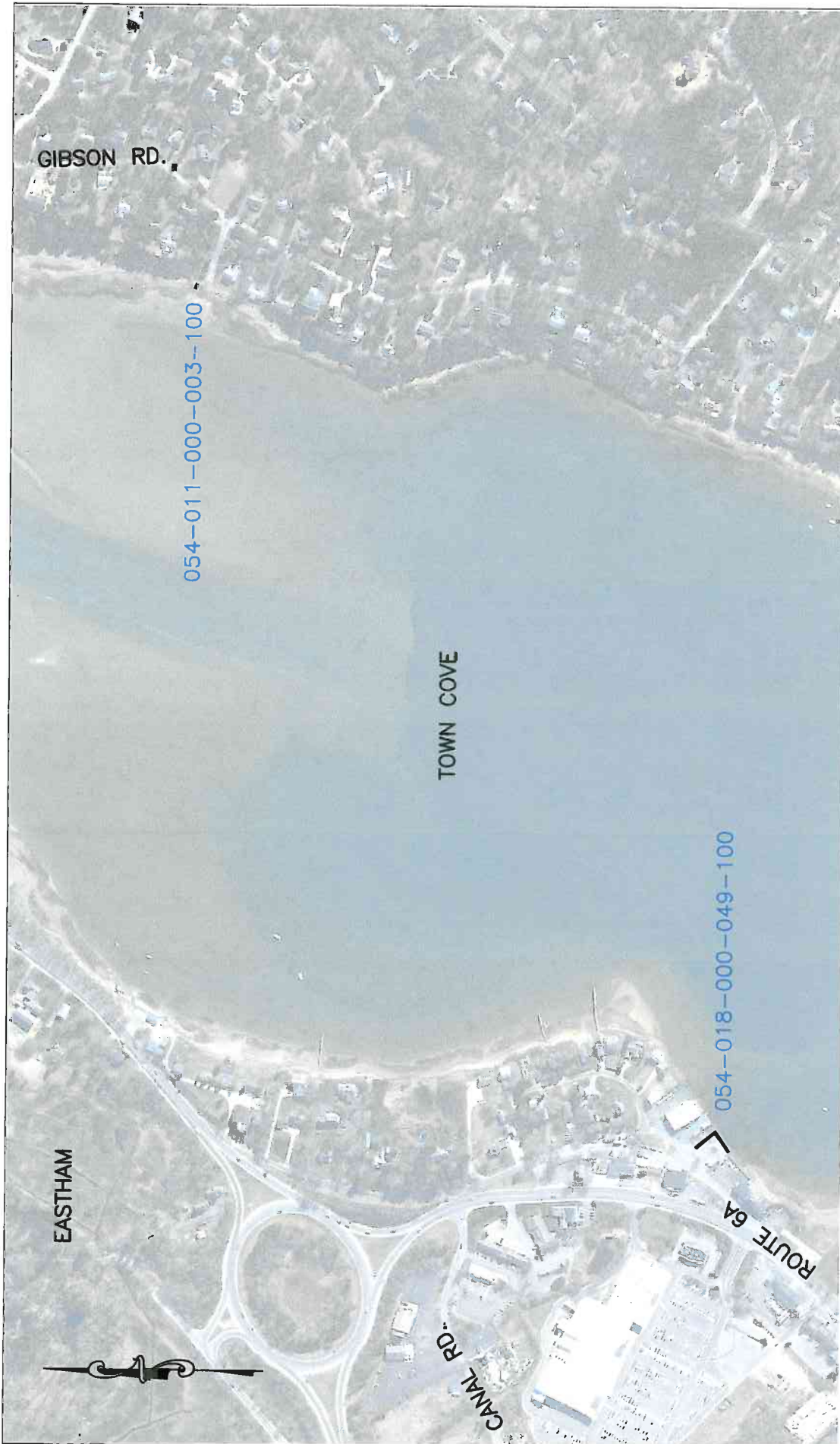
COASTAL STRUCTURE LOCATION PLAN

TOWN OF ORLEANS
COASTAL INFRASTRUCTURE INVENTORY
AND ASSESSMENT PROJECT
NOVEMBER 2007



**BCE**

Bourne Consulting Engineering
200 Main Street
Bourne, MA 01939
TEL (508) 833-0000 FAX (508) 833-0000



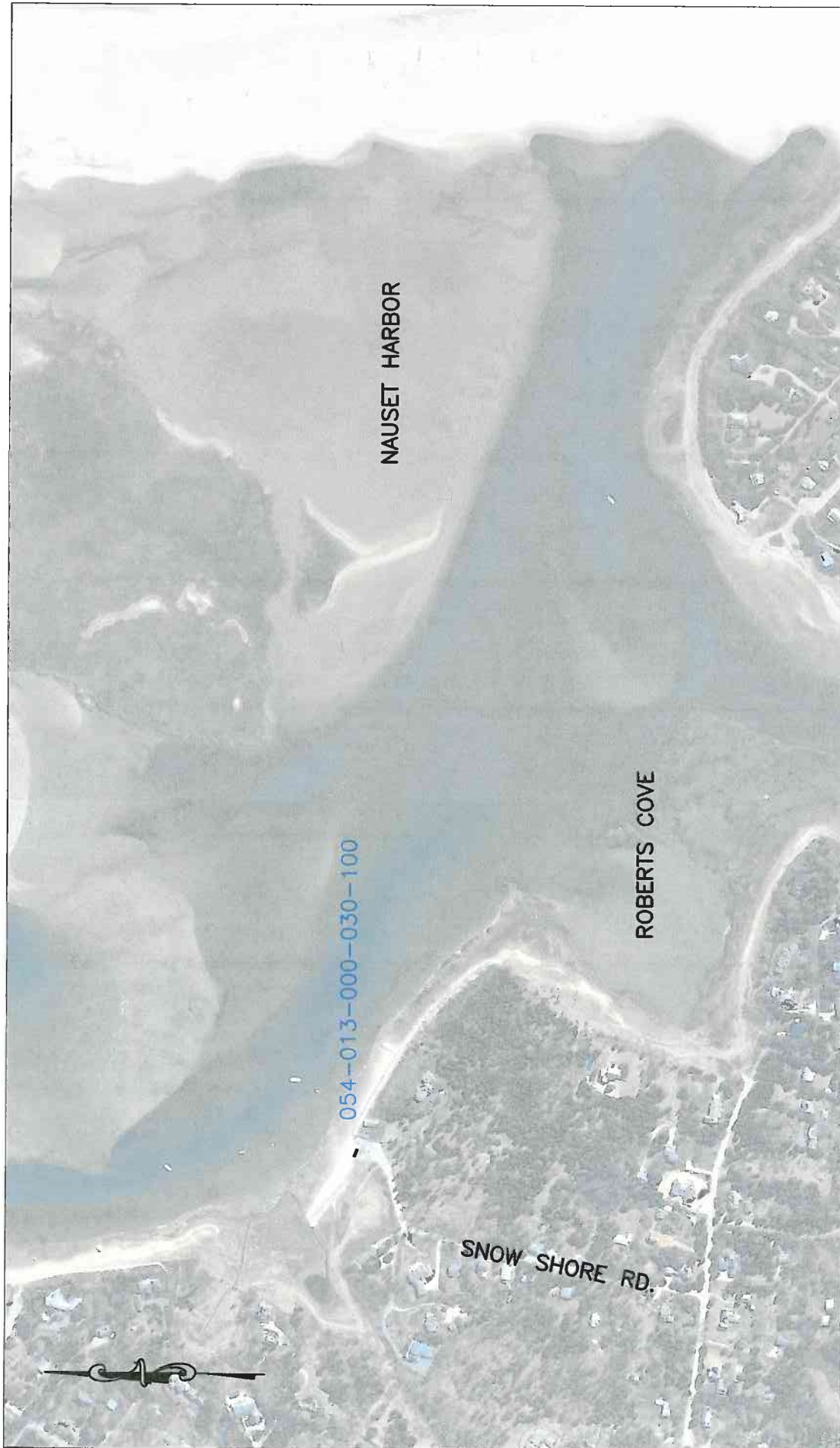
COASTAL STRUCTURE LOCATION PLAN

TOWN OF ORLEANS
COASTAL INFRASTRUCTURE INVENTORY
AND ASSESSMENT PROJECT
NOVEMBER 2007



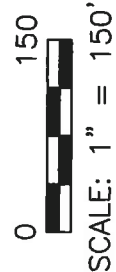


Bourne Consulting Engineering
Professional Engineers
 License No. 0000000000
 P.E. (000) 000-0000 P.E. (000) 000-0000



COASTAL STRUCTURE LOCATION PLAN

TOWN OF ORLEANS
COASTAL INFRASTRUCTURE INVENTORY
AND ASSESSMENT PROJECT
NOVEMBER 2007



**BCE**

Bourne Consulting Engineering
3 Paul Road
Bourne, MA 02532
TEL: (508) 533-0000 FAX: (508) 533-0000



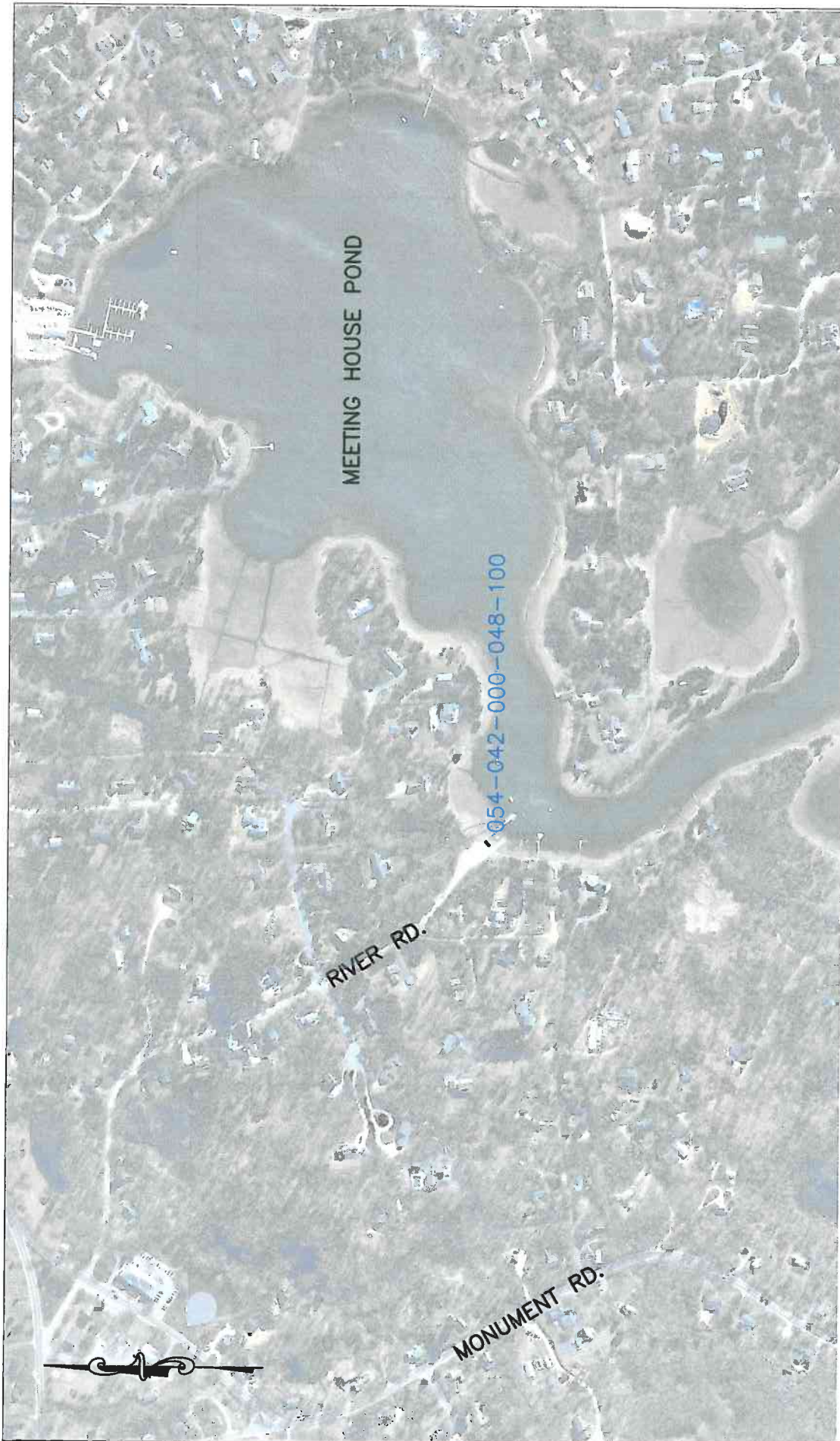
COASTAL STRUCTURE LOCATION PLAN

TOWN OF ORLEANS
COASTAL INFRASTRUCTURE INVENTORY
AND ASSESSMENT PROJECT
NOVEMBER 2007

0 150
SCALE: 1" = 150'

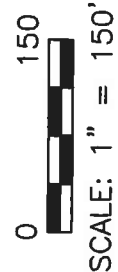


SHEET 5



COASTAL STRUCTURE LOCATION PLAN

TOWN OF ORLEANS
COASTAL INFRASTRUCTURE INVENTORY
AND ASSESSMENT PROJECT
NOVEMBER 2007



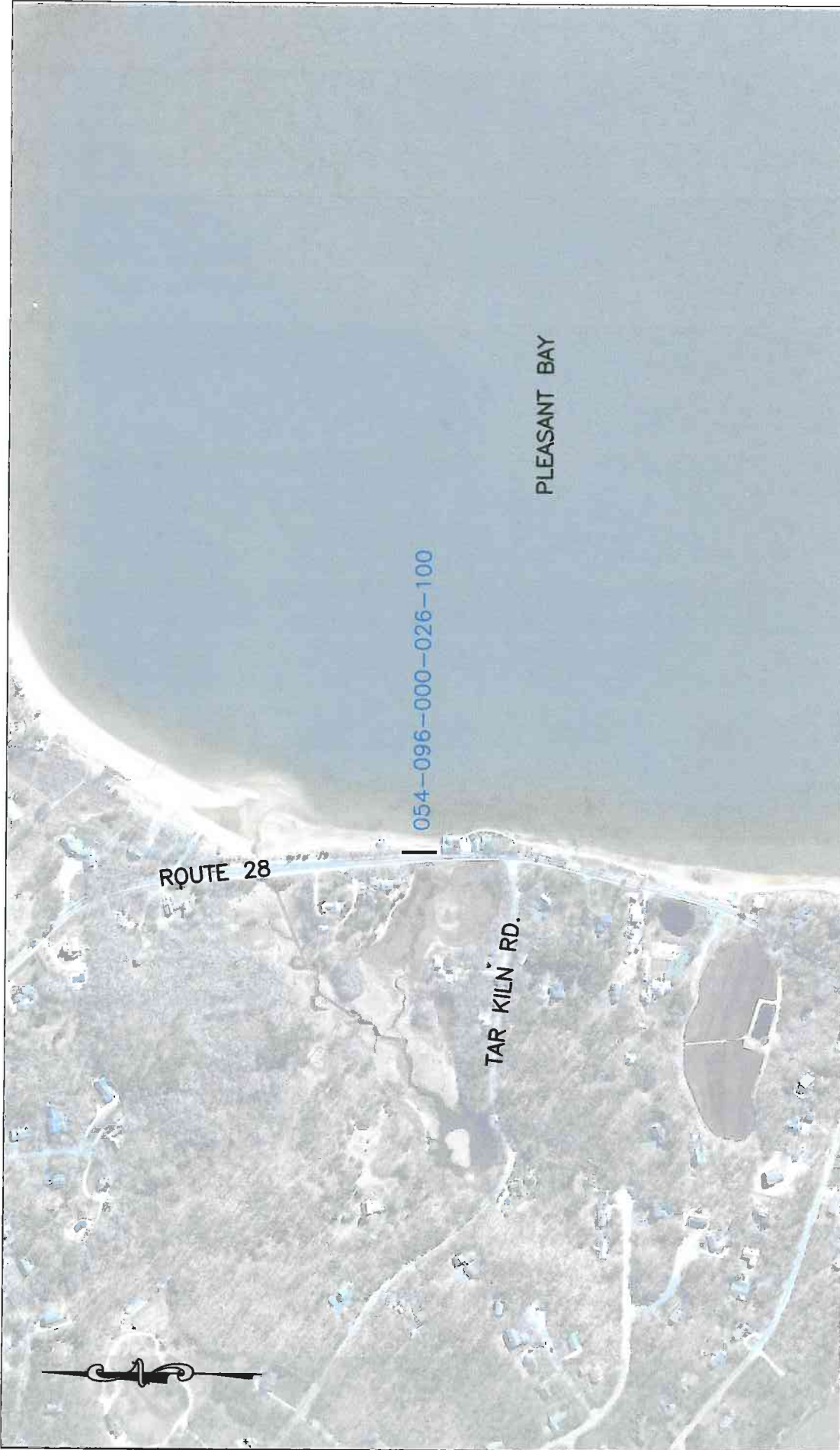


COASTAL STRUCTURE LOCATION PLAN

TOWN OF ORLEANS
COASTAL INFRASTRUCTURE INVENTORY
AND ASSESSMENT PROJECT
NOVEMBER 2007



BCE Bourne Consulting Engineering
3 Paul Street
Barnstable, MA 02532
TEL: (508) 533-6999 FAX: (508) 533-6999



File: X:\27652-\27667\Cape Cod\CI-2\Orleans\dwg\Orleans.dwg

COASTAL STRUCTURE LOCATION PLAN

TOWN OF ORLEANS
COASTAL INFRASTRUCTURE INVENTORY
AND ASSESSMENT PROJECT
NOVEMBER 2007

0 150
SCALE: 1" = 150'



Structure Assessment Form

Town: Orleans

Structure ID: 054-011-000-003-100

Key: community-map-block-parcel-structure

Property Owner:

Local

Location:

Asa's Landing

Date:

10/29/2007

Presumed Structure Owner:

Local

Based On Comment:

Owner Name:

Orleans

Earliest Structure Record:

Unknown

Estimated Reconstruction/Repair Cost:

\$1,320.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
20		A8	10
Feet	Feet NAVD 88		Feet NGVD

Primary Type:

Revetment

Primary Material:

Stone

Primary Height:

Under 5 Feet

Secondary Type:

Secondary Material:

Secondary Height:



Structure Summary :

Placed single line of stones adjacent to the town landing. The stones are on average 2 feet by 1 foot by 1 foot in size.

Condition

B

Rating

Good

Level of Action

Minor

Description

Structure observed to exhibit very minor problems, superficial in nature. Minor erosion to landform is present. Structure / landform adequate to provide protection from a major coastal storm with no damage. Actions taken to prevent / limit future deterioration and extend life of structure.

Priority

I

Rating

None

Action

Long Term Planning Considerations

Description

No Inshore Structures or Residential Dwelling Units Present

Structure Images:

054-011-000-003-100-PHO1A.JPG

Structure Documents:

Structure Assessment Form

Town: Orleans

Structure ID: 054-013-000-030-100

Key: community-map-block-parcel-structure

Property Owner:

Local

Location:

Smuggler's Path

Date:

10/29/2007

Presumed Structure Owner:

Local

Based On Comment:

Owner Name:

Orleans

Earliest Structure Record:

1980

Estimated Reconstruction/Repair Cost:

\$19,919.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
30		V11	13
Feet	Feet NAVD 88		Feet NGVD

Primary Type:

Revetment

Primary Material:

Stone

Primary Height:

Under 5 Feet

Secondary Type:

Secondary Material:

Secondary Height:



Structure Summary :

The dumped stones vary in size, averaging 2 feet by 1 foot by 1 foot. The slope is 1 on 5. There is erosion inshore of the revetment. There is understone visible and unraveling at the toe. Debris, grass, and branches are scattered throughout the structure. There is a parking lot behind, beach in front and boat ramp adjacent to the revetment.

Condition

D

Rating

Poor

Level of Action

Major

Description

Structure exhibits advanced levels of deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure has strong risk of significant damage and possible failure during a major coastal storm. Structure should be monitored until repairs/reconstruction can be initiated. Actions taken to reconstruct structure to regain full capacity to resist a major coastal storm. Landform eroded, stability threatened. Landform not adequate to provide protection during major coastal storm. Actions taken to recreate landform to adequate limits for full protection from a major coastal storm.

Priority

I

Rating

None

Action

Long Term Planning Considerations

Description

No Inshore Structures or Residential Dwelling Units Present

Structure Images:

054-013-000-030-100-PHO1A.JPG

054-013-000-030-100-PHO1B.JPG

Structure Documents:

USACE

November 1

Proposed Timber

054-013-000-030-100-COE1A

DEP

September 1

Plan Accompanying

054-013-000-030-100-LIC1A

Structure Assessment Form

Town: Orleans

Structure ID: 054-016-000-038-100

Key: community-map-block-parcel-structure

Property Owner:

Local

Location:

Rock Harbor Inlet

Date:

10/29/2007

Presumed Structure Owner:

Local

Based On Comment:

Owner Name:

Orleans

Earliest Structure Record:

1958

Estimated Reconstruction/Repair Cost:

\$38,400.00

Length:

160

Feet

Top Elevation:

Feet NAVD 88

FIRM Map Zone:

A4

FIRM Map Elevation:

12

Feet NGVD

Primary Type:

Groin/ Jetty

Primary Material:

Stone

Primary Height:

5 to 10 Feet

Secondary Type:

Secondary Material:

Secondary Height:



Structure Summary :

The stone groin is at the mouth of Rock Harbor, adjacent to the boat ramp. The stones are approximately 2 feet by 2 feet at a 1 on 1 slope. The crest is 1 stone wide. The stones are well placed with no visible movement.

Condition

B

Rating

Good

Level of Action

Minor

Description

Structure observed to exhibit very minor problems, superficial in nature. Minor erosion to landform is present. Structure / landform adequate to provide protection from a major coastal storm with no damage. Actions taken to prevent / limit future deterioration and extend life of structure.

Priority

I

Rating

None

Action

Long Term Planning Considerations

Description

No Inshore Structures or Residential Dwelling Units Present

Structure Images:

054-016-000-038-100-PHO1A.jpg

Structure Documents:

USACE

November 1

Proposed Jetty

054-016-000-038-100-COE1A

MA-DCR

June 1958

Proposed Harbor

054-016-000-038-100-DCR1A

MA-DCR

July 1960

Proposed Harbor

054-016-000-038-100-DCR1B

Structure Assessment Form

Town: Orleans

Structure ID: 054-016-000-038-200

Key: community-map-block-parcel-structure

Property Owner:

Local

Location:

Rock Harbor Inlet

Date:

10/29/2007

Presumed Structure Owner:

Local

Based On Comment:

Owner Name:

Orleans

Earliest Structure Record:

1934

Estimated Reconstruction/Repair Cost:

\$2,471,040.00

Length: 720 Feet
Top Elevation: Feet NAVD 88
FIRM Map Zone: A4
FIRM Map Elevation: 12 Feet NGVD

Primary Type:

Bulkhead/ Seawall

Primary Material:

Steel

Primary Height:

Over 15 Feet

Secondary Type:

Secondary Material:

Secondary Height:



Structure Summary :

Steel bulkhead with steel cap. There were fender piles in front with a ramp and floats. Behind is a parking lot. There is minor corrosion at the tidal zone. There is no visible erosion or scour.

Condition

D

Rating

Poor

Level of Action

Major

Description

Structure exhibits advanced levels of deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure has strong risk of significant damage and possible failure during a major coastal storm. Structure should be monitored until repairs/reconstruction can be initiated. Actions taken to reconstruct structure to regain full capacity to resist a major coastal storm. Landform eroded, stability threatened. Landform not adequate to provide protection during major coastal storm. Actions taken to recreate landform to adequate limits for full protection from a major coastal storm.

Priority

I

Rating

None

Action

Long Term Planning Considerations

Description

No Inshore Structures or Residential Dwelling Units Present

Structure Images:

054-016-000-038-200-PHO2A.jpg

Structure Documents:

USACE	March 1953	Proposed Bulkhead,	054-016-000-038-200-COE2A
USACE	April 1954	Proposed Excavation	054-016-000-038-200-COE2B
USACE	February 19	Proposed Bulkhead,	054-016-000-038-200-COE2C
MA-DCR	June 1934	Proposed Timber	054-016-000-038-200-DCR2A
MA-DCR	January 195	Proposed Retaining	054-016-000-038-200-DCR2B
MA-DCR	April 1954	Proposed Harbor	054-016-000-038-200-DCR2C
MA-DCR	April 1956	Proposed Bulkhead	054-016-000-038-200-DCR2D
MA-DCR	February 19	Proposed Harbor	054-016-000-038-200-DCR2E
MA-DCR	November 1	Proposed Harbor	054-016-000-038-200-DCR2F
DEP	August 1977	Plan Accompanying	054-016-000-038-200-LIC2A

Structure Assessment Form

Town: Orleans

Structure ID: 054-016-000-038-200

Key: community-map-block-parcel-structure

DEP	February 19	Plan Accompanying	054-016-000-038-200-LIC2B
-----	-------------	-------------------	---------------------------

Structure Assessment Form

Town: Orleans

Structure ID: 054-016-000-038-300

Key: community-map-block-parcel-structure

Property Owner:

Local

Location:

Rock Harbor Inlet

Date:

10/29/2007

Presumed Structure Owner:

Local

Based On Comment:

Owner Name:

Orleans

Earliest Structure Record:

Unknown

Estimated Reconstruction/Repair Cost:

\$180,180.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
300		A3	12
Feet	Feet NAVD 88		Feet NGVD

Primary Type:

Revetment

Primary Material:

Stone

Primary Height:

5 to 10 Feet

Secondary Type:

Secondary Material:

Secondary Height:



Structure Summary :

The dumped stone revetment has stones that vary in size. On average, the stones are 3 feet by 2 feet by 1 foot in size. The slope is 1 on 3. There is visible stone movement. The understone is visible. Behind the revetment is a road and houses.

Condition

C

Rating

Fair

Level of Action

Moderate

Description

Structure is sound but may exhibit minor deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure adequate to withstand major coastal storm with little to moderate damage. Actions taken to reinforce structure to provide full protection from major coastal storm and for extending life of structure. Moderate wind or wave damage to landform exists. Landform may not be sufficient to fully protect shoreline during a major coastal storm. Actions taken to provide addition material for full protection and extended life.

Priority

III

Rating

Moderate Priority

Action

Consider for Active Project Improvement Listing

Description

Inshore Structures with potential for Infrastructure Damage and/or Limited Residential Dwellings (<1 dwelling impacted / 100 feet of shoreline)

Structure Images:

054-016-000-038-300-PHO3A.jpg

054-016-000-038-300-PHO3B.jpg

054-016-000-038-300-PHO3C.jpg

Structure Documents:

Structure Assessment Form

Town: Orleans

Structure ID: 054-018-000-049-100

Key: community-map-block-parcel-structure

Property Owner:

Local

Location:

Town Cove - Eastham Town Line

Date:

10/29/2007

Presumed Structure Owner:

Local

Based On Comment:

Owner Name:

Orleans

Earliest Structure Record:

1971

Estimated Reconstruction/Repair Cost:

\$26,572.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
165		A10	12
Feet	Feet NAVD 88		Feet NGVD

Primary Type:

Bulkhead/ Seawall

Primary Material:

Wood

Primary Height:

10 to 15 Feet

Secondary Type:

Secondary Material:

Secondary Height:



Structure Summary :

The timber bulkhead is stabilized by timber piles and wales. There is minor growth at the tidal zone. A gangway and floats come off the middle of the bulkhead. Behind is a parking lot. Adjacent is a boat ramp.

Condition

B

Rating

Good

Level of Action

Minor

Description

Structure observed to exhibit very minor problems, superficial in nature. Minor erosion to landform is present. Structure / landform adequate to provide protection from a major coastal storm with no damage. Actions taken to prevent / limit future deterioration and extend life of structure.

Priority

I

Rating

None

Action

Long Term Planning Considerations

Description

No Inshore Structures or Residential Dwelling Units Present

Structure Images:

054-018-000-049-100-PHO1A.JPG

054-018-000-049-100-PHO1B.JPG

054-018-000-049-100-PHO1C.JPG

Structure Documents:

USACE

December 1

Town of Orleans to

054-018-000-049-100-COE1A

DEP

December 1

Plan to Accompany

054-018-000-049-100-LIC1A

DEP

August 1974

Plan to

054-018-000-049-100-LIC1B

Structure Assessment Form

Town: Orleans

Structure ID: 054-021-000-043-100

Key: community-map-block-parcel-structure

Property Owner:

Local

Location:

Mill Pond

Date:

10/29/2007

Presumed Structure Owner:

Local

Based On Comment:

Owner Name:

Orleans

Earliest Structure Record:

Unknown

Estimated Reconstruction/Repair Cost:

\$14,969.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
45		A11	12
Feet	Feet NAVD 88		Feet NGVD

Primary Type:

Revetment

Primary Material:

Stone

Primary Height:

Under 5 Feet

Secondary Type:

Secondary Material:

Secondary Height:



Structure Summary :

The dumped stone revetment consists of stones that are approximately 2 feet by 1 foot by 1 foot in size. The stones are dumped along the boat ramp.

Condition

C

Rating

Fair

Level of Action

Moderate

Description

Structure is sound but may exhibit minor deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure adequate to withstand major coastal storm with little to moderate damage. Actions taken to reinforce structure to provide full protection from major coastal storm and for extending life of structure. Moderate wind or wave damage to landform exists. Landform may not be sufficient to fully protect shoreline during a major coastal storm. Actions taken to provide addition material for full protection and extended life.

Priority

I

Rating

None

Action

Long Term Planning Considerations

Description

No Inshore Structures or Residential Dwelling Units Present

Structure Images:

054-021-000-043-100-PHO1A.JPG

054-021-000-043-100-PHO1B.JPG

Structure Documents:

Structure Assessment Form

Town: Orleans

Structure ID: 054-023-000-014-100

Key: community-map-block-parcel-structure

Property Owner:

State

Location:

Namskaket - Wildflower Lane

Date:

10/29/2007

Presumed Structure Owner:

State

Based On Comment:

Owner Name:

MA-DCR

Earliest Structure Record:

2006

Estimated Reconstruction/Repair Cost:

\$21,330.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
270		V4	16
Feet	Feet NAVD 88		Feet NGVD

Primary Type:

Coastal Dune

Primary Material:

Sand

Primary Height:

10 to 15 Feet

Secondary Type:

Secondary Material:

Secondary Height:



Structure Summary :

The dunes are at a 1 on 3 slope. The high tide line comes up to the toe of the dunes. Outshore is a beach with some debris. Behind are houses.

Condition

B

Rating

Good

Level of Action

Minor

Description

Structure observed to exhibit very minor problems, superficial in nature. Minor erosion to landform is present. Structure / landform adequate to provide protection from a major coastal storm with no damage. Actions taken to prevent / limit future deterioration and extend life of structure.

Priority

II

Rating

Low Priority

Action

Future Project Consideration

Description

Inshore Structures Present with Limited potential for Significant Infrastructure Damage

Structure Images:

054-023-000-014-100-PHO1A.JPG

054-023-000-014-100-PHO1B.JPG

054-023-000-014-100-PHO1C.JPG

Structure Documents:

MA-DCR

April 2006

Proposed Stone

054-023-000-014-100-DCR1A

DEP

July 30, 200

Plan and Profiles of

054-023-000-014-100-LIC1A

Structure Assessment Form

Town: Orleans

Structure ID: 054-042-000-048-100

Key: community-map-block-parcel-structure

Property Owner:

Local

Location:

Meeting House Pond

Date:

10/29/2007

Presumed Structure Owner:

Local

Based On Comment:

Owner Name:

Orleans

Earliest Structure Record:

1979

Estimated Reconstruction/Repair Cost:

\$8,316.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
25		A15	13
Feet	Feet NAVD 88		Feet NGVD

Primary Type:

Revetment

Primary Material:

Stone

Primary Height:

Under 5 Feet

Secondary Type:

Secondary Material:

Secondary Height:



Structure Summary :

A single line of placed stones lines the side of a boat ramp. The stones are approximately 1 foot by 1 foot by 1 foot in size. The stones have been overgrown. There is a parking area behind the revetment and a boat ramp and pier adjacent.

Condition

C

Rating

Fair

Level of Action

Moderate

Description

Structure is sound but may exhibit minor deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure adequate to withstand major coastal storm with little to moderate damage. Actions taken to reinforce structure to provide full protection from major coastal storm and for extending life of structure. Moderate wind or wave damage to landform exists. Landform may not be sufficient to fully protect shoreline during a major coastal storm. Actions taken to provide addition material for full protection and extended life.

Priority

I

Rating

None

Action

Long Term Planning Considerations

Description

No Inshore Structures or Residential Dwelling Units Present

Structure Images:

054-042-000-048-100-PHO1A.JPG

054-042-000-048-100-PHO1B.JPG

054-042-000-048-100-PHO1C.JPG

Structure Documents:

DEP

January 197

Plan Accompanying

054-042-000-048-100-LIC1A

Structure Assessment FormStructure ID: **054-076-000-016-100**

Key: community-map-block-parcel-structure

Property Owner:

Local

Location:

Elli's Creek

Date:

10/29/2007

Presumed Structure Owner:

Local

Based On Comment:

Owner Name:

Orleans

Earliest Structure Record:

1986

Estimated Reconstruction/Repair Cost:

\$15,200.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
100		A16	13
Feet	Feet NAVD 88		Feet NGVD

Primary Type:

Bulkhead/ Seawall

Primary Material:

Wood

Primary Height:

Under 5 Feet

Secondary Type:

Revetment

Secondary Material:

Stone

Secondary Height:

Under 5 Feet**Structure Summary :**

The timber bulkhead is fully emerged at high tide. The cap and tops of piles are still visible. The bulkhead does not retain the water. The parking area behind the bulkhead is under water also. The bulkhead would not protect any of the houses located behind it. Boats tie off the bulkhead. The stone revetment is adjacent to the bulkhead and boat ramp. There is minor stone movement.

*Condition***B***Priority***III***Rating***Good***Rating***Moderate Priority***Level of Action***Minor***Action***Consider for Active Project Improvement Listing***Description*

Structure observed to exhibit very minor problems, superficial in nature. Minor erosion to landform is present. Structure / landform adequate to provide protection from a major coastal storm with no damage. Actions taken to prevent / limit future deterioration and extend life of structure.

Description

Inshore Structures with potential for Infrastructure Damage and/or Limited Residential Dwellings (<1 dwelling impacted / 100 feet of shoreline)

Structure Images:**054-076-000-016-100-PHO1A.JPG****054-076-000-016-100-PHO1B.JPG****Structure Documents:****DEP****April 1986****Plan Accompanying****054-076-000-016-100-LIC1A**

Structure Assessment Form

Town: Orleans

Structure ID: 054-096-000-026-100

Key: community-map-block-parcel-structure

Property Owner:

State

Location:

Pleasant Bay

Date:

10/29/2007

Presumed Structure Owner:

State

Based On Comment:

Owner Name:

Mass Highway Department

Earliest Structure Record:

1946

Estimated Reconstruction/Repair Cost:

\$138,138.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
230		A16	12
Feet	Feet NAVD 88		Feet NGVD

Primary Type:	Primary Material:	Primary Height:
Revetment	Stone	5 to 10 Feet
Secondary Type:	Secondary Material:	Secondary Height:



Structure Summary :

The dumped stone revetment is at a 1 on 3 slope. The stones are approximately 1 foot by 1 foot by 2 feet. There is stone movement and unraveling throughout. Route 28 is directly behind the revetment. There are houses adjacent to the structure and across the street.

<i>Condition</i>	C	<i>Priority</i>	II
<i>Rating</i>	Fair	<i>Rating</i>	Low Priority
<i>Level of Action</i>	Moderate	<i>Action</i>	Future Project Consideration
<i>Description</i>	Structure is sound but may exhibit minor deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure adequate to withstand major coastal storm with little to moderate damage. Actions taken to reinforce structure to provide full protection from major coastal storm and for extending life of structure. Moderate wind or wave damage to landform exists. Landform may not be sufficient to fully protect shoreline during a major coastal storm. Actions taken to provide addition material for full protection and extended life.	<i>Description</i>	Inshore Structures Present with Limited potential for Significant Infrastructure Damage

Structure Images:

054-096-000-026-100-PHO1A.jpg

054-096-000-026-100-PHO1B.jpg

054-096-000-026-100-PHO1C.jpg

Structure Documents:

MA-DCR

June 1946

Proposed Shore

054-096-000-016-100-DCR1A

Section II - Orleans

Part C

Structure Photographs

TOWN: ORLEANS
 SOURCE: BCE - FIELD PHOTOGRAPHS
 LOCATION: Bourne Consulting Engineering
 DATE OF RESEARCH: JULY 2007

BCE Structure No	Document No	Contract/ Drawing Number	Entity	Municipality	Date	Title	Sheets	Location	Description
054-011-000-003-100	054-011-000-003-100-PHO1A.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
054-013-000-030-100	054-013-000-030-100-PHO1A.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
054-013-000-030-100	054-013-000-030-100-PHO1B.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
054-016-000-038-100	054-016-000-038-100-PHO1A.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
054-016-000-038-200	054-016-000-038-200-PHO2A.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
054-016-000-038-300	054-016-000-038-300-PHO3A.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
054-016-000-038-300	054-016-000-038-300-PHO3B.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
054-016-000-038-300	054-016-000-038-300-PHO3C.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
054-018-000-049-100	054-018-000-049-100-PHO1A.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
054-018-000-049-100	054-018-000-049-100-PHO1B.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
054-018-000-049-100	054-018-000-049-100-PHO1C.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
054-021-000-043-100	054-021-000-043-100-PHO1A.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
054-021-000-043-100	054-021-000-043-100-PHO1B.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
054-023-000-014-100	054-023-000-014-100-PHO1A.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
054-023-000-014-100	054-023-000-014-100-PHO1B.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
054-023-000-014-100	054-023-000-014-100-PHO1C.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
054-042-000-048-100	054-042-000-048-100-PHO1A.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
054-042-000-048-100	054-042-000-048-100-PHO1B.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
054-042-000-048-100	054-042-000-048-100-PHO1C.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
054-076-000-016-100	054-076-000-016-100-PHO1A.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
054-076-000-016-100	054-076-000-016-100-PHO1B.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
054-096-000-026-100	054-096-000-026-100-PHO1A.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey

BCE Structure No	Document No	Contract/ Drawing Number	Entity	Municipality	Date	Title	Sheets	Location	Description
054-096-000-026-100	054-096-000-026-100-PHO1B.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
054-096-000-026-100	054-096-000-026-100-PHO1C.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey

Massachusetts Coastal Infrastructure and Assessment



054-011-000-003-100-PHO1A



054-013-000-030-100-PHO1A



054-013-000-030-100-PHO1B



054-016-000-038-100-PHO1A



054-016-000-038-200-PHO2A



054-016-000-038-300-PHO3A



054-016-000-038-300-PHO3B



054-016-000-038-300-PHO3C



054-018-000-049-100-PHO1A

Massachusetts Coastal Infrastructure and Assessment



054-018-000-049-100-PHO1B



054-018-000-049-100-PHO1C



054-021-000-043-100-PHO1A



054-021-000-043-100-PHO1B



054-023-000-014-100-PHO1A



054-023-000-014-100-PHO1B



054-023-000-014-100-PHO1C



054-042-000-048-100-PHO1A

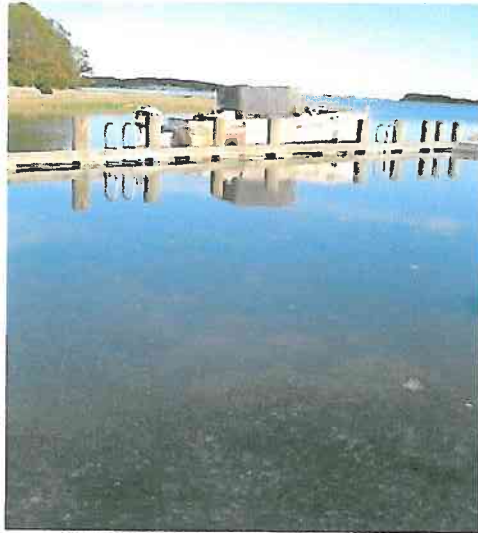


054-042-000-048-100-PHO1B

Massachusetts Coastal Infrastructure and Assessment



054-042-000-048-100-PHO1C



054-076-000-016-100-PHO1A



054-076-000-016-100-PHO1B



054-096-000-026-100-PHO1A



054-096-000-026-100-PHO1B



054-096-000-026-100-PHO1C

Section II - Orleans

Part D

Structure Documents

TOWN DOCUMENT LIST

MA DCR - DOCUMENT LIST

MA DEP – Ch 91 DOCUMENT LIST

- Copies of License Documents

USACE – PERMIT DOCUMENT LIST

- Copies of Permit Documents

TOWN: ORLEANS
SOURCE: Town of Orleans
LOCATION: TOWN
DATE OF RESEARCH: JULY 2007

No Town Documents for the Town of Orleans

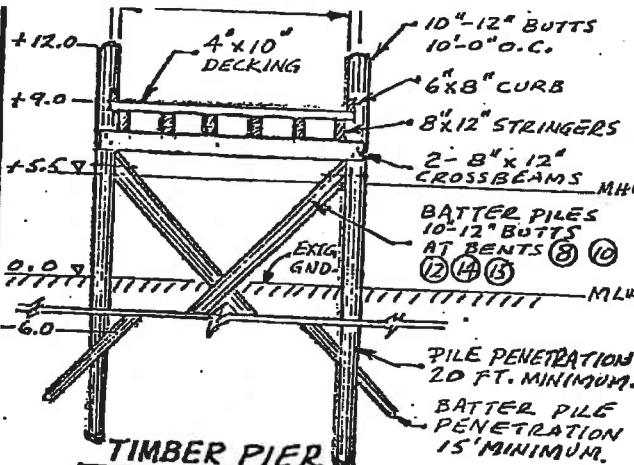
BCE Structure No	Document No	Contract/ Drawing Number	Entity	Municipality	Date	Title	Sheets	Location	Description
------------------	-------------	--------------------------------	--------	--------------	------	-------	--------	----------	-------------

TOWN: ORLEANS
 SOURCE: MA-DCR
 LOCATION: MA-DCR BOSTON and HINGHAM, MA
 DATE OF RESEARCH: JULY 2007

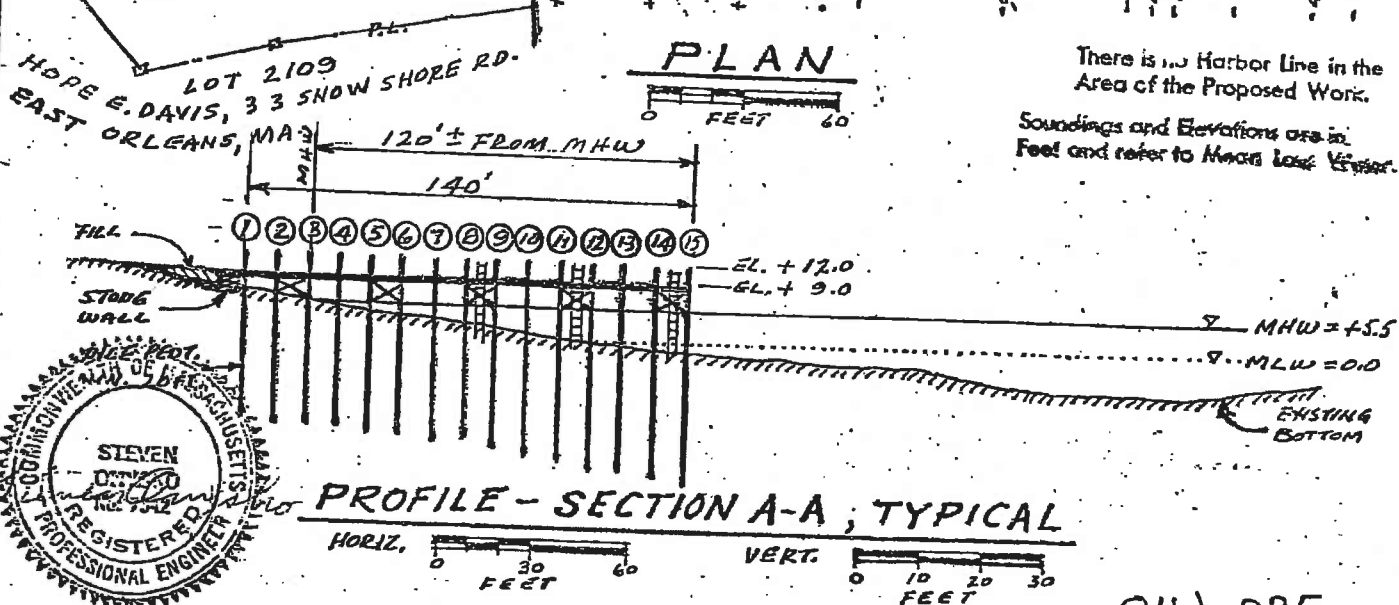
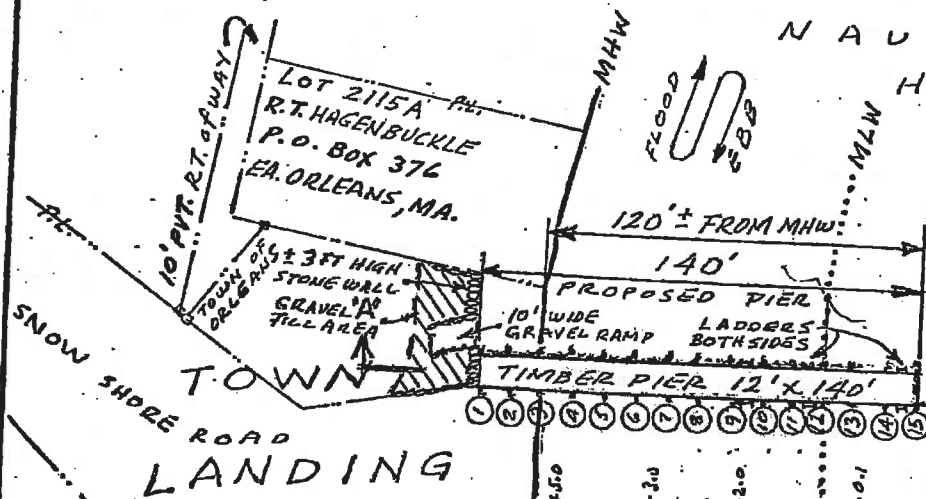
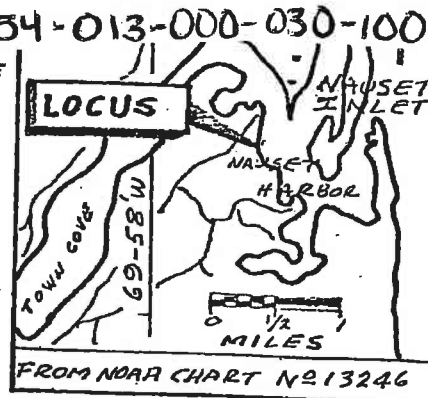
BCE Structure No	Document No	Contract/ Drawing Number	Entity	Municipality	Date	Title	Sheets	Location	Description
054-016-000-038-100	054-016-000-038-100-DCR1A	1919	MA-DCR	Orleans	June 1958	Proposed Harbor Improvements - Boat Ramp, Jetty and Excavation, Rock Harbor, Orleans - DPW of Massachusetts - Division of Waterways	1	Rock Harbor	Boat Ramp and Jetty
054-016-000-038-100	054-016-000-038-100-DCR1B	2139	MA-DCR	Orleans	July 1960	Proposed Harbor Improvements - Boat Ramp Reconstruction and Jetty Reconstruction - Rock Harbor, Orleans - DPW of Massachusetts - Division of Waterways	1	Rock Harbor	Boat Ramp and Jetty
054-016-000-038-200	054-016-000-038-200-DCR2A	409	MA-DCR	Orleans	June 1934	Proposed Timber Bulkhead and Platform - Rock Harbor, Orleans - DPW of Massachusetts	1	Rock Harbor	Bulkhead and Platform
054-016-000-038-200	054-016-000-038-200-DCR2B	1303	MA-DCR	Orleans	January 1953	Proposed Retaining Wall - Rock Harbor, Orleans, Massachusetts - Prepared for the DPW of Massachusetts - Division of Waterways	2	Rock Harbor	Retaining Wall
054-016-000-038-200	054-016-000-038-200-DCR2C	1382	MA-DCR	Orleans	April 1954	Proposed Harbor Development - Extension of Timber Bulkhead and Excavation - Rock Harbor, Orleans - Prepared for DPW of Massachusetts - Division of Waterways	2	Rock Harbor	Timber Bulkhead
054-016-000-038-200	054-016-000-038-200-DCR2D	1600	MA-DCR	Orleans	April 1956	Proposed Bulkhead Repairs - Timber Pile Anchorage - Rock Harbor, Orleans - DPW of Massachusetts - Division of Waterways	1	Rock Harbor	Bulkhead Repairs
054-016-000-038-200	054-016-000-038-200-DCR2E	1867	MA-DCR	Orleans	February 1958	Proposed Harbor Development Timber Bulkhead and Excavation Rock Harbor, Orleans, MA - DPW of Massachusetts - Division of Waterways	2	Rock Harbor	Timber Bulkhead
054-016-000-038-200	054-016-000-038-200-DCR2F	2593	MA-DCR	Orleans	November 1967	Proposed Harbor Improvements - Wharf and Bulkhead Repairs - Rock Harbor, Orleans, MA - DPW of Massachusetts - Division of Waterways	1	Rock Harbor	Bulkhead
054-023-000-014-100	054-023-000-014-100-DCR1A	3589	MA-DCR	Orleans	April 2006	Proposed Stone Revetment Removal, Dune Restoration and Beach Nourishment - Former Gavigan Property	5	Wildflower Lane	Dune Restoration
054-096-000-026-100	054-096-000-016-100-DCR1A	908	MA-DCR	Orleans	June 1946	Proposed Shore Protection - Pleasant Bay - South Orleans - DPW of Massachusetts - Division of Waterways	1	Route 28	Riprap

BCE Structure No	Document No	Contract/ Drawing Number	Entity	Municipality	Date	Title	Sheets	Location	Description
054-013-000-030-100	054-013-000-030-100-LIC1A	758	DEP	Orleans	September 1981	Plan Accompanying Petition of Town of Orleans to Construct and Maintain a Stone Wall, Fill and Timber Pier at Snow's Landing in Nauset Harbor, Orleans, Massachusetts	1	Nauset Harbor	Stone Revetment
054-016-000-038-200	054-016-000-038-200-LIC2A	362	DEP	Orleans	August 1977	Plan Accompanying Petition of the Town of Orleans to Construct and Maintain a Bulkhead, Rock Revetment, Fill, Pile and Timber Piers, Ramps, Pile Held Floats & Fingers, and Dredging in Rock Harbor, Orleans, Massachusetts	2	Rock Harbor	Bulkhead
054-016-000-038-200	054-016-000-038-200-LIC2B	1509	DEP	Orleans	February 1986	Plan Accompanying Petition of Town of Orleans Proposed Bulkhead Landing, Gangways and Floats, Rock Harbor, Orleans, Massachusetts	2	Rock Harbor	Steel Bulkhead
054-018-000-049-100	054-018-000-049-100-LIC1A	5849	DEP	Orleans	December 1971	Plan to Accompany Petition of the Town of Orleans to Construct and Maintain a Timber Bulkhead, Additional Concrete Ramp, Dredging, Fill and Floating Piers in Town Cove, Orleans, Massachusetts	1	Town Cove	Bulkhead
054-018-000-049-100	054-018-000-049-100-LIC1B	6256	DEP	Orleans	August 1974	Plan to Accompany Petition of the Town of Orleans to Construct and Maintain a Timber Bulkhead, Additional Concrete Ramp, Dredging and Fill in Town Cove, Orleans, Massachusetts	1	Town Cove	Bulkhead
054-023-000-014-100	054-023-000-014-100-LIC1A	10245	DEP	Orleans	July 30, 2004	Plan and Profiles of Proposed Beach Nourishment at Skaket Beach Orleans, MA - Prepared for Town of Orleans	4	Skaket Beach	Beach Nourishment
054-042-000-048-100	054-042-000-048-100-LIC1A	521	DEP	Orleans	January 1979	Plan Accompanying Petition of the Town of Orleans to license and Maintain an Existing Pile and Timber Dock, Ramp, Float, and Concrete Boat Ramp in Meeting House River, Orleans, Massachusetts	1	Meeting House River	Revetment
054-076-000-016-100	054-076-000-016-100-LIC1A	1534	DEP	Orleans	April 1986	Plan Accompanying Petition of Town of Orleans to Construct Timber Bulkhead in Eli's Creek, Orleans, Massachusetts	1	Eli's Creek	Timber Bulkhead

054-013-000-030-100



- (1) ALL TIMBER TO BE CREOSOTE OR WOLMANIZE SALT TREATED.
- (2) ALL HARDWARE TO BE GALVANIZED.
- (3) OUTSIDE CROSS BRACING TO BE 4"x6" TIMBER.
- (4) FILL BEHIND WALL = 120 C.Y. ±



PLAN ACCOMPANYING PETITION OF:
THE TOWN OF ORLEANS

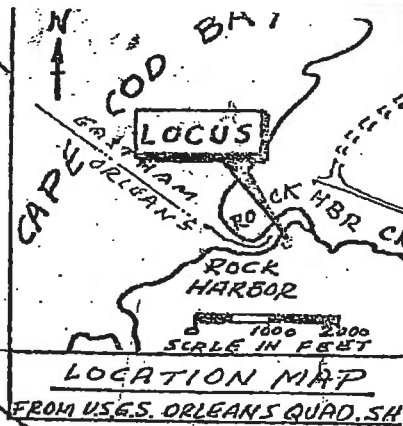
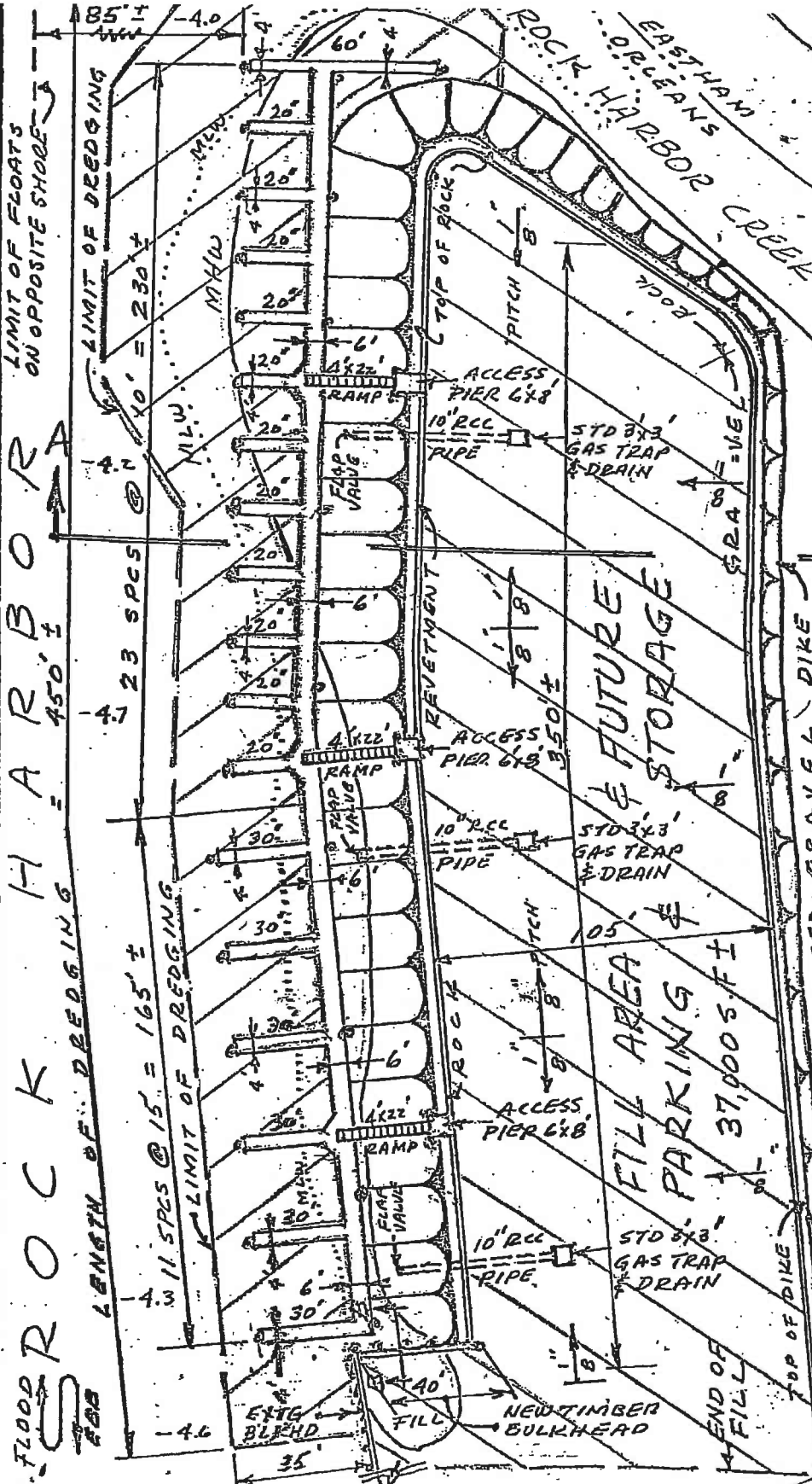
TO CONSTRUCT AND MAINTAIN A STONE WALL, FILL, AND TIMBER PIER AT SNOW'S LANDING, IN NAUSET HARBOR, ORLEANS MASSACHUSETTS

LICENSE PLAN NO. 758

Approved by Department of Environmental Quality Engineering
of Massachusetts: September 2, 1981

[Signature] COMMISSIONER
CHIEF ENGINEER

054-016-000-038-200



NOTES:

- (1) PROPOSED WORK TO BE ENTIRELY ON LAND OWNED BY THE TOWN OF ORLEANS.
- (2) SEE ORIGINAL PETITION PLAN DATED 10 OCT. 1975 FOR ABUTTING PROPERTY OWNERS & ADDRESSES
- (3) DREDGED MATERIAL (-2,200 C.Y.) TO BE USED AS FILL FOR PARKING AREA. ADDITIONAL 4,000 C.Y. OF FILL TO BE OBTAINED FROM SELECTED LAND SOURCES.
- (4) SEE SHEET 2 FOR ADDITIONAL NOTES & DETAILS

PLAN

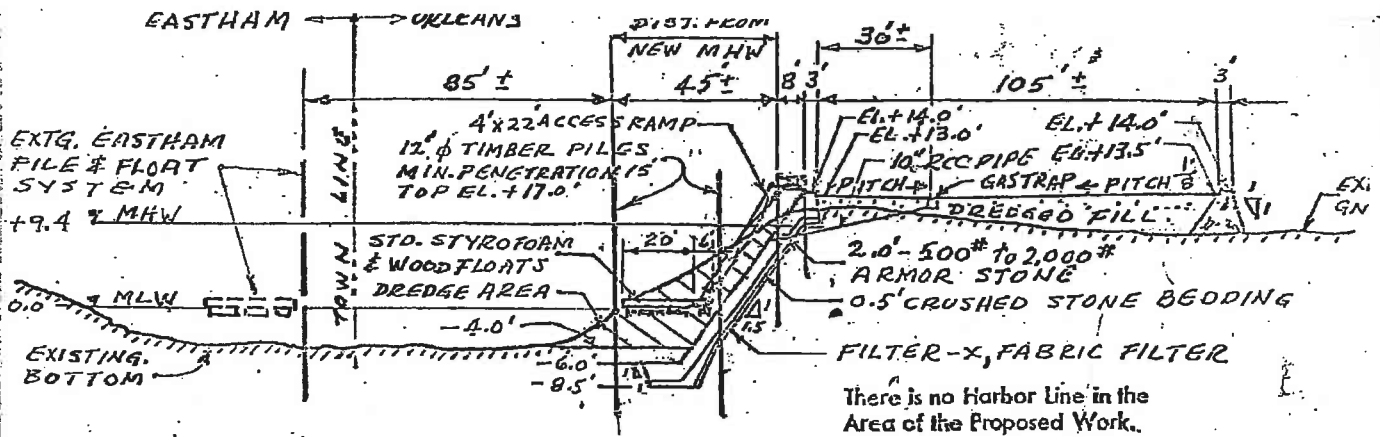
Plan to Accompany Petition of The
TOWN OF ORLEANS

To Construct and Maintain a Bulkhead, Rock Revetment, Fill, Pile and Timber Piers, Ramps, Pile Held Floats & Fingers, and Dredging in
ROCK HARBOR, ORLEANS, MA.

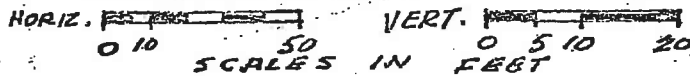
LIC. PLAN NO. 362
Approved by Department of Environmental Quality Engineering
of Massachusetts August 19, 1977

[Signature]

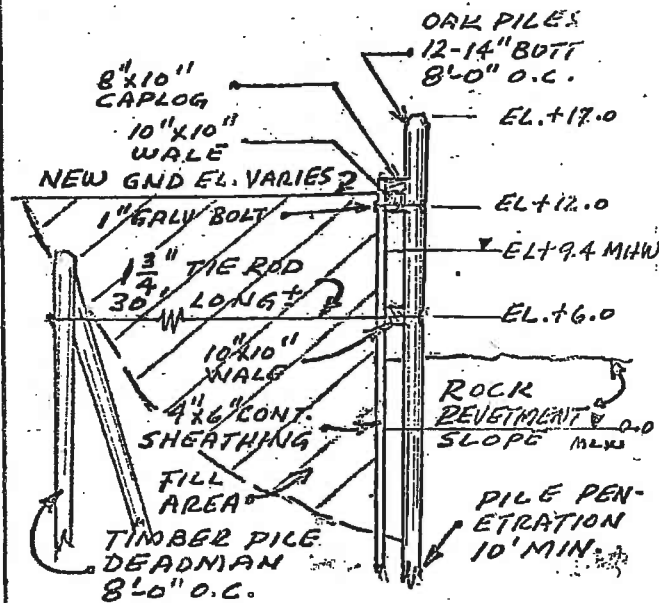
COMMISSIONER
CHIEF ENGINEER



SECTION A-A, TYPICAL

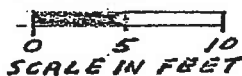


Soundings and Elevations are in Feet and refer to Mean Low Water.



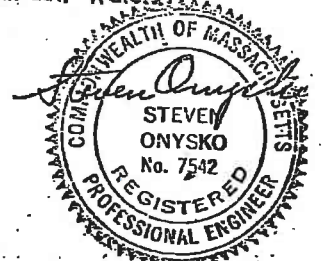
SECTION B-B, TYPICAL

TIMBER BULKHEAD DETAIL



NOTES - CONT'D

- (5.) ELEVATIONS ON THIS PLAN SUPERSEDE THOSE SHOWN ON 10 OCT. 1975 PLAN, TO COMPLY WITH DEQE REQUIREMENTS OF 22 JULY 77
- (6.) PARKING AREA TO BE TEMPORARILY SURFACED WITH COARSE GRAVEL BEDDING. BITUMINOUS PAVEMENT TO BE DEFERRED. A MAXIMUM OF TWO YEARS. SIZE OF THE AREA IS IN ACCORDANCE WITH DEQE MODIFICATION OF 22 JULY 77
- (7.) GAS TRAPS, BACK FLOW FLAP VALVE AND CONCRETE PIPE TO MEET MASS. D.P. STANDARD SPECIFICATIONS OR EQUAL.
- (8.) ALL PILING, PIERS, AND FLOAT TIMBERS TO BE COATED WITH NON-LEACHABLE PERMANENT PRESERVATIVES.
- (9.) ALL FEATURES AND STRUCTURES SHOWN IN RED INDICATES THE PROPOSED WORK.



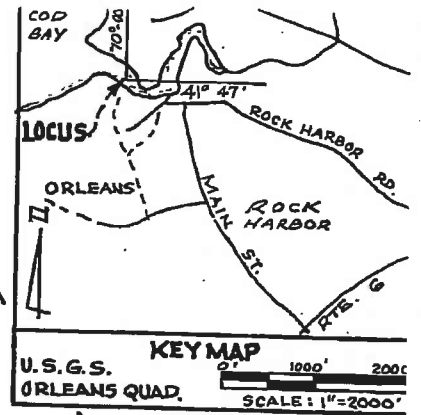
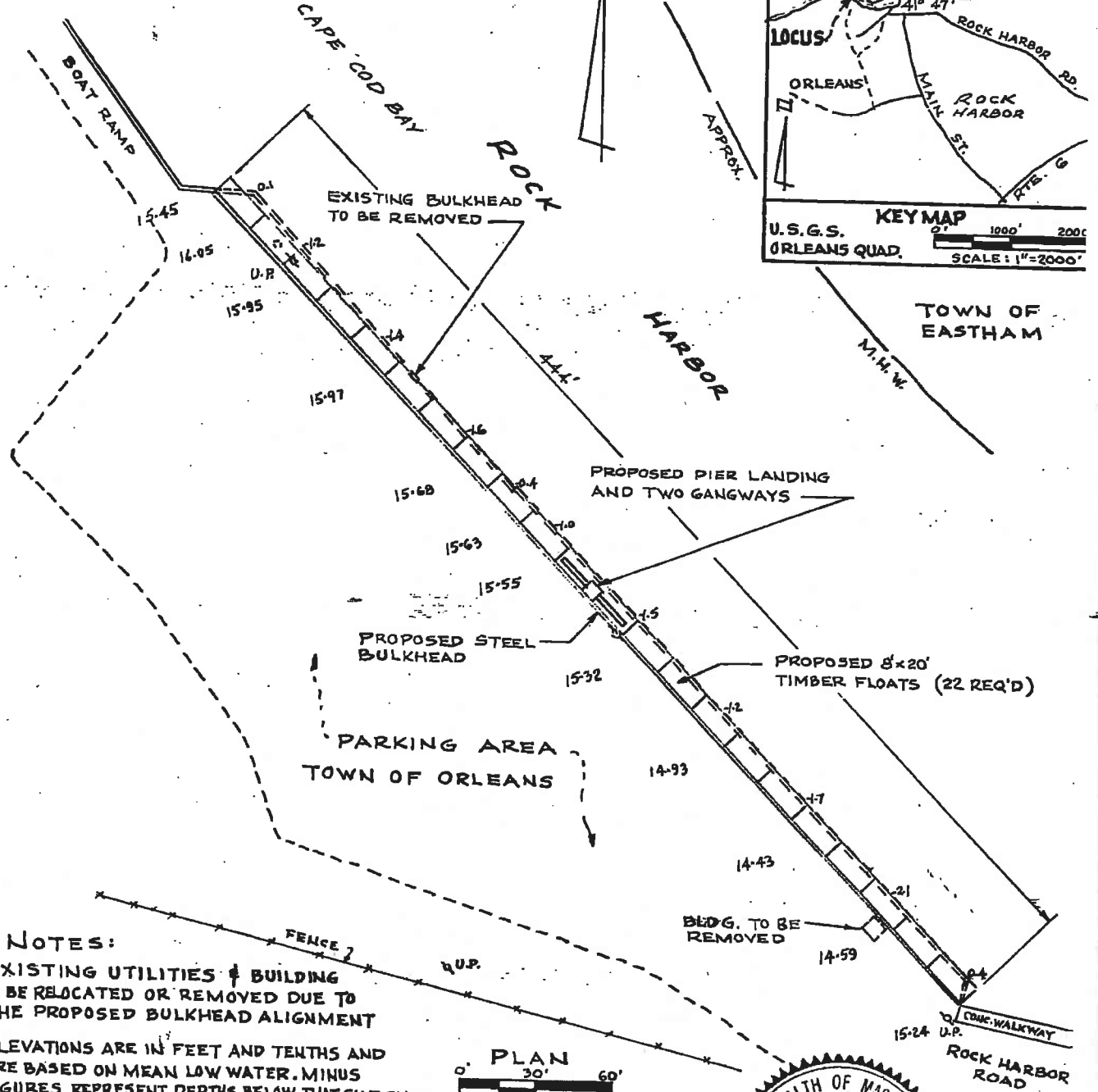
054-016-000-038-200

LICENSE PLAN NO. 362

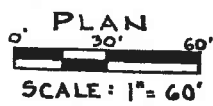
Approved By Department of Environmental Quality Engineering

ROCK HARBOR, ORLEANS, MA.
Barnstable County, MA

054-016-000-038-200

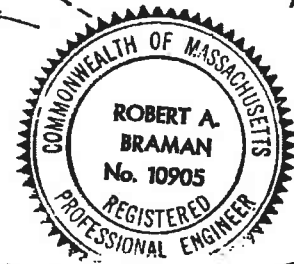


NOTES:
 EXISTING UTILITIES & BUILDING TO BE RELOCATED OR REMOVED DUE TO THE PROPOSED BULKHEAD ALIGNMENT
 ELEVATIONS ARE IN FEET AND TENTHS AND ARE BASED ON MEAN LOW WATER. MINUS FIGURES REPRESENT DEPTHS BELOW THAT SAME PLANE.



ORIGINAL BULKHEAD BUILT IN 1953 & 1954 BY THE DIVISION OF WATERWAYS.

86W-036



Robert A. Braman CIVIL

PLAN ACCOMPANYING PETITION OF
TOWN OF ORLEANS
 PROPOSED BULKHEAD LANDING, GANGWAYS & FLOATS
ROCK HARBOR
 ORLEANS, MASS.

FEB. 18, 1986

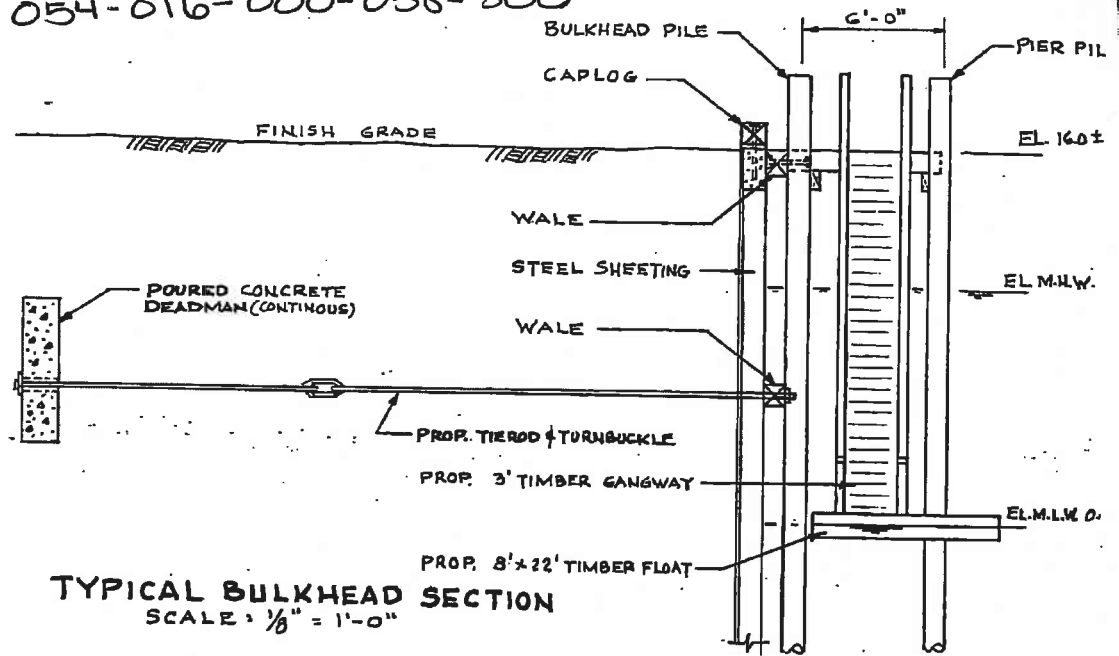
SHEET 1 OF 2



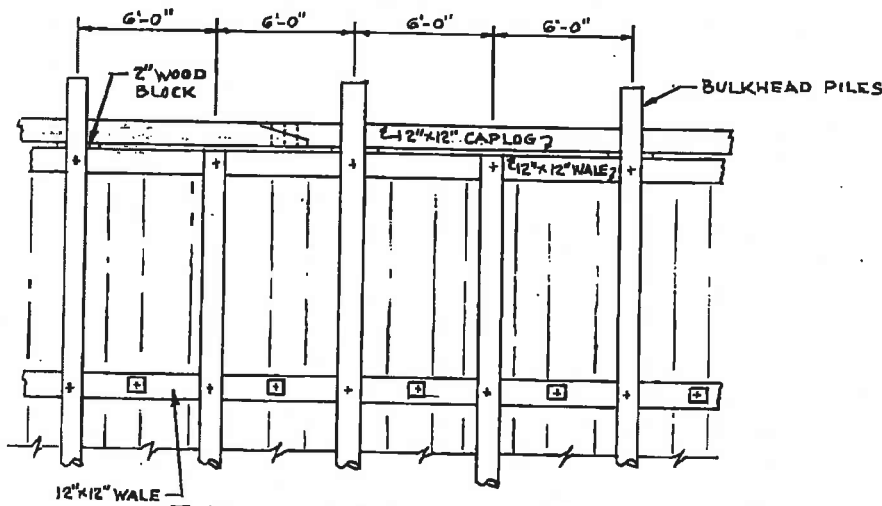
BRAMAN ENGINEERING COMPANY
 CIVIL ENGINEERS & SURVEYORS

LICENSE PLAN NO. 1509
 Approved by Department of Environmental Quality Engineering
 of Massachusetts
[Signature]
 Gary R. Clayton
 Charles J. Natale
JULY 30, 1986
 COMMISSIONER
 DIVISION DIRECTOR
 SECTION CHIEF
 DATE

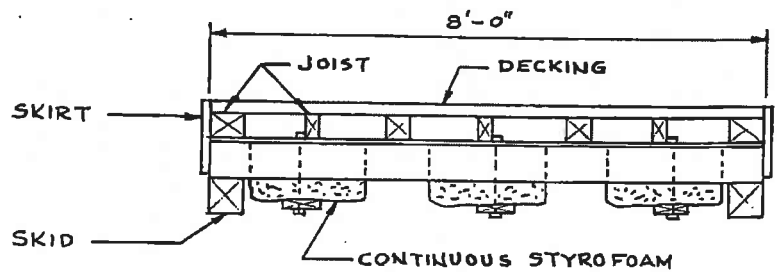
054-016-000-038-300



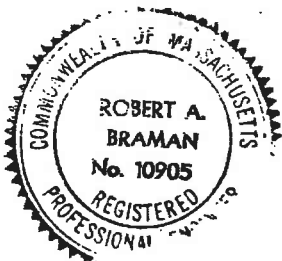
TYPICAL BULKHEAD SECTION
SCALE: $\frac{1}{8}" = 1'-0"$



TYPICAL BULKHEAD ELEVATION
SCALE: $\frac{1}{8}" = 1'-0"$



TIMBER FLOAT SECTION
SCALE: $\frac{3}{8}" = 1'-0"$



CIVIL

Robert A. Braman

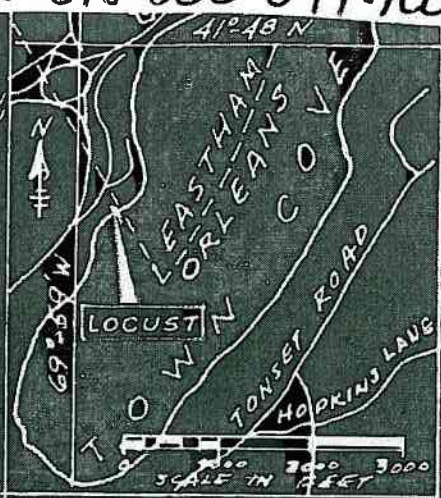
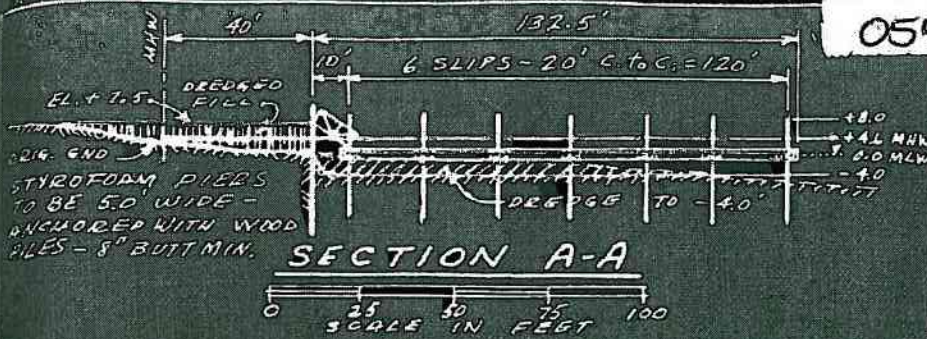
86W-036

LICENSE PLAN NO. 1509

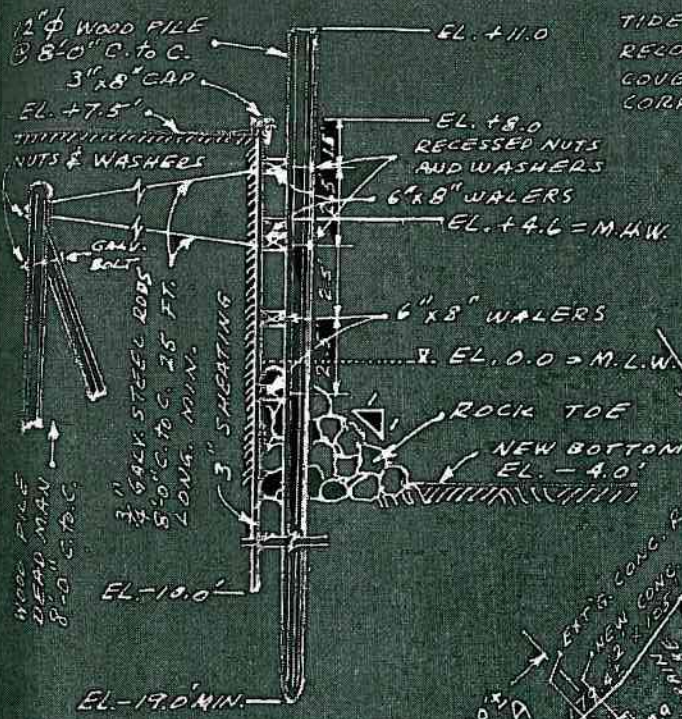
Approved by Registrar
Date: **JULY 30, 1986**

for Chief Engineer

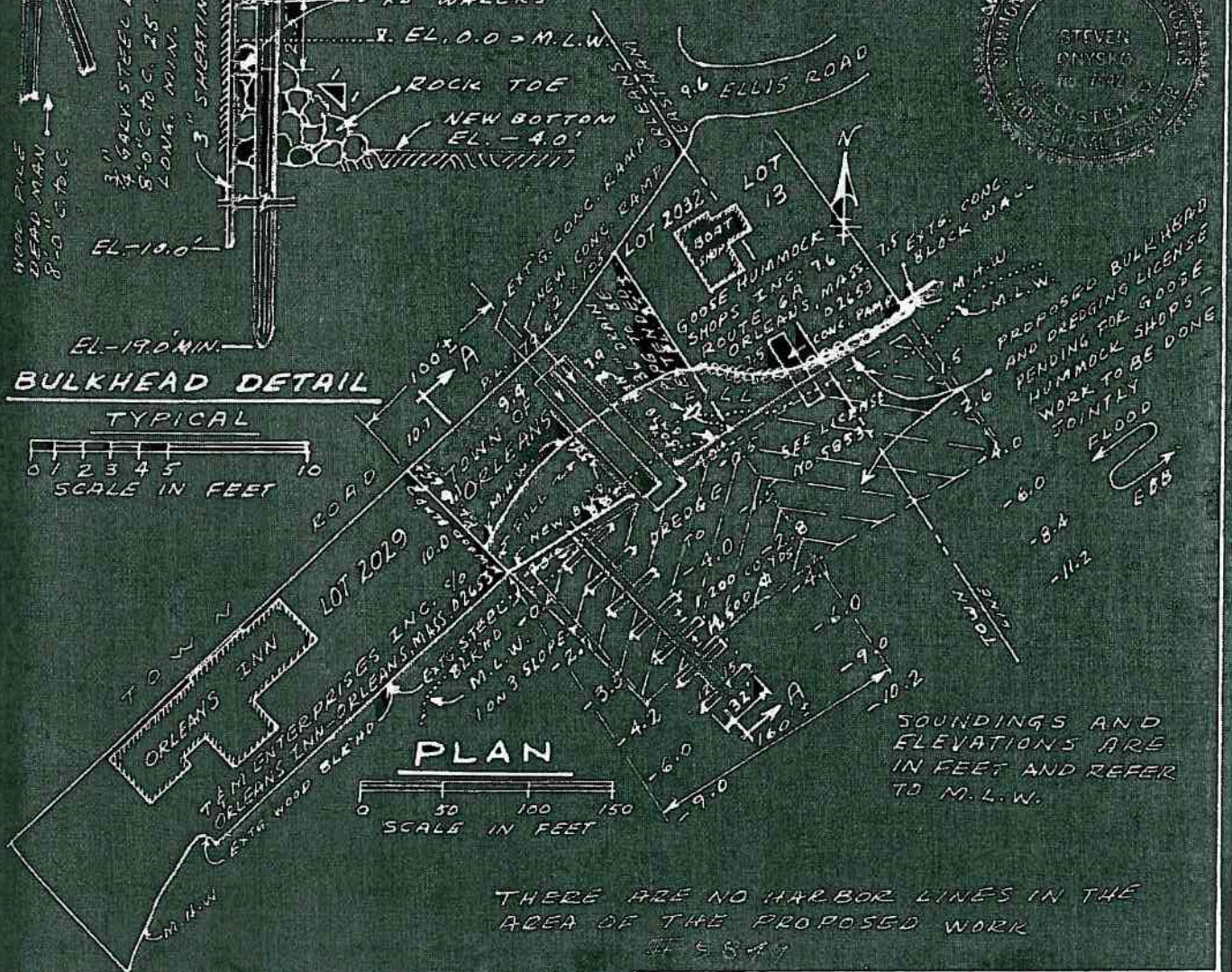
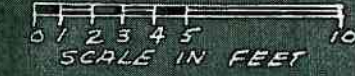
054-018-000-049-100



FROM U.S.G.S. MAP - 7.5 MIN. SERIES-ORLEANS QUADRANGLE



TYPICAL



SOUNDINGS AND ELEVATIONS ARE IN FEET AND REFER TO M.L.W.

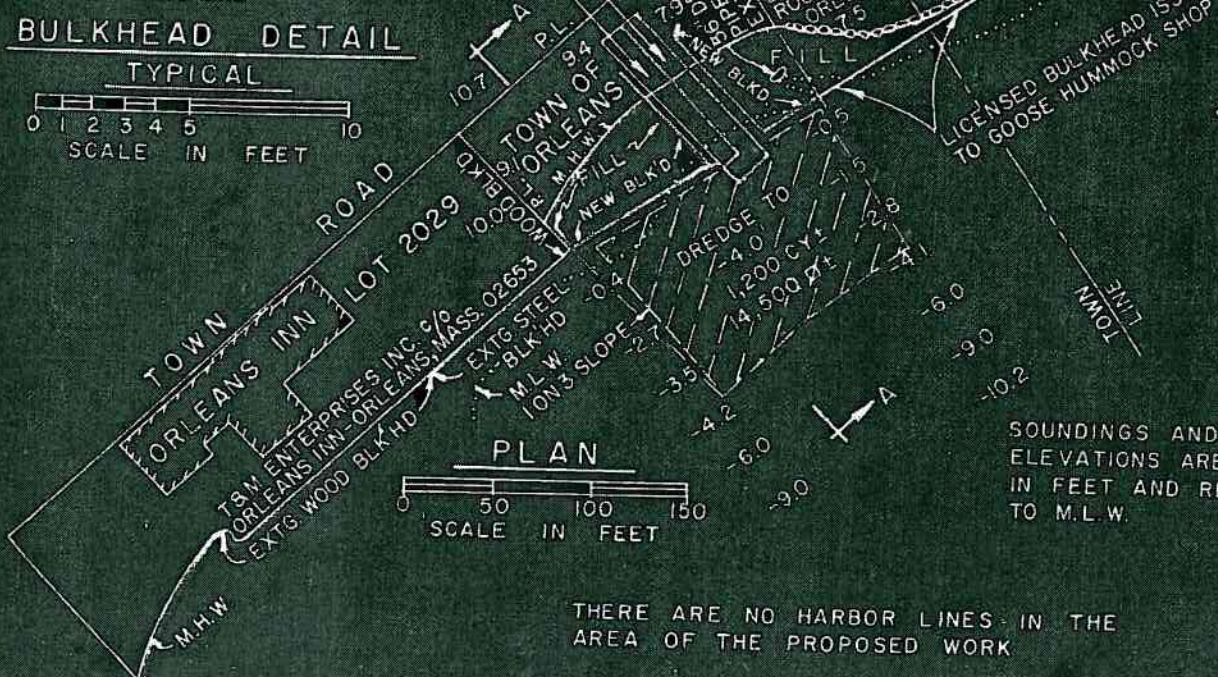
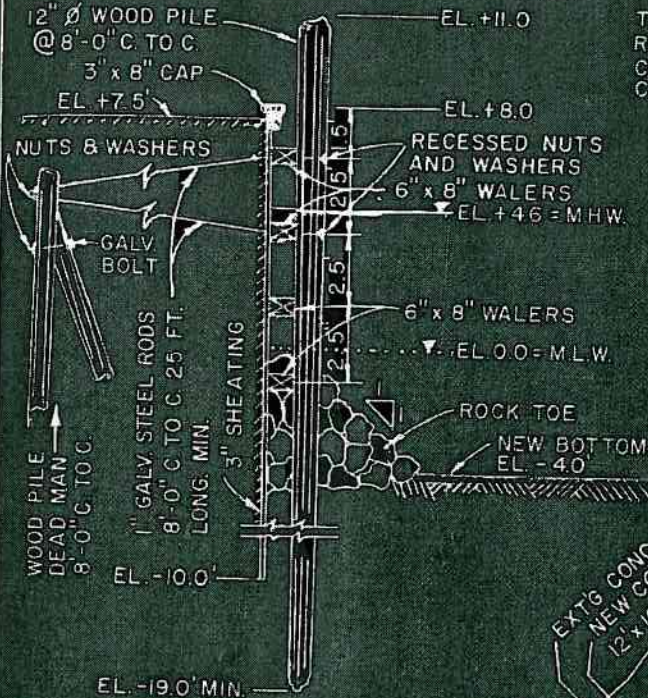
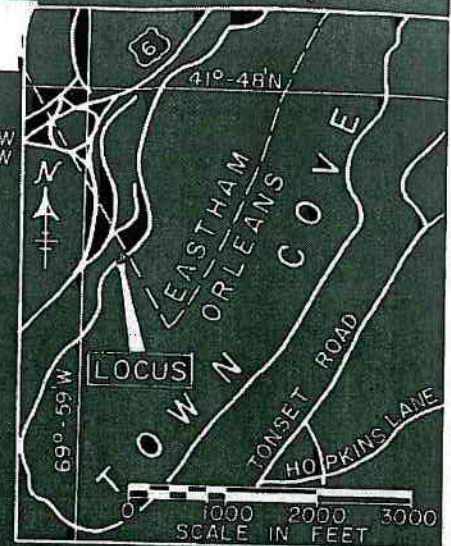
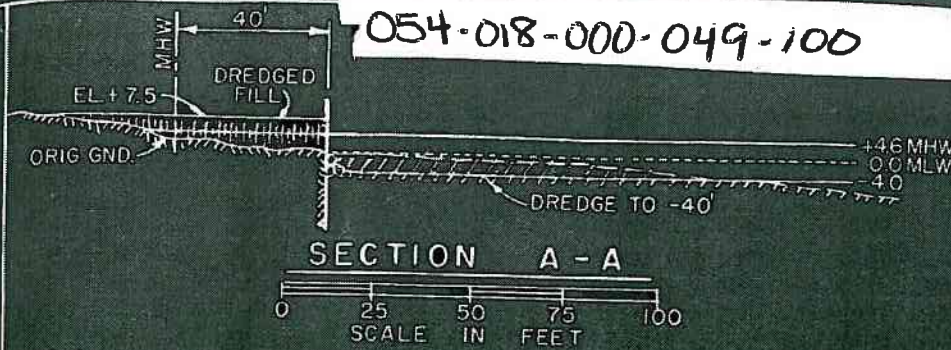
THERE ARE NO HARBOR LINES IN THE AREA OF THE PROPOSED WORK

PLAN TO ACCOMPANY PETITION OF THE
TOWN OF ORLEANS
 TO CONSTRUCT AND MAINTAIN A TIMBER
 BULKHEAD, ADDITIONAL CONCRETE RAMP,
 DREDGING, FILL, AND FLOATING PIERS IN
TOWN COVE
 ORLEANS, MASSACHUSETTS

LICENSE PLAN NO. 5849
 APPROVED BY DEPARTMENT OF PUBLIC WORKS OF MASSACHUSETTS
 DECEMBER 22, 1991
 Robert S. Swales
 Robert S. Swales
 Robert S. Swales

License No.

054-018-000-049-100



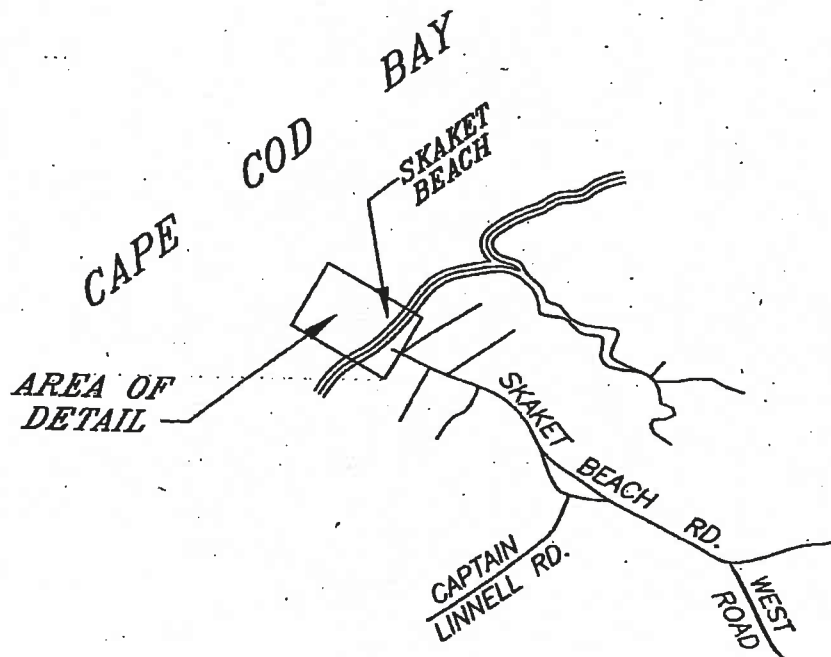
PLAN TO ACCOMPANY PETITION OF THE
TOWN OF ORLEANS
TO CONSTRUCT AND MAINTAIN A TIMBER
BULKHEAD, ADDITIONAL CONCRETE RAMP,
DREDGING AND FILL IN
TOWN COVE
ORLEANS, MASSACHUSETTS

LICENSE PLAN NO. 6256
APPROVED BY DEPARTMENT OF PUBLIC WORKS OF
MASSACHUSETTS
AUGUST 1, 1974
COMMISSIONER - DEPT.
OF PUBLIC WORKS
ASSOCIATE
COMMISSIONER

054-023-000-014-100

LOCATION MAP

Not to Scale



PLAN & PROFILES
of
PROPOSED BEACH NOURISHMENT
at
SKAKET BEACH ORLEANS, MA
prepared for
TOWN of ORLEANS

Scale: As Noted

Date: JULY 30, 2004

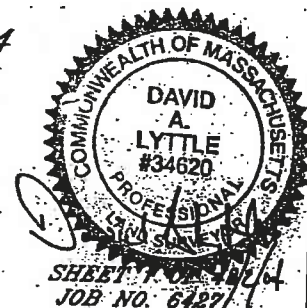
Ryder & Wilcox, Inc. P.E. & P.L.S.
P.O. Box 439 South Orleans, MA 02662

PERMIT NO. 10245

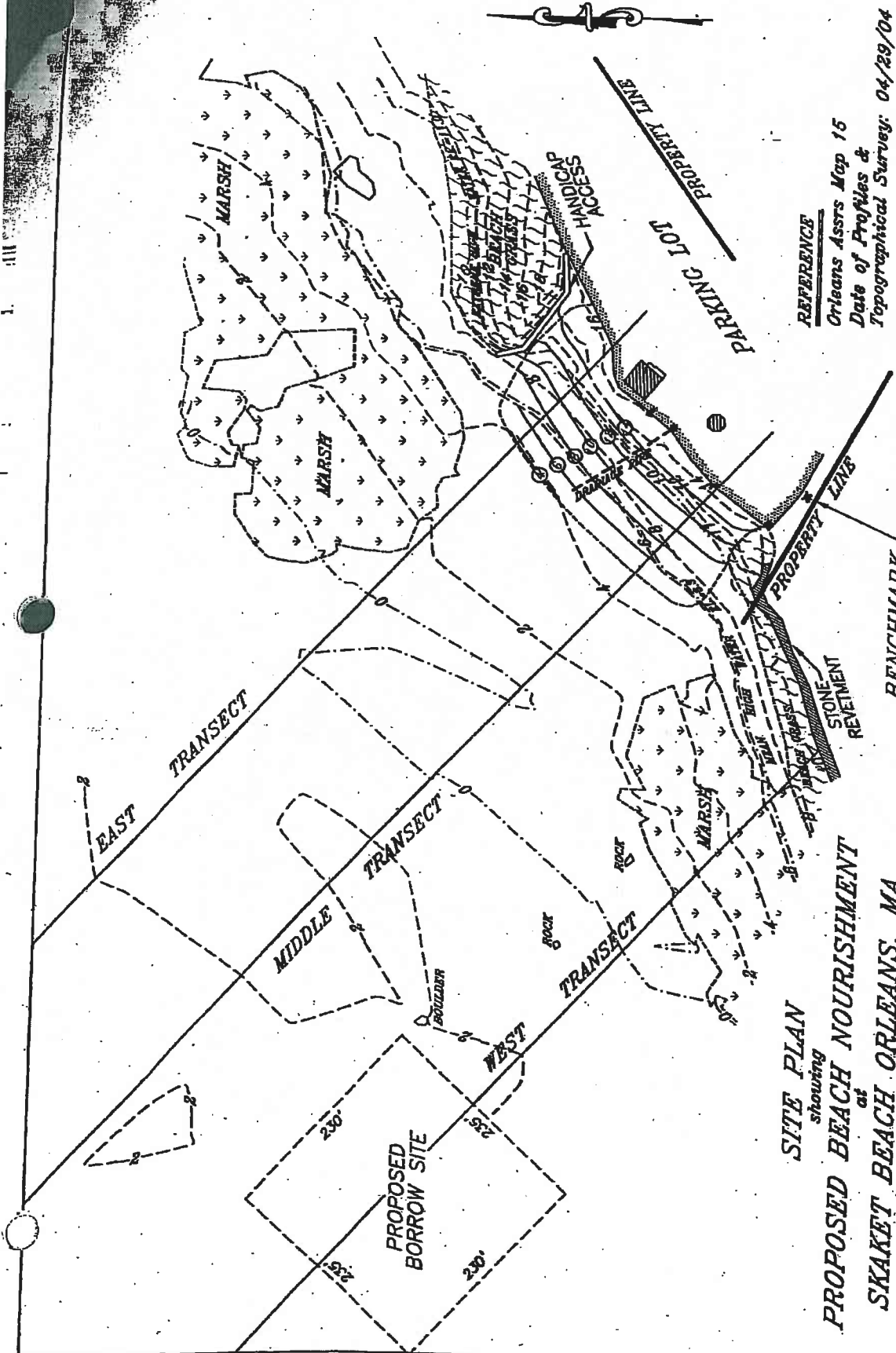
Approved by Department of Environmental Protection

Date:

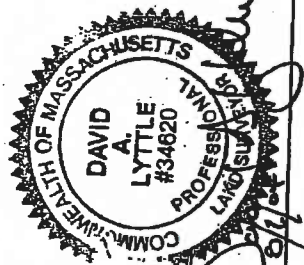
MAY 03 2005



054-023-000-014-100



REFERENCE
Orleans Assrs Map 15
Date of Profiles &
Topographical Survey: 04/29/04



SHEET 2 OF 4
JOB NO. 6427

PERMIT NO. 10245
Approved by Department of Environmental Protection
Date: 03/2005

Scale: 1" = 150' Date: JULY 30, 2004

Ryder & Wilson, Inc.
P.E. & P.L.S.
So. Orleans, MA

054-023-000-014-100

PROPERTY LINE
PARKING LOT

SITE DETAIL

Scale: 1" = 80'

PERMIT NO. 10245

Approved by Department of Environmental Protection

MAY 03 2005

Date:

SHEET 4 OF 4
JOB NO. 6427

MARSH

EAST TRANSECT

AMOUNT OF FILL
NOT TO EXCEED
2000 CU. YDS.

MIDDLE TRANSECT

HANDICAP ACCESS

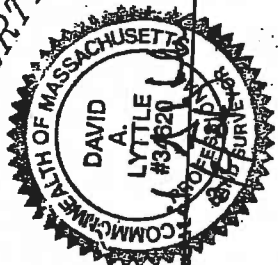
EXISTING CONTOUR

PROPOSED CONTOUR

DRAINAGE PIPE

EXTENT OF REMEDIATION

PROPERTY LINE



STONE
REVETMENT

BEACH GRASS

HIGH WATER

MEAN

MARSH

BEACH PROFILES showing PROPOSED BEACH NOURISHMENT

at
SKAKET BEACH ORLEANS, MA

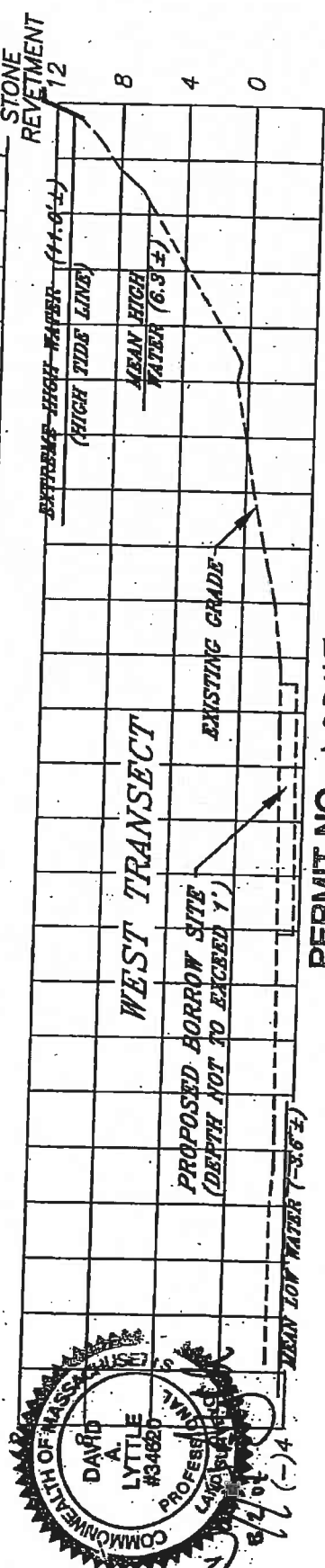
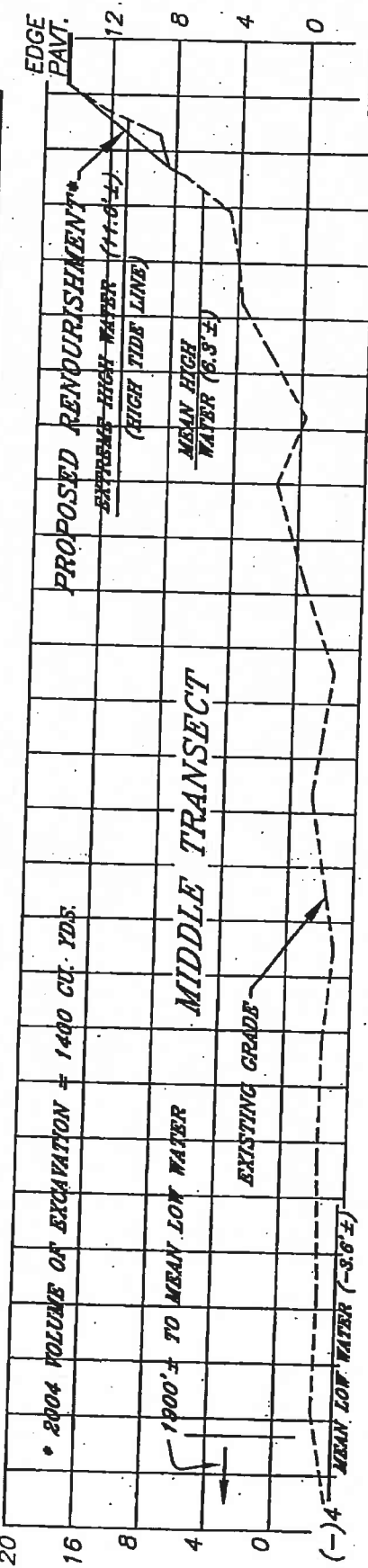
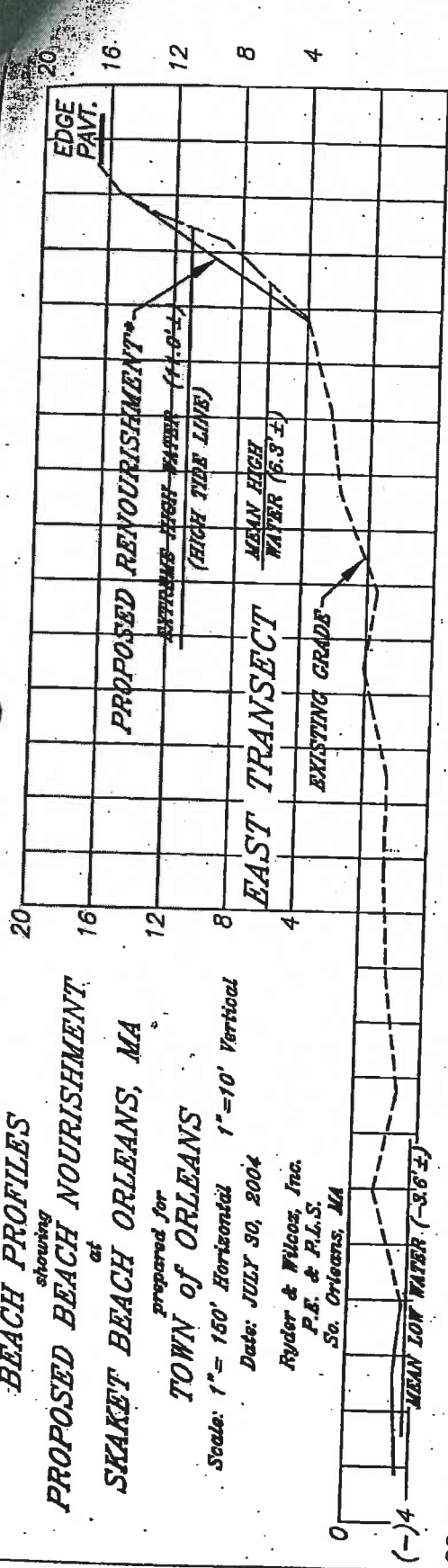
prepared for
TOWN of ORLEANS

Scale: 1" = 150' Horizontal 1" = 10' Vertical

Date: JULY 30, 2004

Ryder & Wilcox, Inc.
P.E. & P.L.S.
So. Orleans, MA

054-023-000-014-100



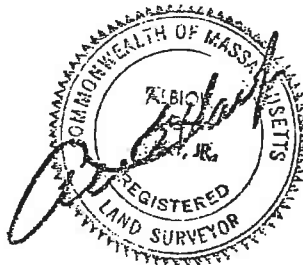
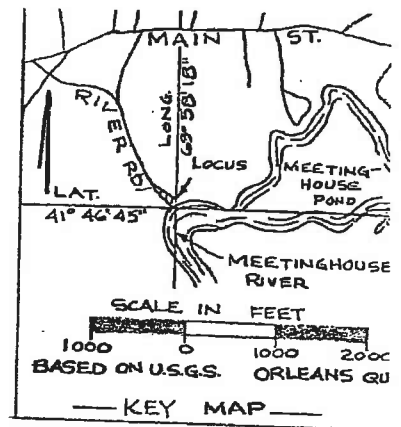
PERMIT NO. 10245

Approved by Department of Environmental Protection

Date: MAY 03 2005

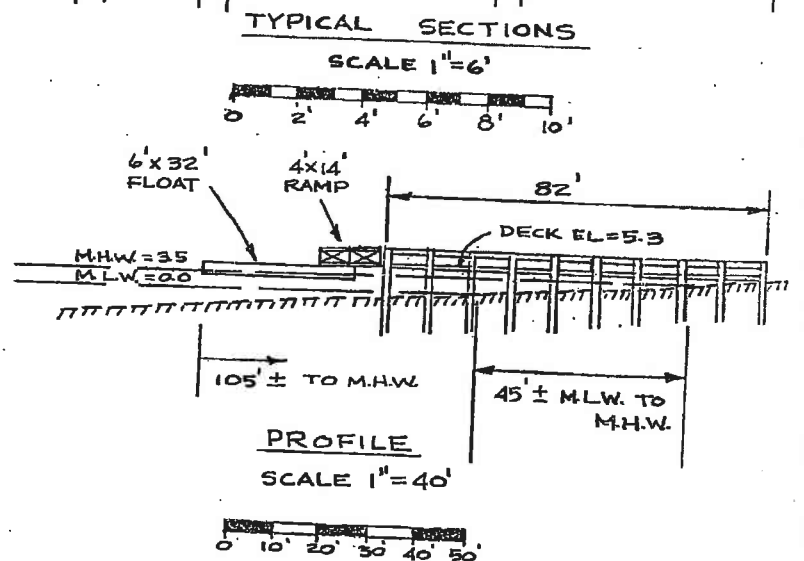
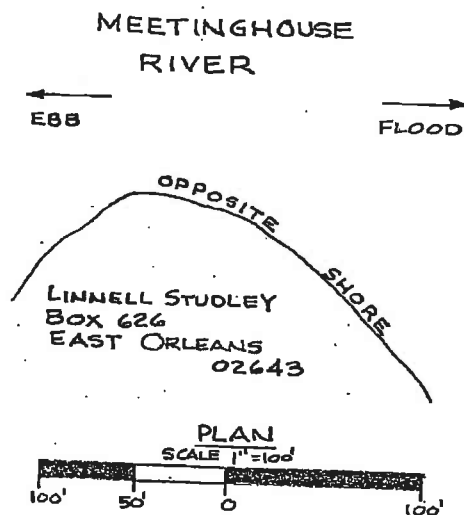
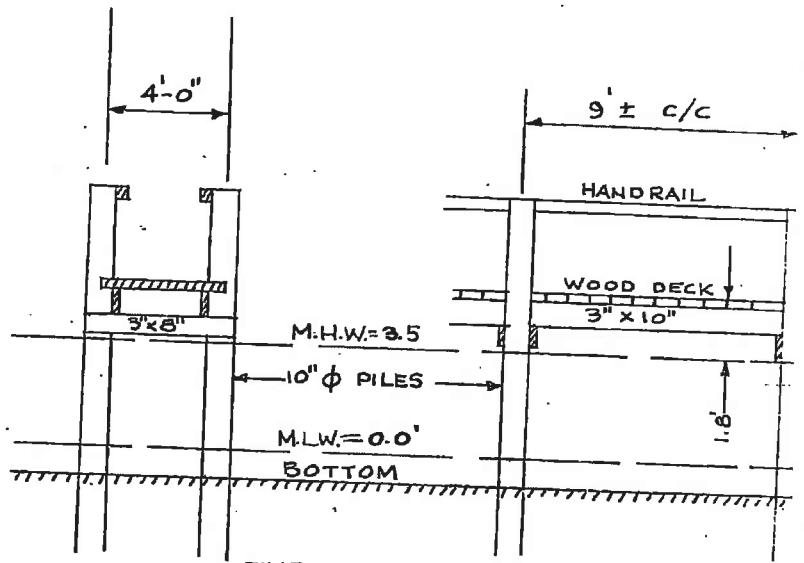
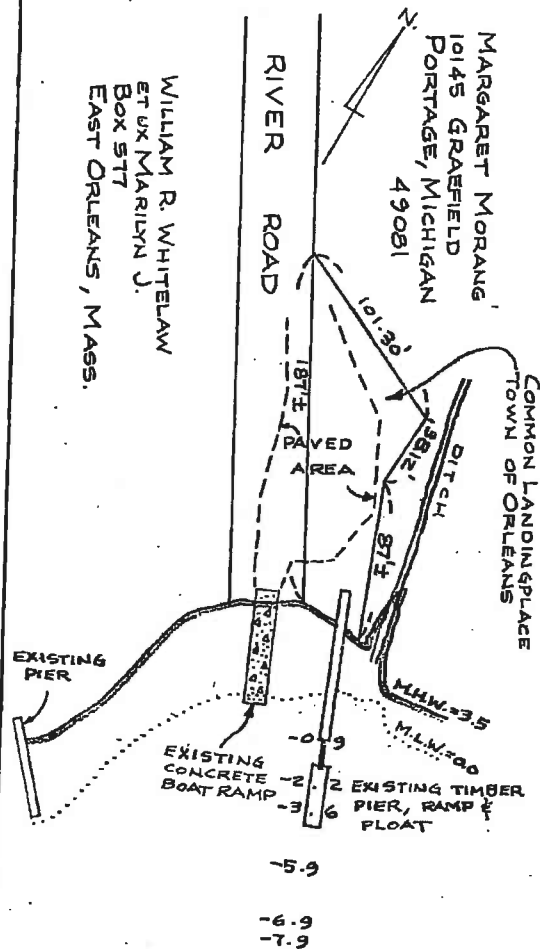
SHEET 3 OF 4
JOB NO. 6427

054-042-000-048-100



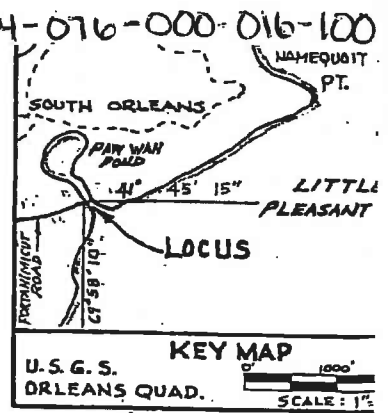
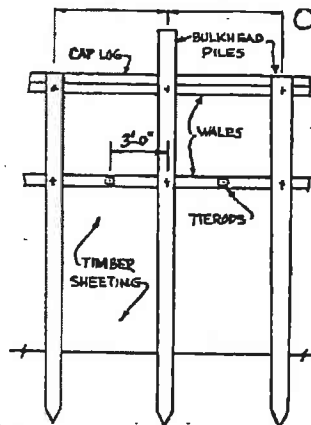
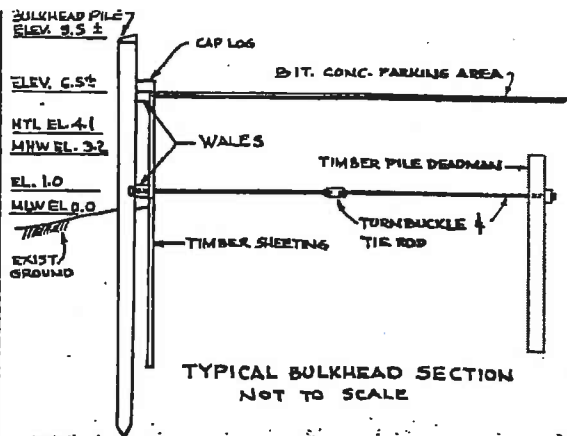
WILLIAM R. WHITELAW
ET UX MARIANA J.
BOX 577
EAST ORLEANS, MASS.

MARGARET MORANG
10145 GRAEFELD
PORTAGE, MICHIGAN
49081



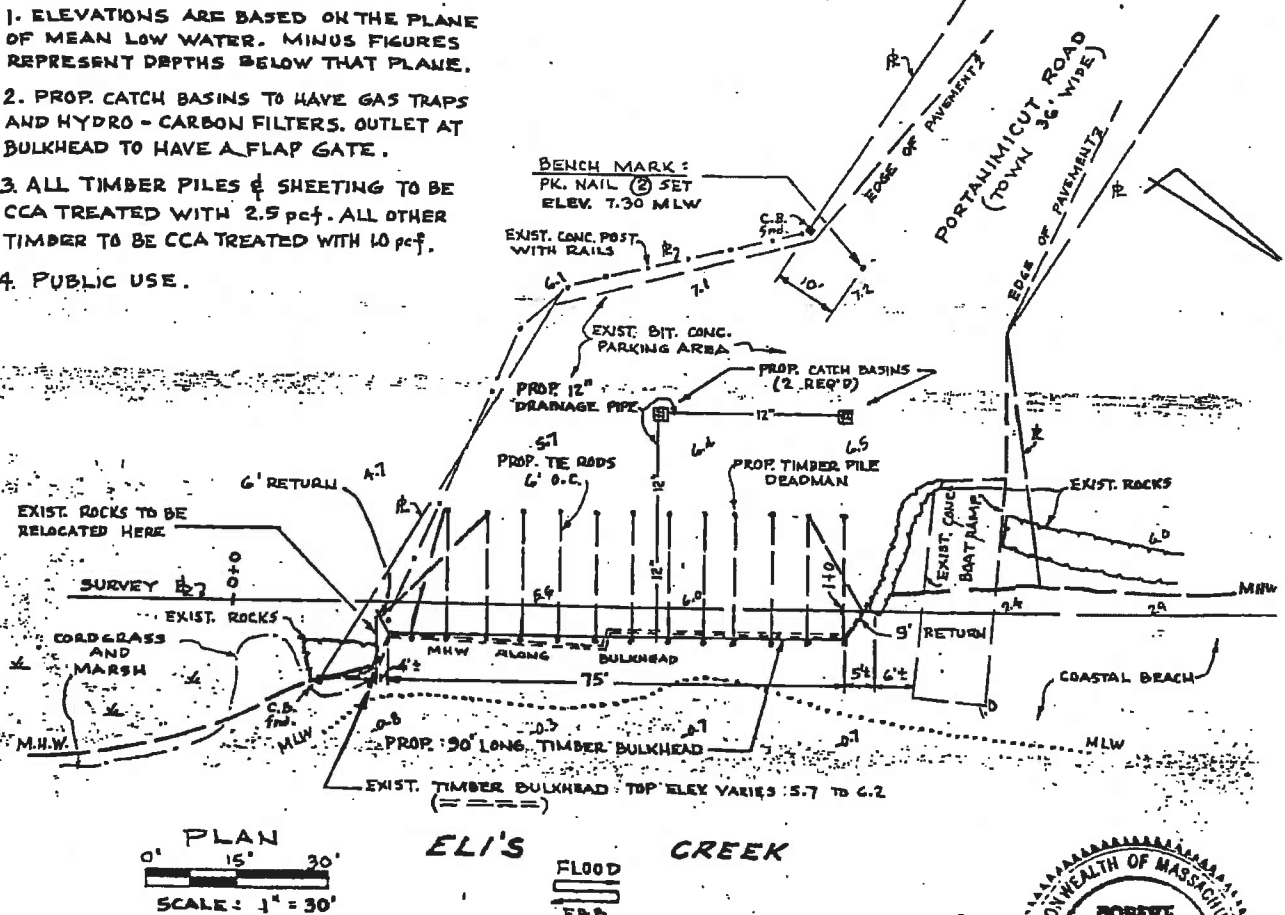
PLAN ACCOMPANYING PETITION OF
THE TOWN OF ORLEANS
TO LICENSE AND MAINTAIN AN EXISTING
PILE AND TIMBER DOCK, RAMP, FLOAT,
AND CONCRETE BOAT RAMP, IN
MEETINGHOUSE RIVER, ORLEANS, MASS.
NICKERSON & BERGER, INC. ENGINEERS

LICENSE PLAN NO. 321
Approved by Department of Environmental Control's Engineer
of Massachusetts JANUARY 8, 1979
COMMISSIONER
CHIEF ENGINEER



NOTES:

1. ELEVATIONS ARE BASED ON THE PLANE OF MEAN LOW WATER. MINUS FIGURES REPRESENT DEPTHS BELOW THAT PLANE.
2. PROP. CATCH BASINS TO HAVE GAS TRAPS AND HYDRO - CARBON FILTERS. OUTLET AT BULKHEAD TO HAVE A FLAP GATE.
3. ALL TIMBER PILES & SHEETING TO BE CCA TREATED WITH 2.5 pc.f. ALL OTHER TIMBER TO BE CCA TREATED WITH 10 pc.f.
4. PUBLIC USE.



PLAN ACCOMPANYING PETITION OF
TOWN OF ORLEANS
TO CONSTRUCT TIMBER BULKHEAD IN
ELI'S CREEK
ORLEANS, MASS.

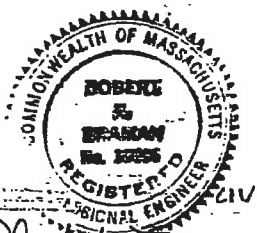
APRIL 7, 1986

SHEET 1 OF 1



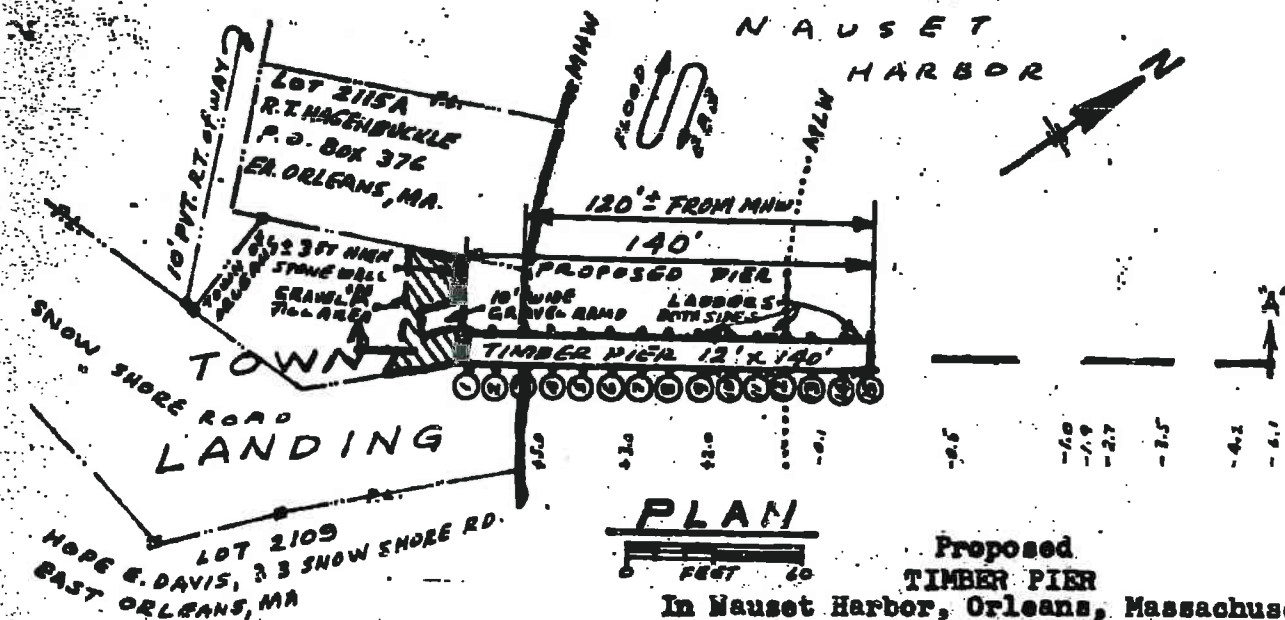
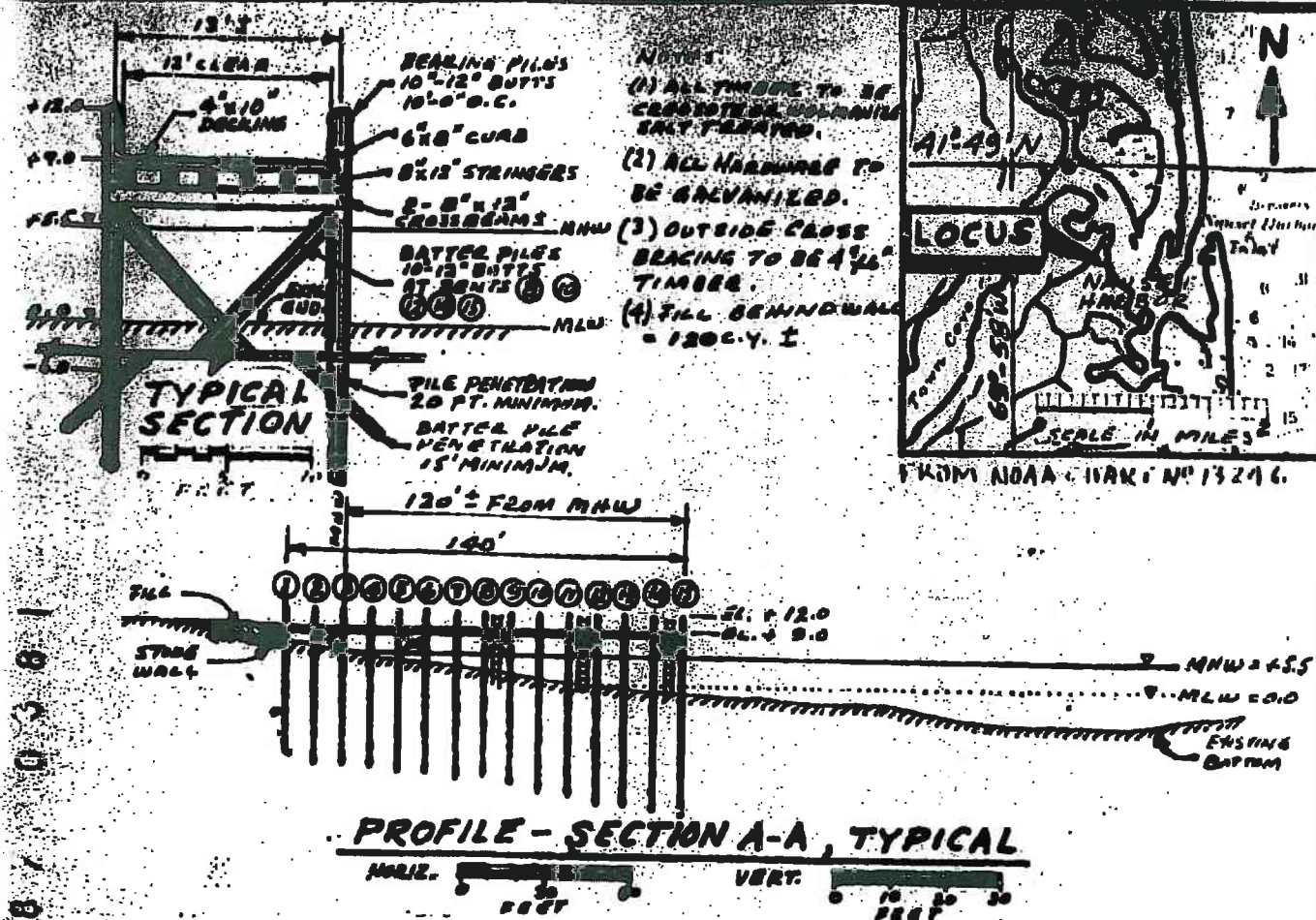
BRAMAN ENGINEERING COMPANY
CIVIL ENGINEERS & SURVEYORS

LICENSE PLAN NO. **1534**
Approved by Department of Environmental Quality Engne.
of Massachusetts
Robert A. Braman
COMMISSIONER
DIVISION DIRECTOR
SECTION CHIEF



BCE Structure No	Document No	Contract/ Drawing Number	Entity	Municipality	Date	Title	Sheets	Location	Description
054-013-000-030-100	054-013-000-030-100-COE1A	82-023	USACE	Orleans	November 1980	Proposed Timber Pier in Nauset Harbor, Orleans, Massachusetts - Application by the Town of Orleans	1	Snow Shore Road	Stone Revetment
054-016-000-038-100	054-016-000-038-100-COE1A	61-54	USACE	Orleans	November 1960	Proposed Jetty Extension - Rock Harbor Orleans, Massachusetts - Application by DPW of Massachusetts - Division of Waterways	1	Rock Harbor	Jetty
054-016-000-038-200	054-016-000-038-200-COE2A	53-56	USACE	Orleans	March 1953	Proposed Bulkhead, Dredging and Fill in Rock Creek at Rock Harbor, Orleans, Massachusetts - DPW of Massachusetts - Division of Waterways	1	Rock Harbor	Bulkhead
054-016-000-038-200	054-016-000-038-200-COE2B	54-136	USACE	Orleans	April 1954	Proposed Excavation and Bulkhead Construction - Rock Creek - Eastham and Orleans, Massachusetts - Application by the DPW of Massachusetts - Division of Waterways	2	Rock Harbor	Proposed Bulkhead
054-016-000-038-200	054-016-000-038-200-COE2C	86-226	USACE	Orleans	February 1986	Proposed Bulkhead, Landing, Gangways and Floats in Rock Harbor, Orleans, Barnstable County, Massachusetts - Application by the Town of Orleans	2	Rock Harbor	Steel Bulkhead
054-018-000-049-100	054-018-000-049-100-COE1A	74-206	USACE	Orleans	December 1973	Town of Orleans to Construct and Maintain a Timber Bulkhead, Additional Concrete Ramp, Dredging Fill and Floating Piers in Town Cove, Orleans, Massachusetts	1	Town Cove	Timber Bulkhead

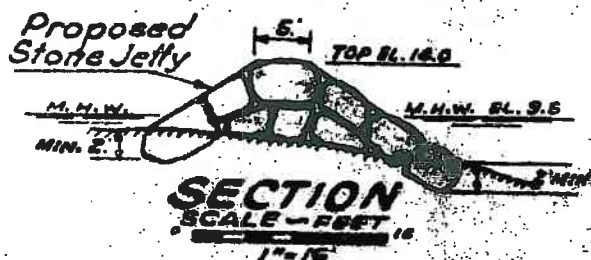
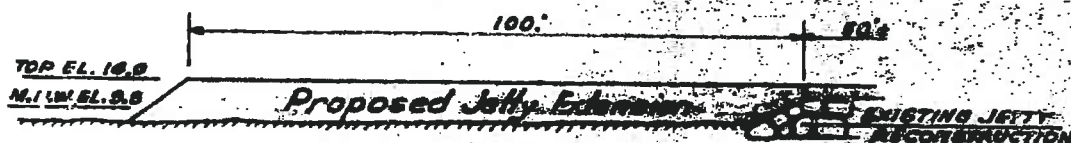
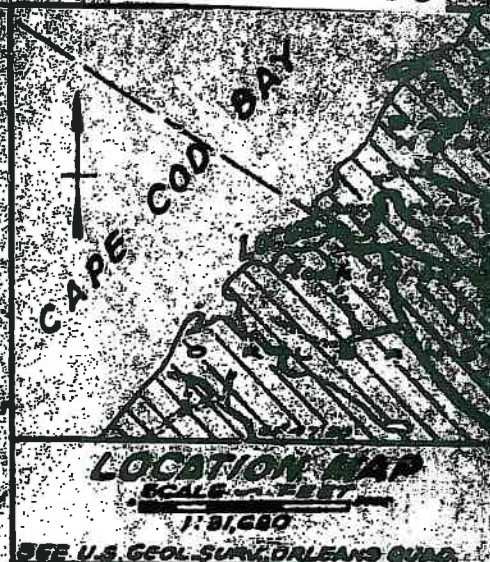
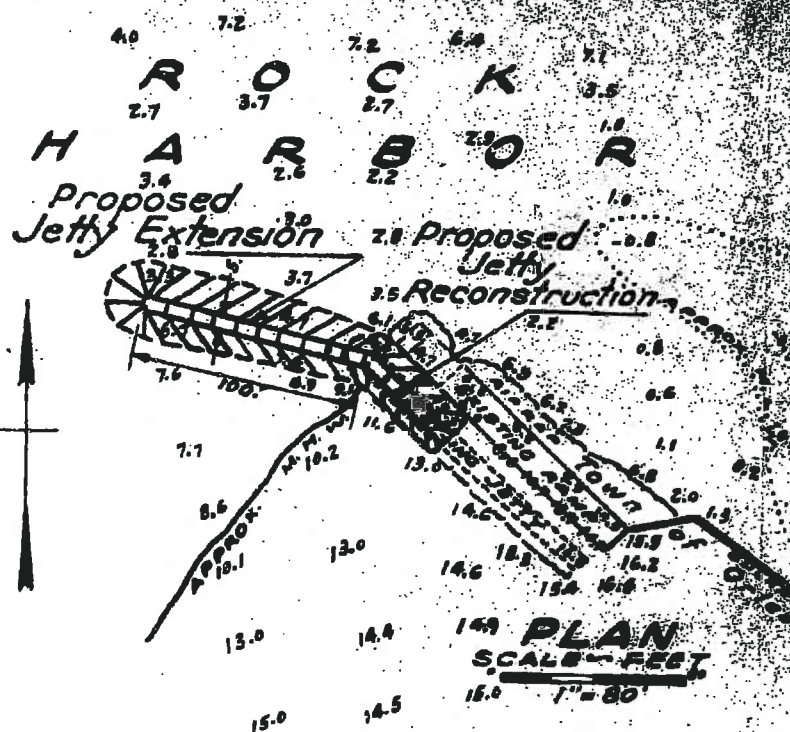
054-013-000-030-100



**Soundings and Elevations are in
Feet and refer to Mean Low Water.**

Proposed
 TIMBER PIER
 In Nauset Harbor, Orleans, Massachusetts
 APPLICATION BY THE TOWN OF ORLEANS
 Town Offices, Orleans, MA. 02653
 Sheet 1 of 1 November 29, 1980

07908



NOTE

ELEVATIONS ARE IN FEET AND TENTHS
AND REFER TO PLANE OF MEAN LOW WATER.
MINUS FIGURES SHOW DEPTHS BELOW THE
SAME PLANE.
SIDE AND END SLOPES ARE ALL 1.5 TO 1.0
APPROX. EXISTING SURFACE SHOWN THUS WITH
LOCATION OF PROPOSED WORK IS SHOWN
IN RED.
LENGTH OF NEW EXTENSION APPROX. 100'.
LENGTH OF RECONSTRUCTION FOR EXIST-
ING JETTY APPROX. 30'.

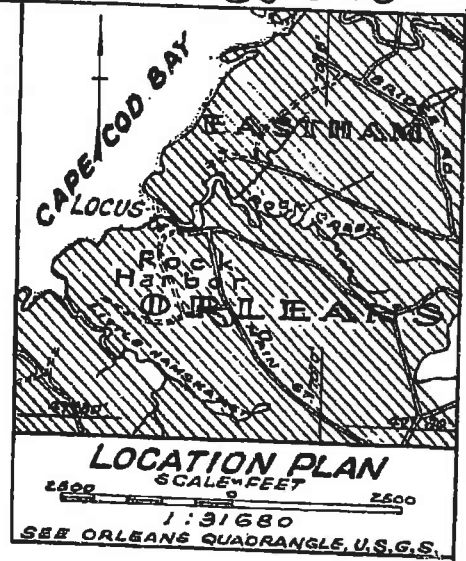
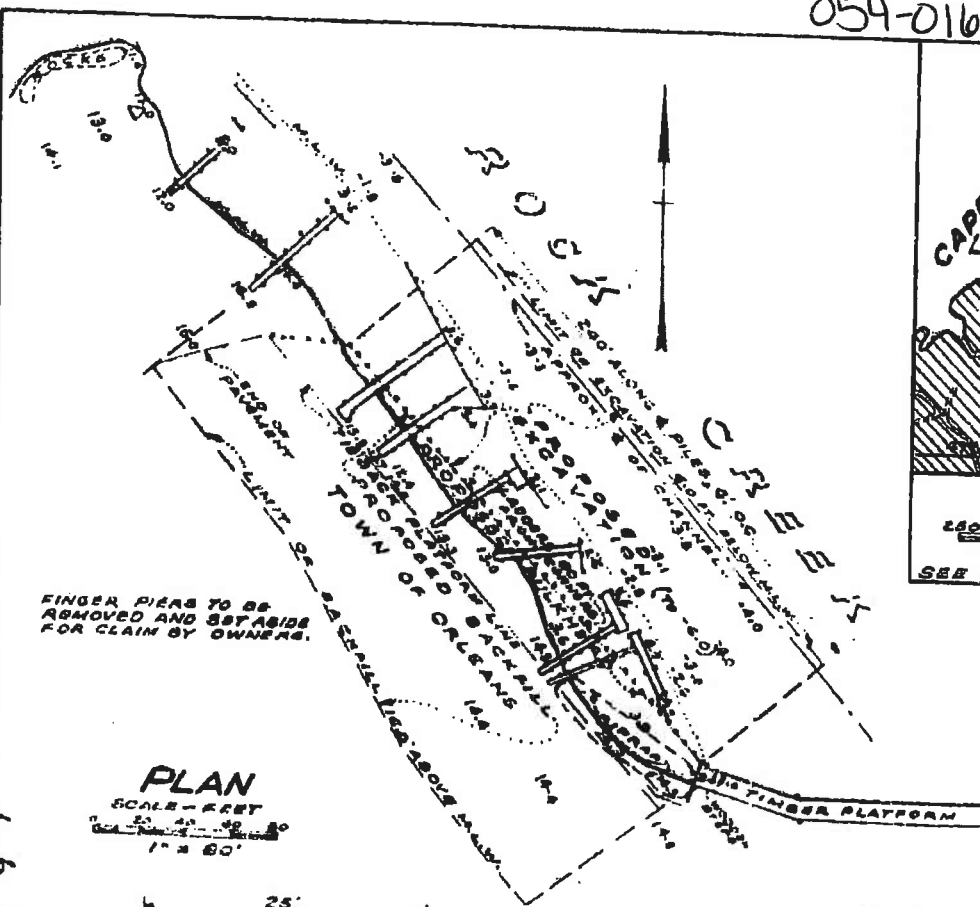
**PROPOSED
JETTY EXTENSION
ROCK HARBOR**

ORLEANS, MASS.
APPLICATION BY
DEPARTMENT OF PUBLIC WORKS, MASSACHUSETTS
DIVISION OF WATERWAYS
NOVEMBER-1960

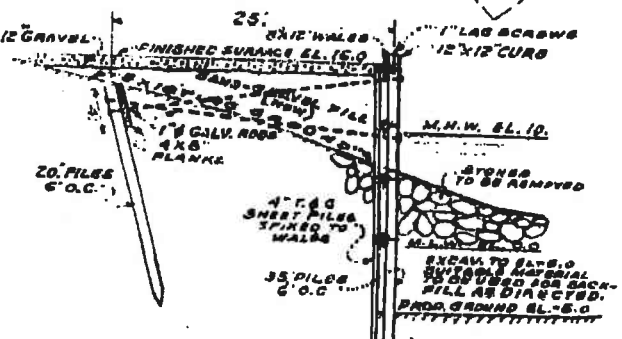
Robert B. MacKenzie

09 1350

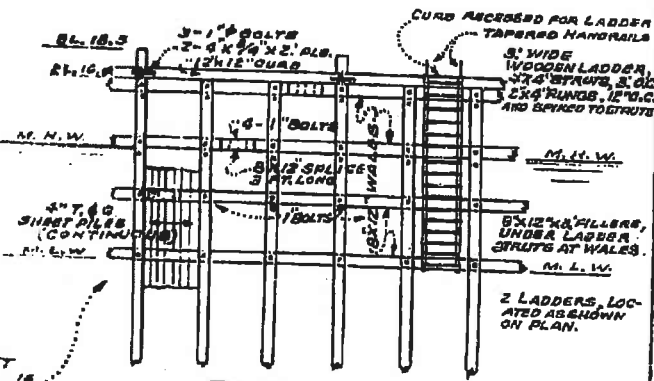
054-016-000-038-200



PLAN
SCALE - FEET
1" = 60'



SECTION



ELEVATION

NOTE
ELEVATIONS ARE IN FEET AND TENTHS ABOVE THE PLANE OF MEAN LOW WATER. MINUS FIGURES SHOW DEPTHS BELOW THE SAME PLANE. WORK TO BE DONE HATCHED IN RED.

PROPOSED BULKHEAD, DREDGING & FILL
IN
ROCK CREEK
AT
ROCK HARBOR
ORLEANS, MASS.
APPLICATION BY
DEPARTMENT OF PUBLIC WORKS OF MASSACHUSETTS
DIVISION OF WATERWAYS
MARCH 1953
Everett N. Hutchins
DISTRICT WATERWAYS ENGINEER

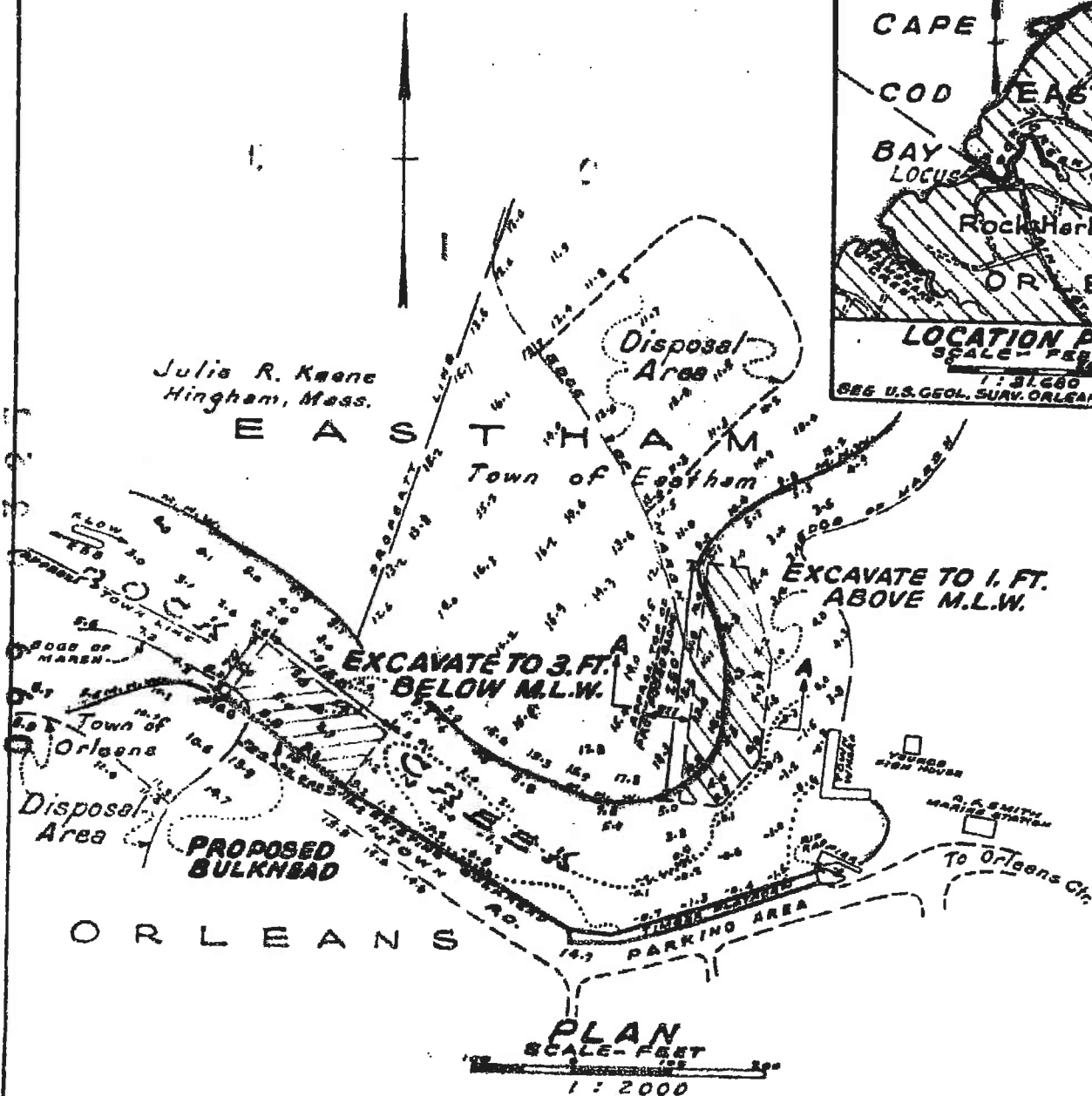
NEW ENGLAND CITY

09 MAY 1950

054-016-000-038-200

BOSTON, MASS.

SHEET 1 OF 2



NOTE

ELEVATIONS ARE IN FEET AND TENTHS ABOVE THE PLANE OF MEAN LOW WATER, MINUS FIGURES SHOW DEPTHS BELOW THE SAME PLANE.
EXCAVATED MATERIAL, APPROXIMATELY 15,000 CUBIC YARDS IN EASTHAM AND 4,300 CUBIC YARDS IN ORLEANS TO BE DEPOSITED ABOVE M.L.W. IN AREAS SHOWN ON PLAN.
LOCATIONS OF WORK TO BE DONE ARE SHOWN IN RED.

PROPOSED EXCAVATION AND BULKHEAD CONSTRUCTION ROCK CREEK EASTHAM & ORLEANS, MASS.

APPLICATION BY
DEPARTMENT OF PUBLIC WORKS - MASSACHUSETTS
DIVISION OF WATERWAYS
APRIL 1954
SCALES SHOWN

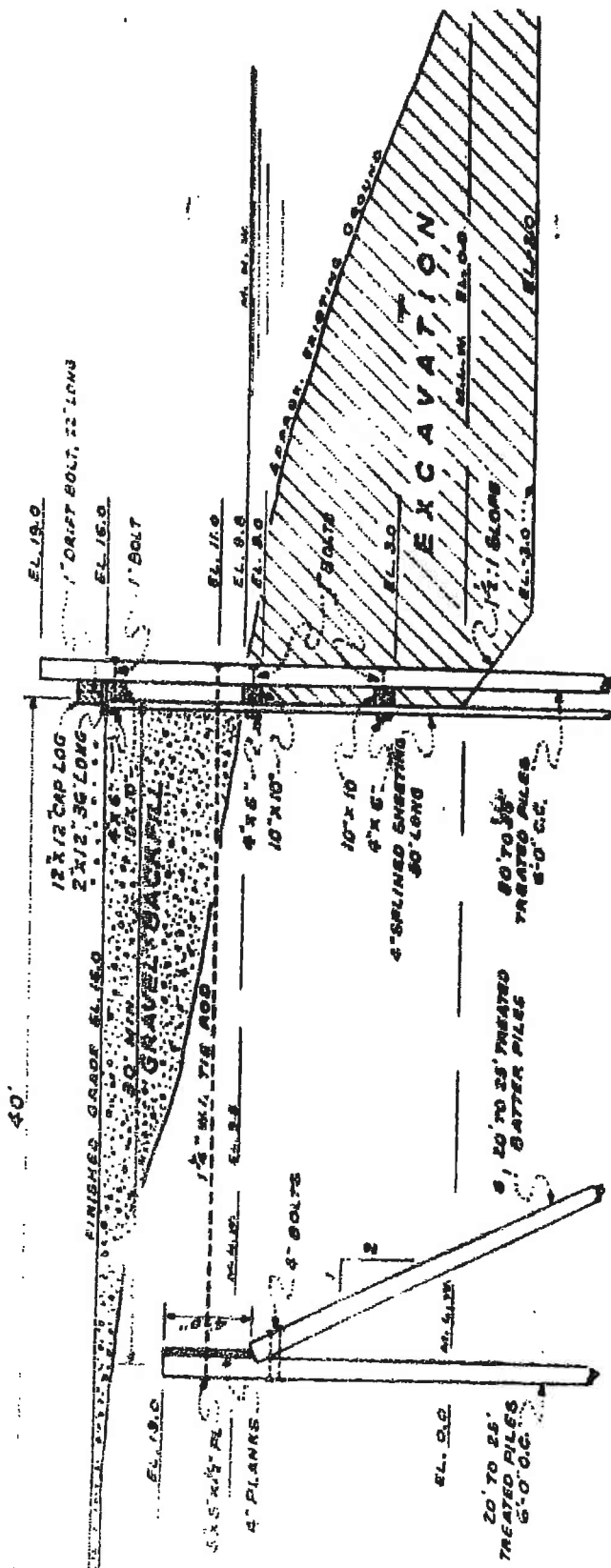
0110001 N

NEW ENGLAND DIV.
09 JUL 1954
MAY 7 5 58 AM '54

054-016-000-038-200

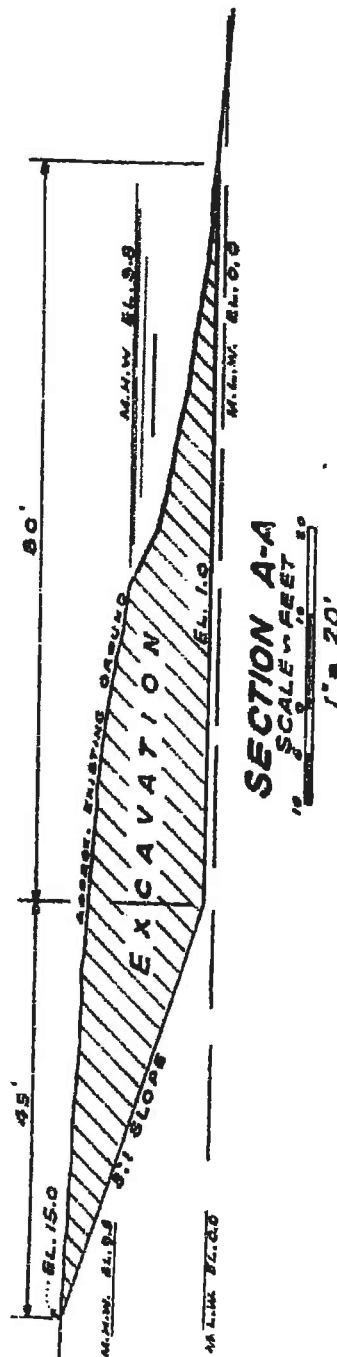
BOSTON, MASS

SHEET 2 OF 2



BULKHEAD-TYPICAL SECTION

SCALE 1/8" = 1'



SECTION A-A

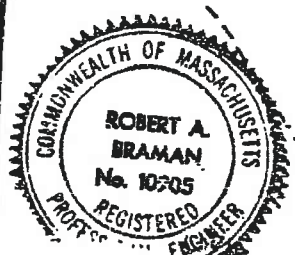
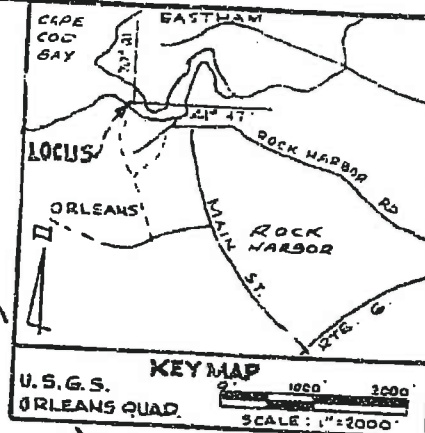
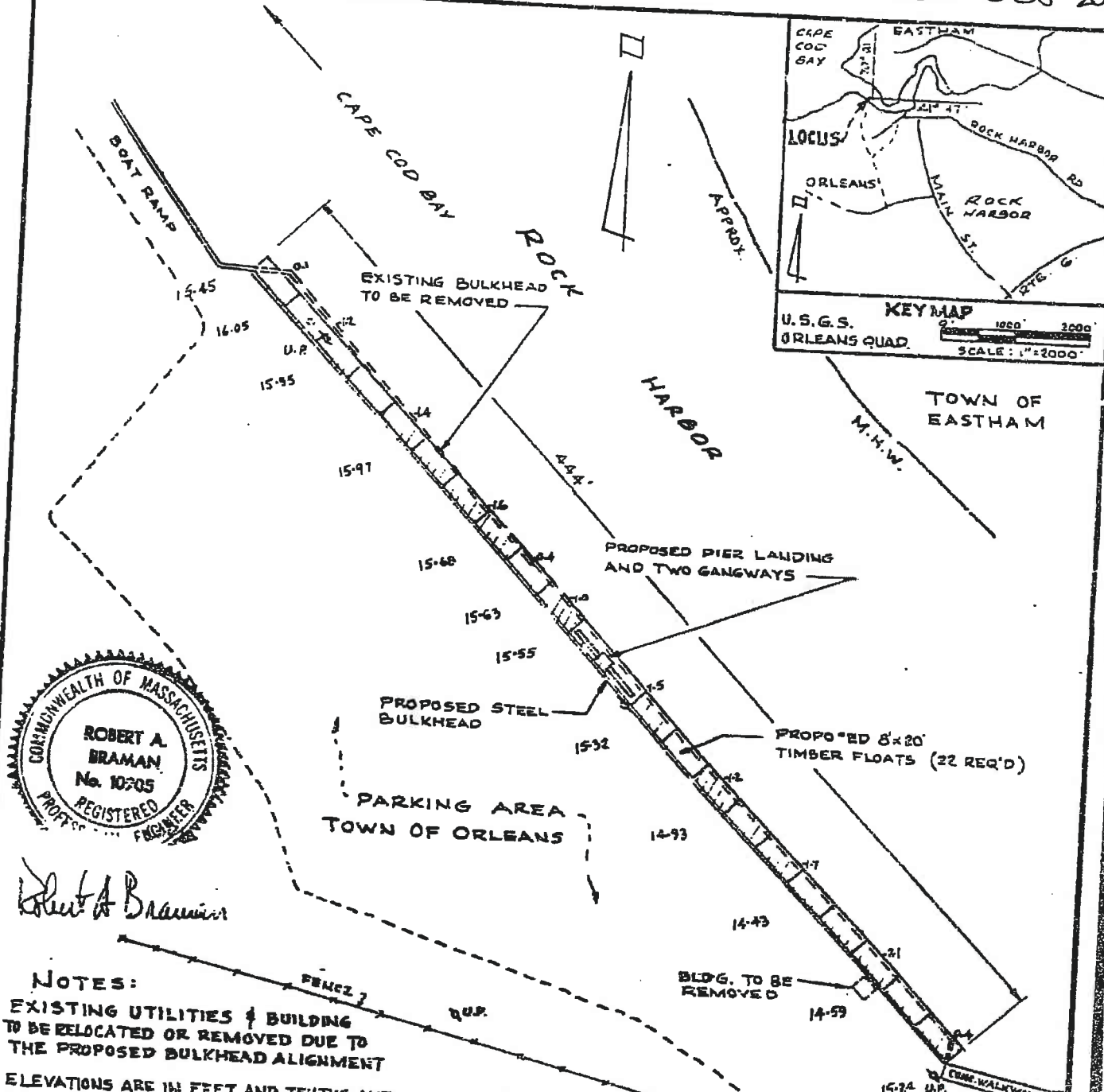
SCALE 1/2" = 1'

PROPOSED EXCAVATION
AND
BULKHEAD CONSTRUCTION
ROCK CREEK
EASTHAM & ORLEANS-MASS.

APPLICATION BY
DEPARTMENT OF PUBLIC WORKS-MASSACHUSETTS
DIVISION OF WATERWAYS
APRIL 1954
SCALES SHOWN

054-016-000-038-200

054-016-000-038-200



Robert A. Braman

NOTES:

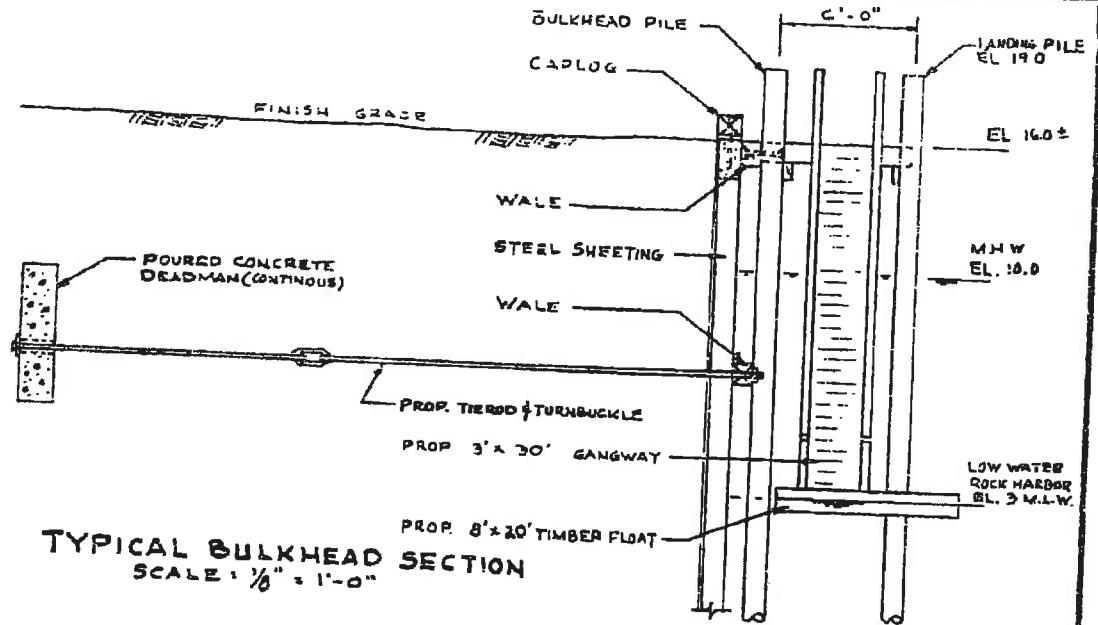
EXISTING UTILITIES & BUILDING TO BE RELOCATED OR REMOVED DUE TO THE PROPOSED BULKHEAD ALIGNMENT
ELEVATIONS ARE IN FEET AND TENTHS AND ARE BASED ON MEAN LOW WATER. MINUS FIGURES REPRESENT DEPTHS BELOW THAT SAME PLANE.

ORIGINAL BULKHEAD BUILT IN 1953 & 1954 BY THE DIVISION OF WATERWAYS.

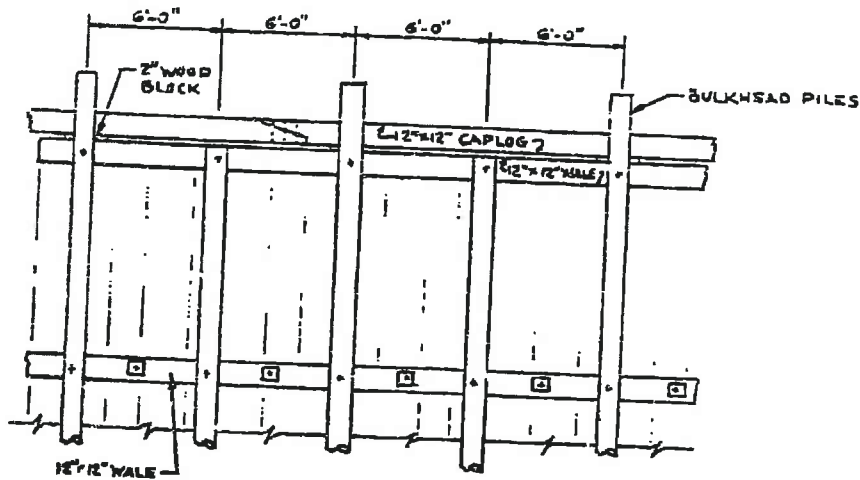
PLAN
SCALE: 1" = 60'

PROPOSED BULKHEAD, LANDING, GANGWAYS & FLOATS IN
ROCK HARBOR
ORLEANS, BARNSTABLE CO. MA.
APPLICATION BY
TOWN OF ORLEANS
FEB. 18, 1986 SHEET 2 OF 3
BRAMAN ENGINEERING CO.
CIVIL ENGINEERS & SURVEYORS
258 MAIN ST. BUZZARDS BAY, MA.

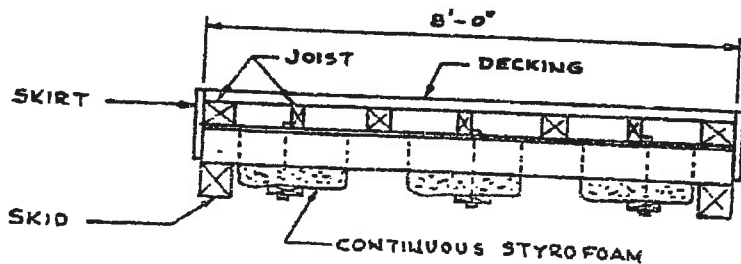
054-016-000-038-200



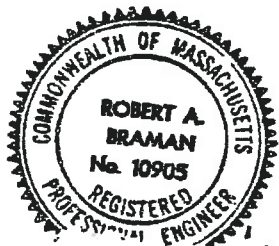
TYPICAL BULKHEAD SECTION
SCALE: $\frac{1}{8}" = 1'-0"$



TYPICAL BULKHEAD ELEVATION
SCALE: $\frac{1}{8}" = 1'-0"$



TIMBER FLOAT SECTION
SCALE: $\frac{3}{8}" = 1'-0"$



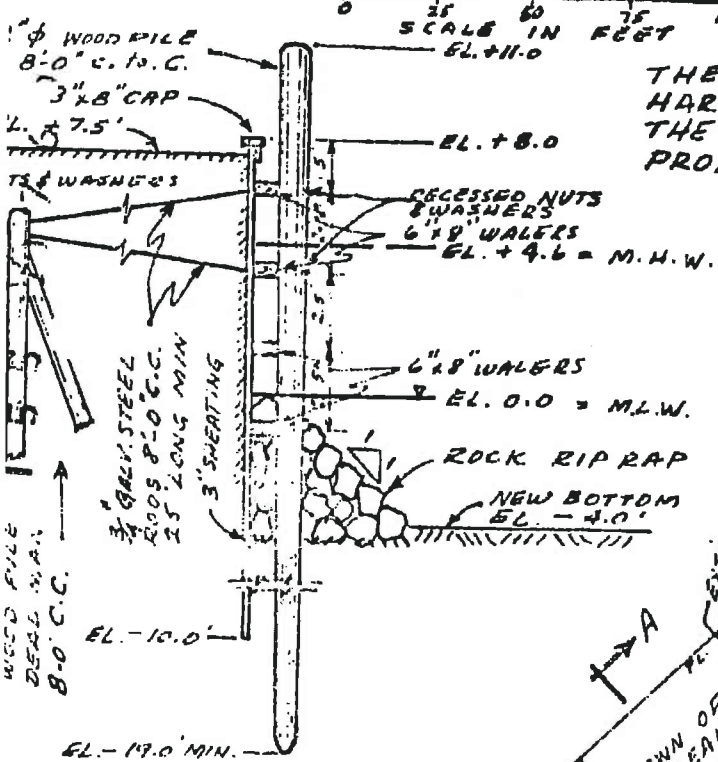
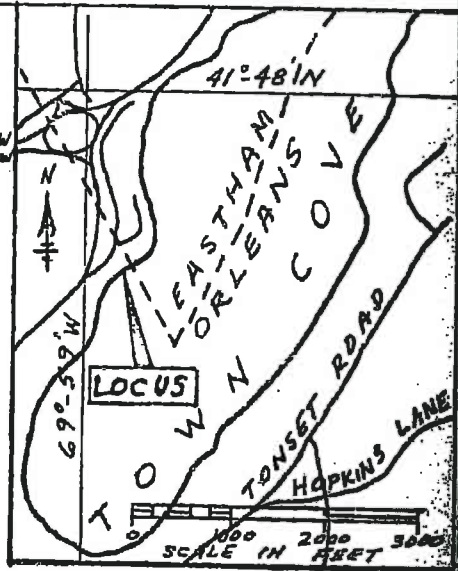
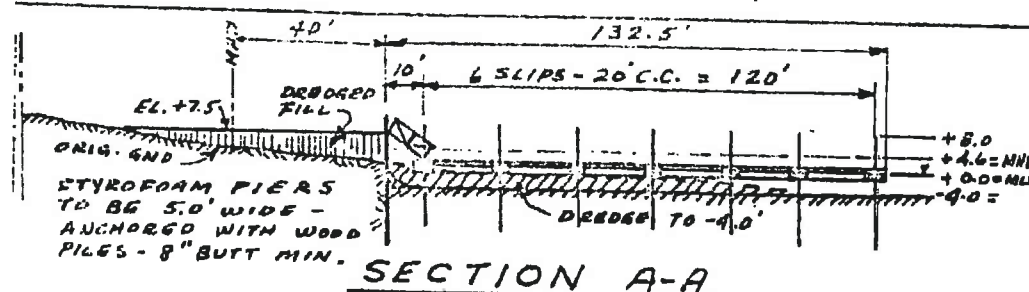
Robert A. Braman
TOWN OF ORLEANS

FEB. 18, 1986

SHEET 3 OF 3

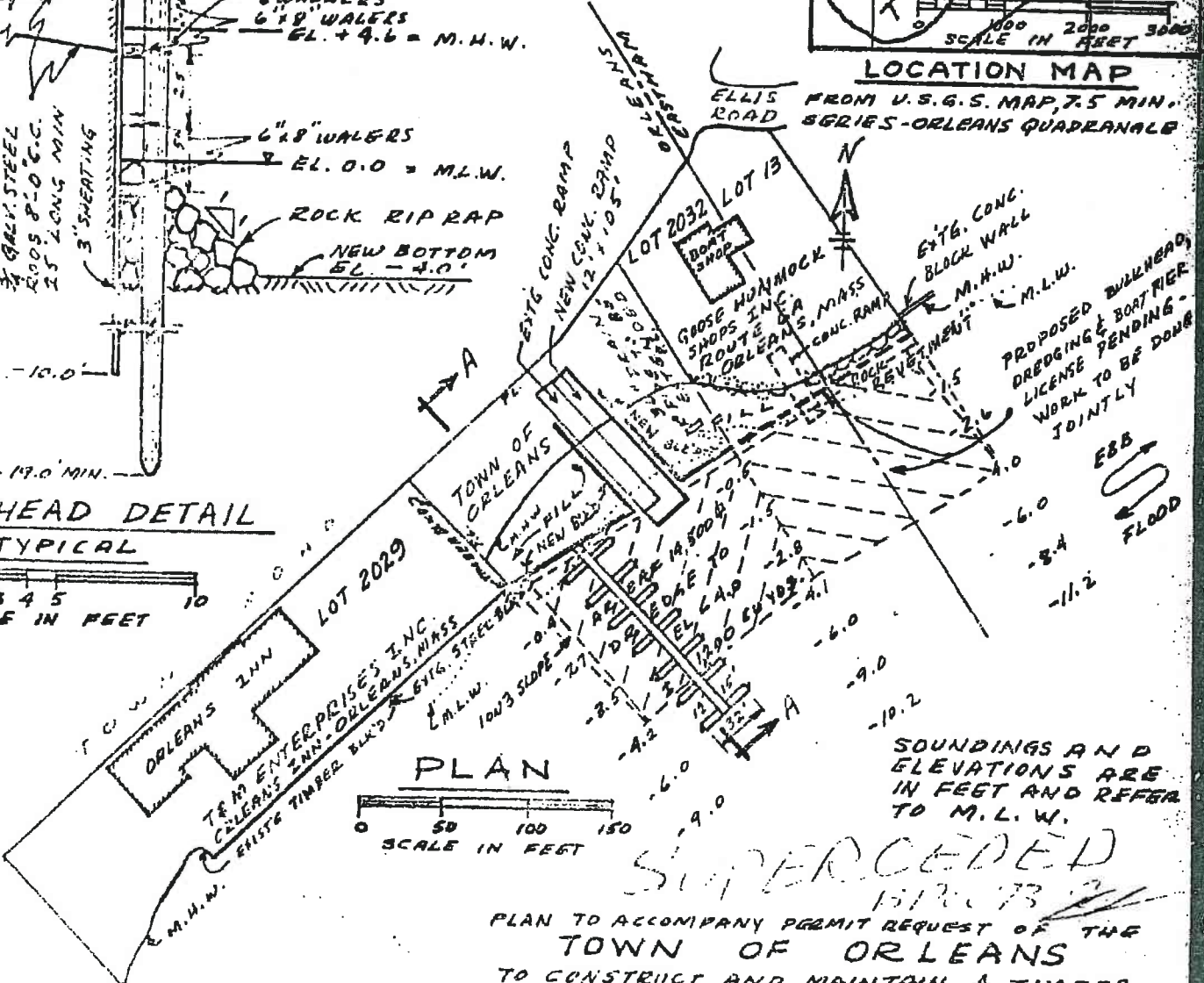
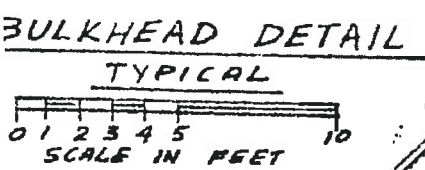
0341770

054-018-000-049-100



THERE ARE NO HARBOR LINES IN THE AREA OF THE PROPOSED WORK

FROM U.S.G.S. MAP, 7.5 MIN. SERIES-ORLEANS QUADRANGLE



PROPOSED BULKHEAD DREDGING & BOATRIEVE LICENSE PENDING - WORK TO BE DONE JOINTLY

SOUNDINGS AND ELEVATIONS ARE IN FEET AND REFER TO M.L.W.

~~SUPERCEDED~~ 1512.73

PLAN TO ACCOMPANY PERMIT REQUEST OF THE TOWN OF ORLEANS TO CONSTRUCT AND MAINTAIN A TIMBER BULKHEAD

Section III

Brewster

Section III – Community Findings – Town of Brewster

COMMUNITY DESCRIPTION

The Town of Brewster consists of a land area of 23.01 square miles out of a total area of 25.48 square miles and had a population of 10,094 in the 2000 census. The Town is located on Cape Cod of Massachusetts and its location can be seen on this report's cover. The estimated length of shoreline is 7 miles that are directly exposed to open ocean. The Town is protected from major coastal storms by both natural and man-made shoreline structures that require maintenance to insure the long term protection of its coastline. The man-made and publicly owned structures that protect the Town were investigated for their ability to provide adequate protection from major coastal storms. Structures have been identified as publicly owned, including coastal dunes and beaches, based on evidence of investment of public funds made to create/enhance/maintain these structures. The assessment did not include floating or pile supported structures as they are assumed not to provide any significant coastal protection from major storm events.

STRUCTURE INVENTORY

Within the Town of Brewster, there were 2 structures which had public or unknown ownership which provide significant coastal protection. The location of the structures can be seen on Sheet 1 in Section III-B of this report. The structures were categorized by their type and by their structural condition based on a preliminary field assessment. The distribution of structures by type and condition can be seen in the following table:

STRUCTURE TYPE AND QUANTITY - Town of Brewster

Primary Structure (1)	Total	Structure Condition Rating					Total Length
	Structures	A	B	C	D	F	
Bulkhead / Seawall							
Revetment	1			1			545
Breakwater							
Groin / Jetty	1			1			275
Coastal Dune							
Coastal Beach							
	2			2			820

Within the above table, the total length of each type of structure is also provided. The structures are listed by the type which is providing the primary coastal protection. Many sites have multiple structure types at the same location (i.e. revetment in front of seawall). These secondary structures, although not identified within these tables, are included in the development of repair/rehabilitation costs.

The development of repair costs has been included by structure type and by condition. In the Town of Brewster's case there are a total of 2 structures which would require approximately \$ 511,000 to bring all the coastal structures to "A" Rating. Most critical will be the structures in the "D" and "F" classifications as those are assumed to undergo some level of damage or failure during the next major coastal storm event of which Brewster has none.

STRUCTURE REPAIR / RECONSTRUCTION COST - Town of Brewster

Primary Structure (1)	Total Structures	Structure Condition Rating				F	Total Cost
		A	B	C	D		
Bulkhead / Seawall							\$ -
Revetment	1			\$ 181,289			\$ 181,289
Breakwater							\$ -
Groin / Jetty	1			\$ 330,275			\$ 330,275
Coastal Dune							\$ -
Coastal Beach							\$ -
	2	\$ -	\$ -	\$ 511,564	\$ -	\$ -	\$ 511,564

Based on the limited research within the scope of this project research, the presumed ownership of the structures was established on an initial basis and would be subject to more intense review in future tasks. Structures identified as being owned privately were excluded from further consideration. Although ownership of the land on which the structure was located was a factor, the structure ownership was treated as a separate issue from land ownership. For the Town of Brewster, the breakdown of structures by assumed ownership is as follows:

STRUCTURE OWNERSHIP / REPAIR COST - Town of Brewster

Primary Structure (1)	Total Structures	Structure Condition Rating				F	Total Cost
		A	B	C	D		
Town Owned	2			\$ 511,564			\$ 511,564
Commonwealth of Massachusetts							\$ -
Federal Government Owned							\$ -
Unknown Ownership							\$ -
	2	\$ -	\$ -	\$ 511,564	\$ -	\$ -	\$ 511,564

The identification of presumed ownership was not based on the investigation of legal documents but relied on property ownership and from construction and regulatory documents that were found. A more detailed investigation of legal documents and agreements would be required where structure ownership is disputed. A more detailed identification of structure type, length, condition and location can be found in Section III-B which contains Structure Assessment Reports for each individual structure found.

SUMMARY

The enclosed reports and associated documents reflects the Town of Brewster's coastal structure information that will eventually be input into a state-wide GIS database and will be accessible through MassGIS. This data, when compiled state-wide, will be critical in the development of both short term and long term planning for maintaining and improving Massachusetts coastal protection.

This database will also provide relatively quick access to identify available documentation for these structures as well as the ability to be updated as coastal structure improvements are made.

Section III - Brewster

Part B

Structure Assessment Reports



COASTAL STRUCTURE LOCATION PLAN

TOWN OF BREWSTER
COASTAL INFRASTRUCTURE INVENTORY
AND ASSESSMENT PROJECT
NOVEMBER 2007



Structure Assessment Form

Town: **Brewster**

Structure ID: 009-038-000-701-100

Key: community-map-block-parcel-structure

Property Owner:

Local

Location:

Paines Creek Beach

Date:

10/2/2007

Presumed Structure Owner:

Local

Based On Comment:

Owner Name:

Brewster

Earliest Structure Record:

Unknown

Estimated Reconstruction/Repair Cost:

\$181,289.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
545		V4	16
Feet	Feet NAVD 88		Feet NGVD

Primary Type:

Revetment

Primary Material:

Stone

Primary Height:

Under 5 Feet

Secondary Type:

Secondary Material:

Secondary Height:



Structure Summary :

This structure is the revetment fronting the parking lot at Paines Creek Beach. There is some slumping of the crest and erosion is evident behind the structure.

Condition

C

Rating

Fair

Level of Action

Moderate

Description

Structure is sound but may exhibit minor deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure adequate to withstand major coastal storm with little to moderate damage. Actions taken to reinforce structure to provide full protection from major coastal storm and for extending life of structure. Moderate wind or wave damage to landform exists. Landform may not be sufficient to fully protect shoreline during a major coastal storm. Actions taken to provide addition material for full protection and extended life.

Priority

II

Rating

Low Priority

Action

Future Project Consideration

Description

Inshore Structures Present with Limited potential for Significant Infrastructure Damage

Structure Images:

009-038-000-701-100-PHO1A.jpg

Structure Documents:

USACE

January 195

Proposed Stone

009-038-000-701-100-COE1A

USACE

June 1958

Proposed Stone

009-038-000-701-100-COE1B

Structure Assessment Form

Town: **Brewster**

Structure ID: 009-038-000-701-200

Key: community-map-block-parcel-structure

Property Owner:

Local

Location:

Paines Creek Beach

Date:

10/2/2007

Presumed Structure Owner:

Local

Based On Comment:

Owner Name:

Brewster

Earliest Structure Record:

1953

Estimated Reconstruction/Repair Cost:

\$330,275.00

Length:

275

Top Elevation:

Feet Feet NAVD 88

FIRM Map Zone:

V4

FIRM Map Elevation:

16

Feet NGVD

Primary Type:

Groin/ Jetty

Primary Material:

Stone

Primary Height:

5 to 10 Feet

Secondary Type:

Secondary Material:

Secondary Height:



Structure Summary :

These structures are the two groins at Paines Creek Beach. The side slopes and crest are in fair condition. Some loss of fill stone is evident.

Condition

C

Rating

Fair

Level of Action

Moderate

Description

Structure is sound but may exhibit minor deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure adequate to withstand major coastal storm with little to moderate damage. Actions taken to reinforce structure to provide full protection from major coastal storm and for extending life of structure. Moderate wind or wave damage to landform exists. Landform may not be sufficient to fully protect shoreline during a major coastal storm. Actions taken to provide addition material for full protection and extended life.

Priority

II

Rating

Low Priority

Action

Future Project Consideration

Description

Inshore Structures Present with Limited potential for Significant Infrastructure Damage

Structure Images:

009-038-000-701-200-PHO2A.jpg

Structure Documents:

USACE

June 1958

Proposed Stone

009-038-000-701-200-COE2A

MA-DCR

December 1

Proposed Shore

009-038-000-701-200-DCR2A

MA-DCR

May 1958

Proposed Shore

009-038-000-701-200-DCR2B

Section III - Brewster

Part C

Structure Photographs

BCE Structure No	Document No	Contract/ Drawing Number	Entity	Municipality	Date	Title	Sheets	Location	Description
009-038-000-701-100	009-038-000-701-100-PHO1A.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
009-038-000-701-200	009-038-000-701-200-PHO2A.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey

Massachusetts Coastal Infrastructure and Assessment



009-038-000-701-100-PHO1A



009-038-000-701-200-PHO2A

Section III - Brewster

Part D

Structure Documents

TOWN DOCUMENT LIST

MA DCR - DOCUMENT LIST

MA DEP – Ch 91 DOCUMENT LIST

- Copies of License Documents

USACE – PERMIT DOCUMENT LIST

- Copies of Permit Documents

TOWN: BREWSTER
SOURCE: Town of Brewster
LOCATION: TOWN
DATE OF RESEARCH: JULY 2007

No Town Documents for the Town of Brewster

BCE Structure No	Document No	Contract/ Drawing Number	Entity	Municipality	Date	Title	Sheets	Location	Description
------------------	-------------	--------------------------------	--------	--------------	------	-------	--------	----------	-------------

TOWN: BREWSTER

SOURCE: MA-DCR

LOCATION: MA-DCR BOSTON and HINGHAM, MA

DATE OF RESEARCH: JULY 2007

BCE Structure No	Document No	Contract/ Drawing Number	Entity	Municipality	Date	Title	Sheets	Location	Description
009-038-000-701-200	009-038-000-701-200-DCR2A	1352	MA-DCR	Brewster	Dec-53	Proposed Shore Protection - Groin Construction - Brewster - Prepared for DPW of Massachusetts - Division of Waterways	2	Paine Brook Road, Robing Hill Road and Linells Landing	Groins
009-038-000-701-200	009-038-000-701-200-DCR2B	1895	MA-DCR	Brewster	May-58	Proposed Shore Protection - Reconstruction of Stone Groins and Mound - Winslow Landing Road - Brewster - Prepared for DPW of Massachusetts - Division of Waterways	2	Paines Creek Landing	Stone Groin

TOWN: BREWSTER
SOURCE: DEP
LOCATION: BOSTON, MA
DATE OF RESEARCH: JULY 2007

No DEP Ch. 91 Licenses for the Town of Brewster

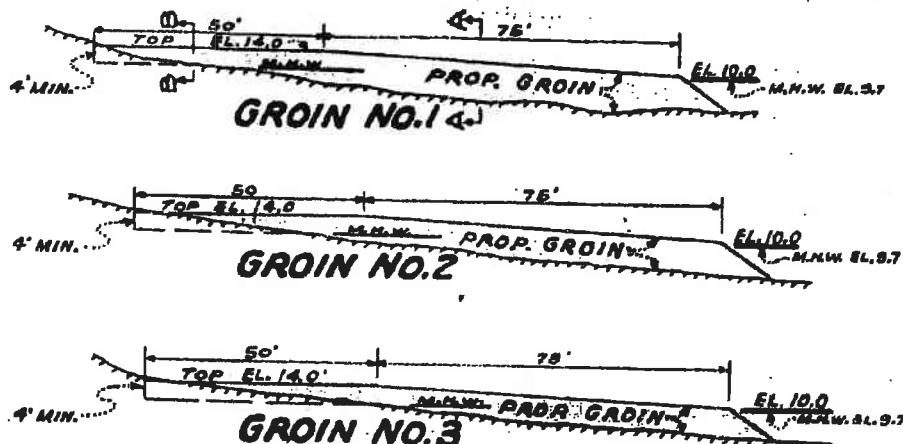
BCE Structure No	Document No	Contract/ Drawing Number	Entity	Municipality	Date	Title	Sheets	Location	Description
------------------	-------------	--------------------------------	--------	--------------	------	-------	--------	----------	-------------

BCE Structure No	Document No	Contract/ Drawing Number	Entity	Municipality	Date	Title	Sheets	Location	Description
009-038-000-701-100	009-038-000-701-100-COE1A	N/A	USACE	Brewster	January 1956	Proposed Stone Groins and Riprap - Cape Cod Bay, Brewster, MA	2	Paline Creek Road	Groins
009-038-000-701-100	009-038-000-701-100-COE1B	N/A	USACE	Brewster	June 1958	Proposed Stone Groin and Mound Palines Creek Landing - Cape Cod Bay, Brewster, MA	1	Palines Creek Landing	Groin and Mound
009-038-000-701-200	009-038-000-701-200-COE2A	N/A	USACE	Brewster	June 1958	Proposed Stone Groin and Mound Palines Creek Landing - Cape Cod Bay, Brewster, MA	1	Palines Creek Landing	Groin and Mound

088 201

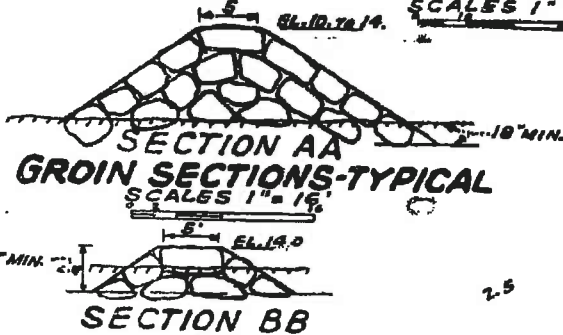
009-038-000-701-100

SHEET 1 OF 2



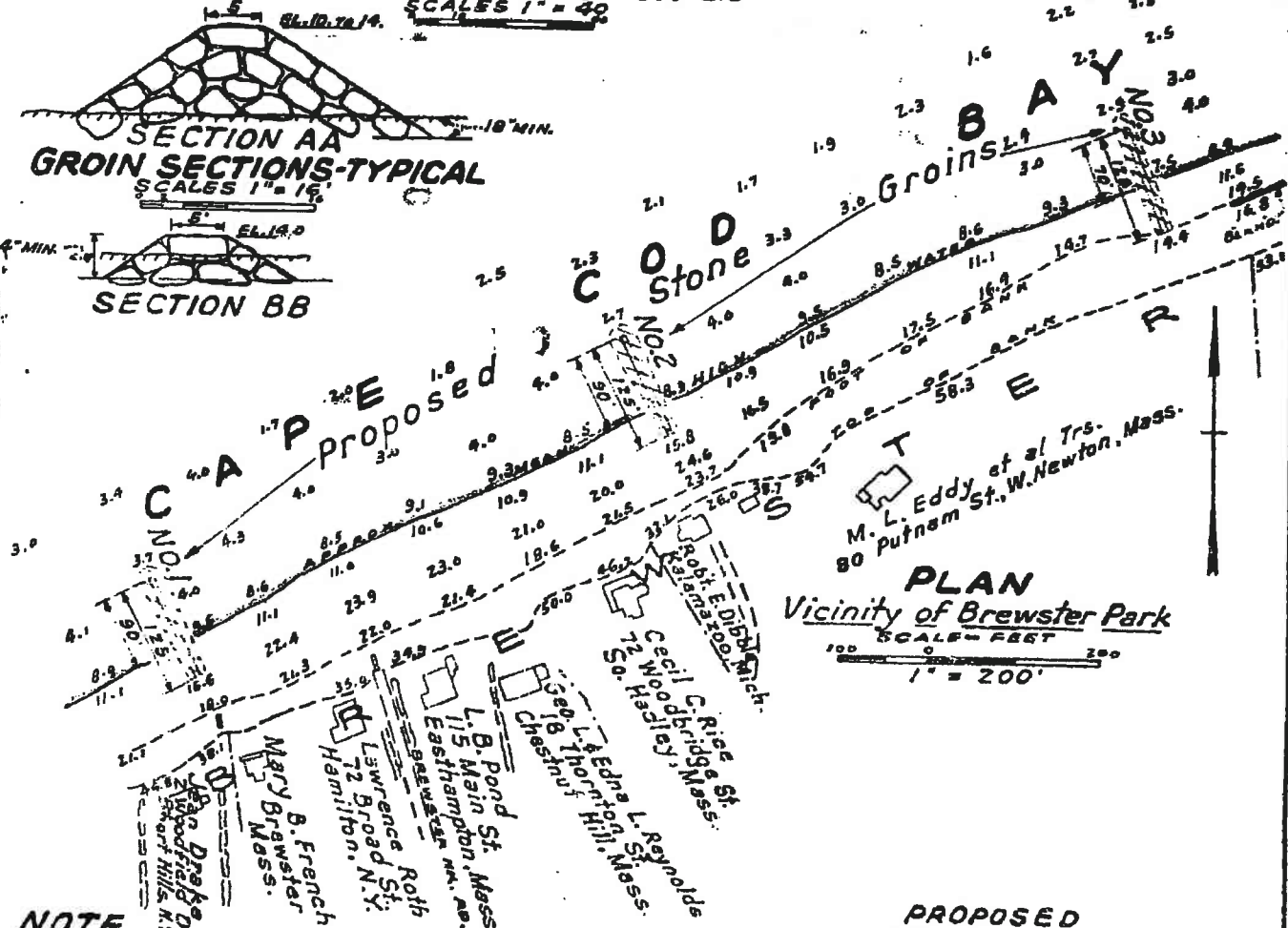
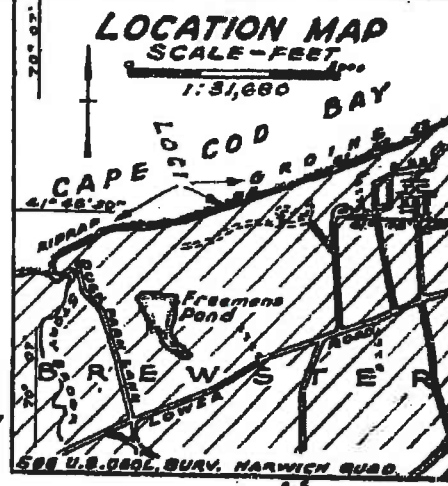
GROIN PROFILES-NO. 1-2-3

SCALE 1" = 40'



GROIN SECTIONS-TYPICAL

SCALE 1" = 16'



NOTE

ELEVATIONS ARE IN FEET AND TENTHS ABOVE PLANE OF MEAN LOW WATER. APPROX. SURFACE EXISTING GROUND SHOWN THUS.

ALL SIDE AND END SLOPES 1 1/2 TO 1.

LOCATION PROPOSED WORK SHOWN IN RED.

PROPOSED

STONE GROINS & RIPRAP

CAPE COD BAY

BREWSTER, MASS.

APPLICATION BY

DEPARTMENT OF PUBLIC WORKS - MASSACHUSETTS

DIVISION OF WATERWAYS

JANUARY 1956

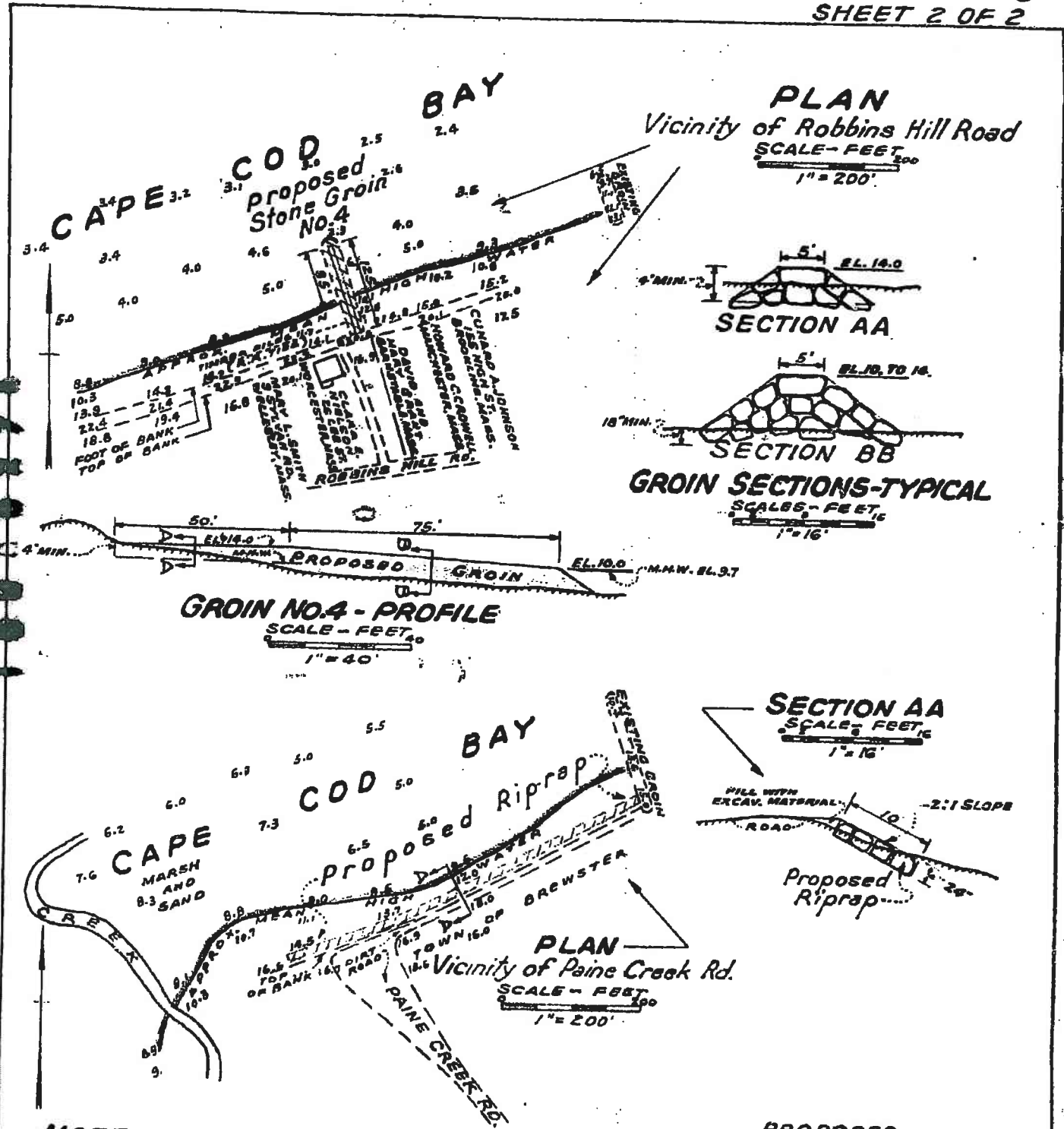
Robert W. MacKinnon

DISTRICT WATERWAYS ENGINEER

0 8 8 2 0 2

009-038-000-101-100

SHEET 2 OF 2



NOTE

ELEVATIONS ARE IN FEET AND TENTHS ABOVE PLANE OF MEAN LOW WATER. APPROX. EXISTING GROUND SHOWN THUS: ALL SIDE AND END SLOPES FOR GROIN ARE 1.5 TO 1. LOCATION OF PROPOSED WORK SHOWN IN RED.

**PROPOSED
STONE GROINS & RIPRAP
CAPE COD BAY**

BREWSTER - MASS.

APPLICATION BY
DEPARTMENT OF PUBLIC WORKS - MASSACHUSETTS

DIVISION OF WATERWAYS

JANUARY 1956

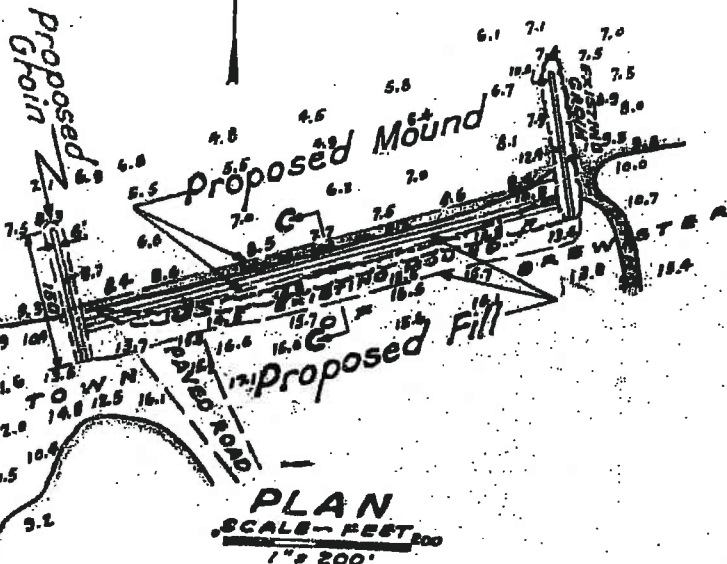
Robert D. MacKinnon
DISTRICT WATERWAYS ENGINEER

085 0795

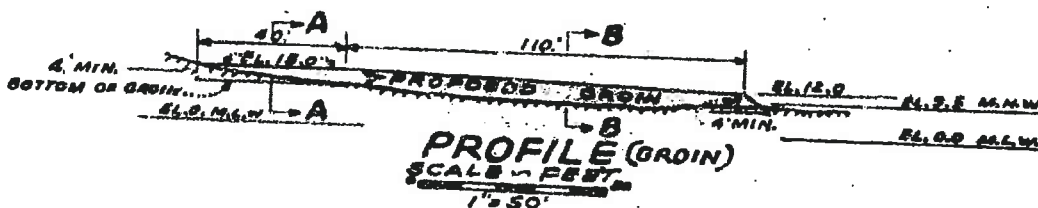
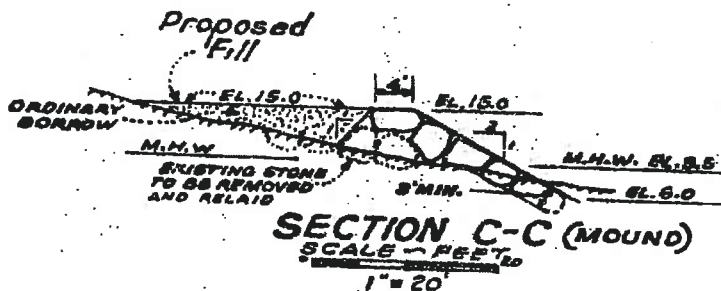
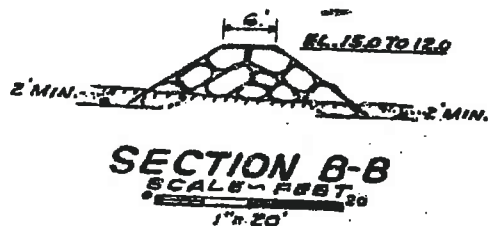
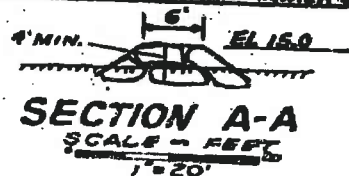
009-038-000-701-100
009-038-000-701-200

CAPE COD BAY

CAPE COD BAY



LOCATION MAP
SCALE - FEET
1" = 67,000
SEE U.S. GEOL. SURV. MAP W-100



NOTE

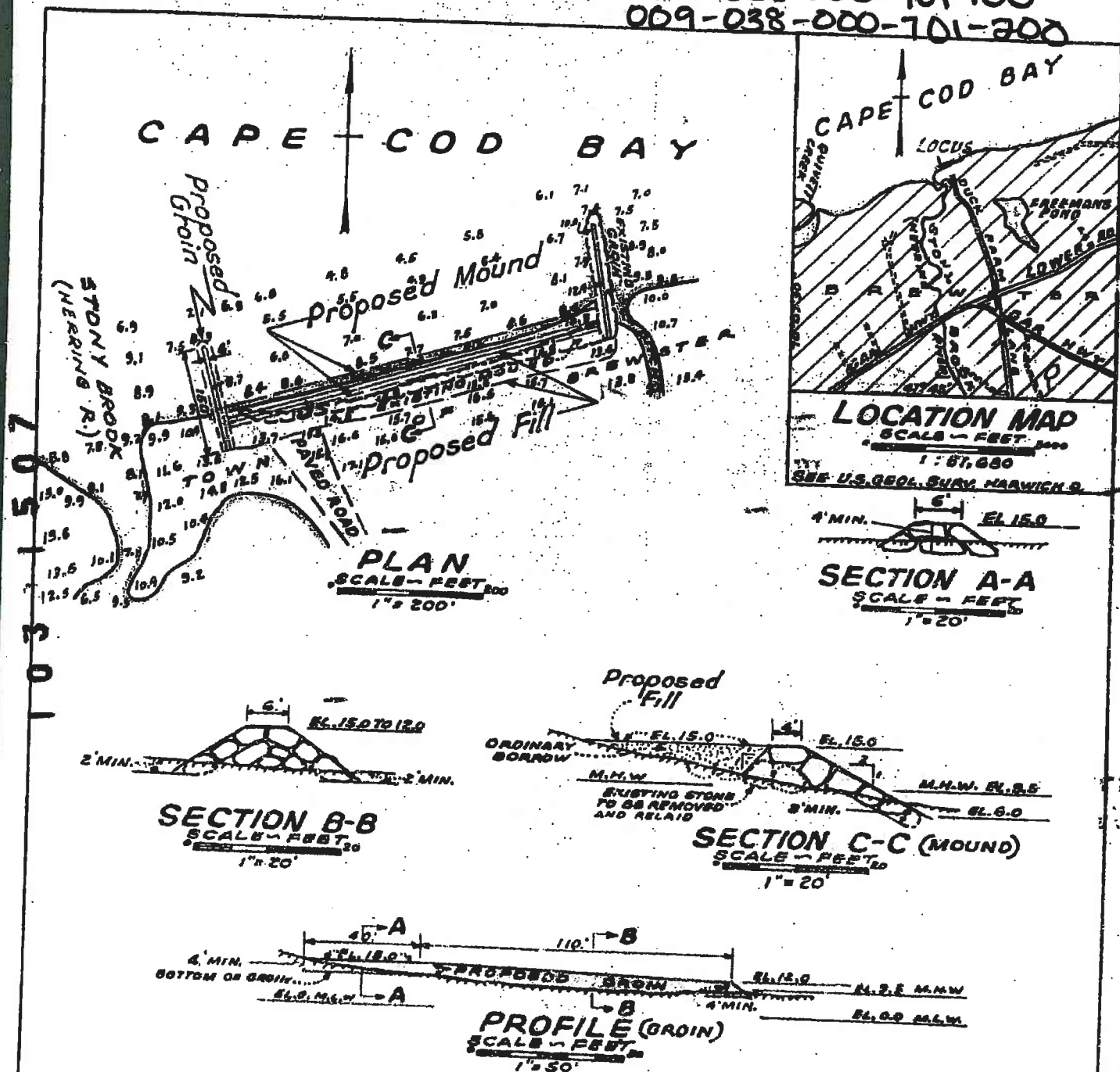
ELEVATIONS ARE IN FEET AND TENTHS AND REFER TO PLANE OF MEAN LOW WATER. APPROX. EXISTING GROUND SHOWN THUS. SIDE AND END SLOPES OF GROIN ARE 1.5 TO 1.0. LOCATION OF PROPOSED WORK IS SHOWN ON THIS PLAN IN RED.

PROPOSED
STONE GROIN AND MOUND
PAINES CREEK LANDING
CAPE COD BAY

BREWSTER - MASS.
DEPARTMENT OF PUBLIC WORKS & MASSACHUSETTS
DIVISION OF WATERWAYS
JUNE - 1958

Robert B. MacKinnon

009-038-000-701-100
009-038-000-701-200



NOTE

ELEVATIONS ARE IN FEET AND TENTHS
AND REFER TO PLANE OF MEAN LOW WATER.
APPROX. EXISTING GROUND SHOWN THUS ~~THUS~~
SIDE AND END SLOPES OF DRAIN ARE 1.5 TO 1.0
LOCATION OF PROPOSED WORK IS SHOWN
ON THIS PLAN IN RED.

PROPOSED
STONE GROIN AND MOUND
PAINES CREEK LANDING
CAPE COD BAY

DEPARTMENT OF PUBLIC WORKS OF MASSACHUSETTS
DIVISION OF WATERWAYS
JUNE-1958

Robert B. McKinnon

Section IV

Harwich

Section IV – Community Findings – Town of Harwich

COMMUNITY DESCRIPTION

The Town of Harwich consists of a land area of 21.04 square miles out of a total area of 33.15 square miles and had a population of 12,386 in the 2000 census. The Town is located on Cape Cod of Massachusetts and its location can be seen on this report's cover. The estimated length of shoreline is 5 miles that are directly exposed to open ocean. The Town is protected from major coastal storms by both natural and man-made shoreline structures that require maintenance to insure the long term protection of its coastline. The man-made and publicly owned structures that protect the Town were investigated for their ability to provide adequate protection from major coastal storms. Structures have been identified as publicly owned, including coastal dunes and beaches, based on evidence of investment of public funds made to create/enhance/maintain these structures. The assessment did not include floating or pile supported structures as they are assumed not to provide any significant coastal protection from major storm events.

STRUCTURE INVENTORY

Within the Town of Harwich, there were 16 structures which had public or unknown ownership which provide significant coastal protection. The location of the structures can be seen in Sheets 1 through Sheet 6 in Section IV-B of this report. The structures were categorized by their type and by their structural condition based on a preliminary field assessment. The distribution of structures by type and condition can be seen in the following table:

STRUCTURE TYPE AND QUANTITY - Town of Harwich

Primary Structure (1)	Total Structures	Structure Condition Rating				F	Total Length
		A	B	C	D		
Bulkhead / Seawall	4			4			1135
Revetment	7			7			1000
Breakwater	1			1			1160
Groin / Jetty	4		2	1	1		740
Coastal Dune							
Coastal Beach							
	16		2	13	1		4035

Within the above table, the total length of each type of structure is also provided. The structures are listed by the type which is providing the primary coastal protection. Many sites have multiple structure types at the same location (i.e. revetment in front of seawall). These secondary structures, although not identified within these tables, are included in the development of repair/rehabilitation costs.

The development of repair costs has been included by structure type and by condition. In the Town of Harwich's case there are a total of 16 structures which would require approximately \$ 3.7 million to bring all the coastal structures to "A" Rating. Most critical will be the structures in the "D" and "F" classifications as those are assumed to undergo some level of damage or failure during the next major coastal storm event. To reconstruct these structures, identified in the preliminary survey as being in poor condition, an estimated \$ 165,000 would be required to upgrade the Town's coastal protection.

STRUCTURE REPAIR / RECONSTRUCTION COST - Town of Harwich

Primary Structure (1)	Total Structures	Structure Condition Rating				F	Total Cost
		A	B	C	D		
Bulkhead / Seawall	4			\$ 817,113			\$ 817,113
Revetment	7			\$ 600,600			\$ 600,600
Breakwater	1			\$ 1,814,240			\$ 1,814,240
Groin / Jetty	4		\$ 24,420	\$ 285,520	\$ 165,990		\$ 475,930
Coastal Dune							\$ -
Coastal Beach							\$ -
	16	\$ -	\$ 24,420	\$ 3,517,473	\$ 165,990	\$ -	\$ 3,707,883

Based on the limited research within the scope of this project research, the presumed ownership of the structures was established on an initial basis and would be subject to more intense review in future tasks. Structures identified as being owned privately were excluded from further consideration. Although ownership of the land on which the structure was located was a factor, the structure ownership was treated as a separate issue from land ownership. For the Town of Harwich, the breakdown of structures by assumed ownership is as follows:

STRUCTURE OWNERSHIP / REPAIR COST - Town of Harwich

Primary Structure (1)	Total Structures	Structure Condition Rating				F	Total Cost
		A	B	C	D		
Town Owned	16		\$ 24,420	\$ 3,517,473	\$ 165,990		\$ 3,707,883
Commonwealth of Massachusetts							\$ -
Federal Government Owned							\$ -
Unknown Ownership							\$ -
	16	\$ -	\$ 24,420	\$ 3,517,473	\$ 165,990	\$ -	\$ 3,707,883

The identification of presumed ownership was not based on the investigation of legal documents but relied on property ownership and from construction and regulatory documents that were found. A more detailed investigation of legal documents and agreements would be required where structure ownership is disputed. A more detailed identification of structure type, length, condition and location can be found in Section IV-B which contains Structure Assessment Reports for each individual structure found.

SUMMARY

The enclosed reports and associated documents reflects the Town of Harwich's coastal structure information that will eventually be input into a state-wide GIS database and will be accessible through MassGIS. This data, when compiled state-wide, will be critical in the development of both short term and long term planning for maintaining and improving Massachusetts coastal protection.

This database will also provide relatively quick access to identify available documentation for these structures as well as the ability to be updated as coastal structure improvements are made.

Section IV - Harwich

Part B

Structure Assessment Reports



COASTAL STRUCTURE LOCATION PLAN

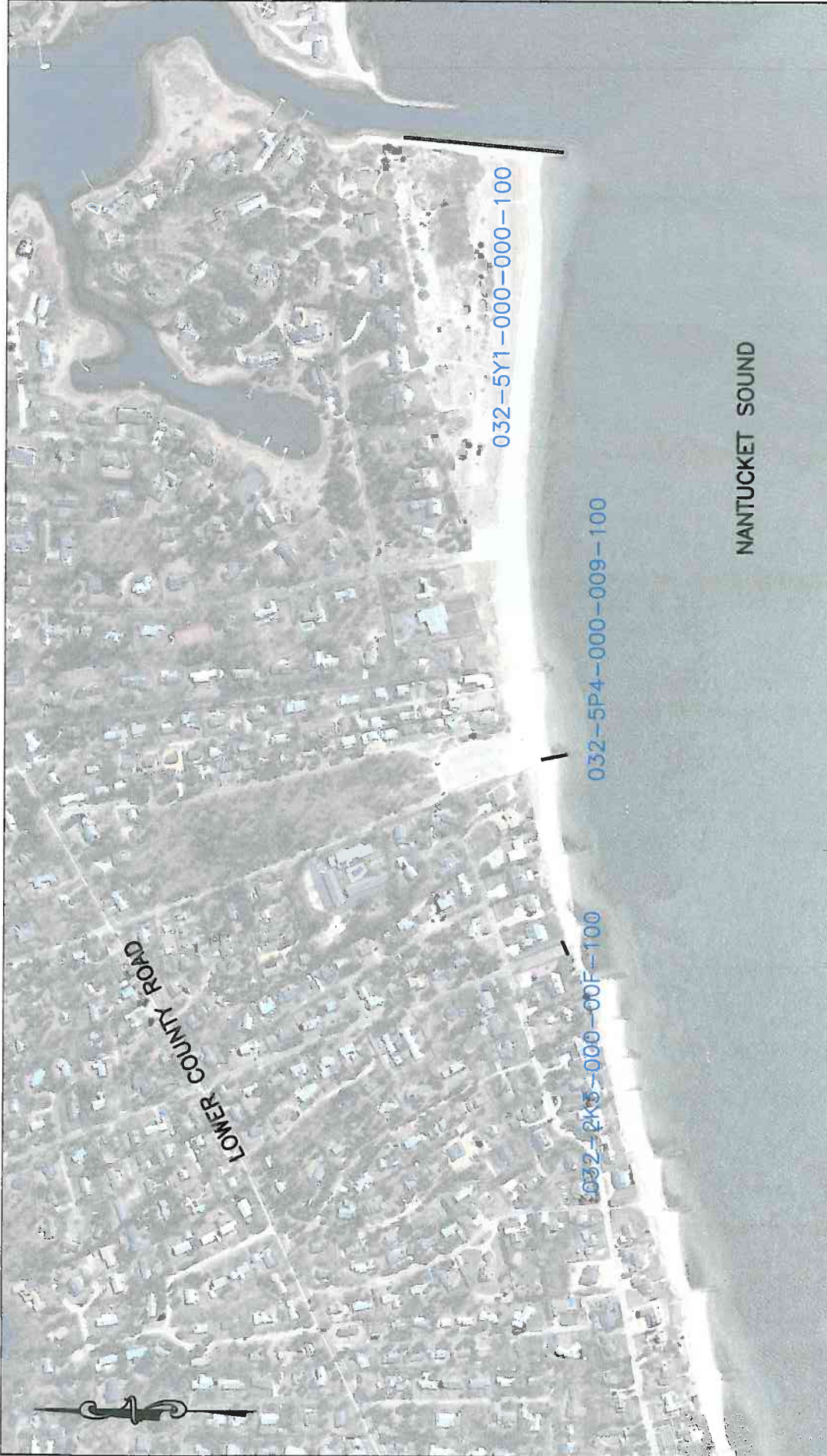
TOWN OF HARWICH
COASTAL INFRASTRUCTURE INVENTORY
AND ASSESSMENT PROJECT
NOVEMBER 2007



SCALE: 1" = 150'

BCE *Bourne Consulting Engineering*
3 West Street
Harwich, MA 02645
TEL (508) 253-4000 FAX (508) 253-4000

SHEET 1

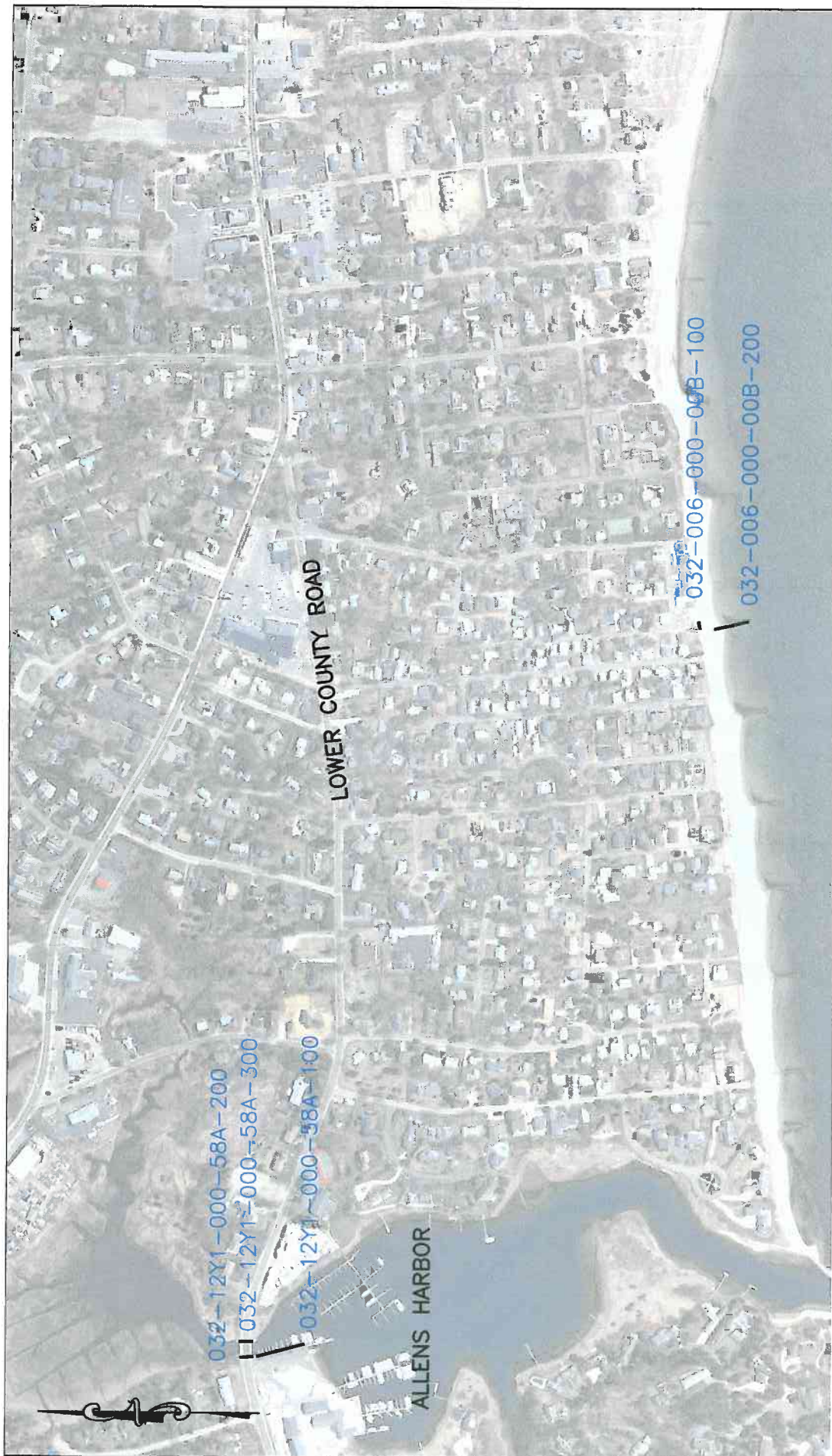


COASTAL STRUCTURE LOCATION PLAN

TOWN OF HARWICH
COASTAL INFRASTRUCTURE INVENTORY
AND ASSESSMENT PROJECT
NOVEMBER 2007



SCALE: 1" = 150'



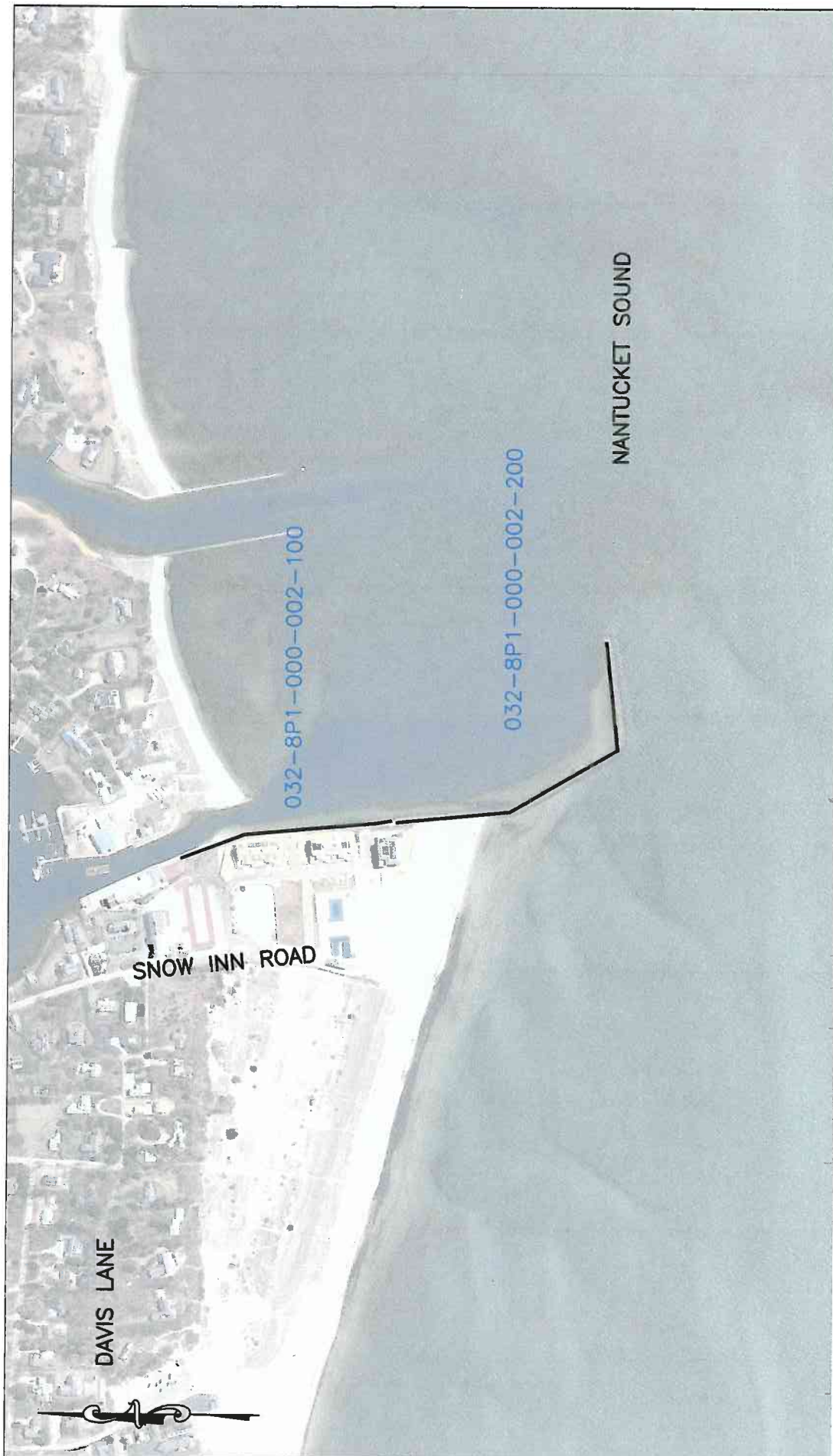
COASTAL STRUCTURE LOCATION PLAN

TOWN OF HARWICH
COASTAL INFRASTRUCTURE INVENTORY
AND ASSESSMENT PROJECT
NOVEMBER 2007



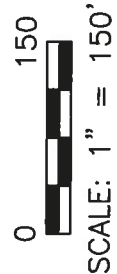
SCALE: 1" = 150'





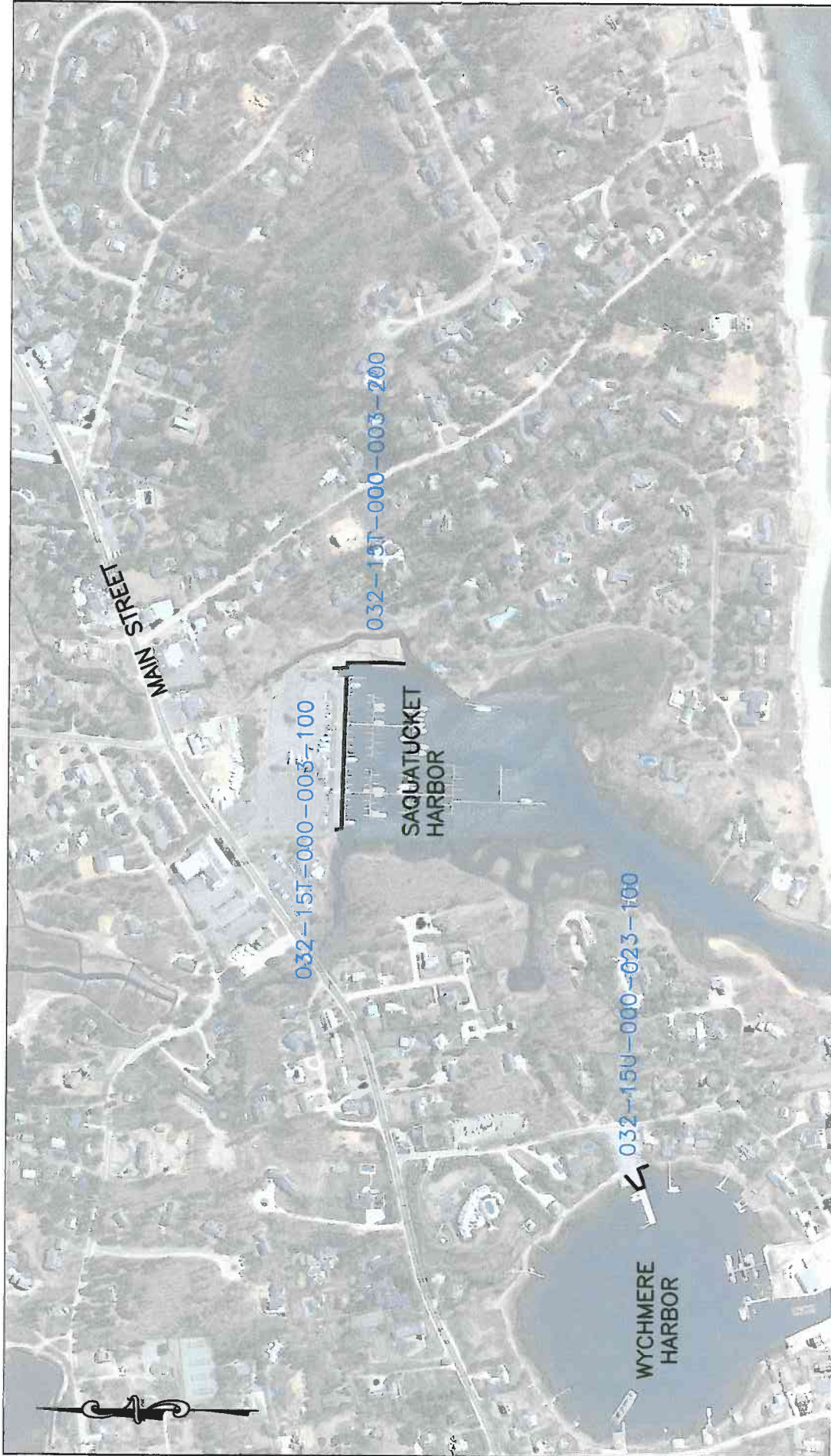
COASTAL STRUCTURE LOCATION PLAN

TOWN OF HARWICH
COASTAL INFRASTRUCTURE INVENTORY
AND ASSESSMENT PROJECT
NOVEMBER 2007



**BCE**

Bourne Consulting Engineering
350 Main Street
Bourne, MA 02532
TEL: (508) 233-4000 FAX: (508) 233-4000



COASTAL STRUCTURE LOCATION PLAN

TOWN OF HARWICH
COASTAL INFRASTRUCTURE INVENTORY
AND ASSESSMENT PROJECT
NOVEMBER 2007



SCALE: 1" = 150'





COASTAL STRUCTURE LOCATION PLAN

TOWN OF HARWICH
COASTAL INFRASTRUCTURE INVENTORY
AND ASSESSMENT PROJECT
NOVEMBER 2007



SCALE: 1" = 150'



Bourne Consulting Engineering
100 Main Street
Harwich, MA 02645
TEL: (508) 552-4000 FAX: (508) 552-4000

Structure Assessment Form

Town: **Harwich**Structure ID: **032-006-000-00B-100**

Key: community-map-block-parcel-structure

Property Owner:

Local

Location:

Central Avenue

Date:

10/16/2007

Presumed Structure Owner:

Local

Based On Comment:

Owner Name:

Harwich

Earliest Structure Record:

Unknown

Estimated Reconstruction/Repair Cost:

\$18,018.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
30		V8	18
Feet	Feet NAVD 88		Feet NGVD

Primary Type:

Revetment

Primary Material:

Stone

Primary Height:

5 to 10 Feet

Secondary Type:

Secondary Material:

Secondary Height:



Structure Summary :

This structure is a revetment at the end of Central Avenue. The side slope is in good condition but there is some erosion evident behind the crest. There is vegetation growing from between the armor stones. The structure toe is buried.

Condition

C

Rating

Fair

Level of Action

Moderate

Description

Structure is sound but may exhibit minor deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure adequate to withstand major coastal storm with little to moderate damage. Actions taken to reinforce structure to provide full protection from major coastal storm and for extending life of structure. Moderate wind or wave damage to landform exists. Landform may not be sufficient to fully protect shoreline during a major coastal storm. Actions taken to provide addition material for full protection and extended life.

Priority

III

Rating

Moderate Priority

Action

Consider for Active Project Improvement Listing

Description

Inshore Structures with potential for Infrastructure Damage and/or Limited Residential Dwellings (<1 dwelling impacted / 100 feet of shoreline)

Structure Images:

032-006-000-00B-100-PHO1A.jpg

Structure Documents:

Structure Assessment FormStructure ID: **032-006-000-00B-200**

Key: community-map-block-parcel-structure

Property Owner:

Local

Location:

Central Avenue

Date:

10/16/2007

Presumed Structure Owner:

Local

Based On Comment:

Owner Name:

Harwich

Earliest Structure Record:

Unknown

Estimated Reconstruction/Repair Cost:

\$165,990.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
125		V8	18
Feet	Feet NAVD 88		Feet NGVD

Primary Type:

Groin/ Jetty

Primary Material:

Stone

Primary Height:

Under 5 Feet

Secondary Type:

Secondary Material:

Secondary Height:

**Structure Summary :**

This structure is a groin at the end of Central Avenue. It is unraveled and leaking sand. There is very little interlocking evident between adjacent armor stones.

*Condition***D***Rating***Poor***Level of Action***Major***Description*

Structure exhibits advanced levels of deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure has strong risk of significant damage and possible failure during a major coastal storm. Structure should be monitored until repairs/reconstruction can be initiated. Actions taken to reconstruct structure to regain full capacity to resist a major coastal storm. Landform eroded, stability threatened. Landform not adequate to provide protection during major coastal storm. Actions taken to recreate landform to adequate limits for full protection from a major coastal storm.

*Priority***I***Rating***None***Action***Long Term Planning Considerations***Description***No Inshore Structures or Residential Dwelling Units Present****Structure Images:****032-006-000-00B-200-PHO2A.jpg****Structure Documents:**

Structure Assessment Form

Town: **Harwich**Structure ID: **032-12Y1-000-58A-100**

Key: community-map-block-parcel-structure

Property Owner:

Local

Location:

Allens Harbor

Date:

10/16/2007

Presumed Structure Owner:

Local

Based On Comment:

Owner Name:

Harwich

Earliest Structure Record:

1965

Estimated Reconstruction/Repair Cost:

\$104,326.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
165		V13	13
Feet	Feet NAVD 88		Feet NGVD

Primary Type:

Bulkhead/ Seawall

Primary Material:

Wood

Primary Height:

5 to 10 Feet

Secondary Type:

Secondary Material:

Secondary Height:



Structure Summary :

This structure is a bulkhead at Allens Harbor. This structure fronts a parking lot for the marina and has floating dockage on the water side. The timbers on the wall front are weathered while the cap is cracked and splintered in places. No inspection below water line.

Condition

C

Rating

Fair

Level of Action

Moderate

Description

Structure is sound but may exhibit minor deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure adequate to withstand major coastal storm with little to moderate damage. Actions taken to reinforce structure to provide full protection from major coastal storm and for extending life of structure. Moderate wind or wave damage to landform exists. Landform may not be sufficient to fully protect shoreline during a major coastal storm. Actions taken to provide addition material for full protection and extended life.

Priority

III

Rating

Moderate Priority

Action

Consider for Active Project Improvement Listing

Description

Inshore Structures with potential for Infrastructure Damage and/or Limited Residential Dwellings (<1 dwelling impacted / 100 feet of shoreline)

Structure Images:

032-12Y1-000-58A-100-PHO1A.jpg

Structure Documents:

USACE

March 1965

Proposed Harbor

032-12Y1-000-58A-100-COE1A

DEP

January 198

Plan Accompanying

032-12Y1-000-58A-100-LIC1A

DEP

November 1

Plans Accompanying

032-12Y1-000-58A-100-LIC1B

Structure Assessment Form

Town: **Harwich**Structure ID: **032-12Y1-000-58A-200**

Key: community-map-block-parcel-structure

Property Owner:

Local

Location:

Allens Harbor

Date:

10/16/2007

Presumed Structure Owner:

Local

Based On Comment:

Owner Name:

Harwich

Earliest Structure Record:

Unknown

Estimated Reconstruction/Repair Cost:

\$27,027.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
45		A8	10
Feet	Feet NAVD 88		Feet NGVD

Primary Type:

Revetment

Primary Material:

Stone

Primary Height:

5 to 10 Feet

Secondary Type:

Secondary Material:

Secondary Height:



Structure Summary :

These structures are the abutments at the Lower County Road bridge over Allens Harbor (West Side). They are generally in good condition but there is some slumping in the southwest corner.

Condition

C

Rating

Fair

Level of Action

Moderate

Description

Structure is sound but may exhibit minor deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure adequate to withstand major coastal storm with little to moderate damage. Actions taken to reinforce structure to provide full protection from major coastal storm and for extending life of structure. Moderate wind or wave damage to landform exists. Landform may not be sufficient to fully protect shoreline during a major coastal storm. Actions taken to provide addition material for full protection and extended life.

Priority

III

Rating

Moderate Priority

Action

Consider for Active Project Improvement Listing

Description

Inshore Structures with potential for Infrastructure Damage and/or Limited Residential Dwellings (<1 dwelling impacted / 100 feet of shoreline)

Structure Images:

032-12Y1-000-58A-200-PHO2A.jpg

Structure Documents:

Structure Assessment Form

Town: **Harwich**Structure ID: **032-12Y1-000-58A-300**

Key: community-map-block-parcel-structure

Property Owner:

Local

Location:

Allens Harbor

Date:

10/16/2007

Presumed Structure Owner:

Local

Based On Comment:

Owner Name:

Harwich

Earliest Structure Record:

Unknown

Estimated Reconstruction/Repair Cost:

\$27,027.00

Length:

45

Feet

Top Elevation:

Feet NAVD 88

FIRM Map Zone:

A8

FIRM Map Elevation:

10

Feet NGVD

Primary Type:

Revetment

Primary Material:

Stone

Primary Height:

5 to 10 Feet

Secondary Type:

Secondary Material:

Secondary Height:



Structure Summary :

These structures are the abutments at the Lower County Road bridge over Allens Harbor (East Side). They are generally in good condition but there is some slumping in the southwest corner.

Condition

C

Rating

Fair

Level of Action

Moderate

Description

Structure is sound but may exhibit minor deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure adequate to withstand major coastal storm with little to moderate damage. Actions taken to reinforce structure to provide full protection from major coastal storm and for extending life of structure. Moderate wind or wave damage to landform exists. Landform may not be sufficient to fully protect shoreline during a major coastal storm. Actions taken to provide addition material for full protection and extended life.

Priority

III

Rating

Moderate Priority

Action

Consider for Active Project Improvement Listing

Description

Inshore Structures with potential for Infrastructure Damage and/or Limited Residential Dwellings (<1 dwelling impacted / 100 feet of shoreline)

Structure Images:

032-12Y1-000-58A-300-PHO3A.jpg

Structure Documents:

Structure Assessment Form

Town: **Harwich**Structure ID: **032-15T-000-003-100**

Key: community-map-block-parcel-structure

Property Owner:

Local

Location:

Saquatucket Harbor

Date:

10/16/2007

Presumed Structure Owner:

Local

Based On Comment:

Owner Name:

Harwich

Earliest Structure Record:

1968

Estimated Reconstruction/Repair Cost:

\$398,475.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
525		A10	11
Feet	Feet NAVD 88		Feet NGVD

Primary Type:

Bulkhead/ Seawall

Primary Material:

Concrete

Primary Height:

5 to 10 Feet

Secondary Type:

Secondary Material:

Secondary Height:



Structure Summary :

This structure is a concrete bulkhead fronting the parking lot at Saquatucket Harbor. The concrete is discolored but solid. There is a minimum of cracking and spalling evident.

Condition

C

Rating

Fair

Level of Action

Moderate

Description

Structure is sound but may exhibit minor deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure adequate to withstand major coastal storm with little to moderate damage. Actions taken to reinforce structure to provide full protection from major coastal storm and for extending life of structure. Moderate wind or wave damage to landform exists. Landform may not be sufficient to fully protect shoreline during a major coastal storm. Actions taken to provide addition material for full protection and extended life.

Priority

III

Rating

Moderate Priority

Action

Consider for Active Project Improvement Listing

Description

Inshore Structures with potential for Infrastructure Damage and/or Limited Residential Dwellings (<1 dwelling impacted / 100 feet of shoreline)

Structure Images:

032-15T-000-003-100-PHO1A.jpg

Structure Documents:

USACE

October 196

Proposed Marina

032-15T-000-003-100-COE1A

MA-DCR

September 1

Proposed Marina

032-15T-000-003-100-DCR1A

Structure Assessment Form

Town: **Harwich**Structure ID: **032-15T-000-003-200**

Key: community-map-block-parcel-structure

Property Owner:

Local

Location:

Squatucket Harbor

Date:

10/16/2007

Presumed Structure Owner:

Local

Based On Comment:

Owner Name:

Harwich

Earliest Structure Record:

1968

Estimated Reconstruction/Repair Cost:

\$197,340.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
260		A10	11
Feet	Feet NAVD 88		Feet NGVD

Primary Type:

Bulkhead/ Seawall

Primary Material:

Concrete

Primary Height:

5 to 10 Feet

Secondary Type:

Secondary Material:

Secondary Height:



Structure Summary :

This structure is a concrete bulkhead on the east side of Squatucket Harbor. It is aged and discolored. There is some minor cracking and spalling evident.

Condition

C

Rating

Fair

Level of Action

Moderate

Description

Structure is sound but may exhibit minor deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure adequate to withstand major coastal storm with little to moderate damage. Actions taken to reinforce structure to provide full protection from major coastal storm and for extending life of structure. Moderate wind or wave damage to landform exists. Landform may not be sufficient to fully protect shoreline during a major coastal storm. Actions taken to provide additional material for full protection and extended life.

Priority

III

Rating

Moderate Priority

Action

Consider for Active Project Improvement Listing

Description

Inshore Structures with potential for Infrastructure Damage and/or Limited Residential Dwellings (<1 dwelling impacted / 100 feet of shoreline)

Structure Images:

032-15T-000-003-200-PHO2A.jpg

Structure Documents:

USACE

October 196

Proposed Marina

032-15T-000-003-200-COE2A

MA-DCR

September 1

Proposed Marina

032-15T-000-003-200-DCR2A

Structure Assessment Form

Town: **Harwich**Structure ID: **032-15U-000-023-100**

Key: community-map-block-parcel-structure

Property Owner:

Local

Location:

Wychmere Harbor

Date:

10/16/2007

Presumed Structure Owner:

Local

Based On Comment:

Owner Name:

Harwich

Earliest Structure Record:

1961

Estimated Reconstruction/Repair Cost:

\$116,972.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
185		A10	11
Feet	Feet NAVD 88		Feet NGVD

Primary Type:

Bulkhead/ Seawall

Primary Material:

Wood

Primary Height:

5 to 10 Feet

Secondary Type:

Secondary Material:

Secondary Height:



Structure Summary :

This structure is a bulkhead at the Wychmere Harbor town pier. The structure fronts a parking lot and is adjacent to town dockage. It is weathered but solid.

Condition

C

Rating

Fair

Level of Action

Moderate

Description

Structure is sound but may exhibit minor deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure adequate to withstand major coastal storm with little to moderate damage. Actions taken to reinforce structure to provide full protection from major coastal storm and for extending life of structure. Moderate wind or wave damage to landform exists. Landform may not be sufficient to fully protect shoreline during a major coastal storm. Actions taken to provide addition material for full protection and extended life.

Priority

III

Rating

Moderate Priority

Action

Consider for Active Project Improvement Listing

Description

Inshore Structures with potential for Infrastructure Damage and/or Limited Residential Dwellings (<1 dwelling impacted / 100 feet of shoreline)

Structure Images:

032-15U-000-023-100-PHO1A.jpg

Structure Documents:

MA-DCR

July 1961

Proposed Harbor

032-15U-000-023-100-DCR1A

DEP

September 1

Plan Accompanying

032-15U-000-023-100-LIC1A

Structure Assessment Form

Town: **Harwich**Structure ID: **032-17N3-000-001-100**

Key: community-map-block-parcel-structure

Property Owner:

Local

Location:

Red River Beach

Date:

10/16/2007

Presumed Structure Owner:

Local

Based On Comment:

Owner Name:

Harwich

Earliest Structure Record:

1953

Estimated Reconstruction/Repair Cost:

\$285,520.00

Length:

430

Feet

Top Elevation:

Feet NAVD 88

FIRM Map Zone:

V13

FIRM Map Elevation:

15

Feet NGVD

Primary Type:

Groin/ Jetty

Primary Material:

Stone

Primary Height:

Under 5 Feet

Secondary Type:

Secondary Material:

Secondary Height:



Structure Summary :

These structures are the groin field at Red River Beach. There are 9 groins recorded. The western 8 groins alternate in length with one short groin between 2 longer ones. There is a terminal groin at the eastern end of the field which is approximately twice the length of the longer groins. The armor stones on these structures are becoming unraveled.

*Condition***C***Rating***Fair***Level of Action***Moderate***Description*

Structure is sound but may exhibit minor deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure adequate to withstand major coastal storm with little to moderate damage. Actions taken to reinforce structure to provide full protection from major coastal storm and for extending life of structure. Moderate wind or wave damage to landform exists. Landform may not be sufficient to fully protect shoreline during a major coastal storm. Actions taken to provide addition material for full protection and extended life.

*Priority***I***Rating***None***Action***Long Term Planning Considerations***Description***No Inshore Structures or Residential Dwelling Units Present**

Structure Images:

032-17N3-000-001-100-PHO1A.jpg

Structure Documents:

USACE	July 1953	Proposed Beach	032-17N3-000-001-100-COE1A
USACE	March 1959	Proposed Groins and	032-17N3-000-001-100-COE1B
MA-DCR	December 1	Proposed Shore	032-17N3-000-001-100-DCR1A
MA-DCR	November 1	Proposed Beach	032-17N3-000-001-100-DCR1B

Structure Assessment Form

Town: **Harwich**Structure ID: **032-2B1-000-018-100**

Key: community-map-block-parcel-structure

Property Owner:

Local

Location:

Pleasant Road Beach

Date:

10/16/2007

Presumed Structure Owner:

Local

Based On Comment:

Owner Name:

Harwich

Earliest Structure Record:

1947

Estimated Reconstruction/Repair Cost:

\$12,540.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
95		V13	15
Feet	Feet NAVD 88		Feet NGVD

Primary Type:	Primary Material:	Primary Height:
Groin/ Jetty	Stone	Under 5 Feet
Secondary Type:	Secondary Material:	Secondary Height:



Structure Summary :

This structure is the groin at Pleasant Road beach. There is some minor slumping of the armor stone evident. The beach is impounded to the crest on the updrift (west) side while the downdrift side is exposed to the toe.

<i>Condition</i>	B	<i>Priority</i>	I
<i>Rating</i>	Good	<i>Rating</i>	None
<i>Level of Action</i>	Minor	<i>Action</i>	Long Term Planning Considerations
<i>Description</i>	Structure observed to exhibit very minor problems, superficial in nature. Minor erosion to landform is present. Structure / landform adequate to provide protection from a major coastal storm with no damage. Actions taken to prevent / limit future deterioration and extend life of structure.	<i>Description</i>	No Inshore Structures or Residential Dwelling Units Present

Structure Images:

032-2B1-000-018-100-PHO1A.jpg

Structure Documents:

USACE	February 19	Proposed Stone Jetty	032-2B1-000-018-100-COE1A
USACE	March 1954	Proposed Stone	032-2B1-000-018-100-COE1B
MA-DCR	March 1954	Proposed Shore	032-2B1-000-018-100-DCR1A

Structure Assessment Form

Town: **Harwich**

Structure ID: 032-2K3-000-00F-100

Key: community-map-block-parcel-structure

Property Owner:

Local

Location:

Grey Neck Road

Date:

10/16/2007

Presumed Structure Owner:

Local

Based On Comment:

Owner Name:

Harwich

Earliest Structure Record:

Unknown

Estimated Reconstruction/Repair Cost:

\$30,030.00

Length: Top Elevation:

50

Feet

Feet NAVD 88

FIRM Map Zone:

V13

FIRM Map Elevation:

13

Feet NGVD

Primary Type:

Revetment

Primary Material:

Stone

Primary Height:

5 to 10 Feet

Secondary Type:

Secondary Material:

Secondary Height:



Structure Summary :

This structure is a stone revetment at the foot of the dune at Grey Neck Beach. The armor east of the stairs is slumped with erosion evident behind it. The revetment toe is buried and the dune above is vegetated.

Condition

C

Rating

Fair

Level of Action

Moderate

Description

Structure is sound but may exhibit minor deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure adequate to withstand major coastal storm with little to moderate damage. Actions taken to reinforce structure to provide full protection from major coastal storm and for extending life of structure. Moderate wind or wave damage to landform exists. Landform may not be sufficient to fully protect shoreline during a major coastal storm. Actions taken to provide addition material for full protection and extended life.

Priority

II

Rating

Low Priority

Action

Future Project Consideration

Description

Inshore Structures Present with Limited potential for Significant Infrastructure Damage

Structure Images:

032-2K3-000-00F-100-PHO1A.jpg

Structure Documents:

Structure Assessment FormStructure ID: **032-4N3-000-00B-100**

Key: community-map-block-parcel-structure

Property Owner:

Local

Location:

Herring River

Date:

10/16/2007

Presumed Structure Owner:

Local

Based On Comment:

Owner Name:

Harwich

Earliest Structure Record:

Unknown

Estimated Reconstruction/Repair Cost:

\$30,030.00

Length:

50

Feet

Top Elevation:

Feet NAVD 88

FIRM Map Zone:

V13

FIRM Map Elevation:

12

Feet NGVD

Primary Type:

Revetment

Primary Material:

Stone

Primary Height:

5 to 10 Feet

Secondary Type:

Secondary Material:

Secondary Height:



Structure Summary :

These structures are the armored abutments at the Lower County Road bridge over the Herring River (West Side). The riprap is in good condition. There is some slumping at the southwest corner that has begun to undermine the bridge footing.

Condition

C

Rating

Fair

Level of Action

Moderate

Description

Structure is sound but may exhibit minor deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure adequate to withstand major coastal storm with little to moderate damage. Actions taken to reinforce structure to provide full protection from major coastal storm and for extending life of structure. Moderate wind or wave damage to landform exists. Landform may not be sufficient to fully protect shoreline during a major coastal storm. Actions taken to provide addition material for full protection and extended life.

Priority

IV

Rating

High Priority

Action

Consider for Next Project Construction Listing

Description

High Value Inshore Structures with Potential for Infrastructure Damage and/or Moderate Density Residential Dwellings (1-10 dwellings impacted / 100 feet of shoreline)

Structure Images:

032-4N3-000-00B-100-PHO1A.jpg

Structure Documents:

Structure Assessment Form

Town: **Harwich**Structure ID: **032-4N3-000-00B-200**

Key: community-map-block-parcel-structure

Property Owner:

Local

Location:

Herring River

Date:

10/16/2007

Presumed Structure Owner:

Local

Based On Comment:

Owner Name:

Harwich

Earliest Structure Record:

Unknown

Estimated Reconstruction/Repair Cost:

\$33,033.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
55		V13	12
Feet	Feet NAVD 88		Feet NGVD

Primary Type:

Revetment

Primary Material:

Stone

Primary Height:

5 to 10 Feet

Secondary Type:

Secondary Material:

Secondary Height:



Structure Summary :

These structures are the armored abutments at the Lower County Road bridge over the Herring River (East Side). The riprap is in good condition. There is some minor slumping along the north side.

Condition

C

Rating

Fair

Level of Action

Moderate

Description

Structure is sound but may exhibit minor deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure adequate to withstand major coastal storm with little to moderate damage. Actions taken to reinforce structure to provide full protection from major coastal storm and for extending life of structure. Moderate wind or wave damage to landform exists. Landform may not be sufficient to fully protect shoreline during a major coastal storm. Actions taken to provide addition material for full protection and extended life.

Priority

IV

Rating

High Priority

Action

Consider for Next Project Construction Listing

Description

High Value Inshore Structures with Potential for Infrastructure Damage and/or Moderate Density Residential Dwellings (1-10 dwellings impacted / 100 feet of shoreline)

Structure Images:

032-4N3-000-00B-200-PHO2A.jpg

Structure Documents:

Structure Assessment Form

Town: **Harwich**Structure ID: **032-5P4-000-009-100**

Key: community-map-block-parcel-structure

Property Owner:

Local

Location:

Earle Road

Date:

10/16/2007

Presumed Structure Owner:

Local

Based On Comment:

Owner Name:

Harwich

Earliest Structure Record:

1936

Estimated Reconstruction/Repair Cost:

\$11,880.00

Length: Top Elevation: FIRM Map Zone: FIRM Map Elevation:

90

V13

13

Feet

Feet NAVD 88

Feet NGVD

Primary Type:

Groin/ Jetty

Primary Material:

Stone

Primary Height:

Under 5 Feet

Secondary Type:

Secondary Material:

Secondary Height:



Structure Summary :

This structure is a groin at Earle Road Beach. The side slopes and crest are in good condition. The beach is impounded to the groin crest on the updrift (west) side while the groin is exposed to the toe on the downdrift side.

Condition

B

Rating

Good

Level of Action

Minor

Description

Structure observed to exhibit very minor problems, superficial in nature. Minor erosion to landform is present. Structure / landform adequate to provide protection from a major coastal storm with no damage. Actions taken to prevent / limit future deterioration and extend life of structure.

Priority

I

Rating

None

Action

Long Term Planning Considerations

Description

No Inshore Structures or Residential Dwelling Units Present

Structure Images:

032-5P4-000-009-100-PHO1A.jpg

Structure Documents:

MA-DCR

August 1936

Proposed Shore

032-5P4-000-009-100-DCR1A

MA-DCR

November 1

Proposed Shore

032-5P4-000-009-100-DCR1B

Structure Assessment Form

Town: **Harwich**Structure ID: **032-8P1-000-002-100**

Key: community-map-block-parcel-structure

Property Owner:

Local

Location:

Wychmere Harbor

Date:

10/16/2007

Presumed Structure Owner:

Local

Based On Comment:

Owner Name:

Harwich

Earliest Structure Record:

1947

Estimated Reconstruction/Repair Cost:

\$435,435.00

Length:

725

Top Elevation:

FIRM Map Zone:

V13

FIRM Map Elevation:

14

Feet

Feet NAVD 88

Feet NGVD

Primary Type:

Revetment

Primary Material:

Stone

Primary Height:

5 to 10 Feet

Secondary Type:

Secondary Material:

Secondary Height:



Structure Summary :

This structure is a stone revetment along the west bank of the entrance to Wychmere Harbor. The stones are almost stacked vertically and the revetment abuts a vertical stone wall. The armor stones are cracked and slumped in sections.

Condition

C

Rating

Fair

Level of Action

Moderate

Description

Structure is sound but may exhibit minor deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure adequate to withstand major coastal storm with little to moderate damage. Actions taken to reinforce structure to provide full protection from major coastal storm and for extending life of structure. Moderate wind or wave damage to landform exists. Landform may not be sufficient to fully protect shoreline during a major coastal storm. Actions taken to provide addition material for full protection and extended life.

Priority

III

Rating

Moderate Priority

Action

Consider for Active Project Improvement Listing

Description

Inshore Structures with potential for Infrastructure Damage and/or Limited Residential Dwellings (<1 dwelling impacted / 100 feet of shoreline)

Structure Images:

032-8P1-000-002-100-PHO1A.jpg

Structure Documents:

MA-DCR

July 1947

Proposed Channel

032-8P1-000-002-100-DCR1A

MA-DCR

March 1956

Proposed Harbor

032-8P1-000-002-100-DCR1B

Structure Assessment FormStructure ID: **032-8P1-000-002-200**

Key: community-map-block-parcel-structure

Property Owner:

Local

Location:

Wychmere Harbor

Date:

10/16/2007

Presumed Structure Owner:

Local

Based On Comment:

Owner Name:

Harwich

Earliest Structure Record:

1947

Estimated Reconstruction/Repair Cost:

\$1,814,240.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
1160		V13	14
Feet	Feet NAVD 88		Feet NGVD

Primary Type:

Breakwater

Primary Material:

Stone

Primary Height:

10 to 15 Feet

Secondary Type:

Secondary Material:

Secondary Height:

**Structure Summary :**

This structure is a stone breakwater extending past the entrance to Wychmere Harbor. It is mostly in good condition. Some sections near the bend are slumped and the crest is collapsed. Some areas show small displacement of the side slope stones from the crest.

*Condition***C***Rating***Fair***Level of Action***Moderate***Description*

Structure is sound but may exhibit minor deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure adequate to withstand major coastal storm with little to moderate damage. Actions taken to reinforce structure to provide full protection from major coastal storm and for extending life of structure. Moderate wind or wave damage to landform exists. Landform may not be sufficient to fully protect shoreline during a major coastal storm. Actions taken to provide addition material for full protection and extended life.

*Priority***III***Rating***Moderate Priority***Action*

Consider for Active Project Improvement Listing

Description

Inshore Structures with potential for Infrastructure Damage and/or Limited Residential Dwellings (<1 dwelling impacted / 100 feet of shoreline)

Structure Images:**032-8P1-000-002-200-PHO2A.jpg****032-8P1-000-002-200-PHO2B.jpg****032-8P1-000-002-200-PHO2C.jpg****Structure Documents:****MA-DCR****July 1947****Proposed Channel****032-8P1-000-002-200-DCR2A**

Section IV - Harwich

Part C

Structure Photographs

BCE Structure No	Document No	Contract/ Drawing Number	Entity	Municipality	Date	Title	Sheets	Location	Description
032-006-000-00B-100	032-006-000-00B-100-PHO1A.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
032-006-000-00B-200	032-006-000-00B-200-PHO2A.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
032-12Y1-000-58A-100	032-12Y1-000-58A-100-PHO1A.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
032-12Y1-000-58A-200	032-12Y1-000-58A-200-PHO2A.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
032-12Y1-000-58A-300	032-12Y1-000-58A-300-PHO3A.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
032-15T-000-003-100	032-15T-000-003-100-PHO1A.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
032-15T-000-003-200	032-15T-000-003-200-PHO2A.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
032-15U-000-023-100	032-15U-000-023-100-PHO1A.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
032-17N3-000-001-100	032-17N3-000-001-100-PHO1A.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
032-2B1-000-01B-100	032-2B1-000-01B-100-PHO1A.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
032-2K3-000-00F-100	032-2K3-000-00F-100-PHO1A.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
032-4N3-000-00B-100	032-4N3-000-00B-100-PHO1A.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
032-4N3-000-00B-200	032-4N3-000-00B-200-PHO2A.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
032-5P4-000-00B-100	032-5P4-000-00B-100-PHO1A.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
032-8P1-000-002-100	032-8P1-000-002-100-PHO1A.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
032-8P1-000-002-200	032-8P1-000-002-200-PHO2A.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
032-8P1-000-002-200	032-8P1-000-002-200-PHO2B.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
032-8P1-000-002-200	032-8P1-000-002-200-PHO2C.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey

Massachusetts Coastal Infrastructure and Assessment



032-006-000-00B-100-PHO1A



032-006-000-00B-200-PHO2A



032-12Y1-000-58A-100-PHO1A



032-12Y1-000-58A-200-PHO2A



032-12Y1-000-58A-300-PHO3A



032-15T-000-003-100-PHO1A



032-15T-000-003-200-PHO2A



032-15U-000-023-100-PHO1A



032-17N3-000-001-100-PHO1A

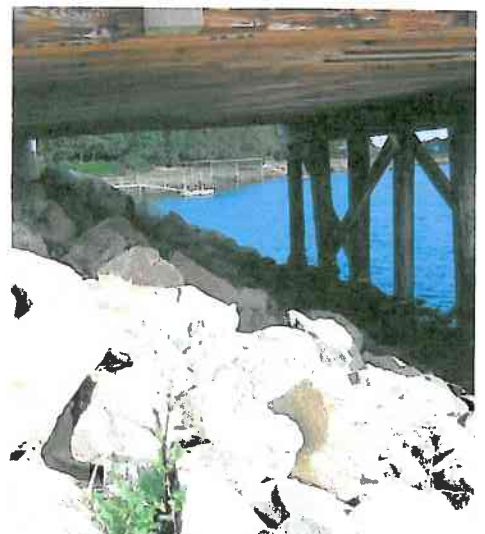
Massachusetts Coastal Infrastructure and Assessment



032-2B1-000-018-100-PHO1A



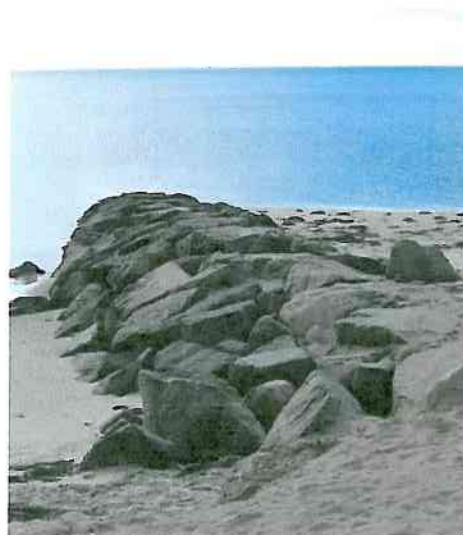
032-2K3-000-00F-100-PHO1A



032-4N3-000-00B-100-PHO1A



032-4N3-000-00B-200-PHO2A



032-5P4-000-009-100-PHO1A



032-8P1-000-002-100-PHO1A



032-8P1-000-002-200-PHO2A



032-8P1-000-002-200-PHO2B



032-8P1-000-002-200-PHO2C

Section IV - Harwich

Part D

Structure Documents

TOWN DOCUMENT LIST

MA DCR - DOCUMENT LIST

MA DEP – Ch 91 DOCUMENT LIST

- Copies of License Documents

USACE – PERMIT DOCUMENT LIST

- Copies of Permit Documents

TOWN: HARWICH
SOURCE: Town of Harwich
LOCATION: TOWN
DATE OF RESEARCH: JULY 2007

No Town Documents for the Town of Harwich

BCE Structure No	Document No	Contract/ Drawing Number	Entity	Municipality	Date	Title	Sheets	Location	Description
------------------	-------------	--------------------------------	--------	--------------	------	-------	--------	----------	-------------

TOWN: HARWICH
SOURCE: MA-DCR
LOCATION: MA-DCR BOSTON and HINGHAM, MA
DATE OF RESEARCH: JULY 2007

BCE Structure No	Document No	Contract/ Drawing Number	Entity	Municipality	Date	Title	Sheets	Location	Description
032-15T-000-003-100	032-15T-000-003-100-DCR1A	2632	MA-DCR	Harwich	Sep-68	Proposed Marina Facility - Bulkhead, Floats, Access Ramp, Parking Area - Saquatucket Harbor - Prepared for the DPW of Massachusetts - Division of Waterways	11	Saquatucket Harbor	Boat Ramp and Bulkhead
032-15T-000-003-200	032-15T-000-003-200-DCR2A	2632	MA-DCR	Harwich	Sep-68	Proposed Marina Facility - Bulkhead, Floats, Access Ramp, Parking Area - Saquatucket Harbor - Prepared for the DPW of Massachusetts - Division of Waterways	11	Saquatucket Harbor	Boat Ramp and Bulkhead
032-15U-000-023-100	032-15U-000-023-100-DCR1A	2298	MA-DCR	Harwich	Jul-61	Proposed Harbor Improvements - Timber Bulkhead and Pier - Wychmere Harbor - Harwich, Massachusetts - Prepared for the DPW of Massachusetts - Division of Waterways	2	Harbor Road	Timber Bulkhead
032-17N3-000-001-100	032-17N3-000-001-100-DCR1A	1454	MA-DCR	Harwich	Dec-54	Proposed Shore Protection - Stone Groin and Sand Fill - Easterly of Deep Hole Road - South Harwich Beach - Harwich, Massachusetts - Prepared for the DPW of Massachusetts - Division of Waterways	1	Easterly of Deep Hole Road	Stone Groin
032-17N3-000-001-100	032-17N3-000-001-100-DCR1B	1552	MA-DCR	Harwich	Nov-55	Proposed Beach Development - Stone Groins and Sand Fill - South Harwich Beach - Uncle Venie's Road to Red River - Harwich, Massachusetts - Prepared for the DPW of Massachusetts - Division of Waterways	2	Uncle Venie's Road to Red River	Stone Groins
032-2B1-000-018-100	032-2B1-000-018-100-DCR1A	1373	MA-DCR	Harwich	Mar-54	Proposed Shore Protection - Stone Groin and Sand Fill - West Harwich Shore at Pleasant Road - Harwich, Massachusetts - Prepared for the DPW of Massachusetts - Division of Waterways	1	Pleasant Road	Stone Groin
032-5P4-000-009-100	032-5P4-000-009-100-DCR1A	474	MA-DCR	Harwich	Aug-36	Proposed Shore Protection - Harwich - Prepared for the DPW of Massachusetts - Division of Waterways	1	Earle Road	Groins
032-5P4-000-009-100	032-5P4-000-009-100-DCR1B	1444	MA-DCR	Harwich	Nov-54	Proposed Shore Protection - Stone Groin and Sand Fill - Harwich Shore - Vicinity of Earle Road - Harwich, Massachusetts - Prepared for the DPW of Massachusetts - Division of Waterways	1	Earle Road	Groins
032-5Y1-000-000-100	032-5Y1-000-000-100-DCR1A	508	MA-DCR	Harwich	Aug-37	Proposed Shore Protection and Jetty Repairs - Harwich Shore - Harwich, Massachusetts - Prepared for the DPW of Massachusetts - Division of Waterways	1	Allens Harbor	Jetty Repairs
032-5Y1-000-000-100	032-5Y1-000-000-100-DCR1B	963	MA-DCR	Harwich	Feb-47	Proposed Shore Protection - Harwich Shore - Westerly of Allens Harbor - Harwich, Massachusetts - Prepared for the DPW of Massachusetts - Division of Waterways	1	Westerly of Allens Harbor	Groins
032-5Y1-000-000-100	032-5Y1-000-000-100-DCR1C	1221	MA-DCR	Harwich	May-52	Proposed Jetty Construction - Allens Harbor - Harwich - Prepared for the DPW of Massachusetts - Division of Waterways	1	Allens Harbor	Jetty
032-5Y1-000-000-100	032-5Y1-000-000-100-DCR1D	1407	MA-DCR	Harwich	Jun-54	Proposed Jetty Extension - Allens Harbor - Harwich, Massachusetts - Prepared for the DPW of Massachusetts - Division of Waterways	2	Allens Harbor	Jetty Extension
032-5Y1-000-000-100	032-5Y1-000-000-100-DCR1E	2563	MA-DCR	Harwich	Sep-66	Proposed Shore Protection - Jetty Extension - Allens Harbor - Prepared for the DPW of Massachusetts - Division of Waterways	1	Entrance to Allens Harbor	Jetty
032-5Y1-000-000-100	032-5Y1-000-000-100-DCR1F	3363	MA-DCR	Harwich	Mar-06	Proposed Harbor Improvements - Reconstruction of West Jetty - Allen Harbor Entrance Channel - Prepared for the DPW of Massachusetts - Division of Waterways	3	Dunes Road	Jetty
032-8P1-000-002-100	032-8P1-000-002-100-DCR1A	981	MA-DCR	Harwich	Jul-47	Proposed Channel Excavation and Jetty Repairs - Wychmere Harbor - Harwich, Massachusetts - Prepared for the DPW of Massachusetts - Division of Waterways	1	Wychmere Harbor	Jetty
032-8P1-000-002-100	032-8P1-000-002-100-DCR1B	1596	MA-DCR	Harwich	Mar-56	Proposed Harbor Improvements - Jetty Extension - Entrance to Wychmere Harbor - Harwich, Massachusetts - Prepared for the DPW of Massachusetts - Division of Waterways	1	Entrance to Wychmere Harbor	Jetty Extension
032-8P1-000-002-200	032-8P1-000-002-200-DCR2A	981	MA-DCR	Harwich	Jul-47	Proposed Channel Excavation and Jetty Repairs - Wychmere Harbor - Harwich, Massachusetts - Prepared for the DPW of Massachusetts - Division of Waterways	1	Wychmere Harbor	Jetty

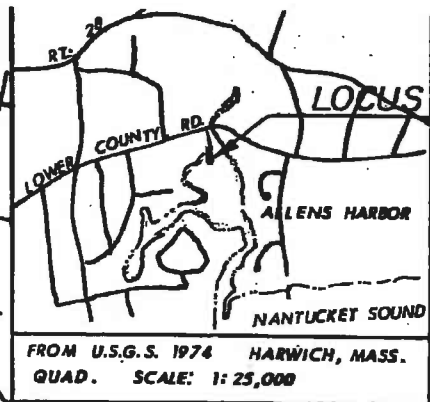
BCE Structure No	Document No	Contract/ Drawing Number	Entity	Municipality	Date	Title	Sheets	Location	Description
032-12Y1-000-58A-100	032-12Y1-000-58A-100-LIC1A	1191	DEP	Harwich	January 1985	Plan Accompanying Petition of Town of Harwich to Construct and Maintain a Boat Launching Ramp in Allens Harbor, Harwich, County of Barnstable, Massachusetts	3	Allens Harbor	Shows Existing Bulkhead License 2453
032-12Y1-000-58A-100	032-12Y1-000-58A-100-LIC1B	2490	DEP	Harwich	November 1990	Plans Accompanying Petition of Town of Harwich - Allens Harbor Boat Ramp Addition	2	Allens Harbor	Shows Existing Bulkhead
032-15U-000-023-100	032-15U-000-023-100-LIC1A	586	DEP	Harwich	September 1979	Plan Accompanying Petition of the Town of Harwich to Construct and Maintain a Concrete Pier, Pile Held Floats and Ramps, and Wood Mooring Piles and to Maintain Existing Bulkhead Constructed of Steel and an Existing Wood Pile Supported 1 Story Building In	2	Wychmere Harbor	Maintain Existing Bulkhead

032-1211-000-58A-100

LOWER

COUNTY

ROAD



C.B.

M.H. M.H.

M.H.

Existing Comfort Station

M.H.

C.B.

C.B.

C.B.

Bench Mark
Top Pile
Elev. 6.04 (MSL)

B
4.59

B

1.27

-203

Existing (cont. #2453) &
Proposed Boat Ramp

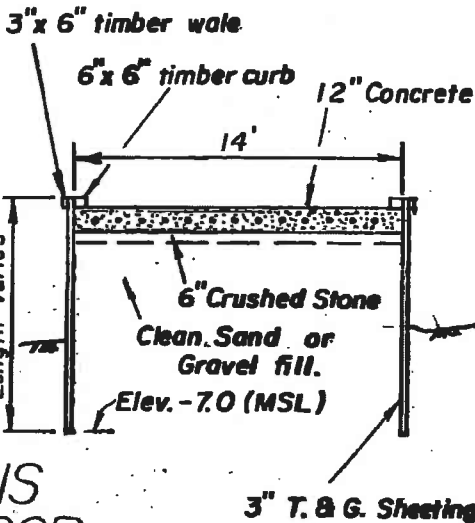
Existing Bulkhead
(cont. #2453)

ALLENS
HARBOR

SECTION A-A

Scale: 1" = 8'

Existing Pier
& Float
(contract #2453)



PLAN

Scale: 1" = 40'

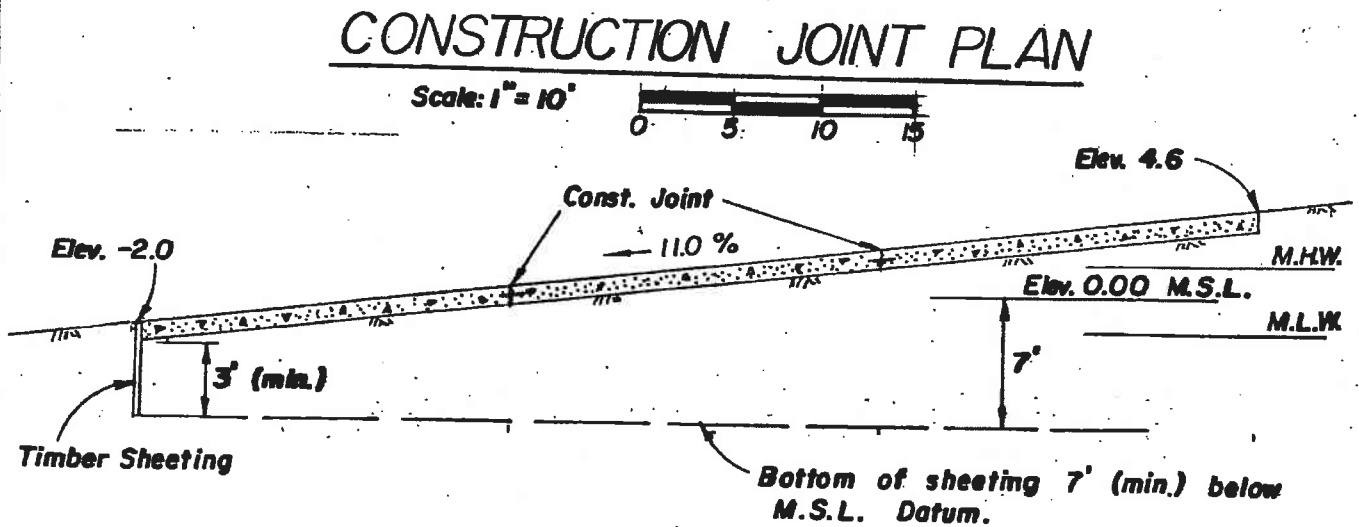
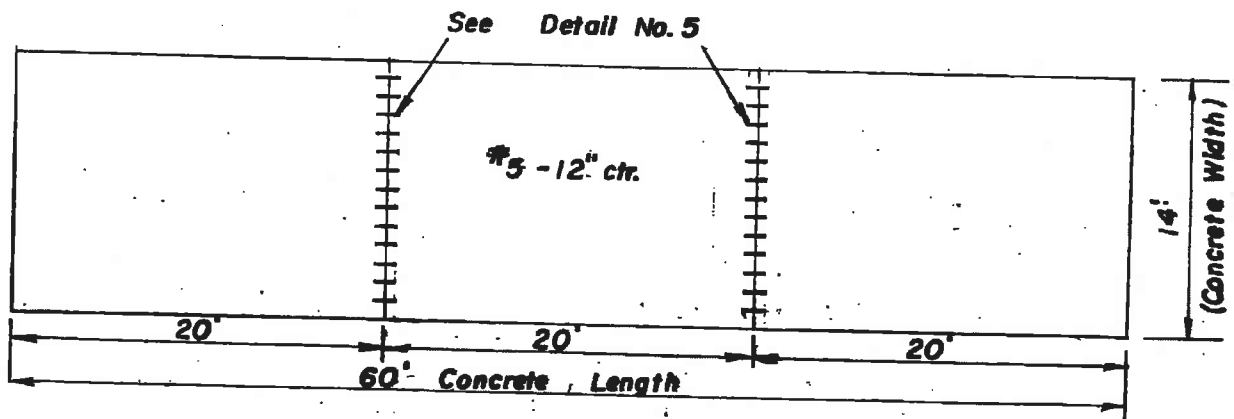
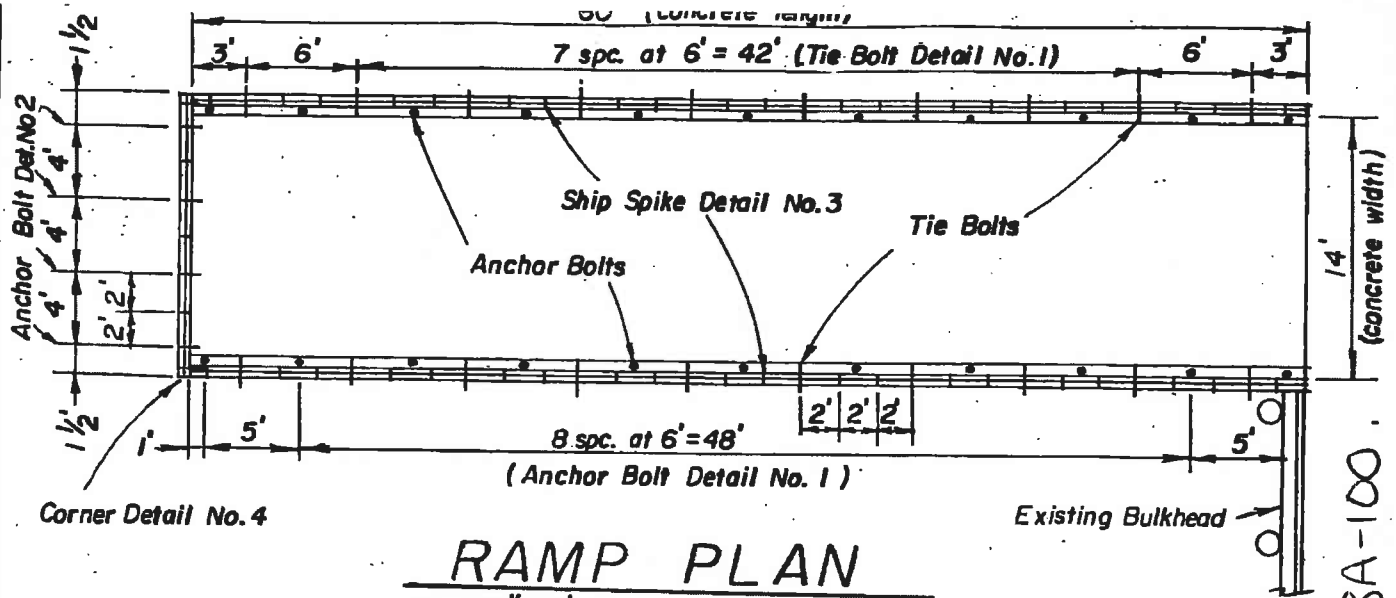
PLAN ACCOMPANYING PETITION OF
TOWN OF HARWICH
TO CONSTRUCT AND MAINTAIN A BOAT
LAUNCHING RAMP IN ALLENS HARBOR,
HARWICH, COUNTY OF BARNSTABLE, MASS.

84W-186

Martin E. Moran

SHEET 1 OF 3

LICENSE PLAN NO. 1191
Approved by Department of Environmental Quality Engineering
of Massachusetts JANUARY 28, 1985
Commissioner
John S. Gagne, Jr. CHIEF ENGINEER
Theriel Harding DIVISION DIRECTOR

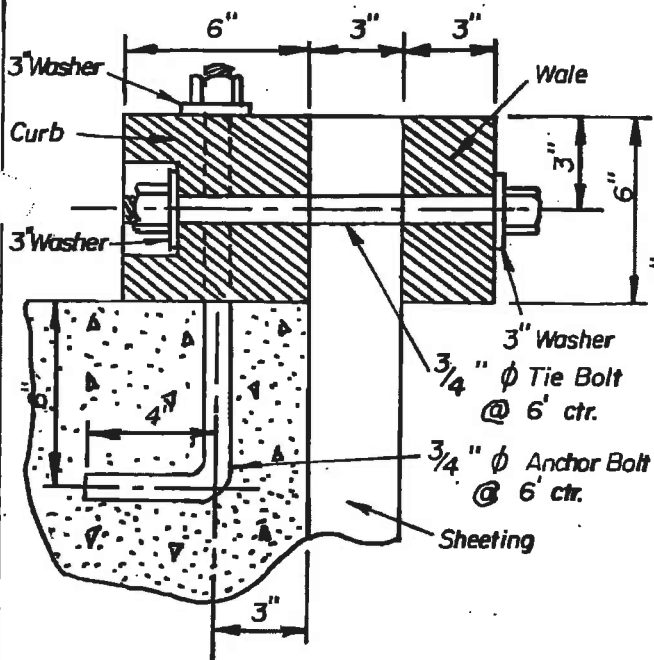


LICENSE PLAN NO. 1191

Approved by Department of Environmental Quality Engineering
JANUARY 28, 1985

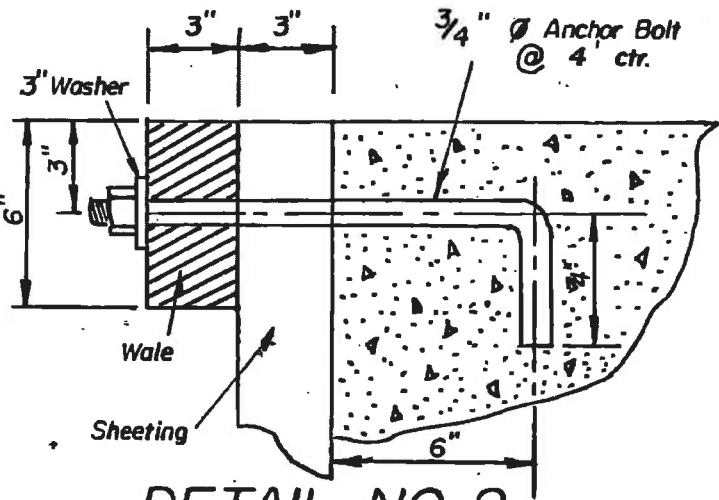
Martin E. Moran
840-186

032-1241-000-58A-100



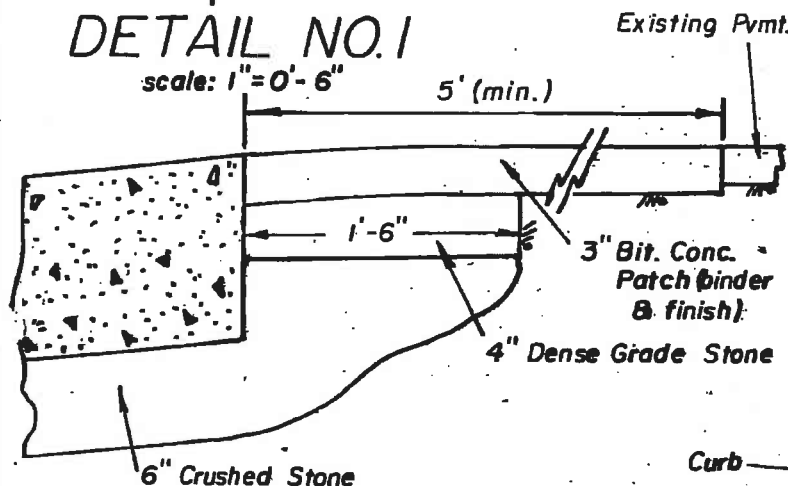
DETAIL NO. 1

scale: 1" = 0'-6"



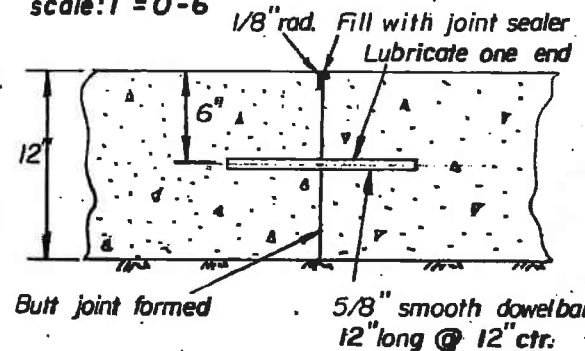
DETAIL NO. 2

scale: 1" = 0'-6"



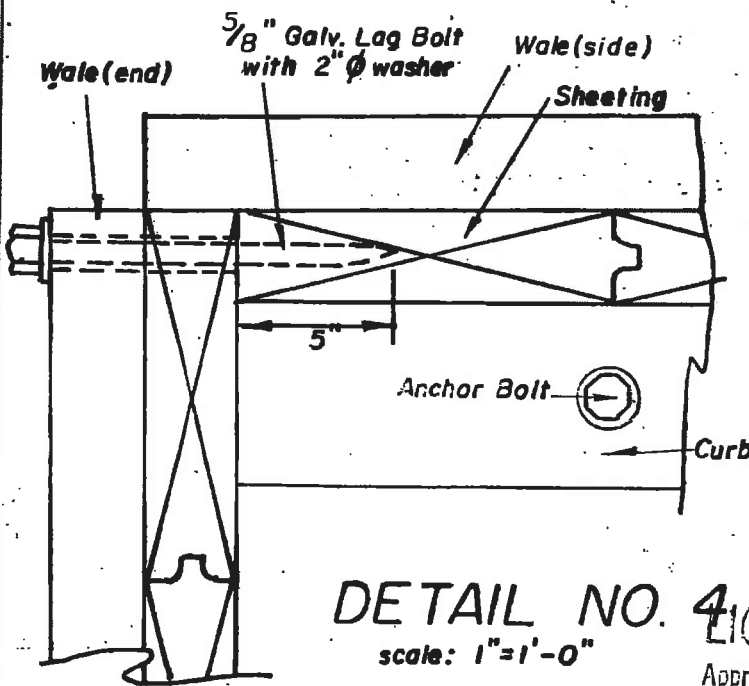
SECTION B-B

scale: 1" = 1'-0"



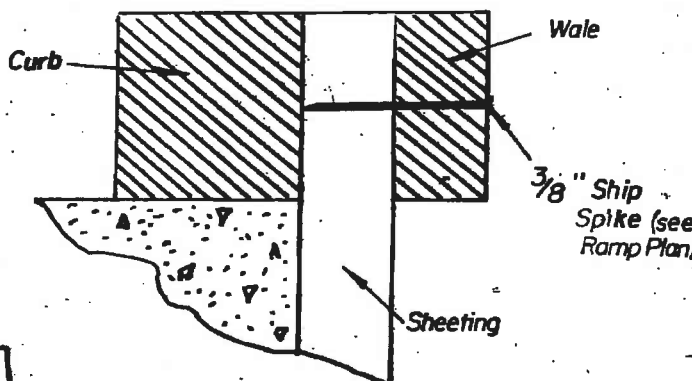
DETAIL NO. 5

scale: 1" = 1'-0"



DETAIL NO. 4

scale: 1" = 1'-0"



DETAIL NO. 3

scale: 1" = 0'-6"

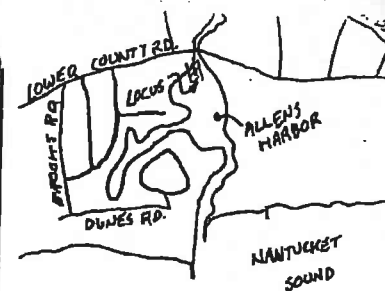
Martin E. Moran

LICENSE PLAN NO. 1191

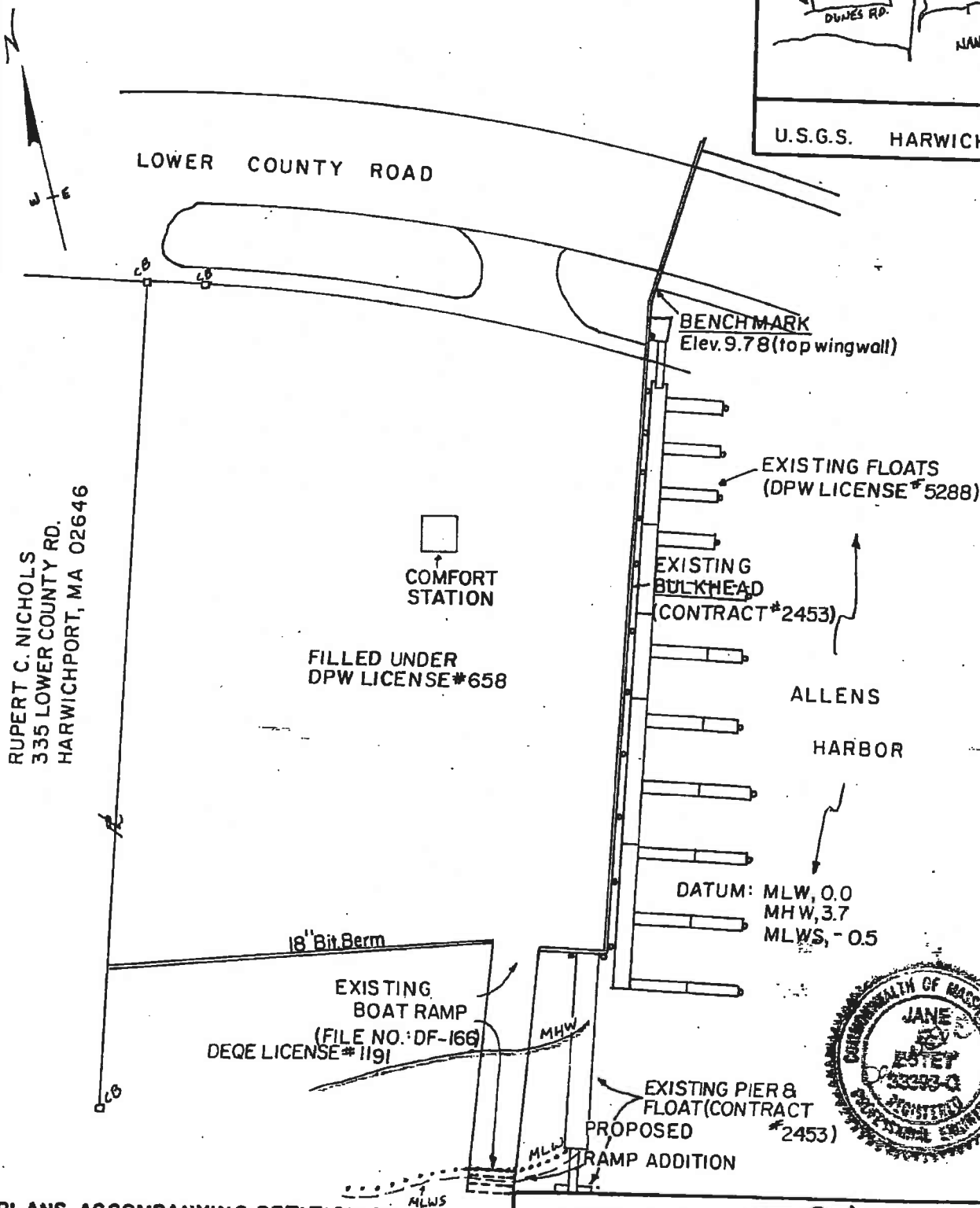
Approved by Department of Environmental Quality Engineering

032-1241-000-58A-100

032-1241-000-58A-100



U.S.G.S. HARWICH, MA



PLANS ACCOMPANYING PETITION OF:
TOWN OF HARWICH,
ALLENS HARBOR BOAT RAMP
ADDITION.

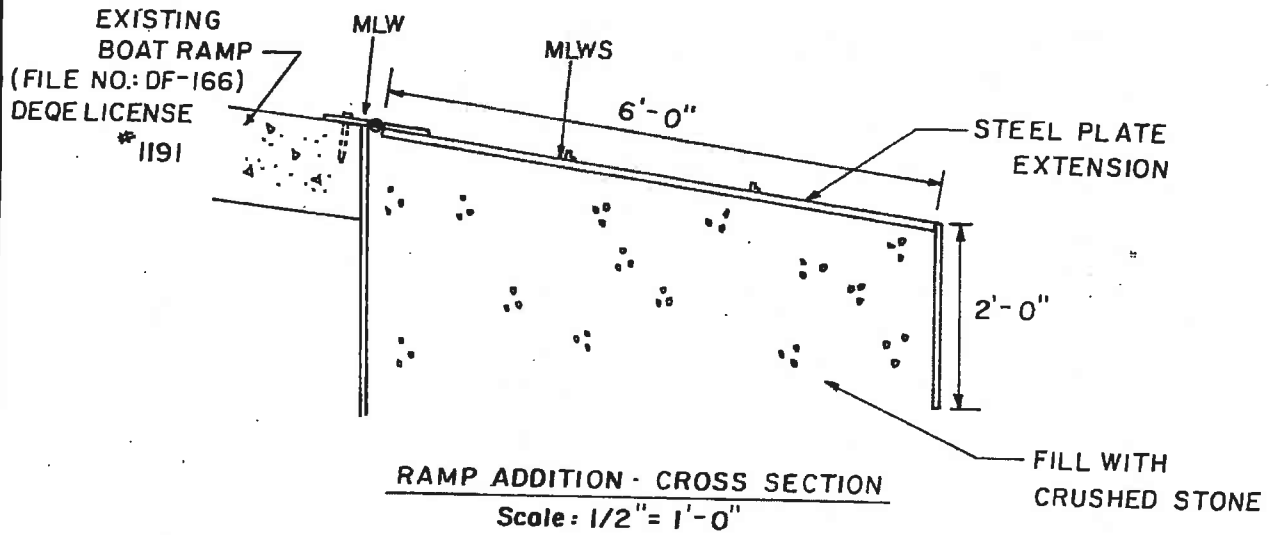
HARWICH ENGINEERING DEPT.
SCALE: 1" = 40'

LICENSE PLAN NO. 2490

Approved by Department of Environmental Protection

[Signature]
COMMISSIONER
SECTION CHIEF

032-1241-000-58A-100



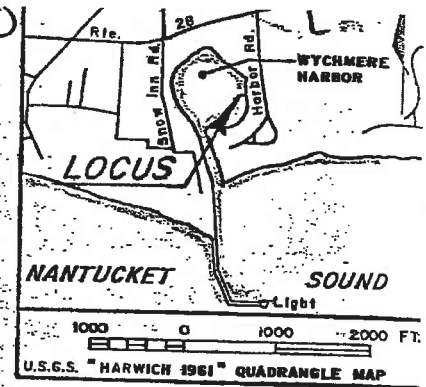
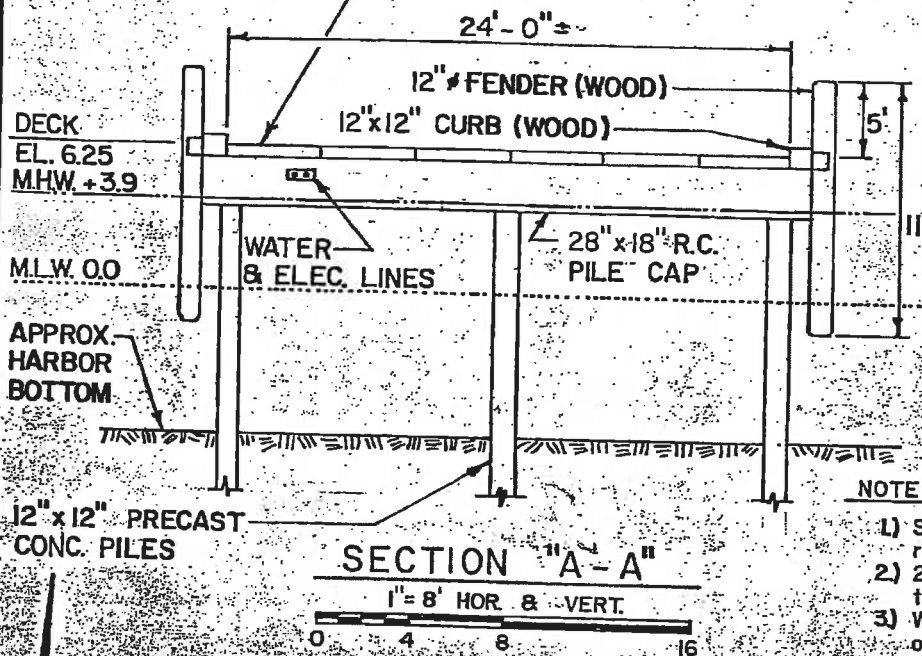
LICENSE PLAN NO. 2490

Approved by Department of Environmental Protection

Date: NOV 30 1990

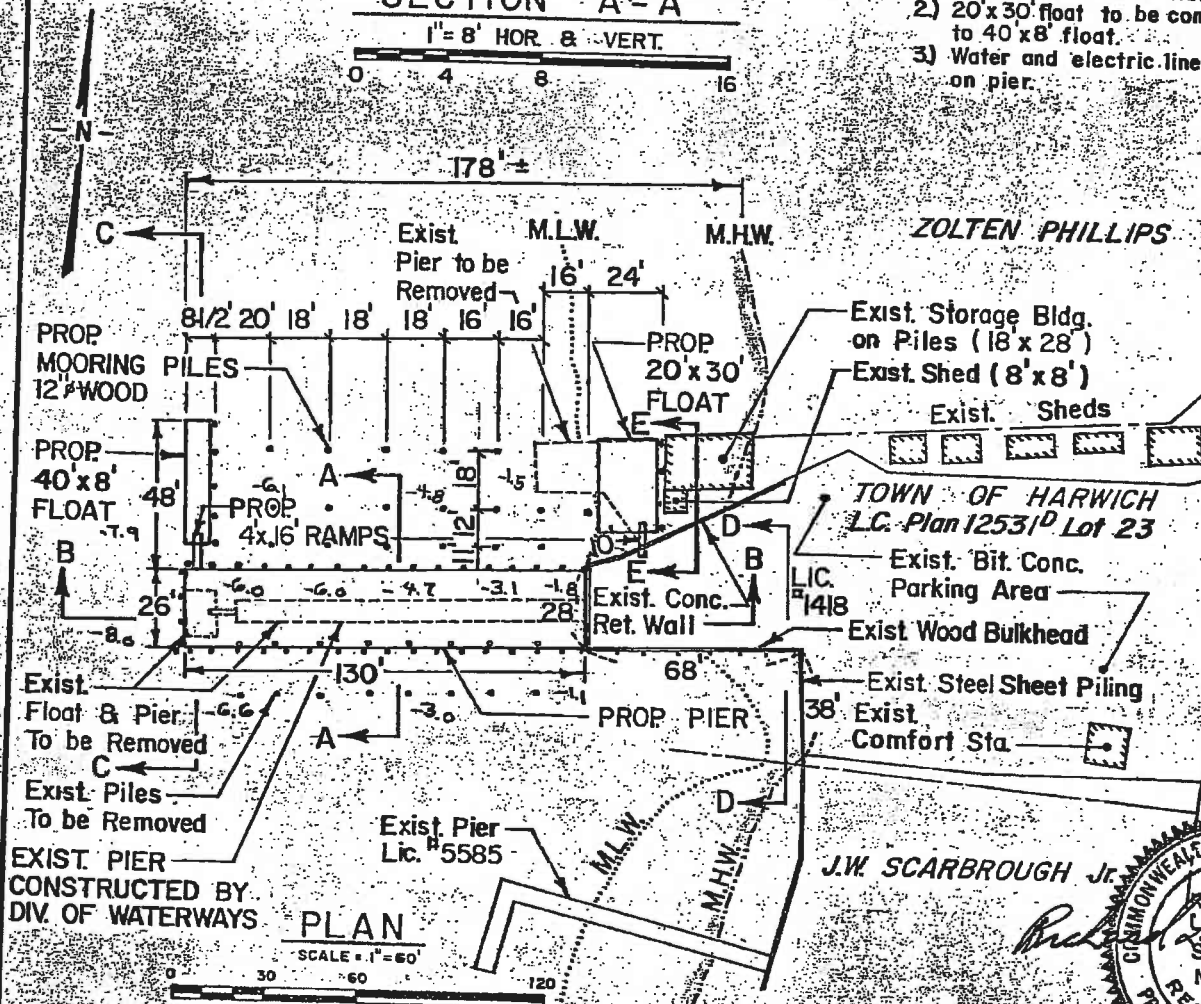
PRESTRESSED UNITS

032-15U-000-023-100



NOTE:

- 1) Soundings are in feet and tenths and refer to Mean Low Water.
- 2) 20' x 30' float to be constructed similar to 40' x 8' float.
- 3) Water and electric lines to be installed on pier.



PLAN ACCOMPANYING PETITION OF THE TOWN OF HARWICH

TO CONSTRUCT AND MAINTAIN A CONCRETE PIER, PILE HELD FLOATS AND RAMPS, AND WOOD MOORING PILES AND TO MAINTAIN EXISTING BULKHEAD CONSTRUCTED OF STEEL AND AN EXISTING WOOD PILE SUPPORTED 1 STORY BUILDING

WYCHMERE HARBOR
HARWICH, MASSACHUSETTS
JUNE 18, 1979

TIBBETTS ENGINEERING CORP NEW BEDFORD, MA.

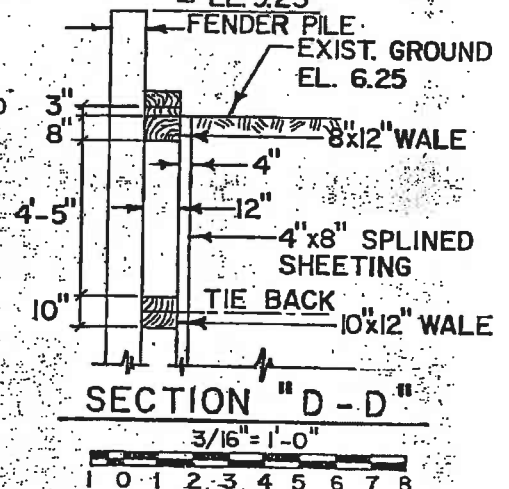
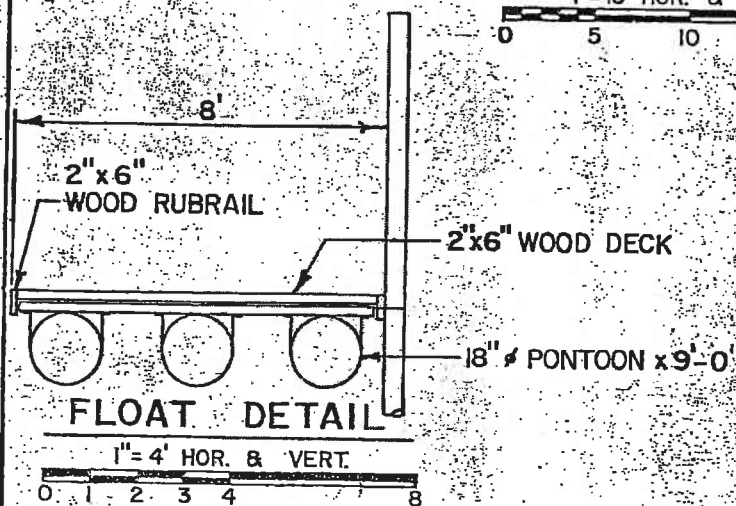
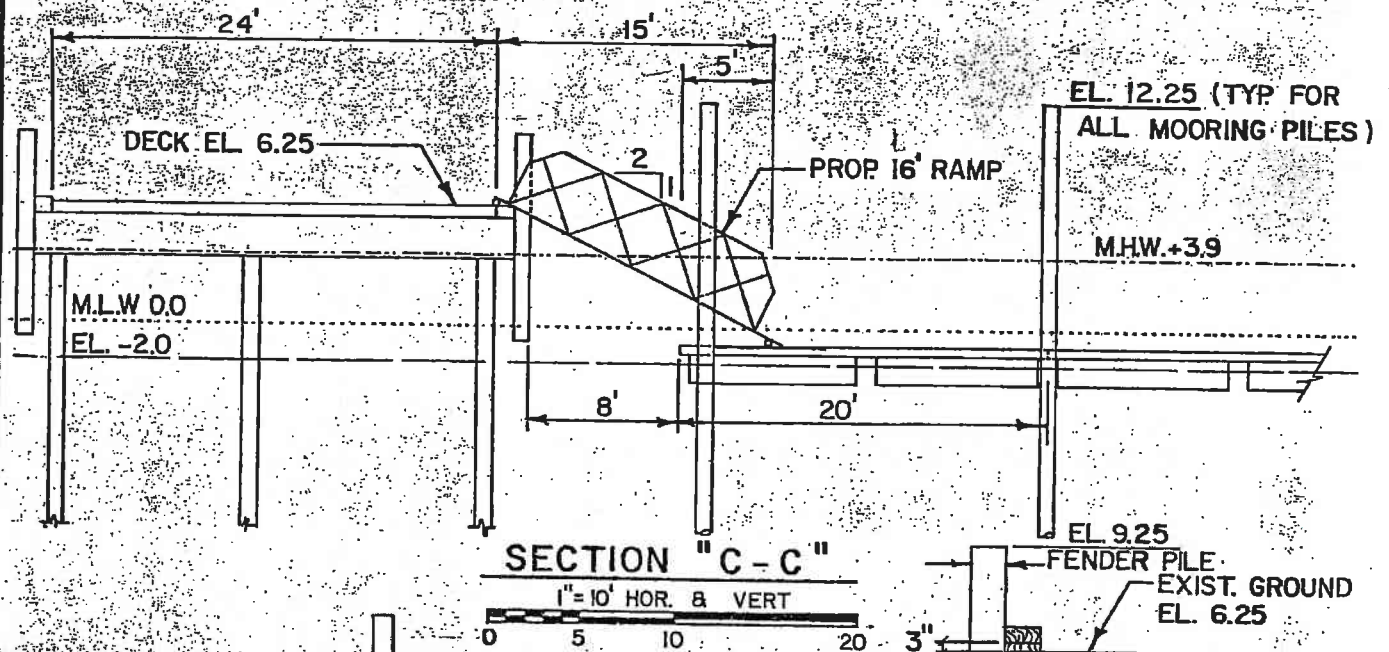
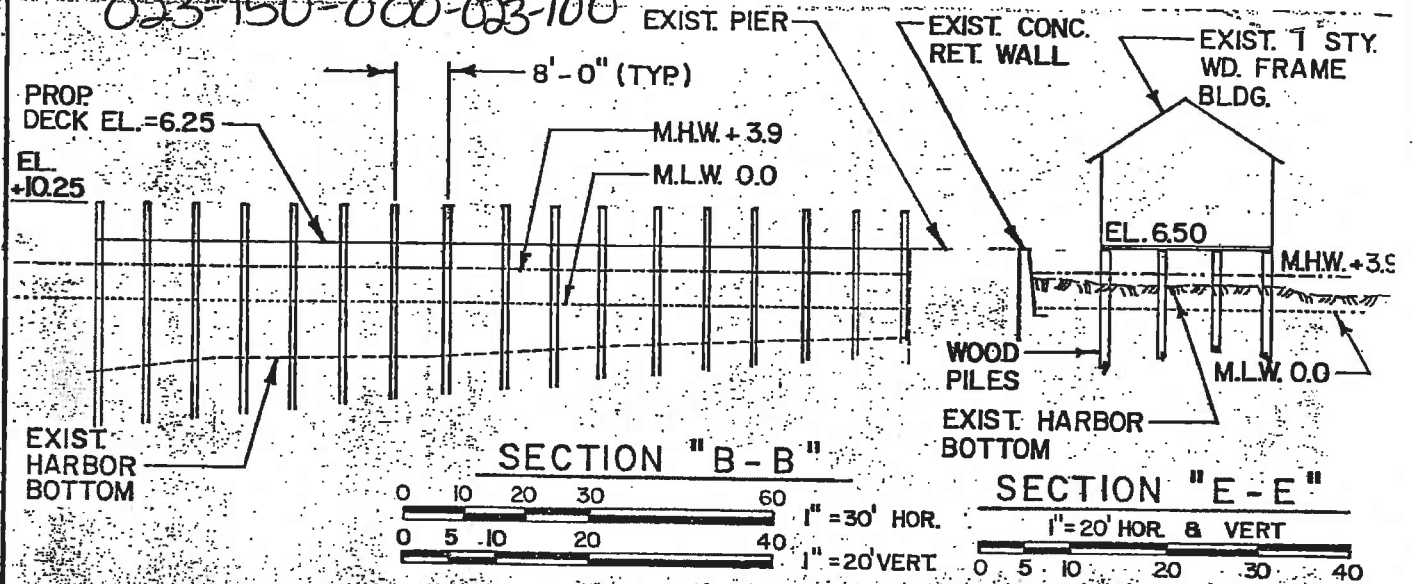
LICENSE PLAN NO. 596

Approved by Department of Environmental Quality Engineering
of Massachusetts September 12, 1979

COMMISSIONER
CHIEF ENGINEER



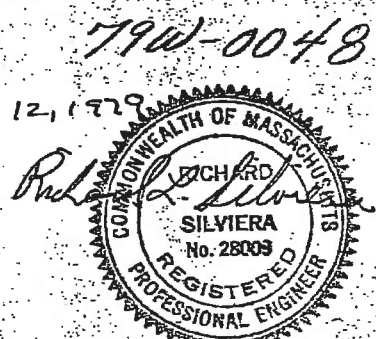
023-150-000-023-100



LICENSE PLAN NO. 596 September, 12, 1979

Approved by Department of Environmental Quality Engineering
 PLAN ACCOMPANYING PETITION OF
 THE TOWN OF HARWICH
 JUNE 18, 1979

TIBBETTS ENGINEERING CORP NEW BEDFORD, MA.

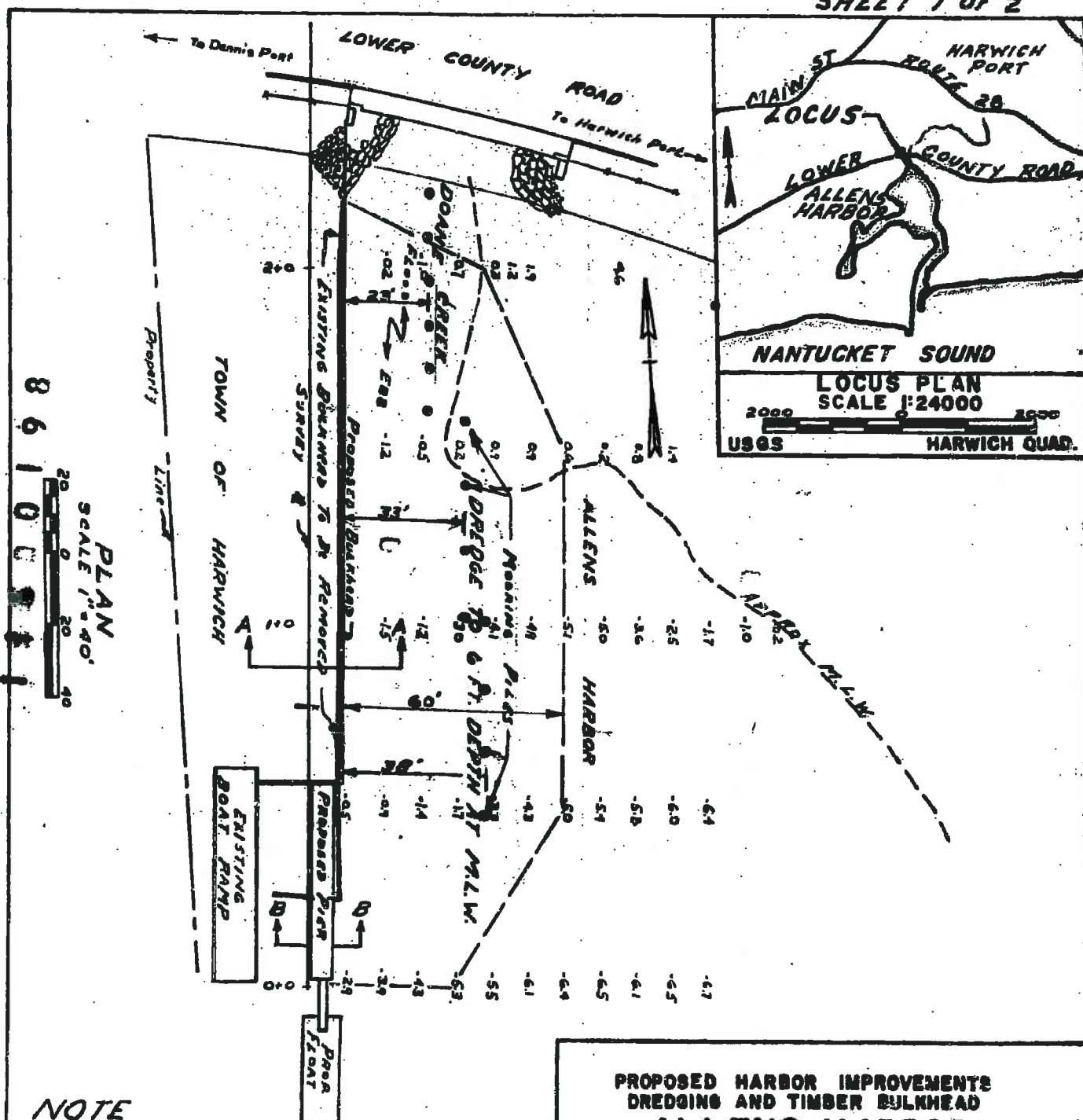


TOWN: HARWICH
 SOURCE: US ACOE
 LOCATION: CONCORD, MA
 DATE OF RESEARCH: AUGUST 2007

8CE Structure No	Document No	Contract/ Drawing Number	Entity	Municipality	Date	Title	Sheets	Location	Description
032-12Y1-000-58A-100	032-12Y1-000-58A-100-COE1A	65-87	USACE	Harwich	March 1965	Proposed Harbor Improvements Dredging and Timber Bulkhead - Allens Harbor - Harwich, Massachusetts - Application by DPW of Massachusetts - Division of Waterways	2	Allens Harbor	Timber Bulkhead
032-15T-000-003-100	032-15T-000-003-100-COE1A	68-352	USACE	Harwich	October 1968	Proposed Marina Facility - Bulkhead, Floats, Access Ramp and Parking Area - Saquatucket harbor - Formerly Andrews River - Harwich, Massachusetts - Application by DPW of Massachusetts - Division of Waterways	2	Saquatucket Harbor	Bulkhead
032-15T-000-003-200	032-15T-000-003-200-COE2A	68-352	USACE	Harwich	October 1968	Proposed Marina Facility - Bulkhead, Floats, Access Ramp and Parking Area - Saquatucket harbor - Formerly Andrews River - Harwich, Massachusetts - Application by DPW of Massachusetts - Division of Waterways	2	Saquatucket Harbor	Bulkhead
032-17N3-000-001-100	032-17N3-000-001-100-COE1A	53-146	USACE	Harwich	July 1953	Proposed Beach Development - Nantucket Sound - Harwich, Massachusetts - Application by DPW of Massachusetts - Division of Waterways	1	Deep Hole Road	Jetty
032-17N3-000-001-100	032-17N3-000-001-100-COE1B	59-119	USACE	Harwich	March 1959	Proposed Groins and Sand Fill - Vicinity of Red River Beach - Nantucket Sound - Harwich, Massachusetts - Application by DPW of Massachusetts - Division of Waterways	1	Red River Beach	Groins
032-2B1-000-018-100	032-2B1-000-018-100-COE1A	47-32	USACE	Harwich	February 1947	Proposed Stone Jetty in Nantucket Sound Harwich, Mass. - Application by DPW of Massachusetts - Division of Waterways	1	Beach Road	Jetty
032-2B1-000-018-100	032-2B1-000-018-100-COE1B	54-92	USACE	Harwich	March 1954	Proposed Stone Groin and Sand Fill - Nantucket Sound - Harwich, Massachusetts - Application by DPW of Massachusetts - Division of Waterways	1	Pleasant Road	Jetty

072 0339 032-12Y1-000-58A-100

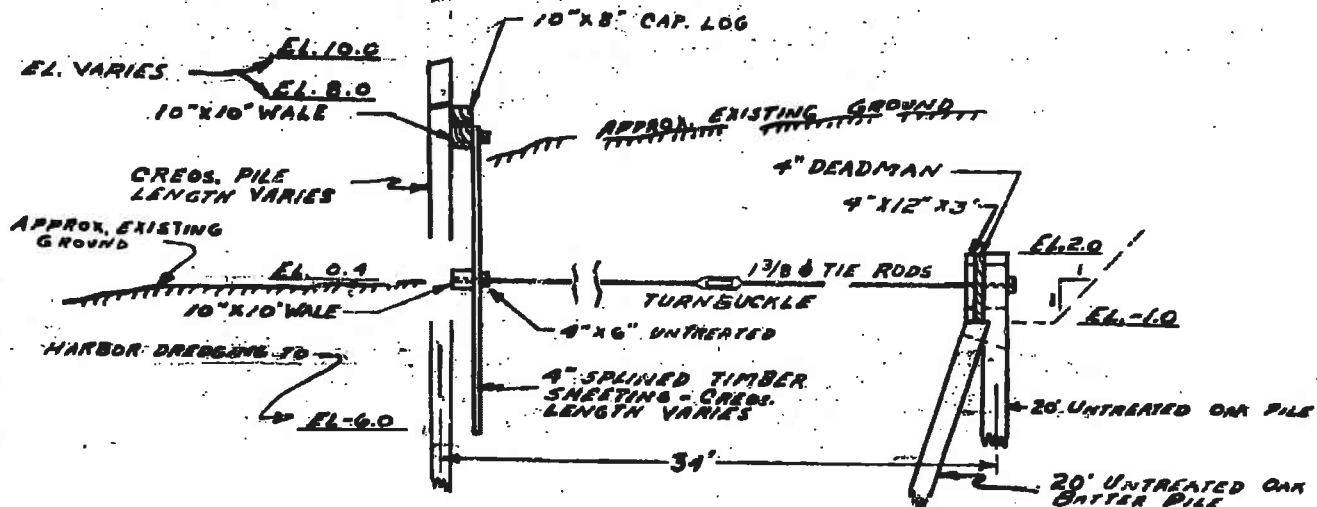
SHEET 1 OF 2



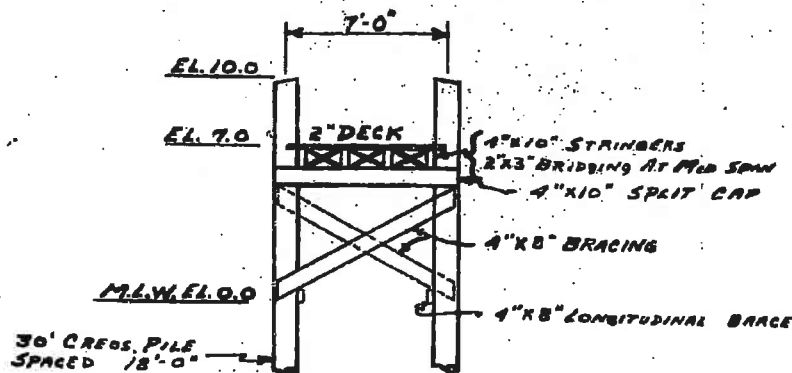
072 0340

032-12Y1-000-58A-100

SHEET 2 OF 2

**BULKHEAD SECTION A-A**

Scale 1" = 8'

**PIER SECTION B-B**

Scale 1" = 8'



PROPOSED HARBOR IMPROVEMENTS
DREDGING AND TIMBER BULKHEAD

ALLENS HARBOR
HARWICH MASS

APPLICATION BY
DEPARTMENT OF PUBLIC WORKS OF MASSACHUSETTS
DIVISION OF WATERWAYS
MARCH 1965

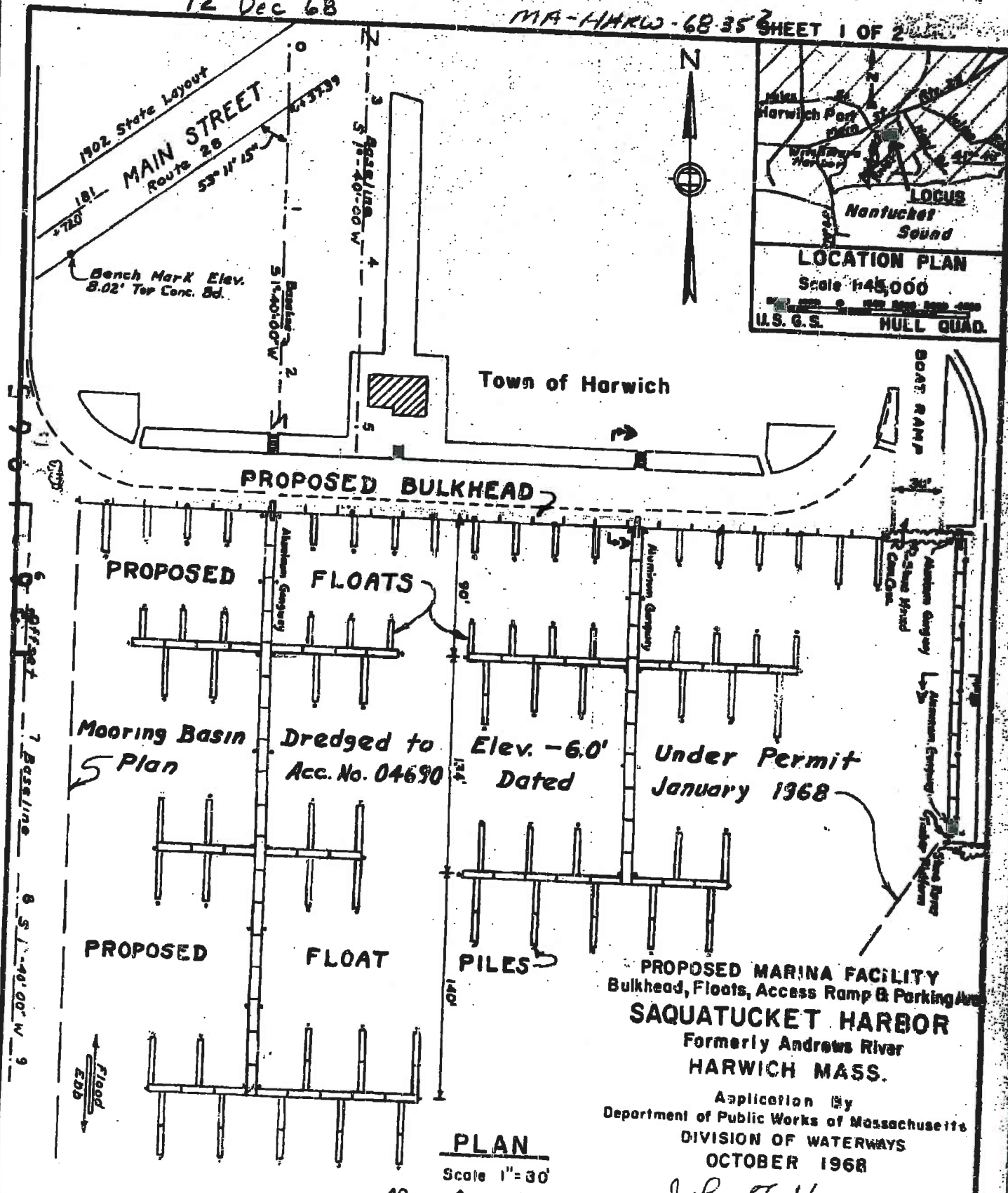
John T. Lannon
DEPUTY CHIEF ENGINEER WATERWAYS

ACC. 04440-B

032-15T-000-003-100
032-15T-000-003-200

12 Dec 68

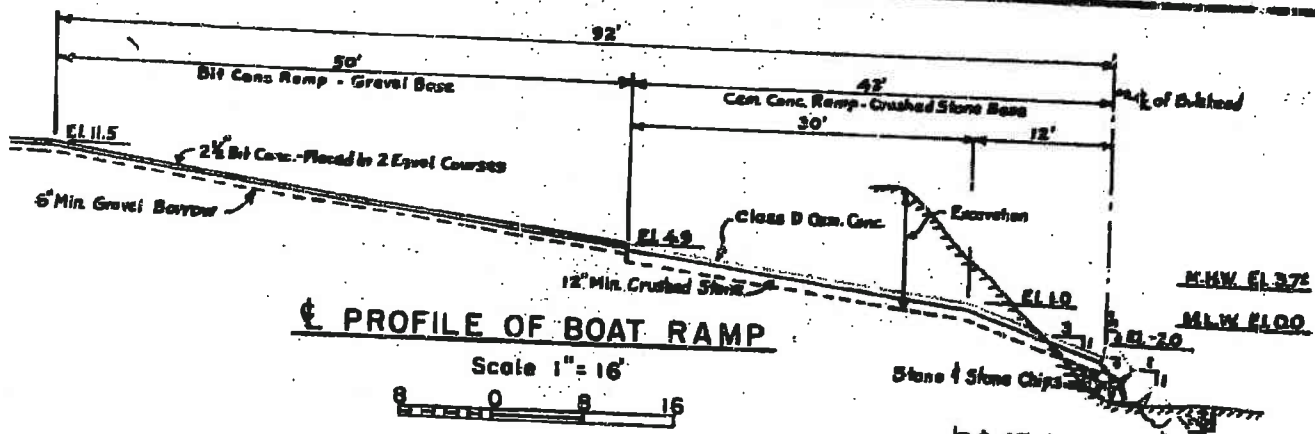
MA-HRW-6835 SHEET 1 OF 2



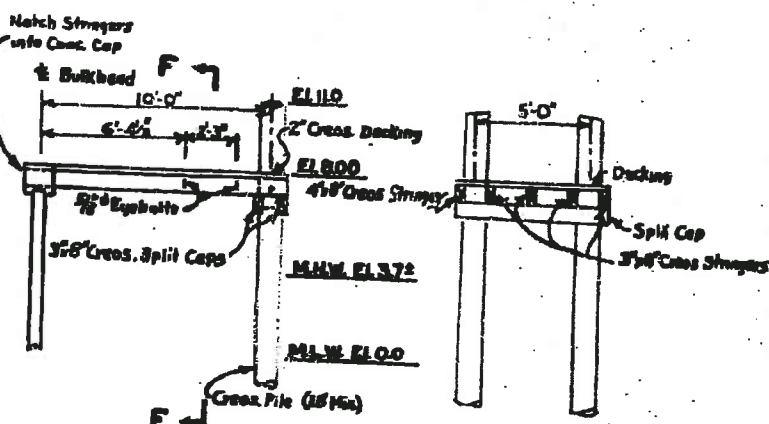
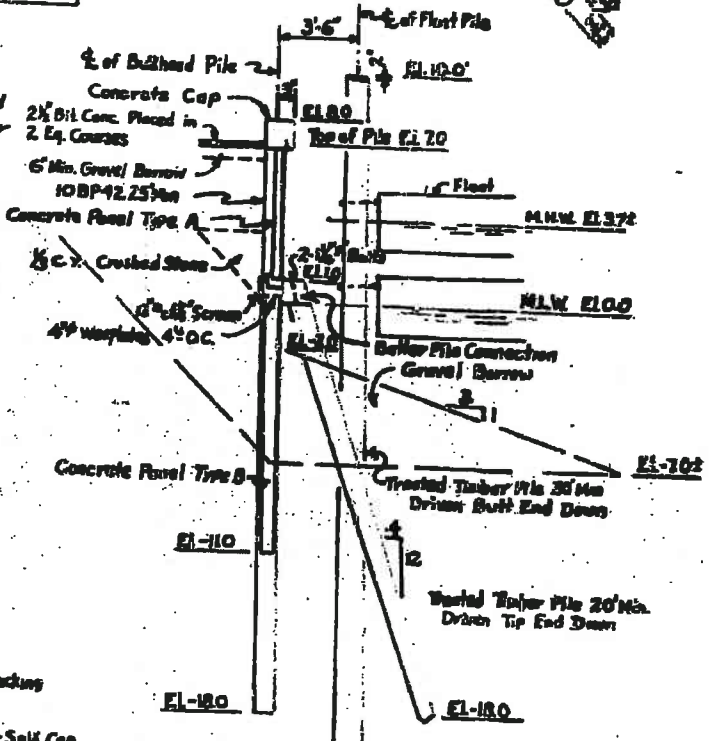
0 6 5 0 0 3 8

032-157-000-003-100
032-157-000-003-200

SHEET 2 OF 2



Notes:
Location of work to be done shown in Red Elevations are in feet & tenths and refer to the plane of M.L.W. Minus figures show depths below that same plane.
All construction methods and materials to be in accordance with standard practice
Property Owners:
Easterly Abbutters 1/4 William F. Downey & Julia T. Downey 1/4 Rudolf Homan & Helen Kroger Homan.
Westerly Abbutters 1/4 Frank H. Thompson 1/4 Marion M. Raymond 1/4 John J. Grulkemans
Property lines are shown on Application dated January 1968 (Acc. No. 04690)

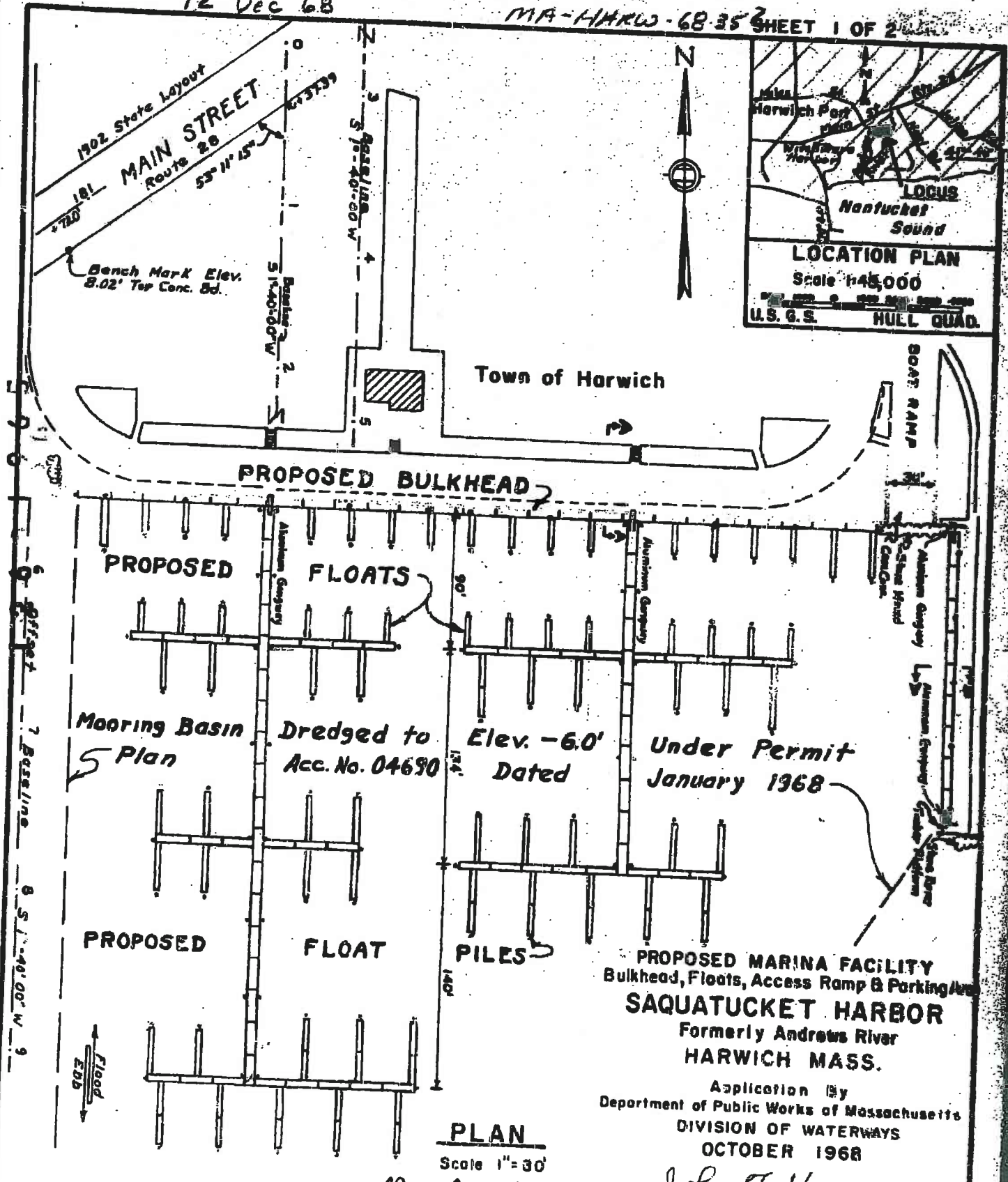


SECTION A-A
Scale 1/8" = 1'-0"

ELEVATION
SECTION F-F
TIMBER PLATFORM
Scale 1" = 8'

PROPOSED MARINA FACILITY
Bulkhead, Floats, Access Ramp & Parking Area
SAQUATUCKET HARBOR
Formerly Andrews River
HARWICH MASS.
Application By
Department of Public Works of Massachusetts
DIVISION OF WATERWAYS
OCTOBER 1968

MA-HRW-68-352 SHEET 1 OF 2



032-157-000-003-100
032-157-000-003-200

1 PROFILE OF BOAT RAMP

8 0 8 16

Location of work to be done shown in Red
Elevations are in feet & tenths and refer
to the plane of M.L.W. Minus figures
show depths below that same plane.
All construction work

All construction methods and materials to be in accordance with standard practice.
Property Owners:

Easterly Abbutters: 1/4 William F. Downey &
Julia T. Downey 1/4 Rudolf Homan & Helen
Kroger Homan.

Westerly Abutters: Frank H. Thompson
Marion M. Raymond John J. Grulkemans
Property lines are shown on Application
dated January 1968 (Acc. No. 04690).

ELEVATION SECTION F-F
TIMBER PLATFORM

Scale 1" = 8'

A number line from 0 to 10. The number 4 is written above the tick mark for 4.

Scale 1/8"=1'-0"

PROPOSED MARINA FACILITY
Bulkhead, Floats, Access Ramp & Parking Area

SAQUATUCKET HARBOR

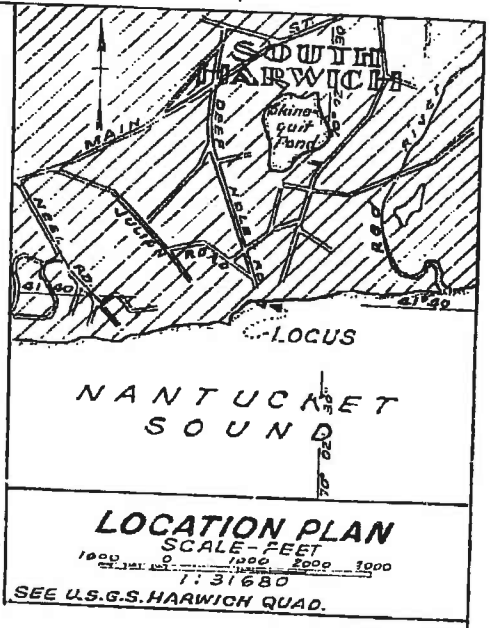
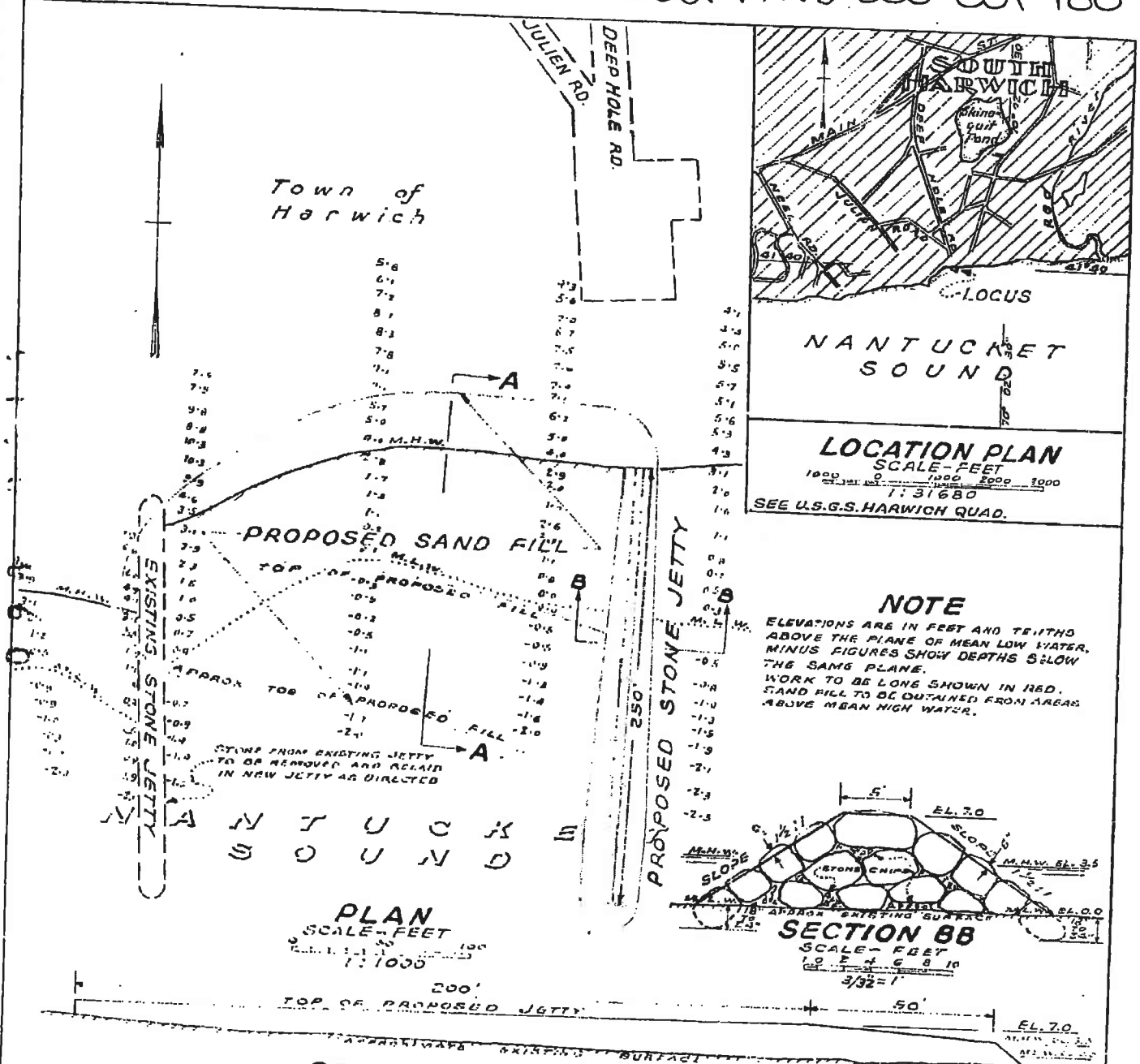
Formerly Andrews River
HARWICH MASS.

Application By
Department of Public Works of Massachusetts
DIVISION OF WATERWAYS

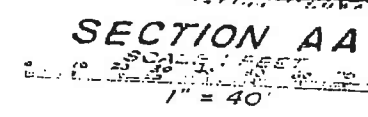
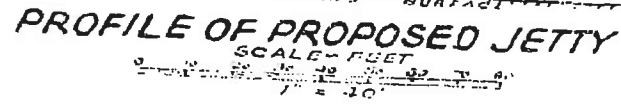
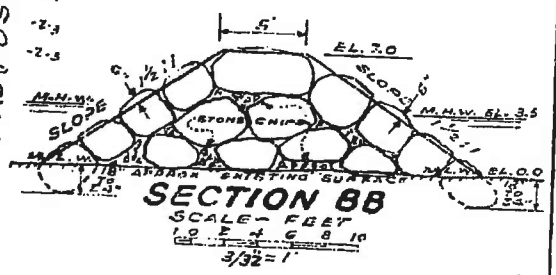
OCTOBER 1968

0 9 3 0 0 9 8

032-17N3-000-001-100



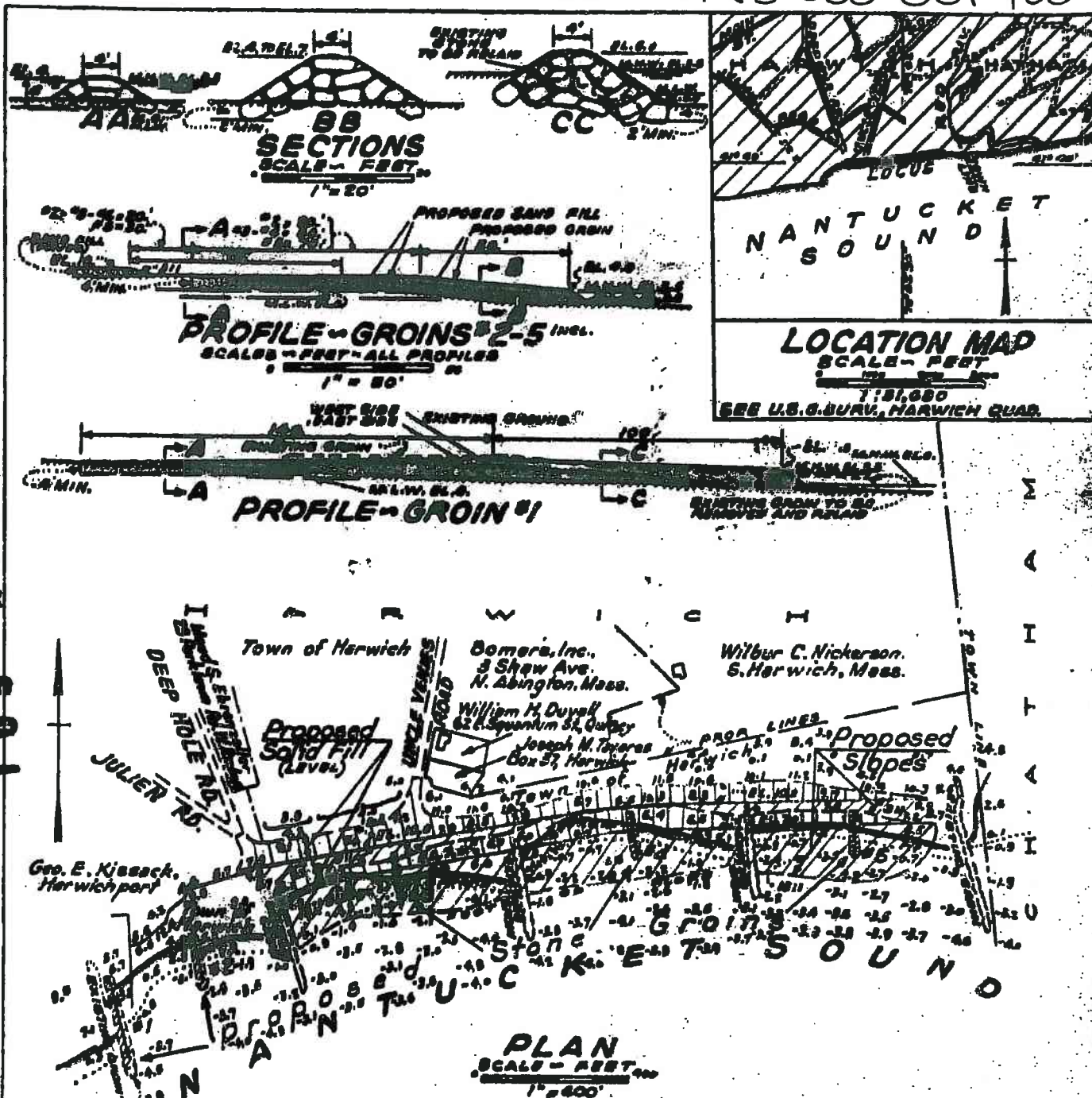
NOTE
ELEVATIONS ARE IN FEET AND TENTHS ABOVE THE PLANE OF MEAN LOW WATER. MINUS FIGURES SHOW DEPTHS BELOW THE SAME PLANE.
WORK TO BE DONE SHOWN IN RED. SAND FILL TO BE OBTAINED FROM AREAS ABOVE MEAN HIGH WATER.



**PROPOSED BEACH DEVELOPMENT
NANTUCKET SOUND
HARWICH, MASS.**
APPLICATION BY
DEPARTMENT OF PUBLIC WORKS OF MASSACHUSETTS
DIVISION OF WATERWAYS
JULY 1953
SCALES SHOWN
John A. Bradford
ACTING DISTRICT WATERWAYS ENGINEER

083 1259

032-17N3-000-001-100



[illegible]

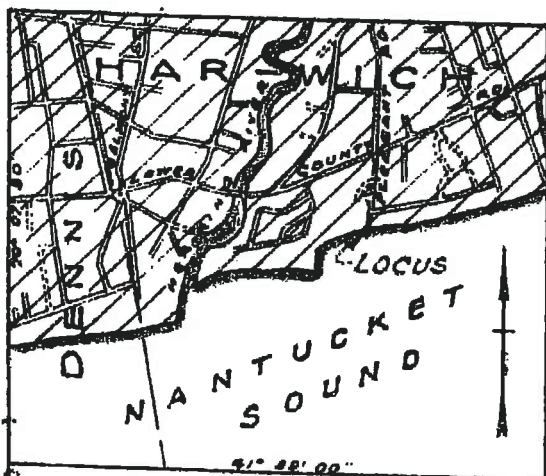
AGC 02597

NEW ENGLAND DIV.

091 1375 APR 29 48 AM '54

BOSTON, MASS.

032-2B1-000-018-100

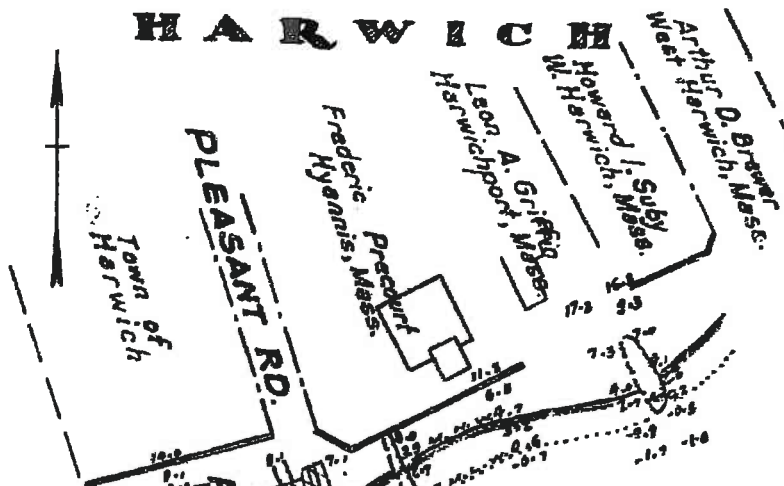


LOCATION PLAN

SCALE - FEET

1:51680
SEE U.S. GEOL. SURV. HARWICH QUAD.

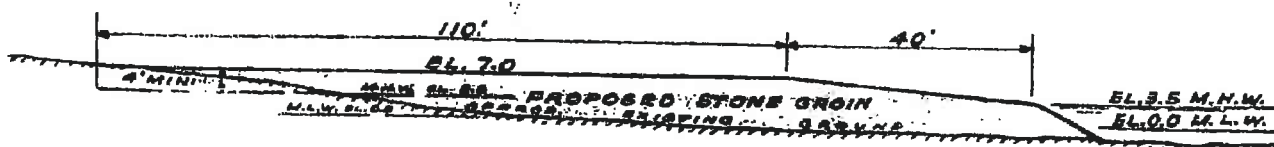
HARWICH



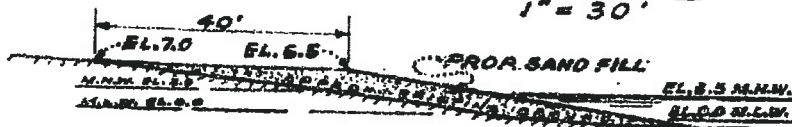
NANTUCKET PLAN
SCALE - FEET
1:2000

Old Mill Point Corp.
Henry Smith, Jr.
Hyannis, Mass.

Clifton Russell
267 Summer St.
Boston, Mass.



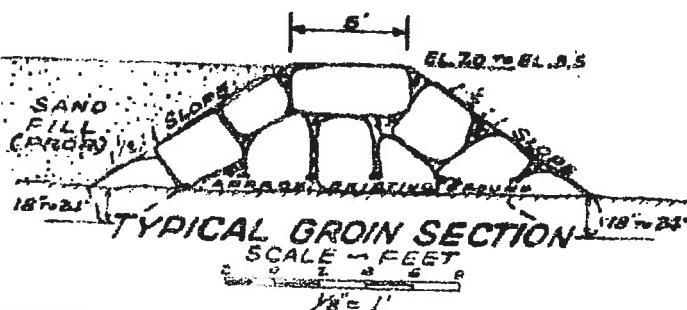
GROIN PROFILE
SCALE - FEET
1" = 30'



SECTION AA
SCALE - FEET
1" = 30'

NOTE

ELEVATIONS ARE IN FEET AND TENTHS ABOVE THE PLANE OF MEAN LOW WATER, MINUS FIGURES SHOW DEPTHS BELOW THE SAME PLANE. PROPOSED WORK SHOWN IN RED.



TYPICAL GROIN SECTION
SCALE - FEET
1" = 1'

PROPOSED
STONE GROIN & SAND FILL
NANTUCKET SOUND
HARWICH SHORE AT PLEASANT ROAD
HARWICH, MASS.

APPLICATION BY
DEPARTMENT OF PUBLIC WORKS, MASSACHUSETTS
DIVISION OF WATERWAYS

MARCH 1954

AD MacKinnon
DISTRICT WATERWAYS ENGINEER

Section V

Chatham

Section V – Community Findings – Town of Chatham

COMMUNITY DESCRIPTION

The Town of Chatham consists of a land area of 16.43 square miles out of a total area of 24.33 square miles and had a population of 6,625 in the 2000 census. The Town is located on Cape Cod of Massachusetts and its location can be seen on this report's cover. The estimated length of shoreline is 37 miles that are directly exposed to open ocean. The Town is protected from major coastal storms by both natural and man-made shoreline structures that require maintenance to insure the long term protection of its coastline. The man-made and publicly owned structures that protect the Town were investigated for their ability to provide adequate protection from major coastal storms. Structures have been identified as publicly owned, including coastal dunes and beaches, based on evidence of investment of public funds made to create/enhance/maintain these structures. The assessment did not include floating or pile supported structures as they are assumed not to provide any significant coastal protection from major storm events.

STRUCTURE INVENTORY

Within the Town of Chatham, there were 23 structures which had public or unknown ownership which provide significant coastal protection. The location of the structures can be seen in Sheets 1 through Sheet 11 in Section V-B of this report. The structures were categorized by their type and by their structural condition based on a preliminary field assessment. The distribution of structures by type and condition can be seen in the following table:

STRUCTURE TYPE AND QUANTITY - Town of Chatham

Primary Structure (1)	Total Structures	Structure Condition Rating				Total Length
		A	B	C	D	
Bulkhead / Seawall	6		1	5		1360
Revetment	7		2	4	1	1450
Breakwater						
Groin / Jetty	3			1	2	1045
Coastal Dune	3			3		210
Coastal Beach	4			4		1610
	23		3	17	3	5675

Within the above table, the total length of each type of structure is also provided. The structures are listed by the type which is providing the primary coastal protection. Many sites have multiple structure types at the same location (i.e. revetment in front of seawall). These secondary structures, although not identified within these tables, are included in the development of repair/rehabilitation costs.

The development of repair costs has been included by structure type and by condition. In the Town of Chatham's case there are a total of 23 structures which would require approximately \$ 4.2 million to bring all the coastal structures to "A" Rating. Most critical will be the structures in the "D" and "F" classifications as those are assumed to undergo some level of damage or failure during the next major coastal storm event. To reconstruct these structures, identified in the preliminary survey as being in poor condition, an estimated \$ 1.4 million would be required to upgrade the Town's coastal protection.

STRUCTURE REPAIR / RECONSTRUCTION COST - Town of Chatham

Primary Structure (1)	Total Structures	Structure Condition Rating					Total Cost
		A	B	C	D	F	
Bulkhead / Seawall	6	\$	36,210	\$ 1,176,437			\$ 1,212,647
Revetment	7	\$	63,433	\$ 233,679	\$ 262,264		\$ 559,376
Breakwater							\$ -
Groin / Jetty	3			\$ 252,320	\$ 1,140,942		\$ 1,393,262
Coastal Dune	3			\$ 41,280			\$ 41,280
Coastal Beach	4			\$ 1,020,096			\$ 1,020,096
	23	\$ -	\$ 99,643	\$ 2,723,812	\$ 1,403,206	\$ -	\$ 4,226,661

Based on the limited research within the scope of this project research, the presumed ownership of the structures was established on an initial basis and would be subject to more intense review in future tasks. Structures identified as being owned privately were excluded from further consideration. Although ownership of the land on which the structure was located was a factor, the structure ownership was treated as a separate issue from land ownership. For the Town of Chatham, the breakdown of structures by assumed ownership is as follows:

STRUCTURE OWNERSHIP / REPAIR COST - Town of Chatham

Primary Structure (1)	Total Structures	Structure Condition Rating					Total Cost
		A	B	C	D	F	
Town Owned	23	\$	99,643	\$ 2,723,812	\$ 1,403,206		\$ 4,226,661
Commonwealth of Massachusetts							\$ -
Federal Government Owned							\$ -
Unknown Ownership							\$ -
	23	\$ -	\$ 99,643	\$ 2,723,812	\$ 1,403,206	\$ -	\$ 4,226,661

The identification of presumed ownership was not based on the investigation of legal documents but relied on property ownership and from construction and regulatory documents that were found. A more detailed investigation of legal documents and agreements would be required where structure ownership is disputed. A more detailed identification of structure type, length, condition and location can be found in Section V-B which contains Structure Assessment Reports for each individual structure found.

SUMMARY

The enclosed reports and associated documents reflects the Town of Chatham's coastal structure information that will eventually be input into a state-wide GIS database and will be accessible through MassGIS. This data, when compiled state-wide, will be critical in the development of both short term and long term planning for maintaining and improving Massachusetts coastal protection.

This database will also provide relatively quick access to identify available documentation for these structures as well as the ability to be updated as coastal structure improvements are made.

Section V - Chatham

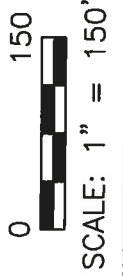
Part B

Structure Assessment Reports



COASTAL STRUCTURE LOCATION PLAN

TOWN OF CHATHAM
COASTAL INFRASTRUCTURE INVENTORY
AND ASSESSMENT PROJECT
NOVEMBER 2007



**BCE**
Bourne Consulting Engineering
3 Paul Road
Bourne, MA 01906
TEL: (508) 833-0000 FAX: (508) 833-0000



COASTAL STRUCTURE LOCATION PLAN

TOWN OF CHATHAM
COASTAL INFRASTRUCTURE INVENTORY
AND ASSESSMENT PROJECT
NOVEMBER 2007

0 150
SCALE: 1" = 150'





COASTAL STRUCTURE LOCATION PLAN

TOWN OF CHATHAM
COASTAL INFRASTRUCTURE INVENTORY
AND ASSESSMENT PROJECT
NOVEMBER 2007

0 150
SCALE: 1" = 150'

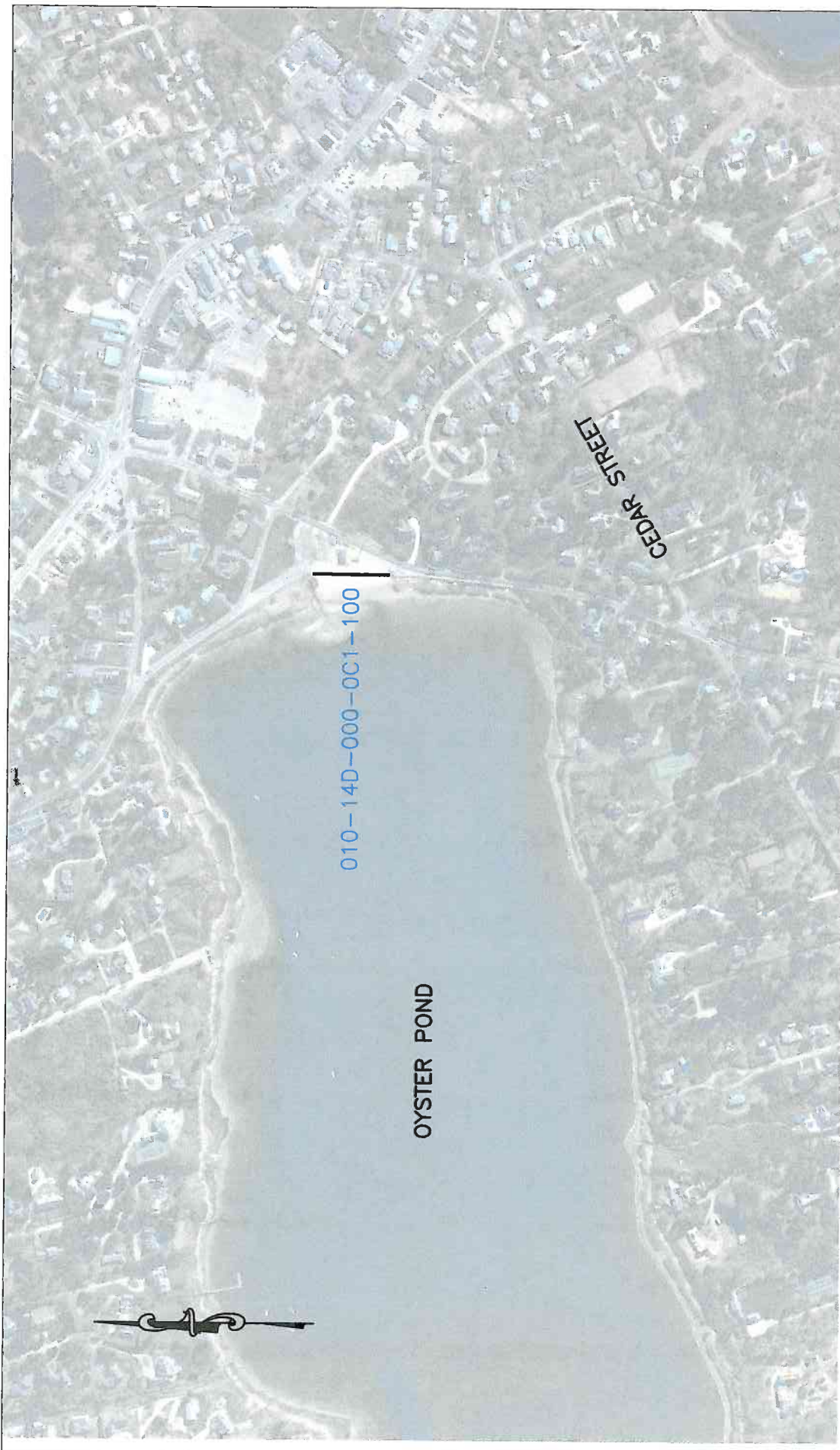




COASTAL STRUCTURE LOCATION PLAN

TOWN OF CHATHAM
COASTAL INFRASTRUCTURE INVENTORY
AND ASSESSMENT PROJECT
NOVEMBER 2007

0 150
SCALE: 1" = 150'



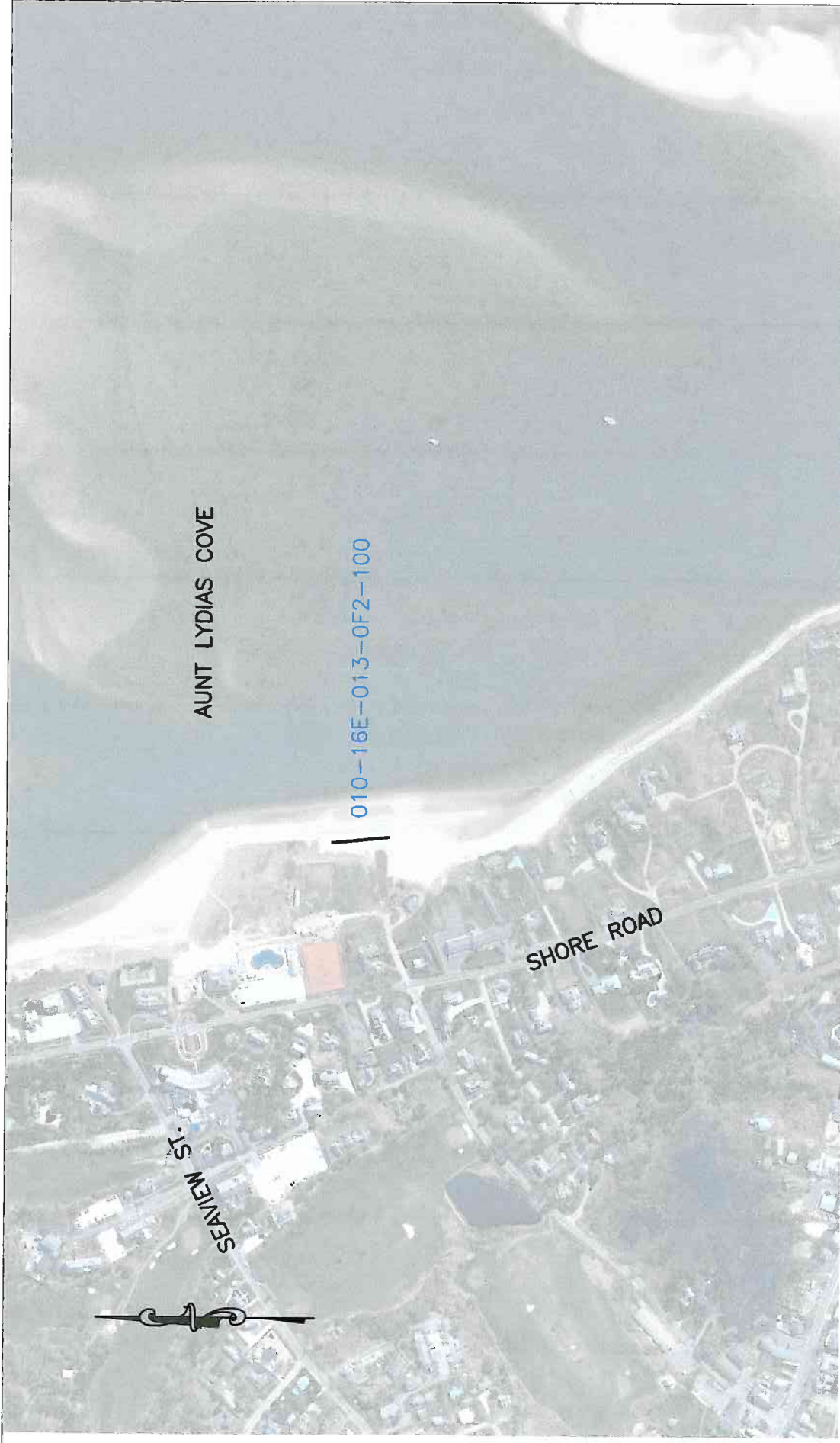
File: X:\27652-27667\Cape Cod\CI-2\Chatham\dwg\Chatham.dwg

COASTAL STRUCTURE LOCATION PLAN

TOWN OF CHATHAM
COASTAL INFRASTRUCTURE INVENTORY
AND ASSESSMENT PROJECT
NOVEMBER 2007



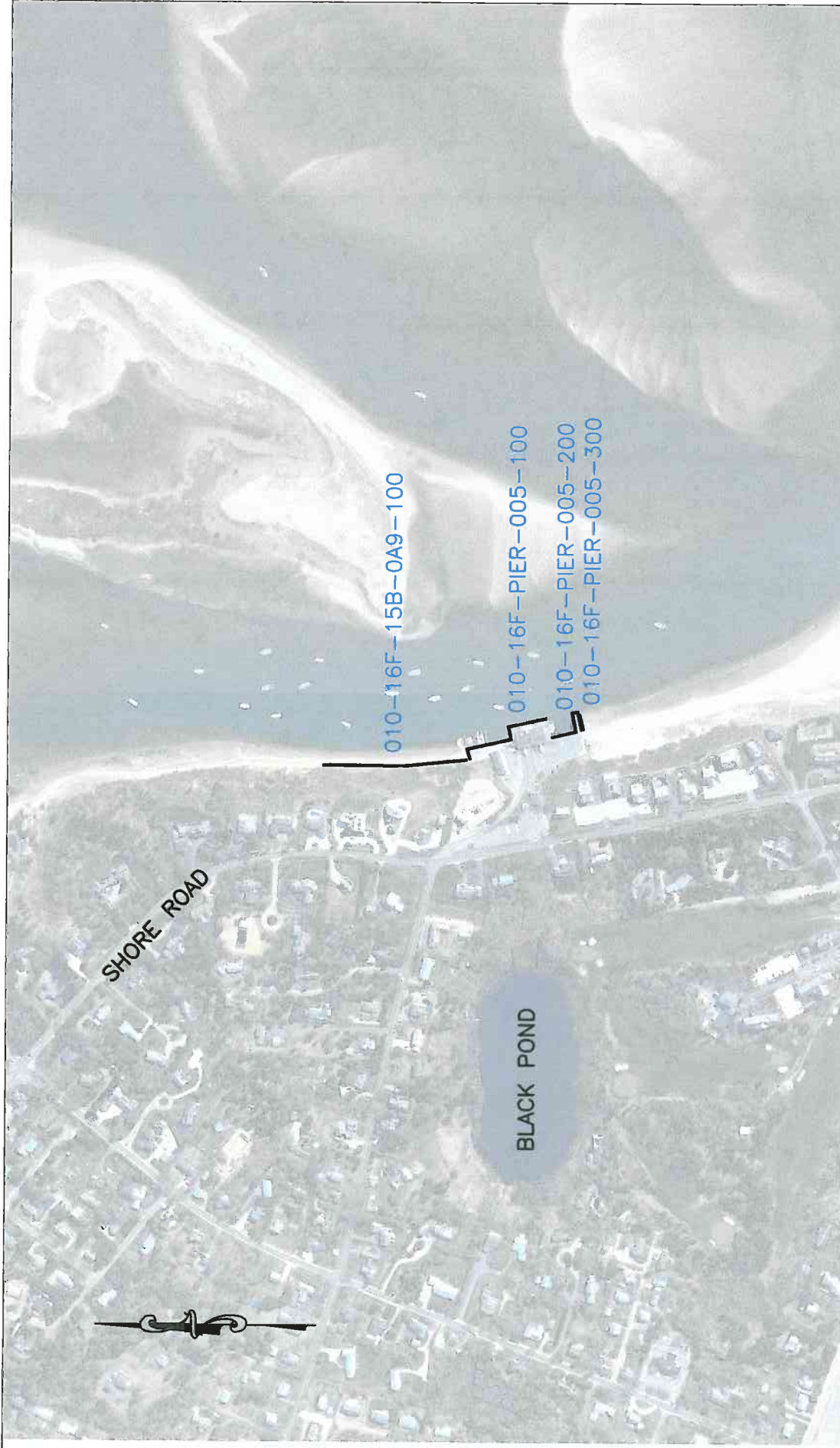
**BCE**
Bourne Consulting Engineering
300 Main Street
Bourne, MA 01909
TEL: (508) 833-8888 FAX: (508) 833-8888



COASTAL STRUCTURE LOCATION PLAN

TOWN OF CHATHAM
COASTAL INFRASTRUCTURE INVENTORY
AND ASSESSMENT PROJECT
NOVEMBER 2007



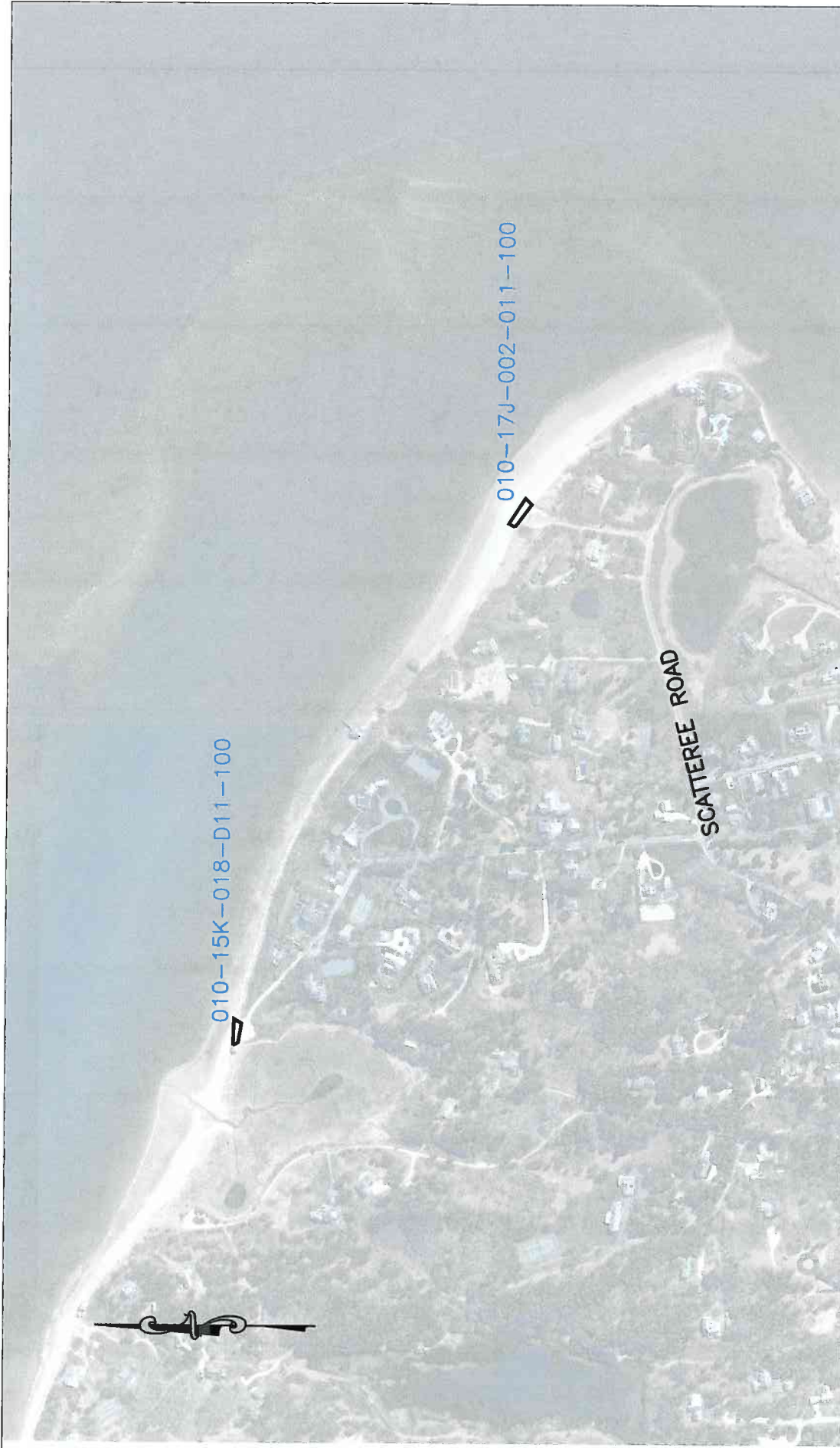


COASTAL STRUCTURE LOCATION PLAN

TOWN OF CHATHAM
COASTAL INFRASTRUCTURE INVENTORY
AND ASSESSMENT PROJECT
NOVEMBER 2007

0 150
SCALE: 1" = 150'

BCE Bourne Consulting Engineering
3 And Over
Providence, RI 02903
TEL: (401) 552-0000 FAX: (401) 552-0000



COASTAL STRUCTURE LOCATION PLAN

TOWN OF CHATHAM
COASTAL INFRASTRUCTURE INVENTORY
AND ASSESSMENT PROJECT
NOVEMBER 2007

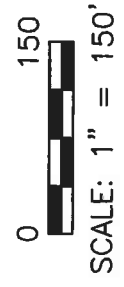
0 150
SCALE: 1" = 150'

BCE Bourne Consulting Engineering
3 Bond Street
Bourne, MA 01939
TEL: (508) 833-4000 FAX: (508) 833-4000



COASTAL STRUCTURE LOCATION PLAN

TOWN OF CHATHAM
COASTAL INFRASTRUCTURE INVENTORY
AND ASSESSMENT PROJECT
NOVEMBER 2007

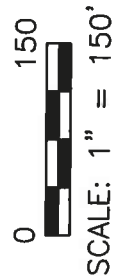



**BCE**
Bourne Consulting Engineering
2 Pond Road
Bourne, MA 01939
TEL (508) 633-4000 FAX (508) 633-4005



COASTAL STRUCTURE LOCATION PLAN

TOWN OF CHATHAM
COASTAL INFRASTRUCTURE INVENTORY
AND ASSESSMENT PROJECT
NOVEMBER 2007



**BCE**
Bourne Consulting Engineering
3 Pond Street
Falmouth, MA 01906
TEL (508) 852-0000 FAX (508) 852-0000

Structure Assessment Form

Town: Chatham

Structure ID: 010-03A-001-015-100

Key: community-map-block-parcel-structure

Property Owner:

Local

Location:

Forest Beach

Date:

8/29/2007

Presumed Structure Owner:

Local

Based On Comment:

Owner Name:

Chatham

Earliest Structure Record:

1946

Estimated Reconstruction/Repair Cost:

\$252,320.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
380		V8	16
Feet	Feet NAVD 88		Feet NGVD

Primary Type:

Groin/ Jetty

Primary Material:

Stone

Primary Height:

Under 5 Feet

Secondary Type:

Secondary Material:

Secondary Height:



Structure Summary :

This is a field of stone groins at Forest Beach. They are low profile groins with weathered armor. Some armor stones have become displaced and there is little interlocking apparent. 14 groins were noted.

Condition

C

Rating

Fair

Level of Action

Moderate

Description

Structure is sound but may exhibit minor deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure adequate to withstand major coastal storm with little to moderate damage. Actions taken to reinforce structure to provide full protection from major coastal storm and for extending life of structure. Moderate wind or wave damage to landform exists. Landform may not be sufficient to fully protect shoreline during a major coastal storm. Actions taken to provide addition material for full protection and extended life.

Priority

II

Rating

Low Priority

Action

Future Project Consideration

Description

Inshore Structures Present with Limited potential for Significant Infrastructure Damage

Structure Images:

010-03A-001-015-100-PHO1A.jpg

Structure Documents:

USACE	December 1	Proposed Stone	010-03A-001-015-100-COE1A
USACE	November 1	Proposed Groins and	010-03A-001-015-100-COE1B
USACE	October 195	Proposed Groins and	010-03A-001-015-100-COE1C
USACE	May 1960	Proposed Stone	010-03A-001-015-100-COE1D
USACE	April 1965	Proposed Shore	010-03A-001-015-100-COE1E
MA-DCR	August 1946	Proposed Shore	010-03A-001-015-100-DCR1A
MA-DCR	May 1955	Proposed Hurricane	010-03A-001-015-100-DCR1B
MA-DCR	August 1957	Proposed Shore	010-03A-001-015-100-DCR1C
MA-DCR	December 1	Proposed Shore	010-03A-001-015-100-DCR1D
MA-DCR	May 1967	Proposed Shore	010-03A-001-015-100-DCR1E

Structure Assessment FormStructure ID: **010-04B-004-004-100**

Key: community-map-block-parcel-structure

Property Owner:

Local

Location:

Mill Creek

Date:

8/29/2007

Presumed Structure Owner:

Local

Based On Comment:

Owner Name:

Chatham

Earliest Structure Record:

Unknown

Estimated Reconstruction/Repair Cost:

\$576,576.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
240		V13	15
Feet	Feet NAVD 88		Feet NGVD

Primary Type:

Groin/ Jetty

Primary Material:

Stone

Primary Height:

5 to 10 Feet

Secondary Type:

Secondary Material:

Secondary Height:

**Structure Summary :**

This structure is the terminal groin on the west side of Mill Creek. The landward section of the structure is partially buried by the beach. Armor stones on the structure have become unraveled.

*Condition***D***Rating***Poor***Level of Action***Major***Description*

Structure exhibits advanced levels of deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure has strong risk of significant damage and possible failure during a major coastal storm. Structure should be monitored until repairs/reconstruction can be initiated. Actions taken to reconstruct structure to regain full capacity to resist a major coastal storm. Landform eroded, stability threatened. Landform not adequate to provide protection during major coastal storm. Actions taken to recreate landform to adequate limits for full protection from a major coastal storm.

*Priority***II***Rating***Low Priority***Action***Future Project Consideration***Description***Inshore Structures Present with Limited potential for Significant Infrastructure Damage****Structure Images:****010-04B-004-004-100-PHO1A.jpg****Structure Documents:**

Structure Assessment Form

Town: **Chatham**Structure ID: **010-04B-005-005-100**

Key: community-map-block-parcel-structure

Property Owner:

Local

Location:

Mill Creek

Date:

8/29/2007

Presumed Structure Owner:

Local

Based On Comment:

Owner Name:

Chatham

Earliest Structure Record:

Unknown

Estimated Reconstruction/Repair Cost:

\$564,366.00

Length:

425

Feet

Top Elevation:

Feet NAVD 88

FIRM Map Zone:

V13

FIRM Map Elevation:

15

Feet NGVD

Primary Type:

Groin/ Jetty

Primary Material:

Stone

Primary Height:

Under 5 Feet

Secondary Type:

Secondary Material:

Secondary Height:



Structure Summary :

This structure is a stone jetty on the east side of Mill Creek. The section nearest the shoreline is unraveled and mostly submerged. The armor on the unraveled portion near the shoreline is being flanked. The outer section is also unraveled but sits higher in the water.

*Condition***D***Rating***Poor***Level of Action***Major***Description*

Structure exhibits advanced levels of deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure has strong risk of significant damage and possible failure during a major coastal storm. Structure should be monitored until repairs/reconstruction can be initiated. Actions taken to reconstruct structure to regain full capacity to resist a major coastal storm. Landform eroded, stability threatened. Landform not adequate to provide protection during major coastal storm. Actions taken to recreate landform to adequate limits for full protection from a major coastal storm.

*Priority***II***Rating***Low Priority***Action***Future Project Consideration***Description*

Inshore Structures Present with Limited potential for Significant Infrastructure Damage

Structure Images:

010-04B-005-005-100-PHO1A.jpg

Structure Documents:

Structure Assessment Form

Town: Chatham

Structure ID: 010-05B-000-14A-100

Key: community-map-block-parcel-structure

Property Owner:

Local

Location:

Cockle Cove

Date:

8/29/2007

Presumed Structure Owner:

Local

Based On Comment:

Owner Name:

Chatham

Earliest Structure Record:

1955

Estimated Reconstruction/Repair Cost:

\$506,880.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
800		V13	16
Feet	Feet NAVD 88		Feet NGVD

Primary Type:

Coastal Beach

Primary Material:

Sand

Primary Height:

5 to 10 Feet

Secondary Type:

Secondary Material:

Secondary Height:



Structure Summary :

This structure is the Cockle Cove beach nourishment. The beach is in good condition, showing no erosive hot spots or other issues. A typical beach profile is evident. The backing dune shows a small scarp at the toe.

Condition

C

Rating

Fair

Level of Action

Moderate

Description

Structure is sound but may exhibit minor deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure adequate to withstand major coastal storm with little to moderate damage. Actions taken to reinforce structure to provide full protection from major coastal storm and for extending life of structure. Moderate wind or wave damage to landform exists. Landform may not be sufficient to fully protect shoreline during a major coastal storm. Actions taken to provide addition material for full protection and extended life.

Priority

II

Rating

Low Priority

Action

Future Project Consideration

Description

Inshore Structures Present with Limited potential for Significant Infrastructure Damage

Structure Images:

010-05B-000-14A-100-PHO1A.jpg

Structure Documents:

MA-DCR

May 1955

Proposed Hurricane

010-05B-000-14A-100-DCR1A

DEP

January 7, 2

Cockle Cove Beach

010-05B-000-14A-100-LIC1A

Structure Assessment Form

Town: Chatham

Structure ID: 010-09B-031-014-100

Key: community-map-block-parcel-structure

Property Owner:

Local

Location:

Barn Hill Road

Date:

8/29/2007

Presumed Structure Owner:

Local

Based On Comment:

Owner Name:

Chatham

Earliest Structure Record:

1986

Estimated Reconstruction/Repair Cost:

\$156,750.00

Length: 190 Feet Top Elevation: FIRM Map Zone: A7 FIRM Map Elevation: 8 Feet NGVD

Primary Type:

Bulkhead/ Seawall

Primary Material:

Steel

Primary Height:

5 to 10 Feet

Secondary Type:

Secondary Material:

Secondary Height:



Structure Summary :

This structure is a bulkhead at Barn Hill Road boat ramp. It is a steel sheetpile with timber caps. Both components show aging.

Condition

C

Rating

Fair

Level of Action

Moderate

Description

Structure is sound but may exhibit minor deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure adequate to withstand major coastal storm with little to moderate damage. Actions taken to reinforce structure to provide full protection from major coastal storm and for extending life of structure. Moderate wind or wave damage to landform exists. Landform may not be sufficient to fully protect shoreline during a major coastal storm. Actions taken to provide addition material for full protection and extended life.

Priority

II

Rating

Low Priority

Action

Future Project Consideration

Description

Inshore Structures Present with Limited potential for Significant Infrastructure Damage

Structure Images:

010-09B-031-014-100-PHO1A.jpg

Structure Documents:

USACE

November 1

To Construct

010-09B-031-014-100-COE1A

DEP

November 1

Plan Accompanying

010-09B-031-014-100-LIC1A

DEP

January 26,

Construct a Bulkhead

010-09B-031-014-100-LIC1B

Structure Assessment Form

Property Owner:

Local

Location:

Barn Hill Road

Date:

8/29/2007

Presumed Structure Owner:

Local

Based On Comment:

Owner Name:

Chatham

Earliest Structure Record:

Unknown

Estimated Reconstruction/Repair Cost:

\$10,811.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
90		A7	8
Feet	Feet NAVD 88		Feet NGVD

Primary Type:

Revetment

Primary Material:

Stone

Primary Height:

5 to 10 Feet

Secondary Type:

Secondary Material:

Secondary Height:



Structure Summary :

This structure is a riprap slope adjacent to the Barn Hill boat ramp. The stone is weathered but solid. The side slopes are in good condition. Vegetation is growing out along cap and between stones.

Condition

B

Rating

Good

Level of Action

Minor

Description

Structure observed to exhibit very minor problems, superficial in nature. Minor erosion to landform is present. Structure / landform adequate to provide protection from a major coastal storm with no damage. Actions taken to prevent / limit future deterioration and extend life of structure.

Priority

II

Rating

Low Priority

Action

Future Project Consideration

Description

Inshore Structures Present with Limited potential for Significant Infrastructure Damage

Structure Images:

010-09B-031-014-200-PHO2A.jpg

Structure Documents:

DEP

January 26,

Accompanying

010-09B-031-014-200-LIC2A

Structure Assessment Form

Town: Chatham

Structure ID: 010-11J-006-006-100

Key: community-map-block-parcel-structure

Property Owner:

Local

Location:

Ryder Cove Road

Date:

8/29/2007

Presumed Structure Owner:

Local

Based On Comment:

Owner Name:

Chatham

Earliest Structure Record:

1986

Estimated Reconstruction/Repair Cost:

\$96,466.00

Length:

120

Feet

Top Elevation:

Feet NAVD 88

FIRM Map Zone:

A9

FIRM Map Elevation:

11

Feet NGVD

Primary Type:

Bulkhead/ Seawall

Primary Material:

Wood

Primary Height:

10 to 15 Feet

Secondary Type:

Secondary Material:

Secondary Height:



Structure Summary :

This structure is a timber bulkhead located at the end of Ryder Cove Road. The bulkhead is solid but weathered with some cracking at the crest.

Condition

C

Rating

Fair

Level of Action

Moderate

Description

Structure is sound but may exhibit minor deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure adequate to withstand major coastal storm with little to moderate damage. Actions taken to reinforce structure to provide full protection from major coastal storm and for extending life of structure. Moderate wind or wave damage to landform exists. Landform may not be sufficient to fully protect shoreline during a major coastal storm. Actions taken to provide addition material for full protection and extended life.

Priority

III

Rating

Moderate Priority

Action

Consider for Active Project Improvement Listing

Description

Inshore Structures with potential for Infrastructure Damage and/or Limited Residential Dwellings (<1 dwelling impacted / 100 feet of shoreline)

Structure Images:

010-11J-006-006-100-PHO1A.jpg

Structure Documents:

USACE

November 1

To Construct

010-11J-006-006-100-COE1A

DEP

November 1

Plan Accompanying

010-11J-006-006-100-LIC1A

Structure Assessment Form

Town: **Chatham**Structure ID: **010-12A-005-009-100**

Key: community-map-block-parcel-structure

Property Owner:

Local

Location:

Champlain Road

Date:

8/29/2007

Presumed Structure Owner:

Local

Based On Comment:

Owner Name:

Chatham

Earliest Structure Record:

Unknown

Estimated Reconstruction/Repair Cost:

\$36,210.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
170		V12	13
Feet	Feet NAVD 88		Feet NGVD

Primary Type:

Bulkhead/ Seawall

Primary Material:

Steel

Primary Height:

5 to 10 Feet

Secondary Type:

Coastal Dune

Secondary Material:

Sand

Secondary Height:

5 to 10 Feet



Structure Summary :

This structure is a sheetpile at the bend in Champlain Road that is fronted by earth/dune. The cap of the sheetpile is visible while the rest of the wall is buried in the bank and covered in vegetation. There are fiber rolls at the base that are becoming exposed.

Condition

B

Rating

Good

Level of Action

Minor

Description

Structure observed to exhibit very minor problems, superficial in nature. Minor erosion to landform is present. Structure / landform adequate to provide protection from a major coastal storm with no damage. Actions taken to prevent / limit future deterioration and extend life of structure.

Priority

IV

Rating

High Priority

Action

Consider for Next Project Construction Listing

Description

High Value Inshore Structures with Potential for Infrastructure Damage and/or Moderate Density Residential Dwellings (1-10 dwellings impacted / 100 feet of shoreline)

Structure Images:

010-12A-005-009-100-PHO1A.jpg

Structure Documents:

Structure Assessment Form

Town: Chatham

Structure ID: 010-13A-002-024-100

Key: community-map-block-parcel-structure

Property Owner:

Local

Location:

Stage Harbor Road

Date:

8/29/2007

Presumed Structure Owner:

Local

Based On Comment:

Owner Name:

Chatham

Earliest Structure Record:

1992

Estimated Reconstruction/Repair Cost:

\$183,361.00

Length: Top Elevation:

290

FIRM Map Zone:

V12

FIRM Map Elevation:

12

Feet

Feet NAVD 88

Feet NGVD

Primary Type:

Bulkhead/ Seawall

Primary Material:

Wood

Primary Height:

5 to 10 Feet

Secondary Type:

Secondary Material:

Secondary Height:



Structure Summary :

This structure is a timber bulkhead fronting a parking lot for a boat ramp. The structure is solid but weathered. The cap of the wall is loose in sections.

Condition

C

Rating

Fair

Level of Action

Moderate

Description

Structure is sound but may exhibit minor deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure adequate to withstand major coastal storm with little to moderate damage. Actions taken to reinforce structure to provide full protection from major coastal storm and for extending life of structure. Moderate wind or wave damage to landform exists. Landform may not be sufficient to fully protect shoreline during a major coastal storm. Actions taken to provide addition material for full protection and extended life.

Priority

III

Rating

Moderate Priority

Action

Consider for Active Project Improvement Listing

Description

Inshore Structures with potential for Infrastructure Damage and/or Limited Residential Dwellings (<1 dwelling impacted / 100 feet of shoreline)

Structure Images:

010-13A-002-024-100-PHO1A.jpg

Structure Documents:

DEP

October 199

Plan Accompanying

010-13A-002-024-100-LIC1A

DEP

September 1

Plan Accompanying

010-13A-002-024-100-LIC1B

Structure Assessment Form

Town: ChathamStructure ID: 010-13M-046-01A-100

Key: community-map-block-parcel-structure

Property Owner:

Local

Location:

Strong Island Road

Date:

8/29/2007

Presumed Structure Owner:

Local

Based On Comment:

Owner Name:

Chatham

Earliest Structure Record:

Unknown

Estimated Reconstruction/Repair Cost:

\$11,900.00Length: 50

Feet

Top Elevation:

Feet NAVD 88

FIRM Map Zone:

V16

FIRM Map Elevation:

14

Feet NGVD

Primary Type:

Coastal Dune

Primary Material:

Sand

Primary Height:

5 to 10 Feet

Secondary Type:

Secondary Material:

Secondary Height:



Structure Summary :

This structure is a nourishment located at the end of Strong Island Road. The dune is fronting a small parking lot and functioning well. There is no evidence of the fiber roll reported beneath dune.

*Condition*C*Rating*Fair*Level of Action*Moderate*Description*

Structure is sound but may exhibit minor deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure adequate to withstand major coastal storm with little to moderate damage. Actions taken to reinforce structure to provide full protection from major coastal storm and for extending life of structure. Moderate wind or wave damage to landform exists. Landform may not be sufficient to fully protect shoreline during a major coastal storm. Actions taken to provide addition material for full protection and extended life.

*Priority*III*Rating*Moderate Priority*Action*

Consider for Active Project Improvement Listing

Description

Inshore Structures with potential for Infrastructure Damage and/or Limited Residential Dwellings (<1 dwelling impacted / 100 feet of shoreline)

Structure Images:

010-13M-046-01A-100-PHO1A.jpg

Structure Documents:

Structure Assessment Form

Town: Chatham

Structure ID: 010-14A-11A-093-100

Key: community-map-block-parcel-structure

Property Owner:

Local

Location:

Bridge Street

Date:

8/29/2007

Presumed Structure Owner:

Local

Based On Comment:

Owner Name:

Chatham

Earliest Structure Record:

Unknown

Estimated Reconstruction/Repair Cost:

\$27,027.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
45		A9	10
Feet	Feet NAVD 88		Feet NGVD

Primary Type:

Revetment

Primary Material:

Stone

Primary Height:

5 to 10 Feet

Secondary Type:

Secondary Material:

Secondary Height:



Structure Summary :

This structure is the armored abutment on the east side of the Bridge Street bridge. There are some displaced stones but they are generally in good condition.

Condition

C

Rating

Fair

Level of Action

Moderate

Description

Structure is sound but may exhibit minor deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure adequate to withstand major coastal storm with little to moderate damage. Actions taken to reinforce structure to provide full protection from major coastal storm and for extending life of structure. Moderate wind or wave damage to landform exists. Landform may not be sufficient to fully protect shoreline during a major coastal storm. Actions taken to provide addition material for full protection and extended life.

Priority

III

Rating

Moderate Priority

Action

Consider for Active Project Improvement Listing

Description

Inshore Structures with potential for Infrastructure Damage and/or Limited Residential Dwellings (<1 dwelling impacted / 100 feet of shoreline)

Structure Images:

010-14A-11A-093-100-PHO1A.jpg

Structure Documents:

Structure Assessment Form

Town: ChathamStructure ID: 010-14A-11A-093-200

Key: community-map-block-parcel-structure

Property Owner:

Local

Location:

Bridge Street

Date:

8/29/2007

Presumed Structure Owner:

Local

Based On Comment:

Owner Name:

Chatham

Earliest Structure Record:

Unknown

Estimated Reconstruction/Repair Cost:

\$27,027.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
<u>45</u>		<u>A9</u>	<u>10</u>
Feet	Feet NAVD 88		Feet NGVD

Primary Type:

Revetment

Primary Material:

Stone

Primary Height:

5 to 10 Feet

Secondary Type:

Secondary Material:

Secondary Height:



Structure Summary :

These structures are the armored abutments on the west side of the Bridge Street bridge. There are some displaced armor stones but they are generally in good condition.

*Condition*C*Rating*Fair*Level of Action*Moderate*Description*

Structure is sound but may exhibit minor deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure adequate to withstand major coastal storm with little to moderate damage. Actions taken to reinforce structure to provide full protection from major coastal storm and for extending life of structure. Moderate wind or wave damage to landform exists. Landform may not be sufficient to fully protect shoreline during a major coastal storm. Actions taken to provide addition material for full protection and extended life.

*Priority*III*Rating*Moderate Priority*Action*

Consider for Active Project Improvement Listing

Description

Inshore Structures with potential for Infrastructure Damage and/or Limited Residential Dwellings (<1 dwelling impacted / 100 feet of shoreline)

Structure Images:

010-14A-11A-093-200-PHO2A.jpg

Structure Documents:

Structure Assessment FormStructure ID: **010-14D-000-0C1-100**

Key: community-map-block-parcel-structure

Property Owner:

Local

Location:

Oyster Pond

Date:

8/29/2007

Presumed Structure Owner:

Local

Based On Comment:

Owner Name:

Chatham

Earliest Structure Record:

Unknown

Estimated Reconstruction/Repair Cost:

\$164,736.00

Length: **260** Top Elevation: **8** FIRM Map Zone: **A7** FIRM Map Elevation: **8**
 Feet Feet NAVD 88 Feet NGVD

Primary Type:

Coastal Beach

Primary Material:

Sand

Primary Height:

5 to 10 Feet

Secondary Type:

Secondary Material:

Secondary Height:

**Structure Summary :**

This structure is a beach fill located at the east end of Oyster Pond on the west side of Stage Harbor Road. The beach is in good condition but the elevation is somewhat low. A typical beach profile is evident.

*Condition***C***Rating***Fair***Level of Action***Moderate***Description*

Structure is sound but may exhibit minor deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure adequate to withstand major coastal storm with little to moderate damage. Actions taken to reinforce structure to provide full protection from major coastal storm and for extending life of structure. Moderate wind or wave damage to landform exists. Landform may not be sufficient to fully protect shoreline during a major coastal storm. Actions taken to provide addition material for full protection and extended life.

*Priority***III***Rating***Moderate Priority***Action*

Consider for Active Project Improvement Listing

Description

Inshore Structures with potential for Infrastructure Damage and/or Limited Residential Dwellings (<1 dwelling impacted / 100 feet of shoreline)

Structure Images:**010-14D-000-0C1-100-PHO1A.jpg****Structure Documents:**

Structure Assessment Form

Town: Chatham

Structure ID: 010-15K-018-D11-100

Key: community-map-block-parcel-structure

Property Owner:

Local

Location:

Cotchpinicut Road

Date:

8/29/2007

Presumed Structure Owner:

Local

Based On Comment:

Owner Name:

Chatham

Earliest Structure Record:

Unknown

Estimated Reconstruction/Repair Cost:

\$5,580.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
60		V13	14
Feet	Feet NAVD 88		Feet NGVD

Primary Type:

Coastal Dune

Primary Material:

Sand

Primary Height:

Under 5 Feet

Secondary Type:

Secondary Material:

Secondary Height:



Structure Summary :

This structure is a nourishment located at the end of Cotchpinicut Road. The dune elevation is becoming depleted. The beach is showing a typical profile shape.

Condition

C

Rating

Fair

Level of Action

Moderate

Description

Structure is sound but may exhibit minor deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure adequate to withstand major coastal storm with little to moderate damage. Actions taken to reinforce structure to provide full protection from major coastal storm and for extending life of structure. Moderate wind or wave damage to landform exists. Landform may not be sufficient to fully protect shoreline during a major coastal storm. Actions taken to provide addition material for full protection and extended life.

Priority

II

Rating

Low Priority

Action

Future Project Consideration

Description

Inshore Structures Present with Limited potential for Significant Infrastructure Damage

Structure Images:

010-15K-018-D11-100-PHO1A.jpg

Structure Documents:

Structure Assessment Form

Town: Chatham

Structure ID: 010-16E-013-0F2-100

Key: community-map-block-parcel-structure

Property Owner:

Local

Location:

Claffin Landing

Date:

8/29/2007

Presumed Structure Owner:

Local

Based On Comment:

Owner Name:

Chatham

Earliest Structure Record:

Unknown

Estimated Reconstruction/Repair Cost:

\$126,720.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
200		V13	13
Feet	Feet NAVD 88		Feet NGVD

Primary Type:	Primary Material:	Primary Height:
Coastal Beach	Sand	5 to 10 Feet
Secondary Type:	Secondary Material:	Secondary Height:



Structure Summary :

This structure is a nourishment at Claffin Landing. The beach and dune elevation are somewhat depressed. There is no beach grass on dune area. A typical beach profile is evident.

Condition

C

Rating

Fair

Level of Action

Moderate

Description

Structure is sound but may exhibit minor deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure adequate to withstand major coastal storm with little to moderate damage. Actions taken to reinforce structure to provide full protection from major coastal storm and for extending life of structure. Moderate wind or wave damage to landform exists. Landform may not be sufficient to fully protect shoreline during a major coastal storm. Actions taken to provide addition material for full protection and extended life.

Priority

II

Rating

Low Priority

Action

Future Project Consideration

Description

Inshore Structures Present with Limited potential for Significant Infrastructure Damage

Structure Images:

010-16E-013-0F2-100-PHO1A.jpg

Structure Documents:

Structure Assessment Form

Town: Chatham

Structure ID: 010-16F-15B-0A9-100

Key: community-map-block-parcel-structure

Property Owner:

Local

Location:

Town Fish Pier

Date:

8/29/2007

Presumed Structure Owner:

Local

Based On Comment:

Owner Name:

Chatham

Earliest Structure Record:

1965

Estimated Reconstruction/Repair Cost:

\$161,330.00

Length: 485 Feet
 Top Elevation: Feet NAVD 88
 FIRM Map Zone: A9
 FIRM Map Elevation: 12 Feet NGVD

Primary Type:

Revetment

Primary Material:

Stone

Primary Height:

Under 5 Feet

Secondary Type:

Secondary Material:

Secondary Height:



Structure Summary :

This structure is a stone revetment running north of the Fish Pier. The crest and sideslopes are level. The toe is starting to become unraveled at the southern end. Some armor stones have become displaced.

Condition

C

Rating

Fair

Level of Action

Moderate

Description

Structure is sound but may exhibit minor deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure adequate to withstand major coastal storm with little to moderate damage. Actions taken to reinforce structure to provide full protection from major coastal storm and for extending life of structure. Moderate wind or wave damage to landform exists. Landform may not be sufficient to fully protect shoreline during a major coastal storm. Actions taken to provide addition material for full protection and extended life.

Priority

IV

Rating

High Priority

Action

Consider for Next Project Construction Listing

Description

High Value Inshore Structures with Potential for Infrastructure Damage and/or Moderate Density Residential Dwellings (1-10 dwellings impacted / 100 feet of shoreline)

Structure Images:

010-16F-15B-0A9-100-PHO1A.jpg

Structure Documents:

MA-DCR

August 1965

Proposed Shore

010-16F-15B-0A9-100-DCR1A

Structure Assessment Form

Town: **Chatham**Structure ID: **010-16F-PIER-005-100**

Key: community-map-block-parcel-structure

Property Owner:

Local

Location:

Town Fish Pier

Date:

8/29/2007

Presumed Structure Owner:

Local

Based On Comment:

Owner Name:

Chatham

Earliest Structure Record:

1967

Estimated Reconstruction/Repair Cost:

\$451,440.00

Length: Top Elevation:

360

FIRM Map Zone:

V13

FIRM Map Elevation:

13

Feet

Feet NAVD 88

Feet NGVD

Primary Type:

Bulkhead/ Seawall

Primary Material:

Steel

Primary Height:

10 to 15 Feet

Secondary Type:

Secondary Material:

Secondary Height:



Structure Summary :

This structure is a bulkhead fronting the Fish Pier. The bulkhead is a steel sheetpile with concrete cap and fronted by timber whaling. It was installed in 1998.

Condition

C

Rating

Fair

Level of Action

Moderate

Description

Structure is sound but may exhibit minor deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure adequate to withstand major coastal storm with little to moderate damage. Actions taken to reinforce structure to provide full protection from major coastal storm and for extending life of structure. Moderate wind or wave damage to landform exists. Landform may not be sufficient to fully protect shoreline during a major coastal storm. Actions taken to provide addition material for full protection and extended life.

Priority

IV

Rating

High Priority

Action

Consider for Next Project Construction Listing

Description

High Value Inshore Structures with Potential for Infrastructure Damage and/or Moderate Density Residential Dwellings (1-10 dwellings impacted / 100 feet of shoreline)

Structure Images:

010-16F-PIER-005-100-PHO1A.jpg

Structure Documents:

USACE	October 196	Proposed Bulkhead,	010-16F-PIER-005-100-COE1A
DEP	April 1979	Plan Accompanying	010-16F-PIER-005-100-LIC1A
DEP	October 198	Plan Accompanying	010-16F-PIER-005-100-LIC1B
DEP	January 196	Plan Accompanying	010-16F-PIER-005-100-LIC1C
DEP	April 1996	Plan Accompanying	010-16F-PIER-005-100-LIC1D
DEP	April 1945	Plan Accompanying	010-16F-PIER-005-100-LIC1E

Structure Assessment Form

Town: Chatham

Structure ID: 010-16F-PIER-005-200

Key: community-map-block-parcel-structure

Property Owner:

Local

Location:

Town Fish Pier

Date:

8/29/2007

Presumed Structure Owner:

Local

Based On Comment:

Owner Name:

Chatham

Earliest Structure Record:

1949

Estimated Reconstruction/Repair Cost:

\$288,420.00

Length:

230

Feet

Top Elevation:

Feet NAVD 88

FIRM Map Zone:

V13

FIRM Map Elevation:

13

Feet NGVD

Primary Type:

Bulkhead/ Seawall

Primary Material:

Concrete

Primary Height:

10 to 15 Feet

Secondary Type:

Secondary Material:

Secondary Height:



Structure Summary :

This structure is a bulkhead south of the Fish Pier. There has been repair to the sheetpile and anchors and new tiebacks. The bulkhead was repaired in 1999-2000.

Condition

C

Rating

Fair

Level of Action

Moderate

Description

Structure is sound but may exhibit minor deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure adequate to withstand major coastal storm with little to moderate damage. Actions taken to reinforce structure to provide full protection from major coastal storm and for extending life of structure. Moderate wind or wave damage to landform exists. Landform may not be sufficient to fully protect shoreline during a major coastal storm. Actions taken to provide additional material for full protection and extended life.

Priority

IV

Rating

High Priority

Action

Consider for Next Project Construction Listing

Description

High Value Inshore Structures with Potential for Infrastructure Damage and/or Moderate Density Residential Dwellings (1-10 dwellings impacted / 100 feet of shoreline)

Structure Images:

010-16F-PIER-005-200-PHO2A.jpg

Structure Documents:

USACE	November 1	To Build and Maintain	010-16F-PIER-005-200-COE2A
USACE	July 1956	Proposed Riprap,	010-16F-PIER-005-200-COE2B
USACE	January 197	To Install a Sheet	010-16F-PIER-005-200-COE2C
DEP	April 1979	Plan Accompanying	010-16F-PIER-005-200-LIC2A
DEP	October 26,	Plan Accompanying	010-16F-PIER-005-200-LIC2B
DEP	October 1, 1	Plan Accompanying	010-16F-PIER-005-200-LIC2C
DEP	September 2	Plan Accompanying	010-16F-PIER-005-200-LIC2D

CZM Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Chatham

Structure ID: 010-16F-PIER-005-200

Key: community-map-block-parcel-structure

Structure Assessment Form

Town: Chatham

Structure ID: 010-16F-PIER-005-300

Key: community-map-block-parcel-structure

Property Owner:

Local

Location:

Town Fish Pier

Date:

8/29/2007

Presumed Structure Owner:

Local

Based On Comment:

Owner Name:

Chatham

Earliest Structure Record:

1956

Estimated Reconstruction/Repair Cost:

\$18,295.00

Length: 55 Feet Top Elevation: FIRM Map Zone: V13 FIRM Map Elevation: 13 Feet NGVD

Primary Type:

Revetment

Primary Material:

Stone

Primary Height:

Under 5 Feet

Secondary Type:

Secondary Material:

Secondary Height:



Structure Summary :

This structure is a stone revetment at the south end of the Fish Pier. It is composed of dumped armor stone which lies along the south side of the bulkhead. There is no appreciable interlocking between stones.

Condition

C

Rating

Fair

Level of Action

Moderate

Description

Structure is sound but may exhibit minor deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure adequate to withstand major coastal storm with little to moderate damage. Actions taken to reinforce structure to provide full protection from major coastal storm and for extending life of structure. Moderate wind or wave damage to landform exists. Landform may not be sufficient to fully protect shoreline during a major coastal storm. Actions taken to provide addition material for full protection and extended life.

Priority

III

Rating

Moderate Priority

Action

Consider for Active Project Improvement Listing

Description

Inshore Structures with potential for Infrastructure Damage and/or Limited Residential Dwellings (<1 dwelling impacted / 100 feet of shoreline)

Structure Images:

010-16F-PIER-005-300-PHO3A.jpg

Structure Documents:

USACE

July 1956

Proposed Riprap,

010-16F-PIER-005-300-COE3A

DEP

October 1, 1

Accompanying

010-16F-PIER-005-300-LIC3A

Structure Assessment Form

Town: Chatham

Structure ID: 010-17B-000-075-100

Key: community-map-block-parcel-structure

Property Owner:

Local

Location:

Chatham Light

Date:

8/29/2007

Presumed Structure Owner:

Local

Based On Comment:

Owner Name:

Chatham

Earliest Structure Record:

1991

Estimated Reconstruction/Repair Cost:

\$262,264.00

Length: 395 Feet
 Top Elevation: Feet NAVD 88
 FIRM Map Zone: V13
 FIRM Map Elevation: 15 Feet NGVD

Primary Type:

Revetment

Primary Material:

Stone

Primary Height:

Under 5 Feet

Secondary Type:

Secondary Material:

Secondary Height:



Structure Summary :

This structure is a revetment fronting the parking lot at the Chatham Lighthouse. There is a moderate dune in front of the majority of the structure. The dune fronting and backing the revetment is heavily vegetated with beach grass. The armor stone in the center section is mostly unraveled.

Condition

D

Rating

Poor

Level of Action

Major

Description

Structure exhibits advanced levels of deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure has strong risk of significant damage and possible failure during a major coastal storm. Structure should be monitored until repairs/reconstruction can be initiated. Actions taken to reconstruct structure to regain full capacity to resist a major coastal storm. Landform eroded, stability threatened. Landform not adequate to provide protection during major coastal storm. Actions taken to recreate landform to adequate limits for full protection from a major coastal storm.

Priority

IV

Rating

High Priority

Action

Consider for Next Project Construction Listing

Description

High Value Inshore Structures with Potential for Infrastructure Damage and/or Moderate Density Residential Dwellings (1-10 dwellings impacted / 100 feet of shoreline)

Structure Images:

010-17B-000-075-100-PHO1A.jpg

Structure Documents:

USACE

November 1

Plan and Details of

010-17B-000-075-100-COE1A

DEP

November 1

Plan Accompanying

010-17B-000-075-100-LIC1A

Structure Assessment FormStructure ID: **010-17C-010-027-100**

Key: community-map-block-parcel-structure

Property Owner:

Local

Location:

Andrew Harding Lane

Date:

8/29/2007

Presumed Structure Owner:

Local

Based On Comment:

Owner Name:

Chatham

Earliest Structure Record:

Unknown

Estimated Reconstruction/Repair Cost:

\$221,760.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
350		V13	15
Feet	Feet NAVD 88		Feet NGVD

Primary Type:

Coastal Beach

Primary Material:

Sand

Primary Height:

5 to 10 Feet

Secondary Type:

Secondary Material:

Secondary Height:

**Structure Summary :**

This structure is a beach nourishment at the end of Andrew Harding Lane. The beach and dune are in good condition. There is a small scarp at the toe of the dune. A normal beach profile has developed.

*Condition***C***Rating***Fair***Level of Action***Moderate***Description*

Structure is sound but may exhibit minor deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure adequate to withstand major coastal storm with little to moderate damage. Actions taken to reinforce structure to provide full protection from major coastal storm and for extending life of structure. Moderate wind or wave damage to landform exists. Landform may not be sufficient to fully protect shoreline during a major coastal storm. Actions taken to provide addition material for full protection and extended life.

*Priority***III***Rating***Moderate Priority***Action*

Consider for Active Project Improvement Listing

Description

Inshore Structures with potential for Infrastructure Damage and/or Limited Residential Dwellings (<1 dwelling impacted / 100 feet of shoreline)

Structure Images:**010-17C-010-027-100-PHO1A.jpg****Structure Documents:**

Structure Assessment Form

Town: Chatham

Structure ID: 010-17C-034-018-100

Key: community-map-block-parcel-structure

Property Owner:

Local

Location:

Andrew Harding Beach

Date:

8/29/2007

Presumed Structure Owner:

Local

Based On Comment:

Owner Name:

Chatham

Earliest Structure Record:

Unknown

Estimated Reconstruction/Repair Cost:

\$52,622.00

Length:

335

Feet

Top Elevation:

Feet NAVD 88

FIRM Map Zone:

V13

FIRM Map Elevation:

15

Feet NGVD

Primary Type:

Revetment

Primary Material:

Stone

Primary Height:

10 to 15 Feet

Secondary Type:

Secondary Material:

Secondary Height:



Structure Summary :

This structure is a stone revetment from the end of Holway Street south to Andrew Harding Beach. The crest and side slope are in good shape. There is some shifting of armor at the face and loss of crest elevation.

Condition

B

Rating

Good

Level of Action

Minor

Description

Structure observed to exhibit very minor problems, superficial in nature. Minor erosion to landform is present. Structure / landform adequate to provide protection from a major coastal storm with no damage. Actions taken to prevent / limit future deterioration and extend life of structure.

Priority

IV

Rating

High Priority

Action

Consider for Next Project Construction Listing

Description

High Value Inshore Structures with Potential for Infrastructure Damage and/or Moderate Density Residential Dwellings (1-10 dwellings impacted / 100 feet of shoreline)

Structure Images:

010-17C-034-018-100-PHO1A.jpg

Structure Documents:

DEP

January 26,

Plan to Accompany

010-17C-034-018-100-LIC1A

Structure Assessment Form

Structure ID: 010-17J-002-011-100

Key: community-map-block-parcel-structure

Property Owner:

Local

Location:

Scatteree Beach

Date:

8/29/2007

Presumed Structure Owner:

Local

Based On Comment:

Owner Name:

Chatham

Earliest Structure Record:

Unknown

Estimated Reconstruction/Repair Cost:

\$23,800.00

Length: Top Elevation:

100

FIRM Map Zone:

V13

FIRM Map Elevation:

14

Feet

Feet NAVD 88

Feet NGVD

Primary Type:

Coastal Dune

Primary Material:

Sand

Primary Height:

5 to 10 Feet

Secondary Type:

Secondary Material:

Secondary Height:



Structure Summary :

This structure is a nourishment located at Scatteree Beach. The dune is in good condition. There is no evidence of the Jersey Barriers that are reported beneath the dune. The beach is showing a standard profile shape.

Condition

C

Rating

Fair

Level of Action

Moderate

Description

Structure is sound but may exhibit minor deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure adequate to withstand major coastal storm with little to moderate damage. Actions taken to reinforce structure to provide full protection from major coastal storm and for extending life of structure. Moderate wind or wave damage to landform exists. Landform may not be sufficient to fully protect shoreline during a major coastal storm. Actions taken to provide addition material for full protection and extended life.

Priority

III

Rating

Moderate Priority

Action

Consider for Active Project Improvement Listing

Description

Inshore Structures with potential for Infrastructure Damage and/or Limited Residential Dwellings (<1 dwelling impacted / 100 feet of shoreline)

Structure Images:

010-17J-002-011-100-PHO1A.jpg

Structure Documents:

Section V - Chatham

Part C

Structure Photographs

BCE Structure No	Document No	Contract/ Drawing Number	Entity	Municipality	Date	Title	Sheets	Location	Description
010-03A-001-015-100	010-03A-001-015-100-PHO1A.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
010-04B-004-004-100	010-04B-004-004-100-PHO1A.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
010-04B-005-005-100	010-04B-005-005-100-PHO1A.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
010-05B-000-14A-100	010-05B-000-14A-100-PHO1A.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
010-09B-031-014-100	010-09B-031-014-100-PHO1A.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
010-09B-031-014-200	010-09B-031-014-200-PHO2A.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
010-11J-006-006-100	010-11J-006-006-100-PHO1A.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
010-12A-005-009-100	010-12A-005-009-100-PHO1A.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
010-13A-002-024-100	010-13A-002-024-100-PHO1A.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
010-13M-046-01A-100	010-13M-046-01A-100-PHO1A.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
010-14A-11A-093-100	010-14A-11A-093-100-PHO1A.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
010-14A-11A-093-200	010-14A-11A-093-200-PHO2A.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
010-14D-000-0C1-100	010-14D-000-0C1-100-PHO1A.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
010-15K-018-D11-100	010-15K-018-D11-100-PHO1A.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
010-16E-013-0F2-100	010-16E-013-0F2-100-PHO1A.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
010-16F-15B-0A9-100	010-16F-15B-0A9-100-PHO1A.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
010-16F-PIER-005-100	010-16F-PIER-005-100-PHO1A.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
010-16F-PIER-005-200	010-16F-PIER-005-200-PHO2A.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
010-16F-PIER-005-300	010-16F-PIER-005-300-PHO3A.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
010-17B-000-075-100	010-17B-000-075-100-PHO1A.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
010-17C-010-027-100	010-17C-010-027-100-PHO1A.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey
010-17C-034-018-100	010-17C-034-018-100-PHO1A.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey

BCE Structure No	Document No	Contract/ Drawing Number	Entity	Municipality	Date	Title	Sheets	Location	Description
010-17J-002-011-100	010-17J-002-011-100-PH01A.jpg		Bourne Consulting Engineering		October 2007	DIGITAL IMAGE	1	Structure Location	Structure Condition Photo at Time of Survey

Massachusetts Coastal Infrastructure and Assessment



010-03A-001-015-100-PHO1A



010-04B-004-004-100-PHO1A



010-04B-005-005-100-PHO1A



010-05B-000-14A-100-PHO1A



010-09B-031-014-100-PHO1A



010-09B-031-014-200-PHO2A



010-11J-006-006-100-PHO1A



010-12A-005-009-100-PHO1A



010-13A-002-024-100-PHO1A

Massachusetts Coastal Infrastructure and Assessment



010-13M-046-01A-100-PHO1A



010-14A-11A-093-100-PHO1A



010-14A-11A-093-200-PHO2A



010-14D-000-0C1-100-PHO1A



010-15K-018-D11-100-PHO1A



010-16E-013-0F2-100-PHO1A



010-16F-15B-0A9-100-PHO1A



010-16F-PIER-005-100-PHO1A



010-16F-PIER-005-200-PHO2A

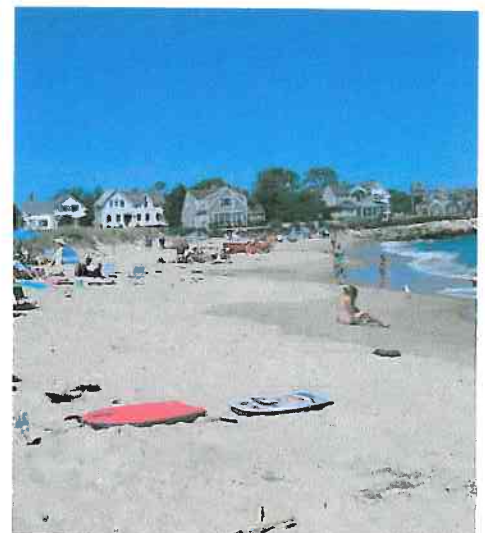
Massachusetts Coastal Infrastructure and Assessment



010-16F-PIER-005-300-PHO3A



010-17B-000-075-100-PHO1A



010-17C-010-027-100-PHO1A



010-17C-034-018-100-PHO1A



010-17J-002-011-100-PHO1A

Section V - Chatham

Part D

Structure Documents

TOWN DOCUMENT LIST

MA DCR - DOCUMENT LIST

MA DEP – Ch 91 DOCUMENT LIST

- Copies of License Documents

USACE – PERMIT DOCUMENT LIST

- Copies of Permit Documents

TOWN: CHATHAM
SOURCE: Town of Chatham
LOCATION: TOWN
DATE OF RESEARCH: JULY 2007

No Town Documents for the Town of Chatham

BCE Structure No	Document No	Contract/ Drawing Number	Entity	Municipality	Date	Title	Sheets	Location	Description
------------------	-------------	--------------------------------	--------	--------------	------	-------	--------	----------	-------------

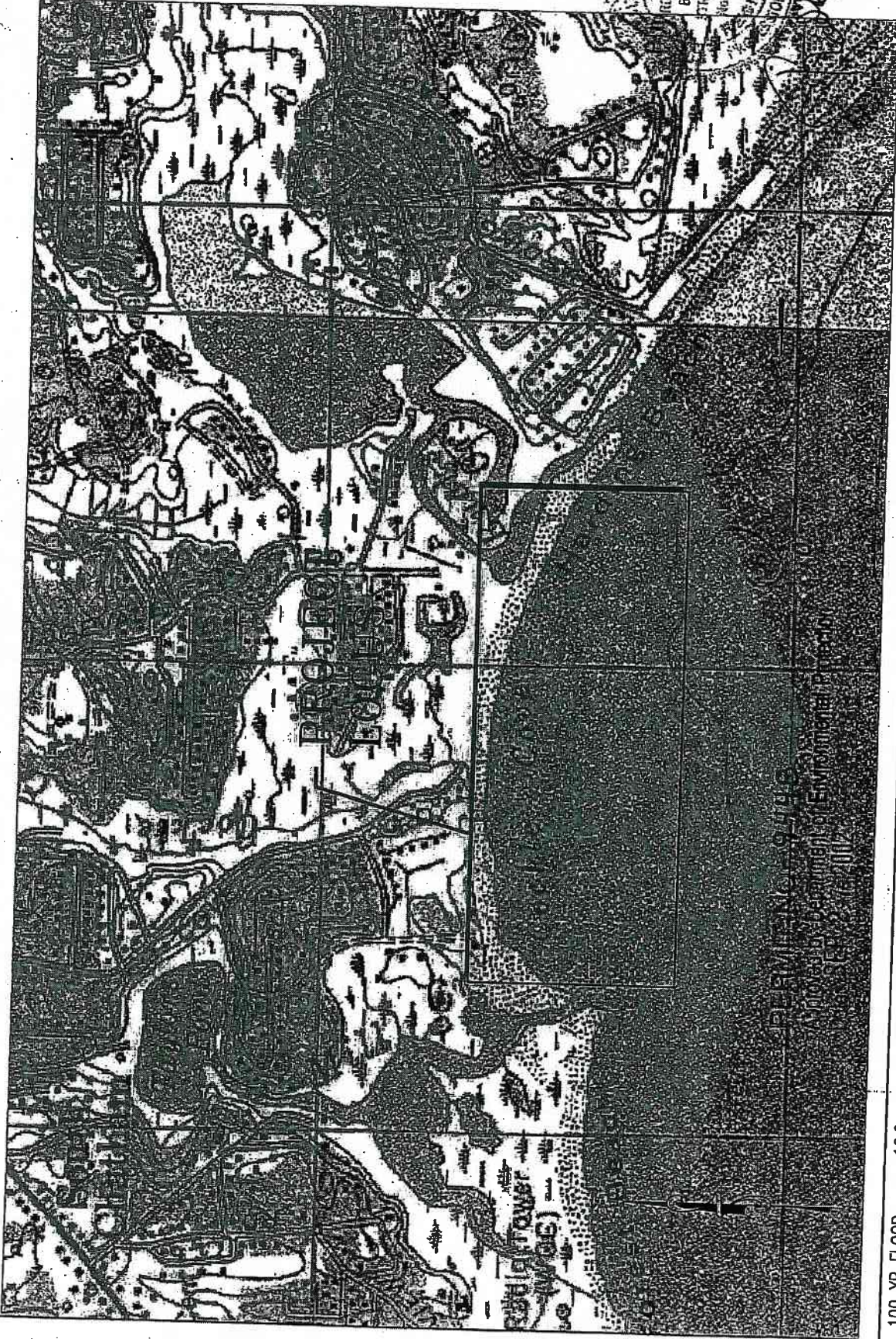
TOWN: CHATHAM
 SOURCE: MA-DCR
 LOCATION: MA-DCR BOSTON and HINGHAM, MA
 DATE OF RESEARCH: JULY 2007

BCE Structure No	Document No	Contract/ Drawing Number	Entity	Municipality	Date	Title	Sheets	Location	Description
010-03A-001-015-100	010-03A-001-015-100-DCR1A	928	MA-DCR	Chatham	Aug-46	Proposed Shore Protection - Forest Beach - Chatham - Prepared for the DPW of Massachusetts - Division of Waterways	1	Forest Beach	Groins
010-03A-001-015-100	010-03A-001-015-100-DCR1B	1511	MA-DCR	Chatham	May-55	Proposed Hurricane Repairs Beach Restoration - Forest Beach Road and Cockle Cove - Chatham - Prepared for the DPW of Massachusetts - Division of Waterways	2	Forest Beach Road and Cockle Cove	Beach Restoration
010-03A-001-015-100	010-03A-001-015-100-DCR1C	1793	MA-DCR	Chatham	Aug-57	Proposed Shore Protection - Groin Construction and Sand Fill - Pleasant Street - Chatham, Massachusetts - Prepared for the DPW of Massachusetts - Division of Waterways	1	Pleasant Street	Groin and Sand Fill
010-03A-001-015-100	010-03A-001-015-100-DCR1D	2080	MA-DCR	Chatham	Dec-59	Proposed Shore Protection - Groin Construction - Vicinity of Forest Beach Road and Morris Island Road - Chatham, Massachusetts	1	Forest Beach Road	Stone Groins
010-03A-001-015-100	010-03A-001-015-100-DCR1E	2571	MA-DCR	Chatham	May-67	Proposed Shore Protection - Stone Mounds, Groin, and Sand Fill - Morris Isle Bridge and Red River Beach - Prepared for the DPW of Massachusetts - Division of Waterways	N/A	Morris Isle Bridge and Pleasant Street	Stone Mounds and Groin
010-05B-000-14A-100	010-05B-000-14A-100-DCR1A	1511	MA-DCR	Chatham	May-55	Proposed Hurricane Repairs Beach Restoration - Forest Beach Road and Cockle Cove - Chatham - Prepared for the DPW of Massachusetts - Division of Waterways	2	Forest Beach Road and Cockle Cove	Beach Restoration
010-16F-15B-0A9-100	010-16F-15B-0A9-100-DCR1A	2474	MA-DCR	Chatham	Aug-65	Proposed Shore Protection - Stone Mound - Aunt Lydia's Cove - Chatham, Massachusetts - Prepared for the DPW of Massachusetts - Division of Waterways	1	Aunt Lydia's Cove	Stone Mound

TOWN: CHATHAM
SOURCE: DEP
LOCATION: BOSTON, MA
DATE OF RESEARCH: JULY 2007

BCE Structure No	Document No	Contract/ Drawing Number	Entity	Municipality	Date	Title	Sheets	Location	Description
010-05B-000-14A-100	010-05B-000-14A-100-LIC1A	9448	DEP	Chatham	January 7, 2002	Cockle Cove Beach Nourishment	7	Cockle cove	Beach Nourishment
010-09B-031-014-100	010-09B-031-014-100-LIC1A	1614	DEP	Chatham	November 1986	Plan Accompanying Petition of Town of Chatham to Construct Concrete Boat Ramp, Timber Bulkhead, Place Floats and to Dredge in Oyster Pond River - Chatham, Massachusetts	2	Oyster Pond River	Timber Bulkhead
010-09B-031-014-100	010-09B-031-014-100-LIC1B	5018	DEP	Chatham	January 26, 1966	Construct a Bulkhead with Boat Ramp and Parking Area At Oyster Pond River	1	Oyster Pond River	Bulkhead
010-09B-031-014-200	010-09B-031-014-200-LIC2A	5018	DEP	Chatham	January 26, 1966	Accompanying Petition of the Town of Chatham, Construct A Bulkhead with Boat Ramp and Parking Area at Oyster Pond River	1	Oyster Pond River	Bulkhead
010-11J-006-006-100	010-11J-006-006-100-LIC1A	1615	DEP	Chatham	November 1986	Plan Accompanying Petition of Town of Chatham to Construct Concrete Boat Ramp, Timber Bulkhead, Place Floats, Gangway and Dredge in Ryder's Cove - Chatham, Massachusetts	2	Ryder's Cove	Timber Bulkhead
010-13A-002-024-100	010-13A-002-024-100-LIC1A	3328	DEP	Chatham	October 1992	Plan Accompanying Petition of Town of Chatham to License and Maintain Concrete Launching Ramp and Floats - Stage Harbor - Chatham, Barnstable County, Massachusetts	3	Stage Harbor	Proposed Riprap and Existing Bulkhead
010-13A-002-024-100	010-13A-002-024-100-LIC1B	2042	DEP	Chatham	September 1989	Plan Accompanying Petition of Town of Chatham to Construct a Timber Bulkhead in Stage Harbor, Chatham, MA	2	Stage Harbor Road	Bulkhead
010-16F-PIER-005-100	010-16F-PIER-005-100-LIC1A	560	DEP	Chatham	April 1979	Plan Accompanying Petition of Town of Chatham to Install a Sheet Steel Bulkhead and to Dredge in Lydia's Cove - Chatham, Massachusetts	2	Fish Pier	Steel Bulkhead
010-16F-PIER-005-100	010-16F-PIER-005-100-LIC1B	2078	DEP	Chatham	October 1989	Plan Accompanying Petition of Town of Chatham to Install Piles and Maintenance Dredge in Aunt Lydia's Cove - Chatham, Barnstable, MA	2	Chatham Fish Pier	Piles to Reinforce Bulkhead
010-16F-PIER-005-100	010-16F-PIER-005-100-LIC1C	5330	DEP	Chatham	January 1968	Plan Accompanying Petition of Town of Chatham to Construct a Bulkhead and Timber Groin, Excavate a Basin and Fill in Aunt Lydia's Cove, Chatham	1	Chatham Fish Pier	Bulkhead
010-16F-PIER-005-100	010-16F-PIER-005-100-LIC1D	7281	DEP	Chatham	April 1996	Plan Accompanying Petition of Town of Chatham to Replace Existing Ties, Install New Sheet Piling and Screw Anchors, Extend North Bulkhead 120 LF, Install Two Finger Piers and a Floating Dock and Dredge 1625 CY of Sediment from Aunt Lydia's Cove	8	Chatham Fish Pier	Extend Existing Bulkhead
010-16F-PIER-005-100	010-16F-PIER-005-100-LIC1E	2747	DEP	Chatham	April 1945	Plan Accompanying Petition of Town of Chatham, MA to Build a Fish Pier and Fish Packing Building at Aunt Lydia's Cove, Chatham, MA	1	Fish Pier	Bulkhead
010-16F-PIER-005-200	010-16F-PIER-005-200-LIC2A	560	DEP	Chatham	April 1979	Plan Accompanying Petition of Town of Chatham to Install a Sheet Steel Bulkhead and to Dredge in Aunt Lydia's Cove - Chatham, Massachusetts	2	Fish Pier	Steel Bulkhead
010-16F-PIER-005-200	010-16F-PIER-005-200-LIC2B	2078	DEP	Chatham	October 26, 1989	Plan Accompanying Petition of Town of Chatham to Install Piles and Maintenance Dredge in Aunt Lydia's Cove	2	Aunt Lydia's Cove	Bulkhead
010-16F-PIER-005-200	010-16F-PIER-005-200-LIC2C	3886	DEP	Chatham	October 1, 1956	Plan Accompanying Petition of Town of Chatham, Build and Maintain a Timber Bulkhead, Riprap, Dredge, and Fill Solid in Aunt Lydia's Cove	3	Aunt Lydia's Cove	Timber Bulkhead and Riprap
010-16F-PIER-005-200	010-16F-PIER-005-200-LIC2D	3171	DEP	Chatham	September 20, 1949	Plan Accompanying Petition of Town of Chatham to Build and Maintain a Timber Bulkhead and Fill Solid in Aunt Lydia's Cove	1	Aunt Lydia's Cove	Timber Bulkhead
010-16F-PIER-005-300	010-16F-PIER-005-300-LIC3A	3886	DEP	Chatham	October 1, 1956	Accompanying Petition of Town of Chatham to Build and Maintain a Timber Bulkhead, Riprap, Dredge and Fill Solid in Aunt Lydia's Cove at Chatham	3	Aunt Lydia's Cove	Timber Bulkhead
010-17B-000-075-100	010-17B-000-075-100-LIC1A	5976	DEP	Chatham	November 1996	Plan Accompanying Petition of Town of Chatham to Reconstruct and Maintain a Rock Revetment at Chatham Harbor - Chatham, Barnstable County, Massachusetts	2	Main Street	Revetment
010-17C-034-018-100	010-17C-034-018-100-LIC1A	11618	DEP	Chatham	January 26, 2007	Plan to Accompany Petition of Town of Chatham to Construct and Maintain a Rock Revetment in Chatham Harbor, Chatham, Mass in the County of Barnstable	3	Chatham Harbor/Holway Street	Rock Revetment

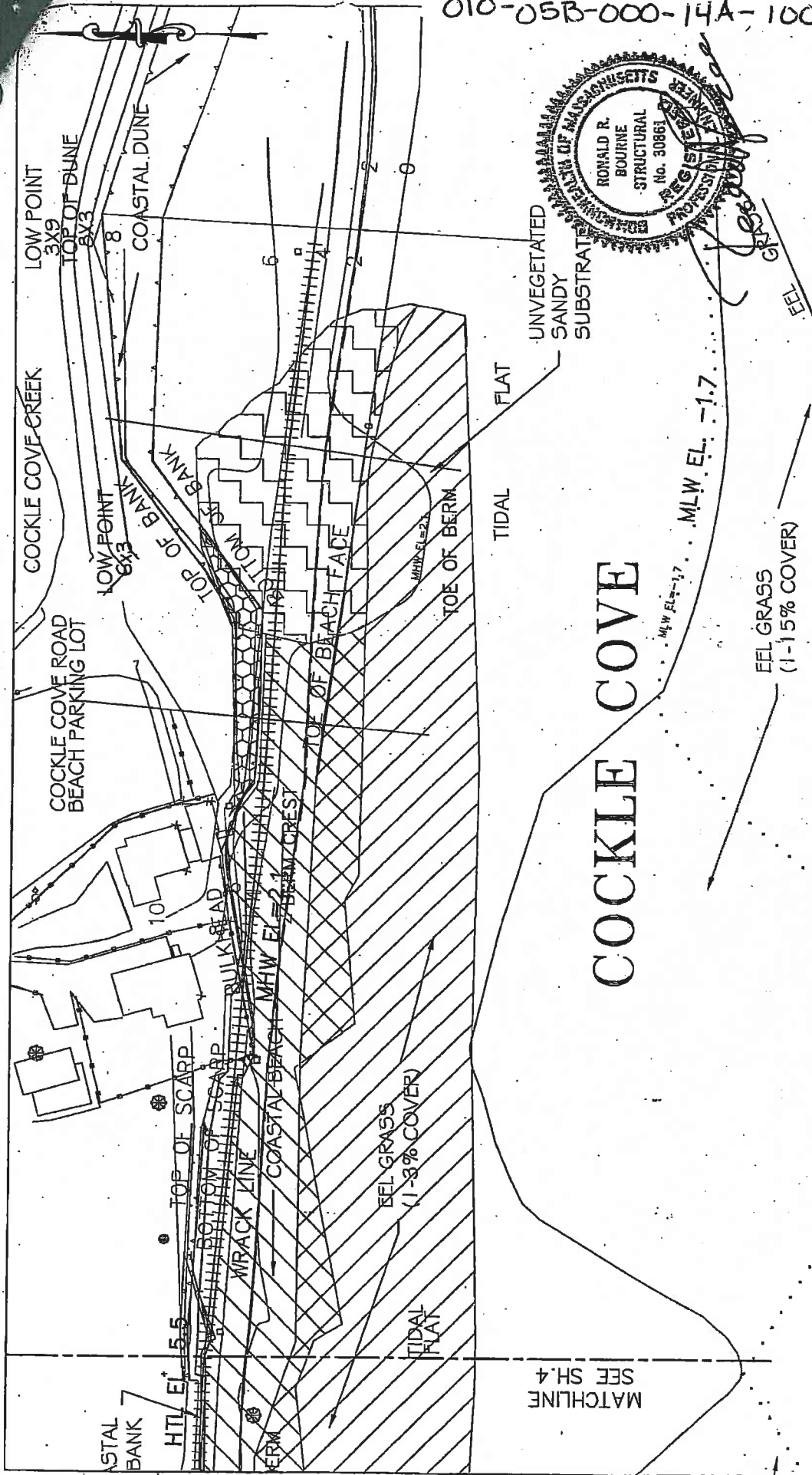
010-058-000-14A-100



100 YR FLOOD HTL 16.0 NGVD MHW 5.5 MLW 2.1		TITLE: COCKLE COVE BEACH NOURISHMENT		IN: CHATHAM AT: COCKLE COVE COUNTY: BARNSTABLE STATE: MA	
PURPOSE: BEACH NOURISHMENT		APPLICATION BY: TOWN OF CHATHAM		SHEET 1 OF 7 DATE: 01/07/02	

SHEET 1 OF 7
BCE
Bourne Consulting Engineering
 100 West Main Street
 Barnstable, MA 02532
 Tel: (508) 548-4125 Fax: (508) 548-4171

010-05B-000-14A-100



PERMIT NO. 9448
 Approved by Department of Environmental Protection
 Date: **SEP 27 2002**

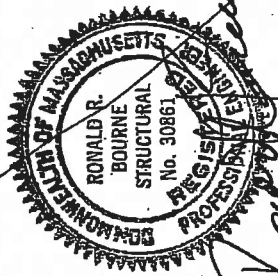
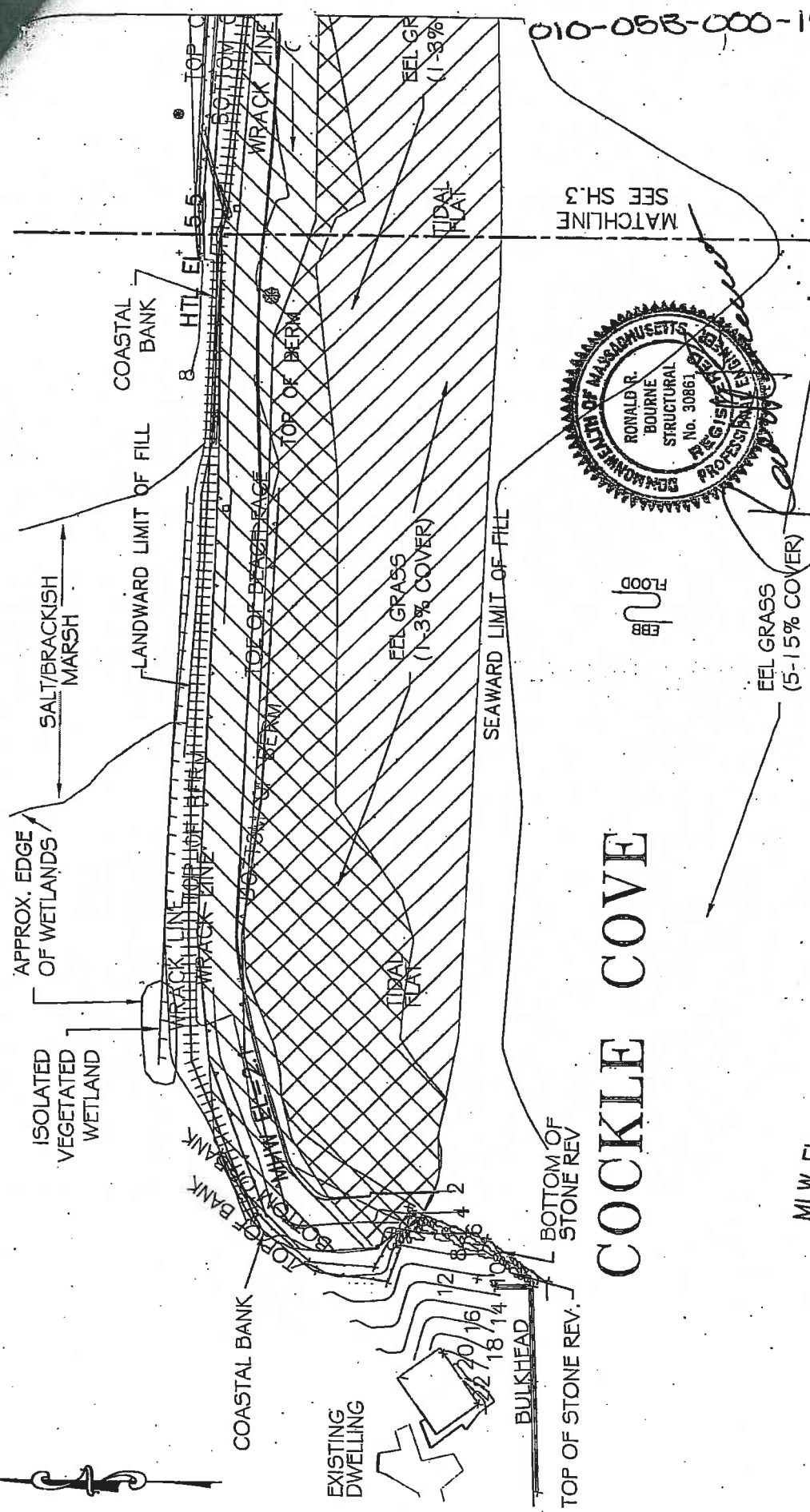
LAND UNDER THE OCEAN



100 YR FLOOD HTL MHW	16 5.5 2.1	NGVD MLW	0.0 -1.7	TITLE: EXISTING CONDITIONS	IN: CHATHAM AT: COCKLE COVE COUNTY: BARNSTABLE STATE: MA
PURPOSE: BEACH NOURISHMENT		APPLICATION BY: TOWN OF CHATHAM			SHEET 2 OF 7 DATE: 01/07/02

BCE
 Bourne Consulting Engineering
 100 West Central Street
 Barnstable, MA 02532
 TEL: (508) 538-4122 FAX: (508) 538-4171

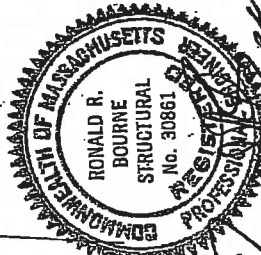
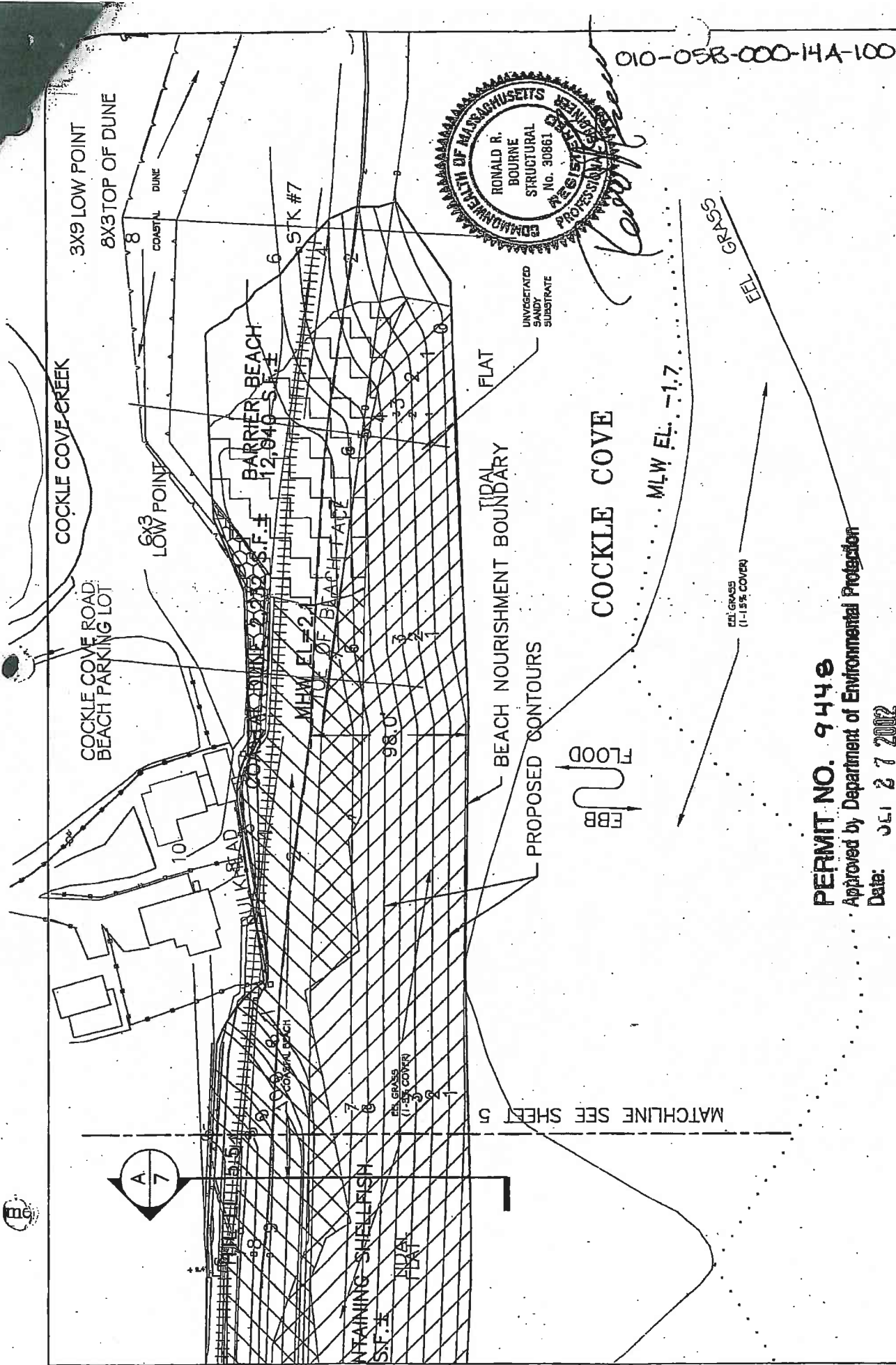
010-058-000-14A-100



PERMIT NO. 9448
 Approved by: Department of Environmental Protection
 Date: **SEP 27 2002**

SCALE: 1" = 80'-0"

100 YR FLOOD HTL MHW	16 5.5 2.1	NGVD MLW	0.0 -1.7	TITLE: EXISTING CONDITIONS	IN: CHATHAM AT: COCKLE COVE COUNTY: BARNSTABLE STATE: MA
BCE Bourne Consulting Engineering 104 West Street, Second Floor New Bedford, MA 01905 Tel: (508) 558-3125 Fax: (508) 558-3171	PURPOSE: BEACH NOURISHMENT	APPLICATION BY: TOWN OF CHATHAM	SHEET 3 OF 7	DATE: 01/07/02	

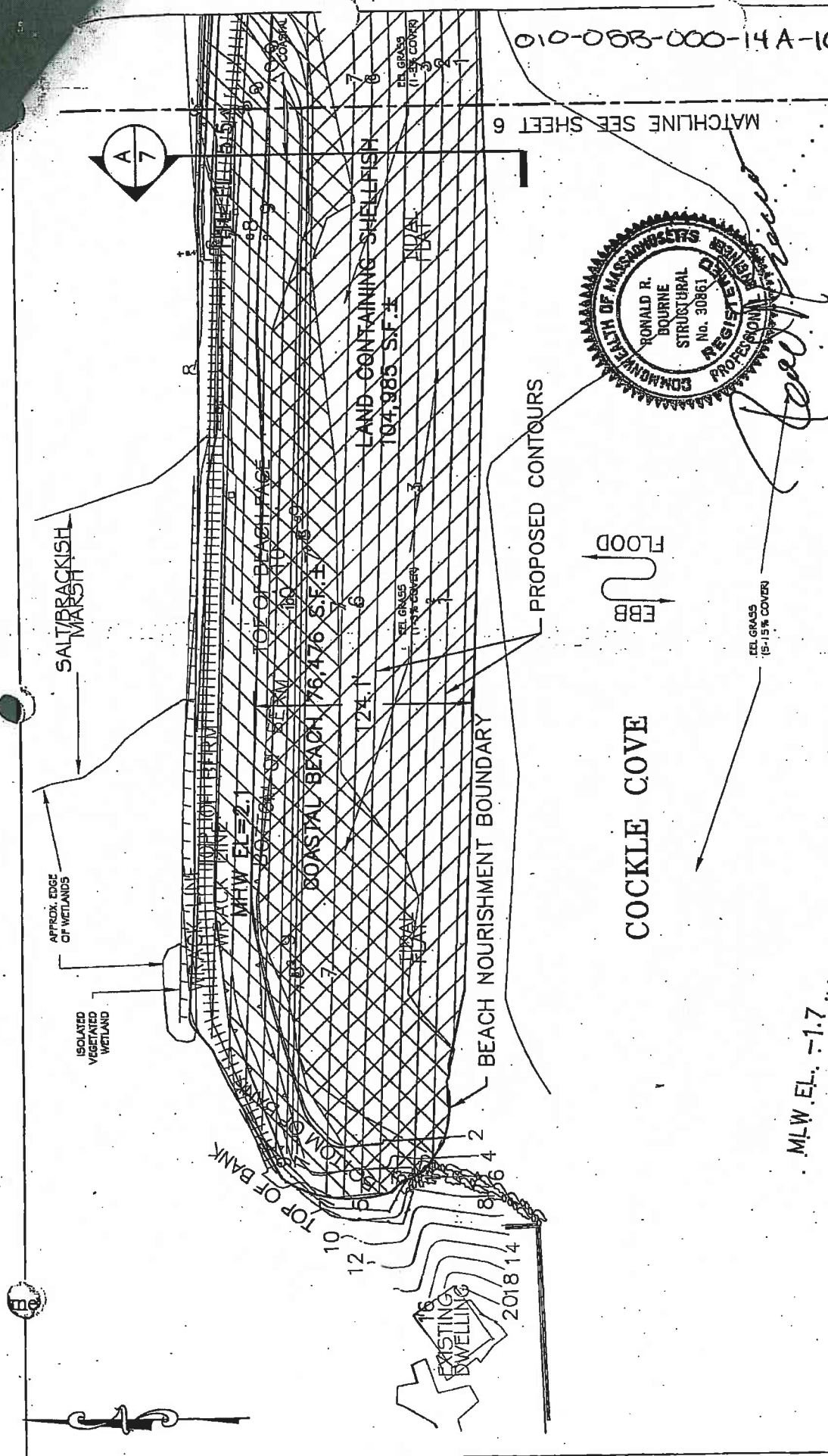


PERMIT NO. 9448

Approved by Department of Environmental Protection


Date: **06/27/2002**

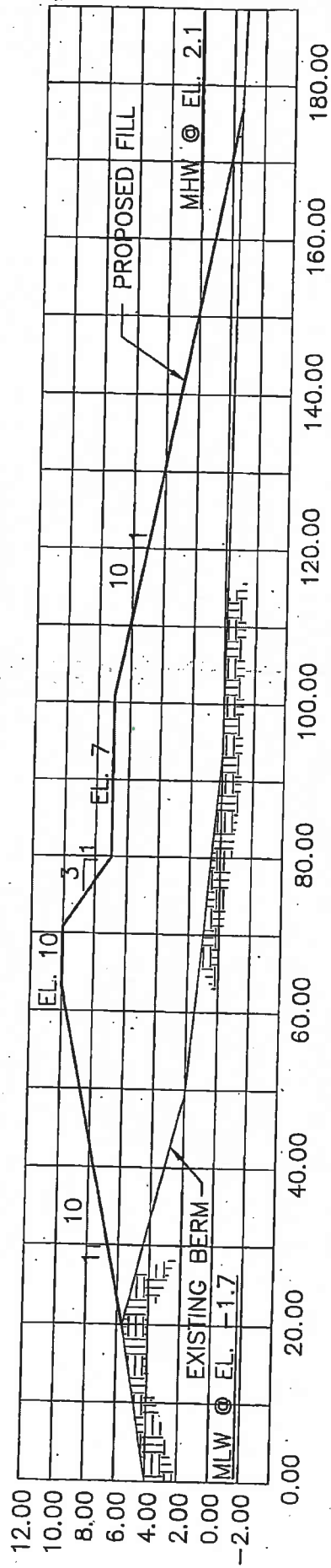
100 YR FLOOD HTL MLW	16 5.5 2.1	NGVD MLW	0.0 -1.7	TITLE: PROPOSED CONDITIONS	IN: CHATHAM AT: COCKLE COVE COUNTY: BARNSTABLE STATE: MA
PURPOSE: BEACH NOURISHMENT				APPLICATION BY: TOWN OF CHATHAM	SHEET 4 OF 7 DATE: 01/07/02



PERMIT NO. 9448

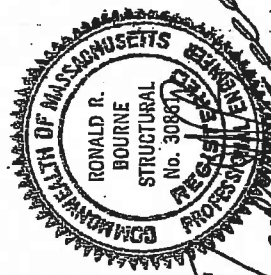
Approved by Department of Environmental Protection
Date: **SEP 27 2002**

 <p>Bourne Consulting Engineering 100 West Street, Suite 200 Barnstable, MA 02532 TEL: (508) 558-1100 FAX: (508) 558-0071</p>	<p>TITLE: PROPOSED CONDITIONS</p>	<p>IN: CHATHAM AT: COCKLE COVE COUNTY: BARNSTABLE STATE: MA</p>
<p>100 YR FLOOD HTL MLW</p>	<p>PURPOSE: BEACH NOURISHMENT</p>	<p>SHEET 5 OF 7 DATE: 01/07/02</p>



A TYPICAL FILL CROSS SECTION

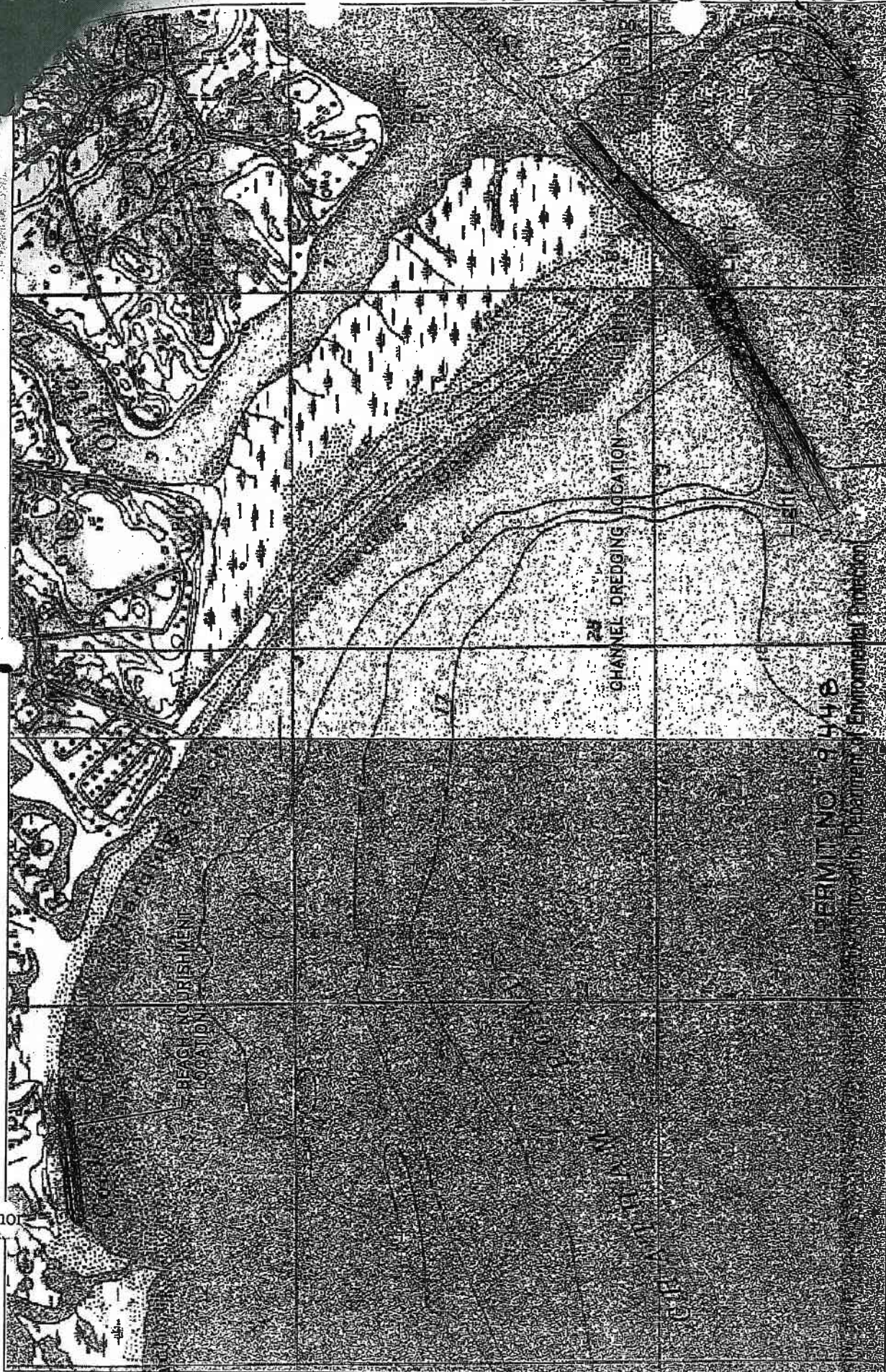
010-058-000-14A-100




PERMIT NO. 9448
 Approved by Department of Environmental Protection
 Date: **SEP 27 2002**

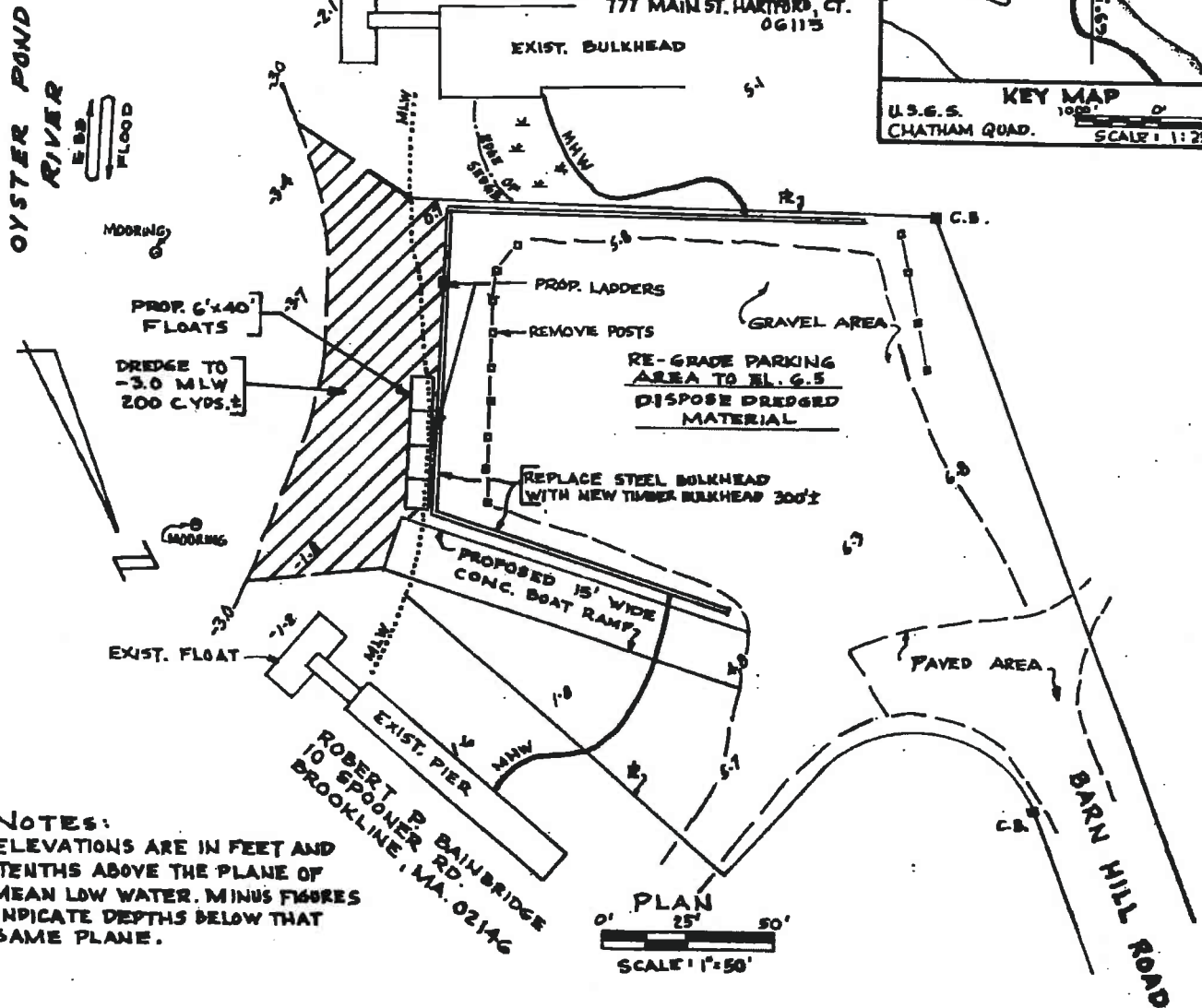
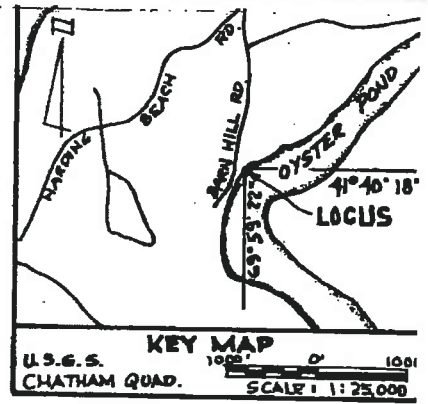
100 YR FLOOD		16	NGVD	0.0	Bourne Consulting Engineering <small>144 West County Road Barnstable, MA 02536 POC (508) 538-4125 FAX (508) 538-4077</small>
HTL		5.5	MLW	-1.7	
MHW		2.1			
TITLE:		PROPOSED BEACH NOURISHMENT SECTION			IN: CHATHAM AT: COCKLE COVE COUNTY: BARNSTABLE STATE: MA
PURPOSE:		BEACH NOURISHMENT			SHEET 6 OF 7
		APPLICATION BY:			DATE: 01/07/02
		TOWN OF CHATHAM			

010-05B-000-14A F100

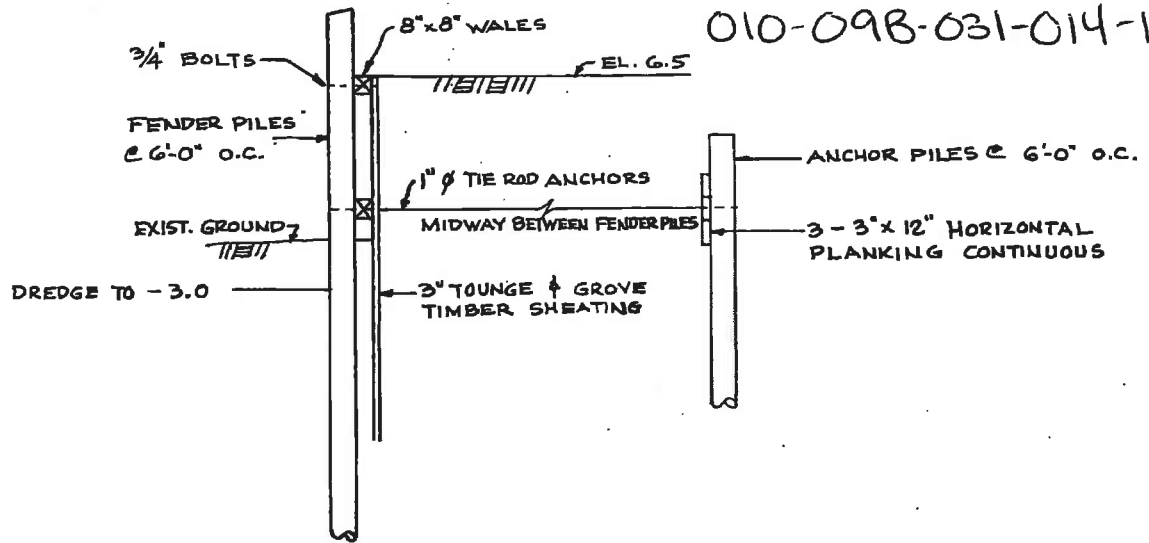


100 YR FLOOD HTL MHW	16.0 5.5 2.1	NGVD MLW	0.0 -1.7	TITLE: COCKLE COVE BEACH NOURISHMENT	IN: CHATHAM AT: COCKLE COVE COUNTY: BARNSTABLE STATE: MA
 BCE <i>Bourne Consulting Engineering</i> 140 West Main Street Bourne, MA 01939 P/E (MA) 000-4105 A/E (MA) 000-4107				PURPOSE: BEACH NOURISHMENT	APPLICATION BY: TOWN OF CHATHAM
				SHEET 7 OF 7	DATE: 01/07/02

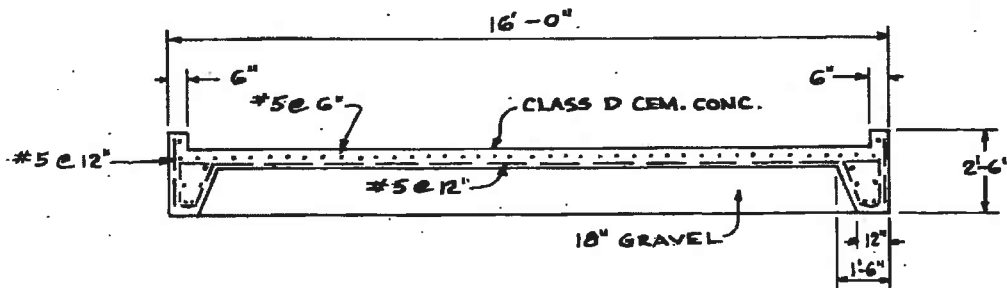
010-098-031-014-100



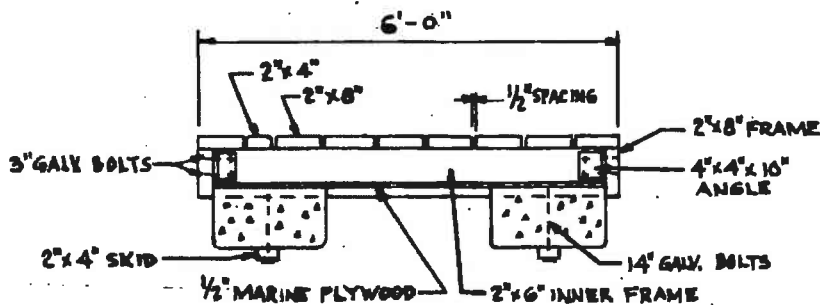
010-098-031-014-100



BULKHEAD SECTION
SCALE: 1" = 6'



RAMP SECTION
NOT TO SCALE



FLOAT SECTION
SCALE: 3/8" = 1'-0"

LICENSE PLAN NO. **1614**

Approved by Department of Environmental Quality Engineering
Date:

April 28, 1987



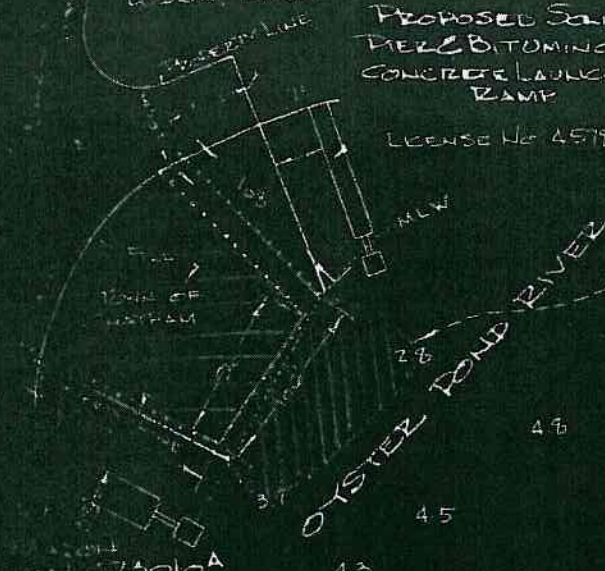
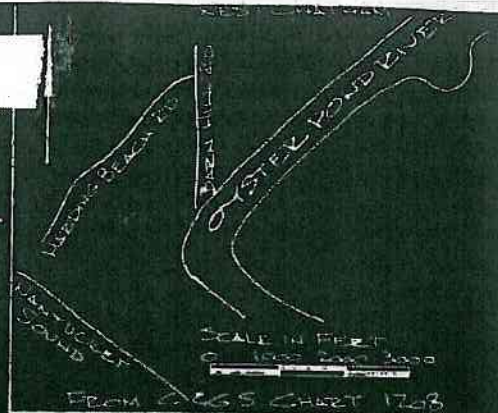
86 W-240

010-098-031-014-100
010-098-031-014-200

200 FT BRIDGE
ET UX
210 COMMERCIAL ST
BOSTON, MASS

PROPOSED SAND FILL
PIERCE BITUMINOUS
CONCRETE LAUNCHING
RAMP

LICENSE NO 4578



PROPOSED AREAS TO BE
EXCAVATED TO EL -3.0
EXCAVATION MATERIAL TO BE
USED FOR FILL

PLAN

SCALE IN FEET
0 50 100 150

DATUM M.L.W. = 0.0

EXISTING CONCRETE



SECTION
RAMP

EXISTING BOTTOM

TOP OF FILL
EL 62.7

FILL

5' x 5'
8' x 8'

EL 20

8' PLE

6' x 6'

M.L.W.

3' RAMP

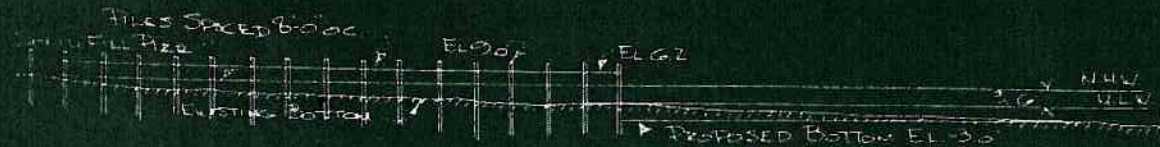
M.L.W.

EXCAVATED AREA

PROPOSED BOTTOM EL -3.0

TYPICAL SECTION

SCALE IN FEET



LONGITUDINAL SECTION

SCALE IN FEET
0 20 40 60

COMPANYING PETITION OF
TOWN OF CHATHAM
STREET & BULLHEAD WITH
LAUNCHING PARKING AREA
AT
OYSTER POND RIVER
CHATHAM

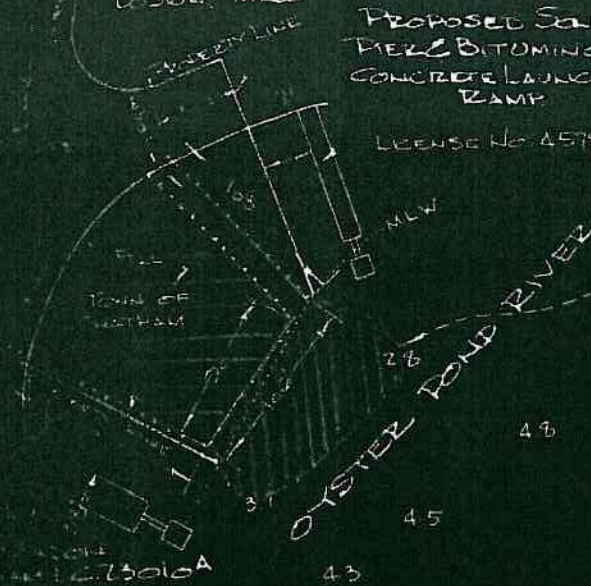
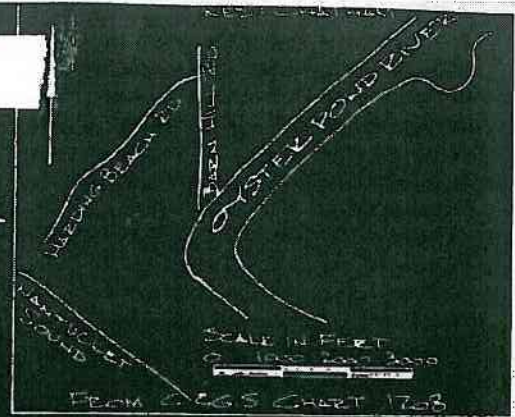
LICENSE PLAN NO. 5018
APPROVED BY DEPARTMENT OF PUBLIC WORKS
MASSACHUSETTS JANUARY 26, 1966
[Signature]
[Signature]
[Signature]

010-098-031-014-100
010-098-031-014-200

100' E. DAINSBIDGE
ET OR
220 COMMERCIAL ST.
DORSET, MASS

PROPOSED SOLID FILL
PIERS BITUMINOUS
CONCRETE LAUNCHING
RAMP

LICENSE NO. 4578



PROPOSED AREAS TO BE
EXCAVATED TO EL. 3.0
EXCAVATION MATERIAL TO BE
USED FOR FILL

PLAN

SCALE IN FEET
0 50 100 150

DATUM M.L.W. = 0.0

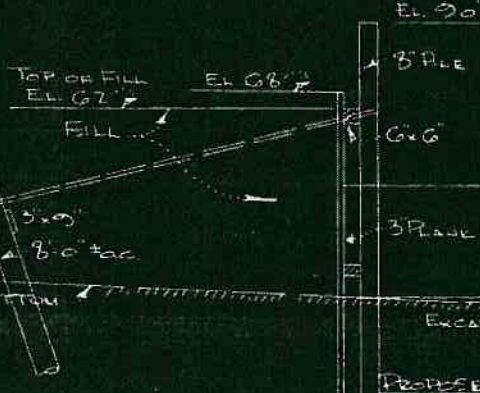
MASS. CONCRETE

M.L.W.
M.L.W.
EXISTING
BOTTOM

SECTION
LAUNCHING RAMP

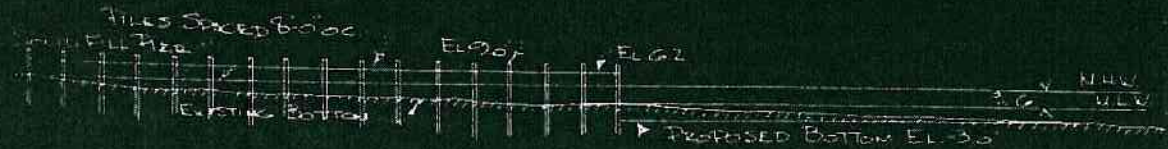
EXISTING BOTTOM

EL. 62



TYPICAL SECTION

SCALE IN FEET
0 4 8 12



LONGITUDINAL SECTION

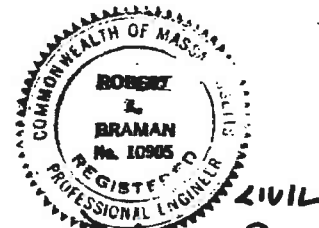
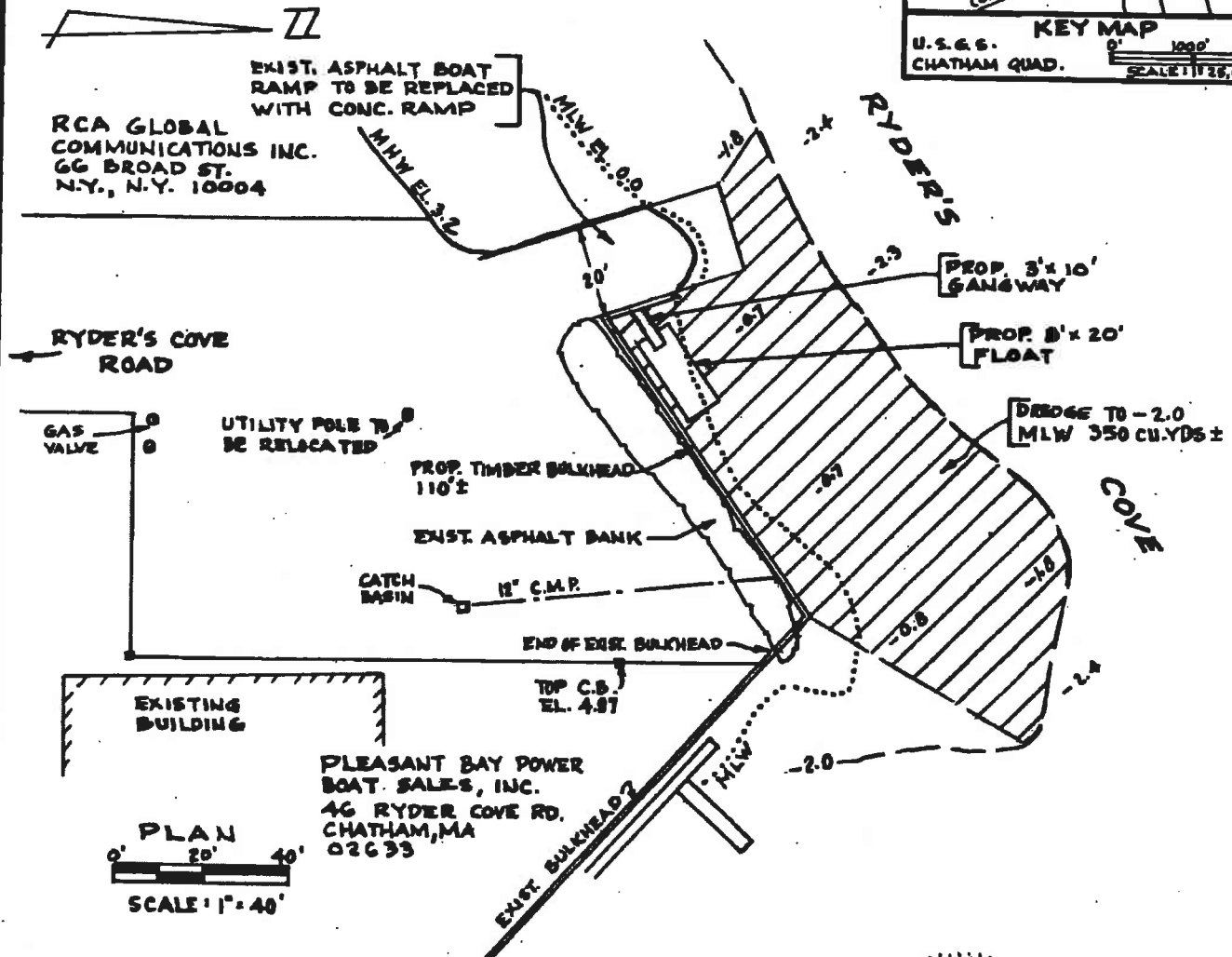
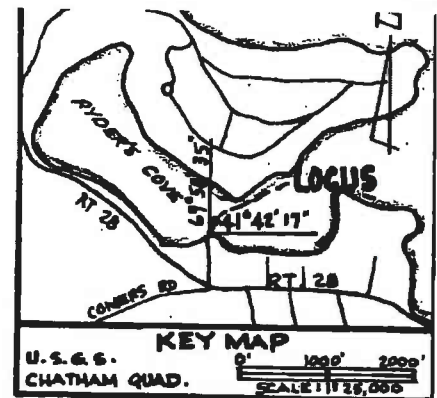
SCALE IN FEET
0 20 40 60

COMPANYING PETITION OF
TOWN OF CHATHAM
FOR A BULKHEAD WITH
LAUNCHING AND PARKING AREA
AT
OYSTER POND RIVER
CHATHAM

LICENSE PLAN NO. 5018
APPROVED BY DEPARTMENT OF PUBLIC WORKS
MASSACHUSETTS
JANUARY 26, 1966
[Signatures]
[Seal]

1. ELEVATIONS ARE IN FEET AND TENTHS ABOVE THE PLANE OF MEAN LOW WATER. MINUS FIGURES INDICATE DEPTHS BELOW THAT SAME PLANE.

2. 350 CU.YDS TO BE DREDGED, 100 CU.YDS TO BE USED FOR FILL BEHIND PROPOSED BULKHEAD. REMAINDER OF DREDGED MATERIAL TO BE TAKEN TO AN IN-LAND DISPOSAL SITE.



Robert A. Braman

PLAN ACCOMPANYING PETITION OF
TOWN OF CHATHAM
TO CONSTRUCT CONCRETE RAMP, TIMBER
BULKHEAD, PLACE FLOAT, GANGWAY AND
DREDGE IN RYDER'S COVE
CHATHAM, MASS.

NOV. 24, 1986

SHEET 1 OF 2



BRAMAN ENGINEERING COMPANY
CIVIL ENGINEERS & SURVEYORS
258 MAIN ST., BUZZARDS BAY, MA.

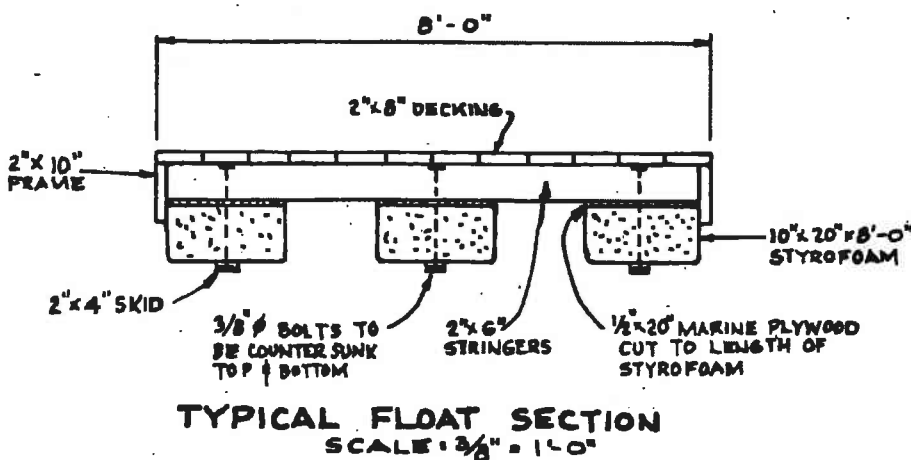
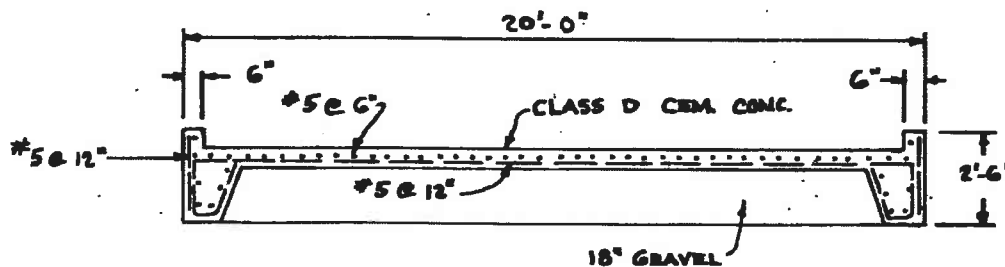
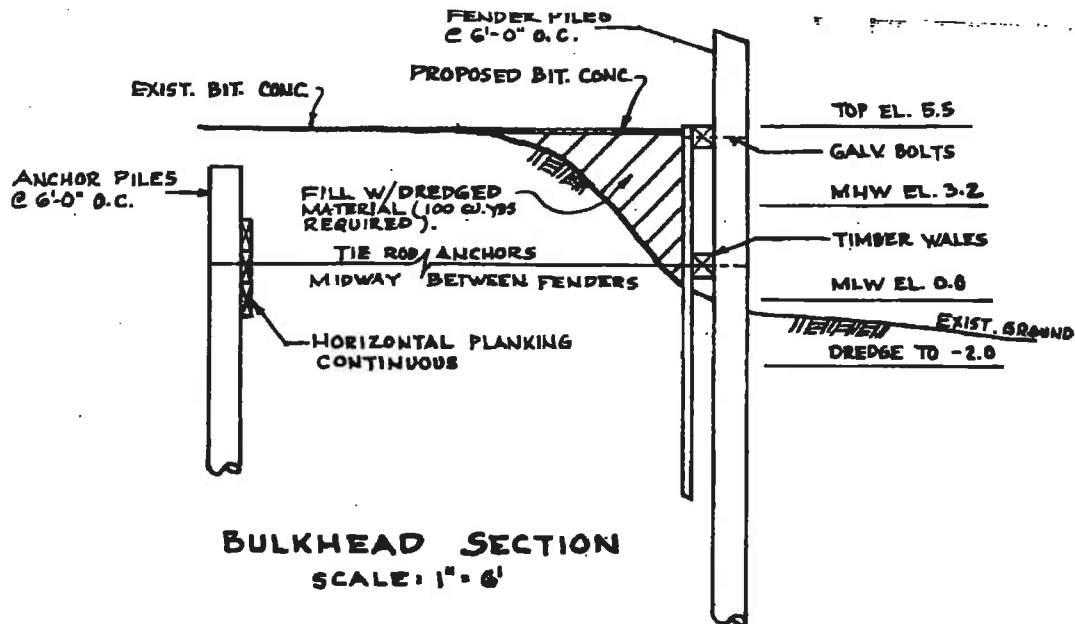
LICENSE PLAN NO. 1615

Approved by Department of Environmental Quality Engineering
of Massachusetts

Gary Clayton
Charles N. Nadeau
April 22, 1987

COMMISSIONER
DIVISION DIRECTOR
SECTION CHIEF
DATE

010-113-006-006-100



LICENSE PLAN NO. **1615**

Approved by Department of Environmental Quality Engineering

Date: **APRIL 28, 1987**

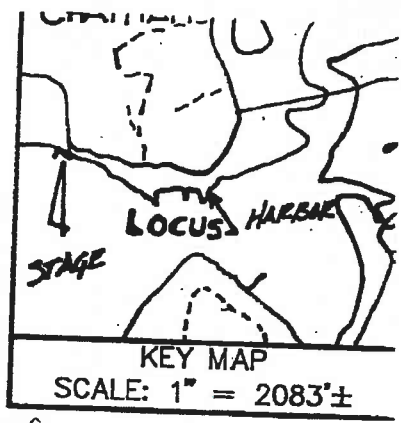
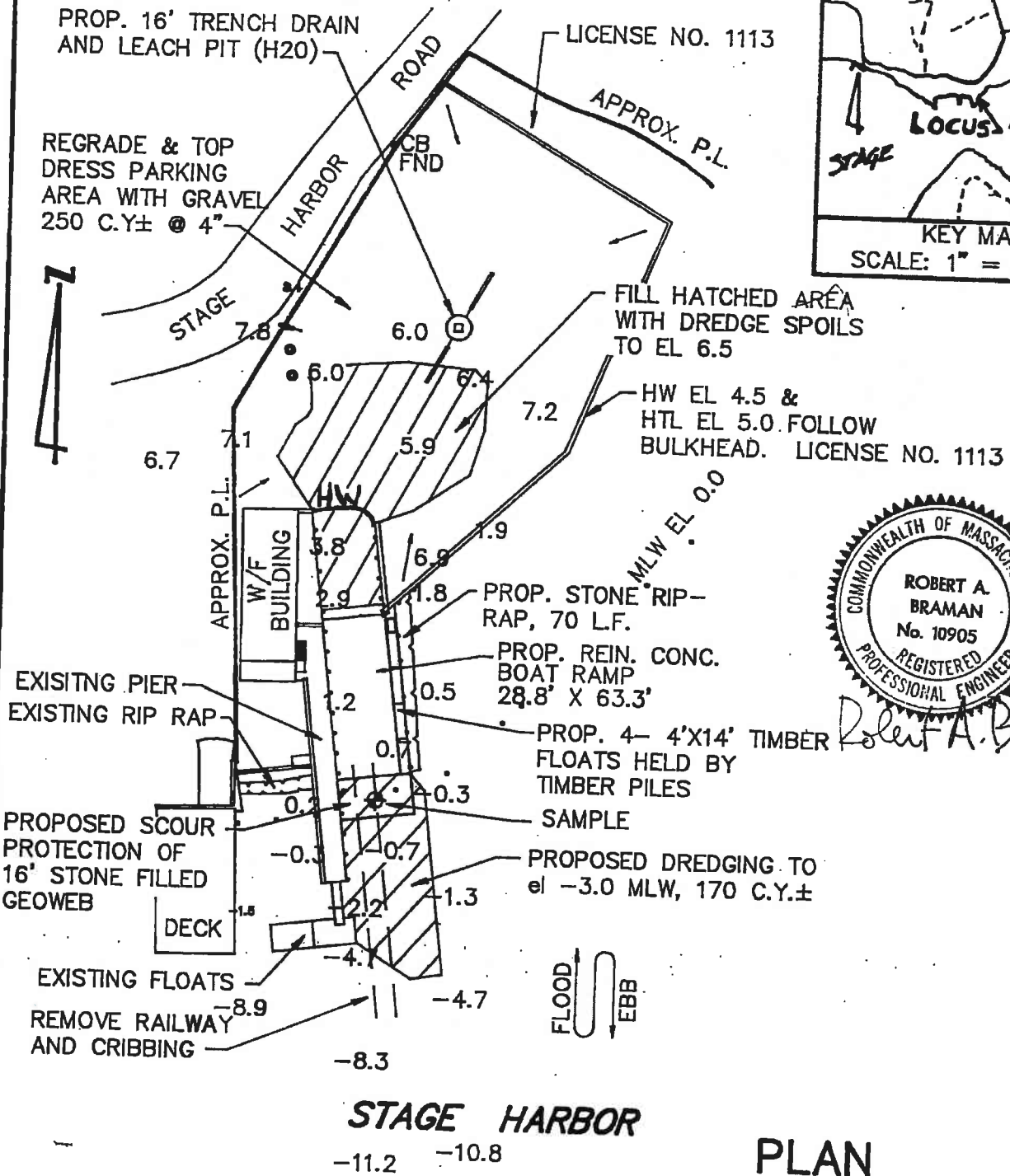


Robert A. Braham

86W-239

010-113-006-006-100

010-13A-002-024-100



COMMONWEALTH OF MASSACHUSETTS
 ROBERT A. BRAMAN
 No. 10905
 REGISTERED PROFESSIONAL ENGINEER
Robert A. Braman

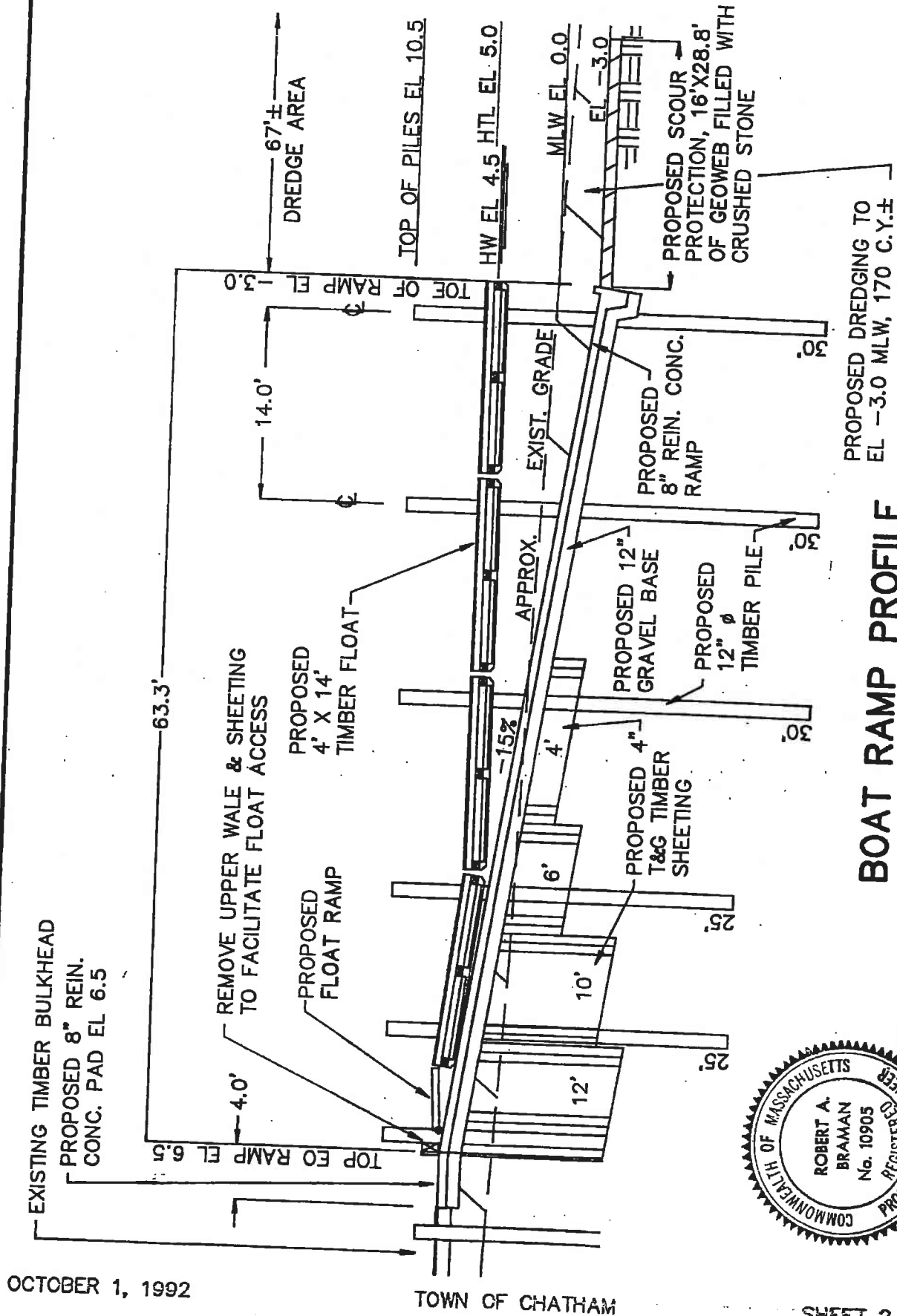
PLAN ACCOMPANYING PETITION OF
 TOWN OF CHATHAM
 TO LICENSE AND MAINTAIN
 CONCRETE LAUNCHING RAMP AND FLOATS
 STAGE HARBOR
 CHATHAM, BARNSTABLE CO., MA
 OCTOBER 1, 1992 SHEET 1 OF 3
 BRAMAN ENGINEERING CO., LTD
 CIVIL ENGINEERS AND SURVEYORS
 258 MAIN ST., BUZZARDS BAY, MA

LICENSE PLAN NO. 3328
 Approved by Department of Environmental Protection
 of Massachusetts
[Signature]
 COMMISSIONER
 DIVISION DIRECTOR
 SECTION CHIEF
 CIV. 9-1-1000

010-13A-002-024-100

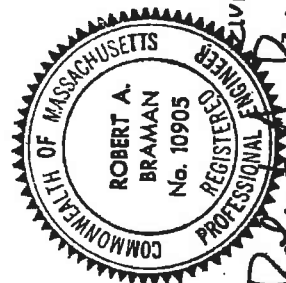
LICENSE PLAN NO. 3328

Approved by Department of Environmental Protection
Date: MAY 21 1992



BOAT RAMP PROFILE

SCALE: 1" = 10'



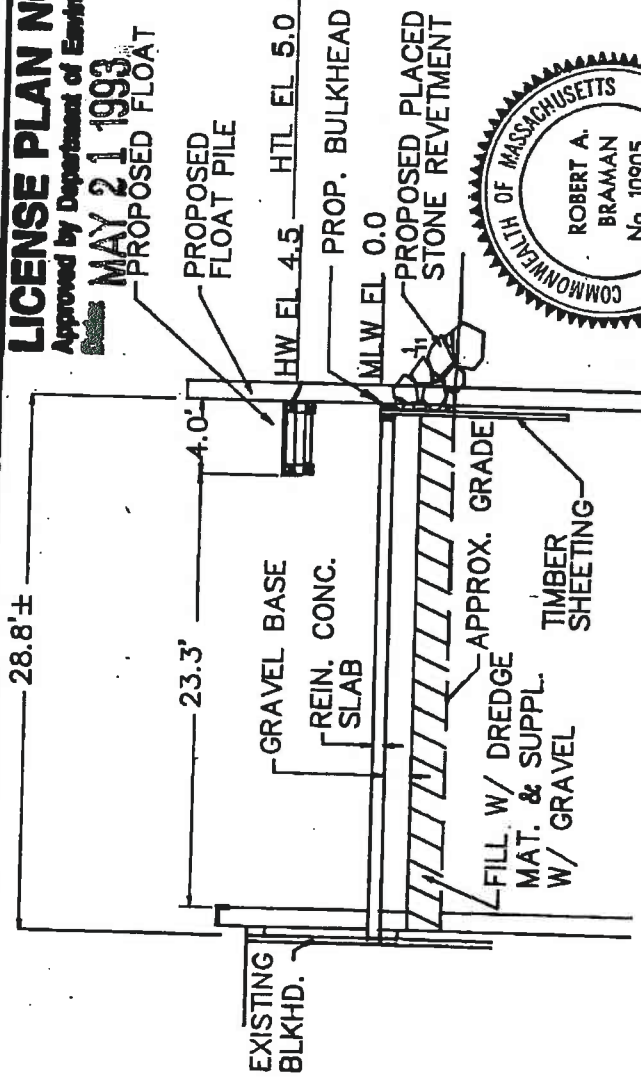
OCTOBER 1, 1992

TOWN OF CHATHAM

SHEET 2 OF 3

LICENSE PLAN NO. 3328

Approved by Department of Environmental Protection
MAY 21 1993



RAMP CROSS SECTION

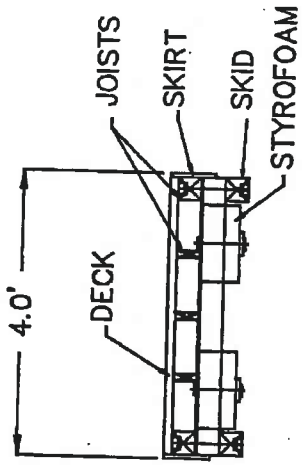
SCALE: 1"=5'



Robert A. Braman

TIMBER FLOAT SECTION

NOT TO SCALE



NOTES:

ELEVATIONS ARE SHOWN IN FEET AND TENTHS BASED ON THE PLANE OF MEAN LOW WATER. TIMBER PILES SHALL BE CCA TREATED @ 2.5 PCF. ALL TIMBER SHALL BE CCA TREATED @ 1.0 PCF. ALL HARDWARE SHALL BE GALVANIZED. FLOOD ZONE V12 EL 12 MSL.

FILL PLACED BELOW HTL = 200 CY±
FILL PLACED BELOW MHW = 185 CY±

PUBLIC USE FACILITY

NORTHERLY ABUTTER:

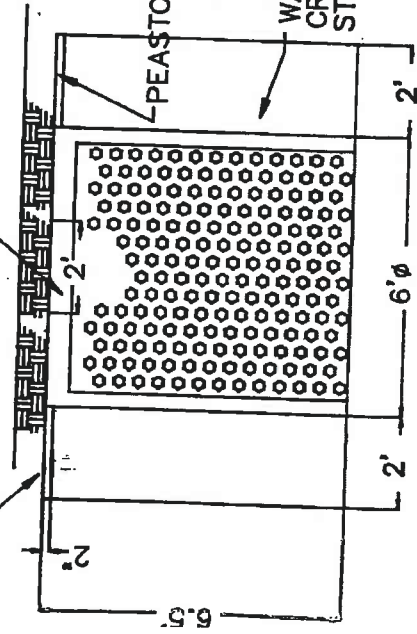
LEWIS & FAITH A. HORTON
8 LOWELL RD. WELLESLEY, MA 02181

WESTERLY ABUTTER:

DAVID C. ELDRIDGE ESTATE
C/O ERNESTINE M. ELDRIDGE
411 STAGE HARBOR RD. CHATHAM, MA 02633

PREDICTED MEAN HIGH WATER EL = 3.9,
OBSERVED HIGH WATER EL = 4.5 DUE TO
DIFFERING TIDAL CONDITIONS AT LOCUS.

CONCRETE COVER

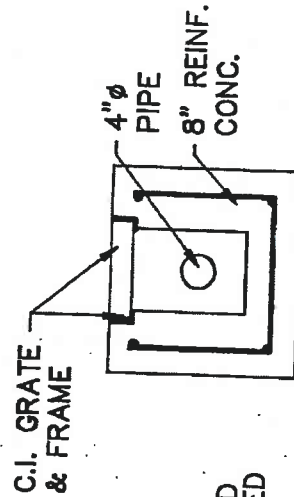


H2O PRECAST LEACH PIT

SCALE: 1"=2'

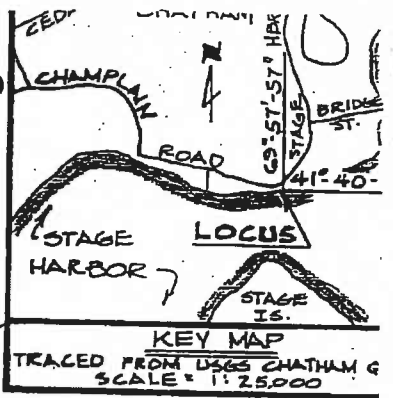
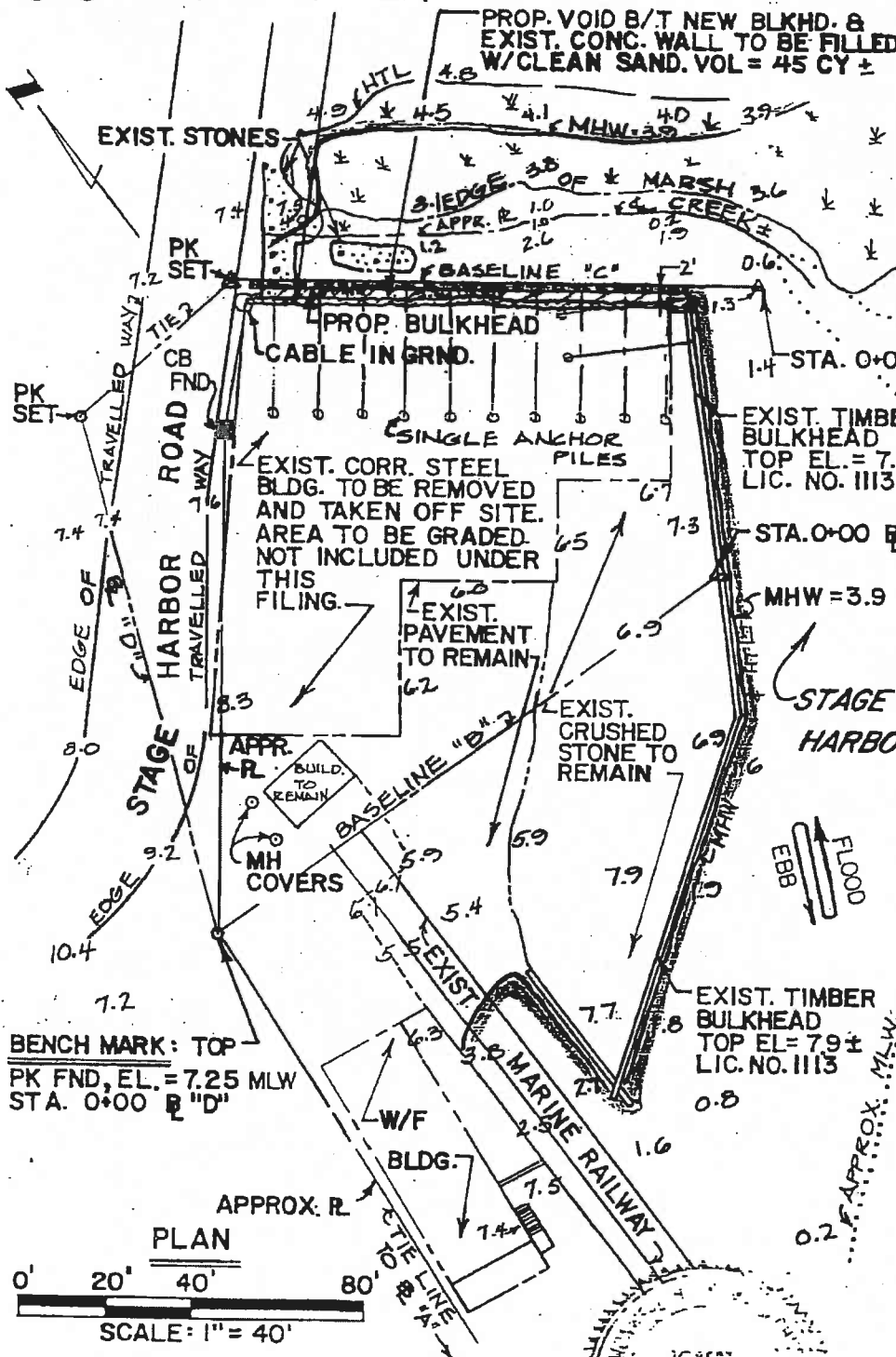
H2O TRENCH DRAIN

N.T.S.



010-13A-002-024-100

010-13A-002-024-100



NOTES:

1. ELEVATIONS ARE 1 FEET AND TENTHS BASED ON THE PLANE OF MEAN LOW WATER.
2. TIMBER PILES SH BE CCA TREATED 2.5 PCF.
3. TIMBER SHEETIN SHALL BE CCA TREATED @ 2.5 PC
4. ALL OTHER TIMB SHALL BE CCA TREATED @ 1.0 PC
5. ALL HARDWARE BE GALVANIZED.
6. ALL FILL SHALL CLEAN SAND.
7. ELW DOESN'T OCC W/I PROJECT ARE

ABUTTERS:

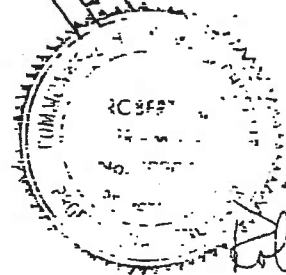
- WEST**
ELDRIDGE, LILLIAN A.
BOX 432
SCHATHAM, MA 02659
- EAST**
HORTON, LEWIS & FAIT
8 LOWELL RD
WELLESLEY, MA 0218

PLAN ACCOMPANYING PETITION OF
TOWN OF CHATHAM
TO CONSTRUCT A TIMBER BULKHEAD IN
STAGE HARBOR

CHATHAM, BARNSTABLE CO., MA
APRIL 7, 1988 SHEET 1 OF 2



BRAMAN ENGINEERING COMPANY LTD
CIVIL ENGINEERS & SURVEYORS
258 MAIN ST. BUZZARDS BAY, MA.



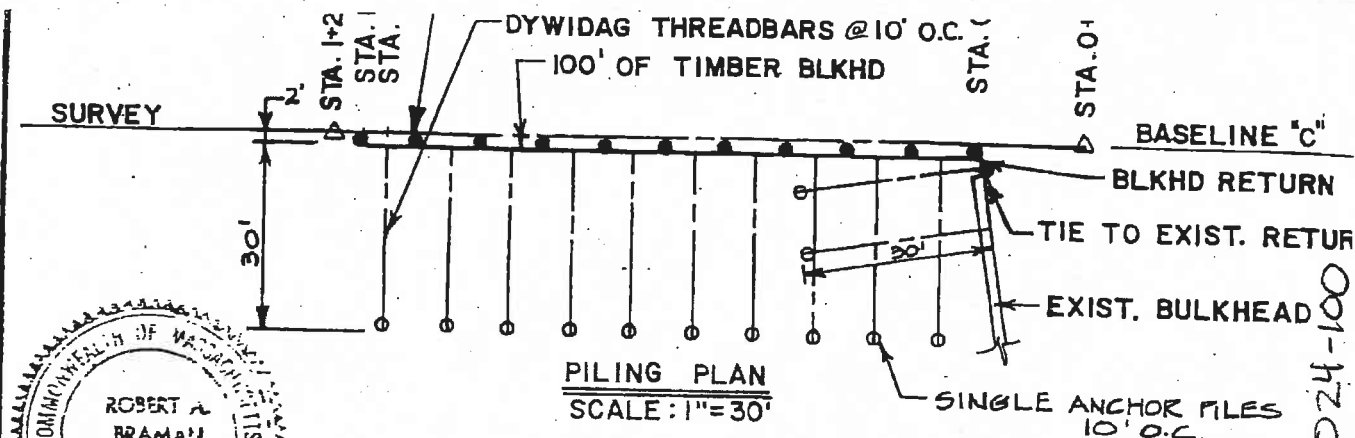
Robert A. Braman

LICENSE PLAN NO. 2042

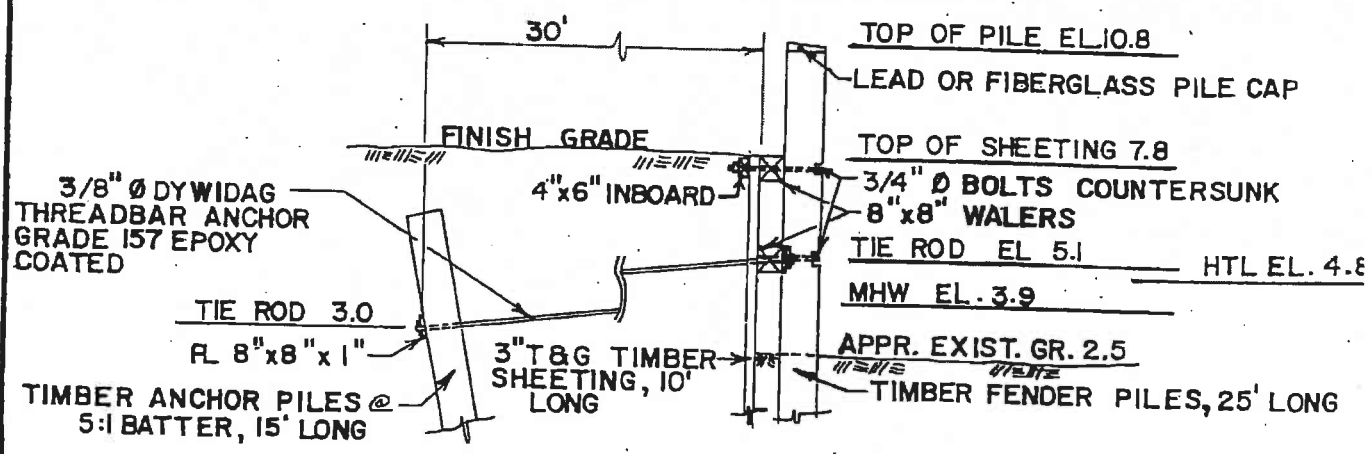
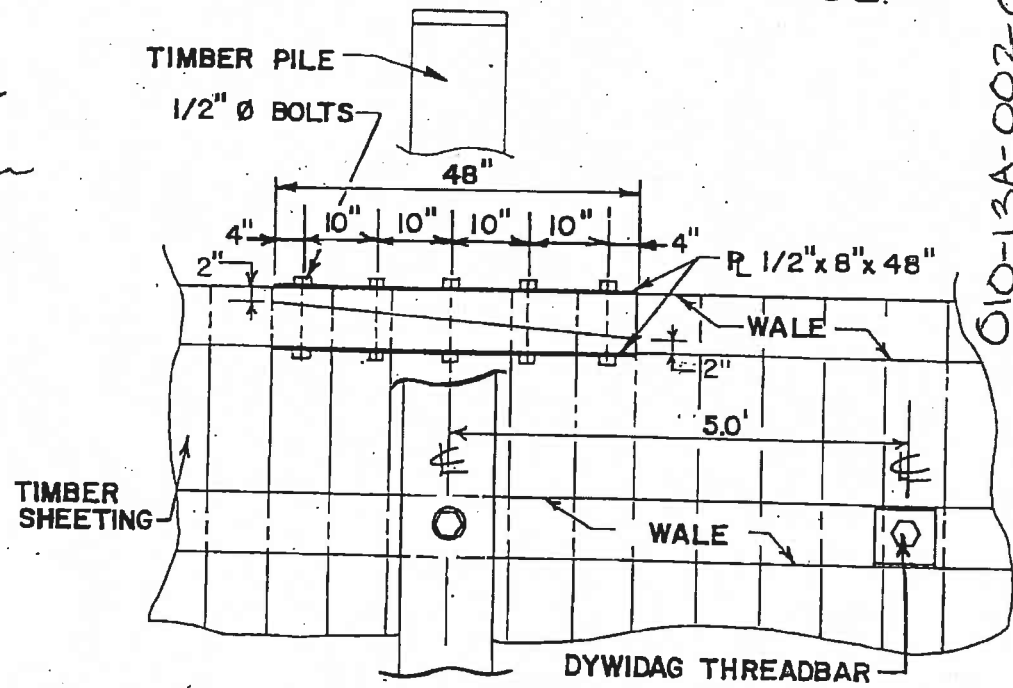
Approved by Department of Environmental Protection
of Massachusetts

COMMISSIONER
DIVISION DIRECTOR
SECTION CHIEF
DATE

SEP. 08. 1980



COMMONWEALTH OF MASSACHUSETTS
 ROBERT A. BRAMAN
 No. 10905
 REGISTERED PROFESSIONAL ENGINEER
 CIVIL
Robert A. Braman



BULKHEAD SECTION
 SCALE: 1"=5'

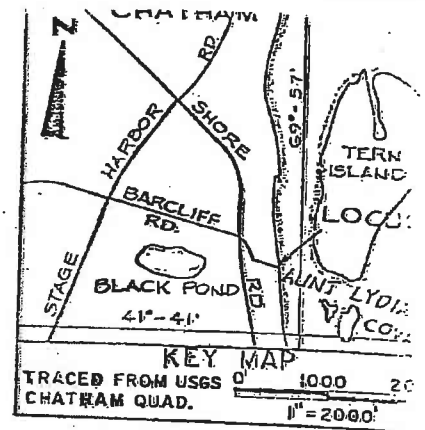
010-13A-002-024-100

88W-156

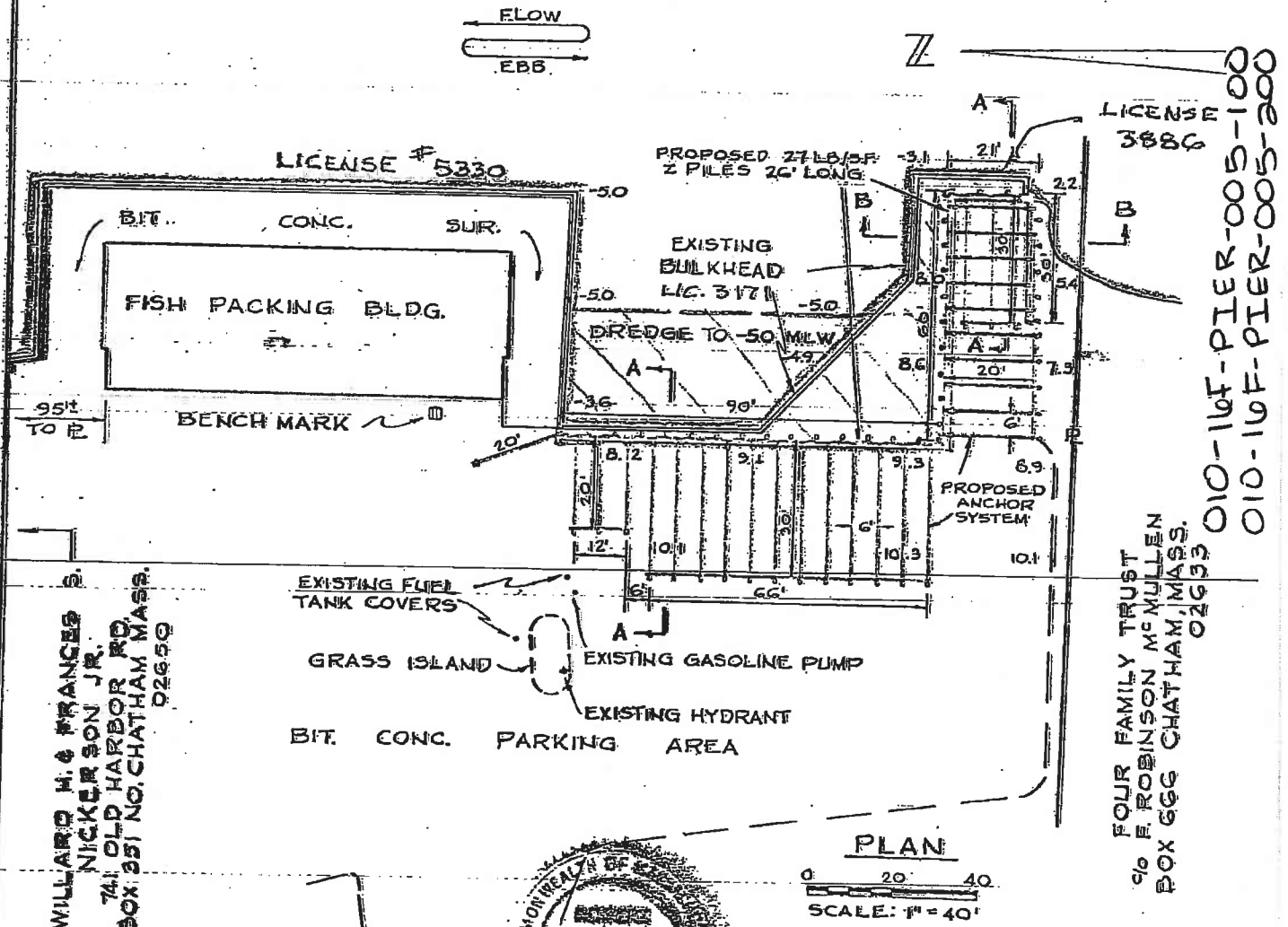
LICENSE PLAN NO. 2042

Approved by Department of Environmental Protection
 Date: SEP 08 1989

1. ELEVATIONS ARE IN FEET & TENTHS ABOVE THE PLANE OF MEAN LOW WATER MINUS FIGURES INDICATE DEPTHS BELOW THAT SAME PLANE.
2. BENCH MARK: TOP OF CATCH BASIN FRAME - EL. 73.6 M.L.W.
3. ALL FENDER PILES & WALES TO BE C.C.A. PRESSURE TREATED TO 2.5 LB/C.F.
4. ALL ANCHOR PILES, DEADMEN, CAPLOGS & SPACERS TO BE C.C.A. PRESSURE TREATED TO 0.6 LB/C.F.
5. EXCAVATED MATERIAL TO BE DISPOSED OF AT TOWN DISPOSAL AREA LOCATED ON SAM RYDER ROAD 3 1/2 MILES FROM SITE.



AUNT LYDIA'S COVE



WILLARD H. & FRANCES S.
 NICKERSON JR.
 741 OLD HARBOR RD.
 BOX 351 NO. CHATHAM MASS.
 02630

FOUR FAMILY TRUST
 c/o F. ROBINSON McMULLEN
 BOX 666 CHATHAM, MASS.
 02633

010-10F-PIER-005-100
 010-10F-PIER-005-200



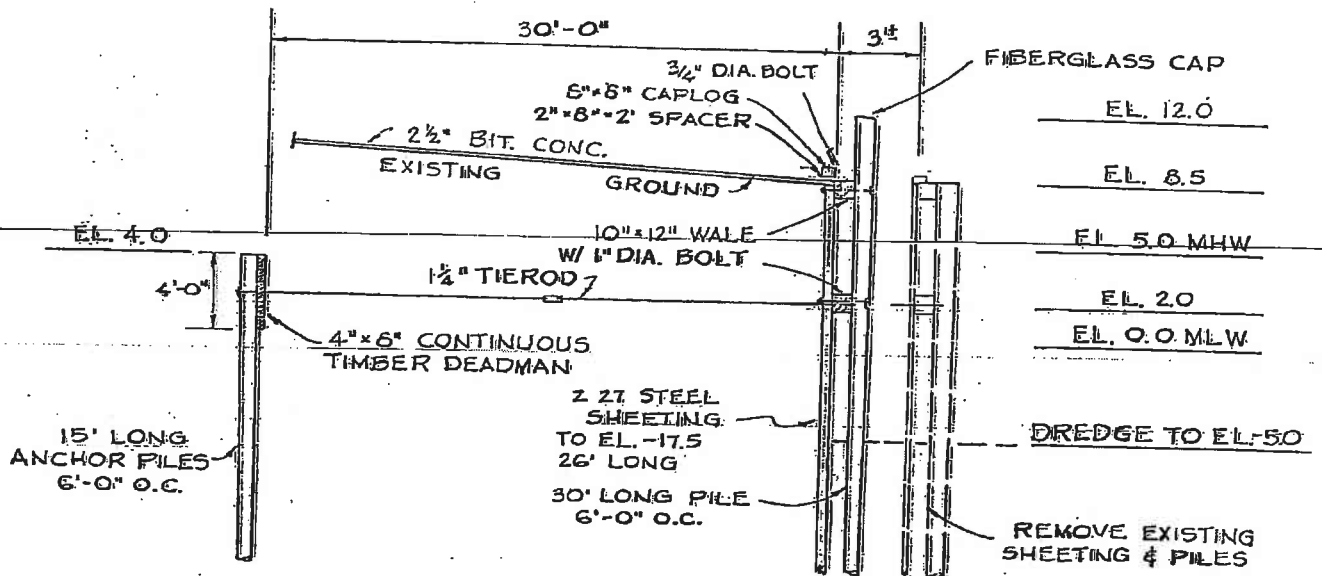
Robert A. Braman

79W-0005

PLAN ACCOMPANYING PETITION OF
 TOWN OF CHATHAM
 TO INSTALL A SHEET STEEL
 BULKHEAD AND TO DREDGE IN
 AUNT LYDIA'S COVE
 CHATHAM, MASS.
 JANUARY 23, 1979 SHEET 1 OF 2
 ROBERT A. BRAMAN
 CIVIL ENGINEER & SURVEYOR

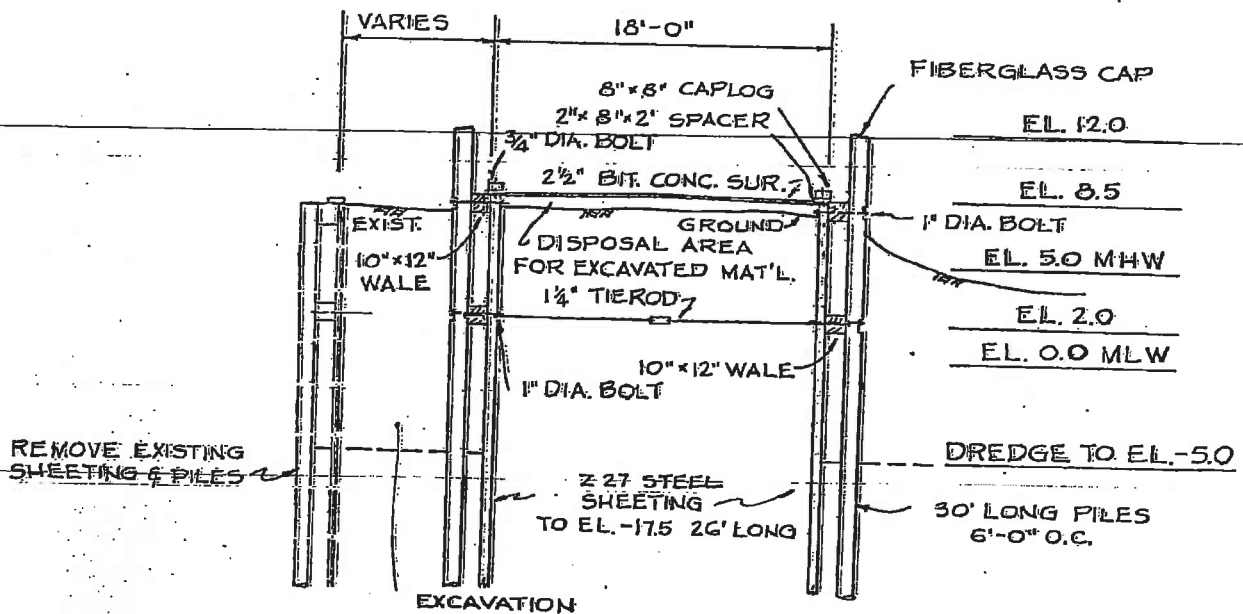
LICENSE PLAN NO. 560
 Approved by Department of Environmental Quality Engineering
 of Massachusetts APRIL 15, 1979
 COMMISSIONER
 CHIEF ENGINEER

010-16F-PIER-005-100
010-16F-PIER-005-200



SECTION "A-A"

0 5 10
SCALE: 1" = 10'



SECTION "B-B"

0 5 10
SCALE: 1" = 10'



Robert A. Braman

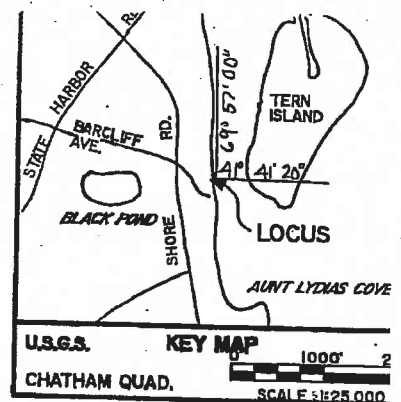
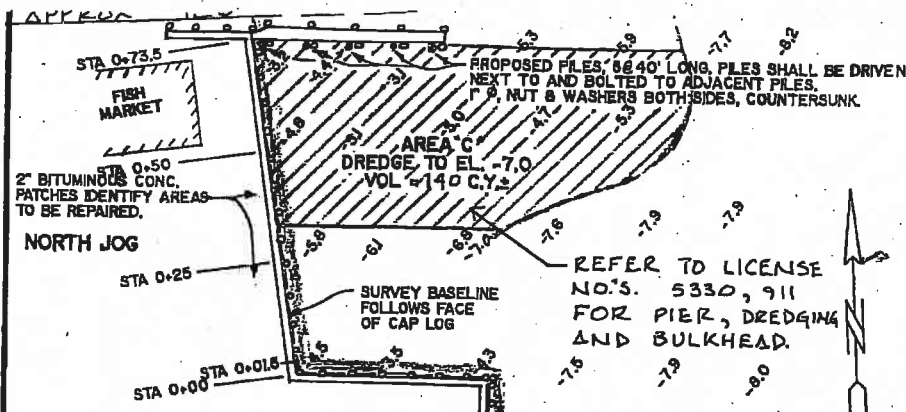
TOWN OF CHATHAM

LICENSE PLAN NO. 560

Approved by Department of Environmental Quality Enforcement

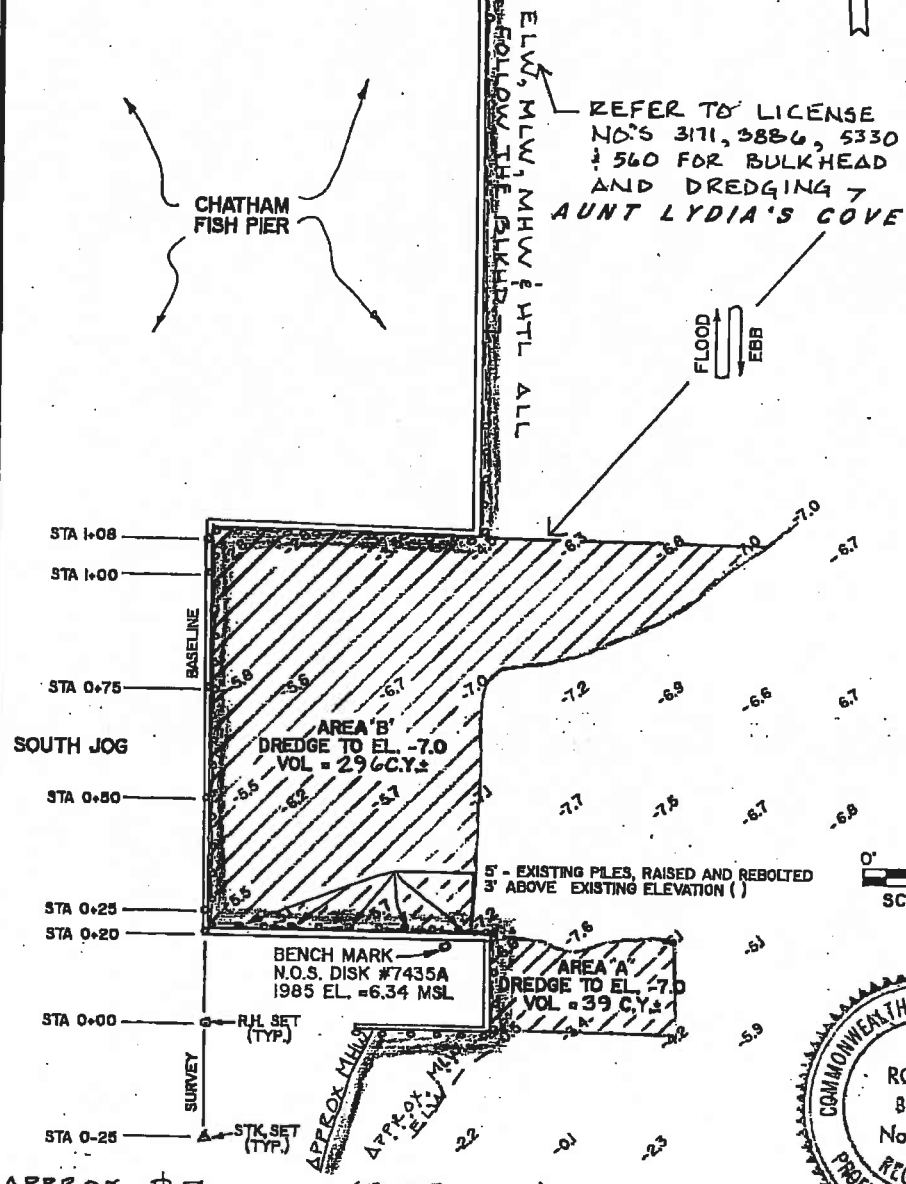
APRIL 15, 1979

79W-0005

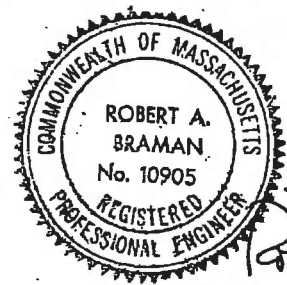


NOTES

1. SOUNDINGS ARE BASED UPON THE LOW OBSERVED TIDE AND INDICATE THE DEPTH OF WATER BASED ON OBSERVATIONS MADE BY DR. GRAHAM GRIESE FROM APR. 4-13. READINGS WERE TAKEN FROM THE TIDE GAUGE BASED ON MEAN SEA LEVEL SET THE SOUTH JOG, THE LOWEST OBSERVED TIDE WAS -1.57, THE HIGHEST OBSERVED TIDE WAS +3.57.
 2. PROPOSED TIMBER PILES TO BE CCA TREATED @ 2.5 PCF. ALL OTHER TIMBER TO BE CCA TREATED @ 1.0 PCF.
 3. ALL HARDWARE TO BE GALVANIZED.
 4. EXISTING PILE (O).
- NORTHERLY ADJUTER
BERQUIST,



SOUTHERLY ADJUTER
F.F. TRUST
E.R. McMULLEN & DE BECK TRS
BOX 666
CHATHAM, MA 02633



PLAN ACCOMPANYING PETITION OF
TOWN OF CHATHAM
TO INSTALL PILES & MAINTENANCE DREDGE
IN
AUNT LYDIA'S COVE
CHATHAM, BARNSTABLE CO., MA.

APRIL 4, 1988 SHEET 1 OF 2

BRAMAN ENGINEERING COMPANY LTD
CIVIL ENGINEERS & SURVEYORS
258 MAIN ST. BUZZARDS BAY, MA.

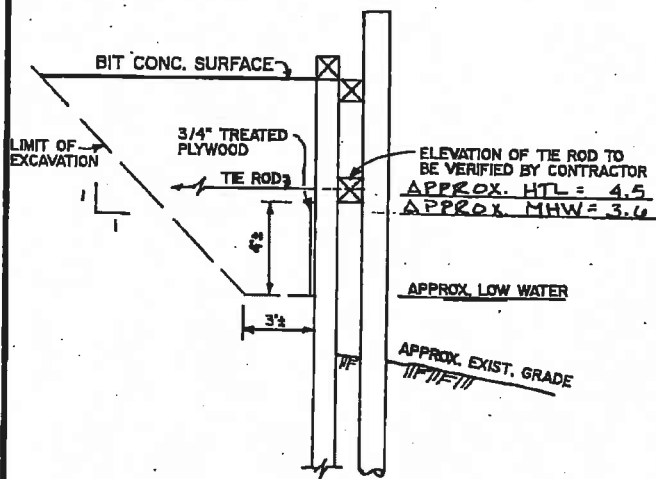
LICENSE PLAN NO. 2078
Approved by Department of Environmental Protection
of Massachusetts
Christina Smith COMMISSIONER
W.A.S. DIVISION DIRECTOR
04/20/1989 SECTION CHIEF
DATE

010-16F-PIER-005100
010-16F-PIER-005200

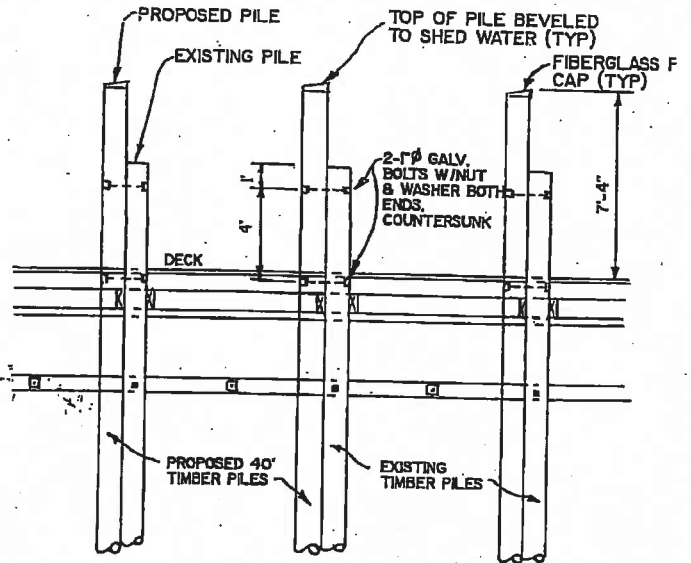
Robert A. Braman

TREATED PLYWOOD SHALL BE PLACED BEHIND ANY PERFORATION IN BULKHEAD AND SECURED,

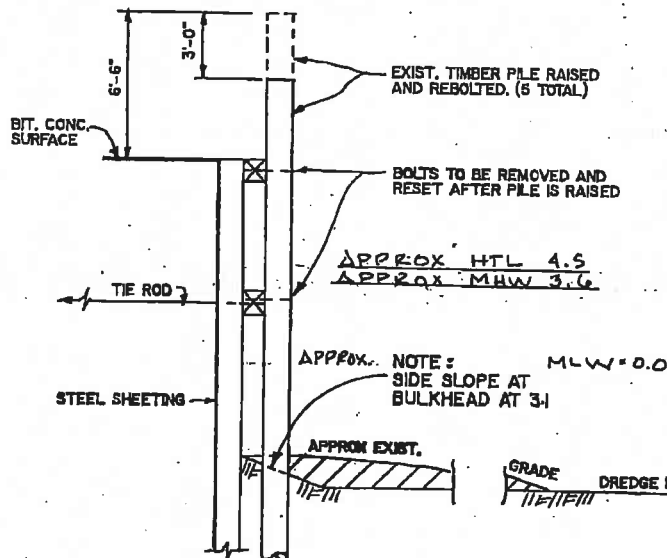
010-16F-PIER-005-100
010-16F-PIER-005-200



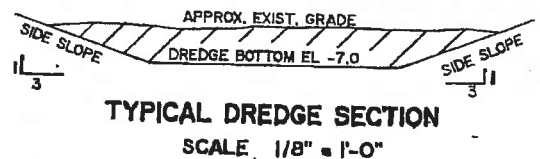
REPAIR DETAIL
SCALE 1/8" = 1'-0"



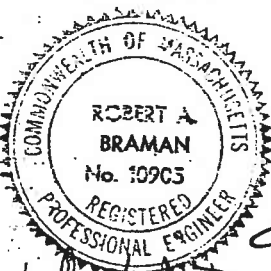
ELEVATION OF CATWALK
SCALE 1/8" = 1'-0"



DREDGE SECTION AT BULKHEAD
SCALE 1/8" = 1'-0"



TYPICAL DREDGE SECTION
SCALE 1/8" = 1'-0"



Robert A. Braman

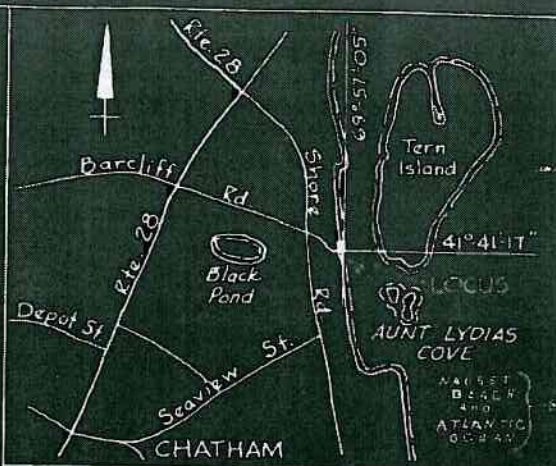
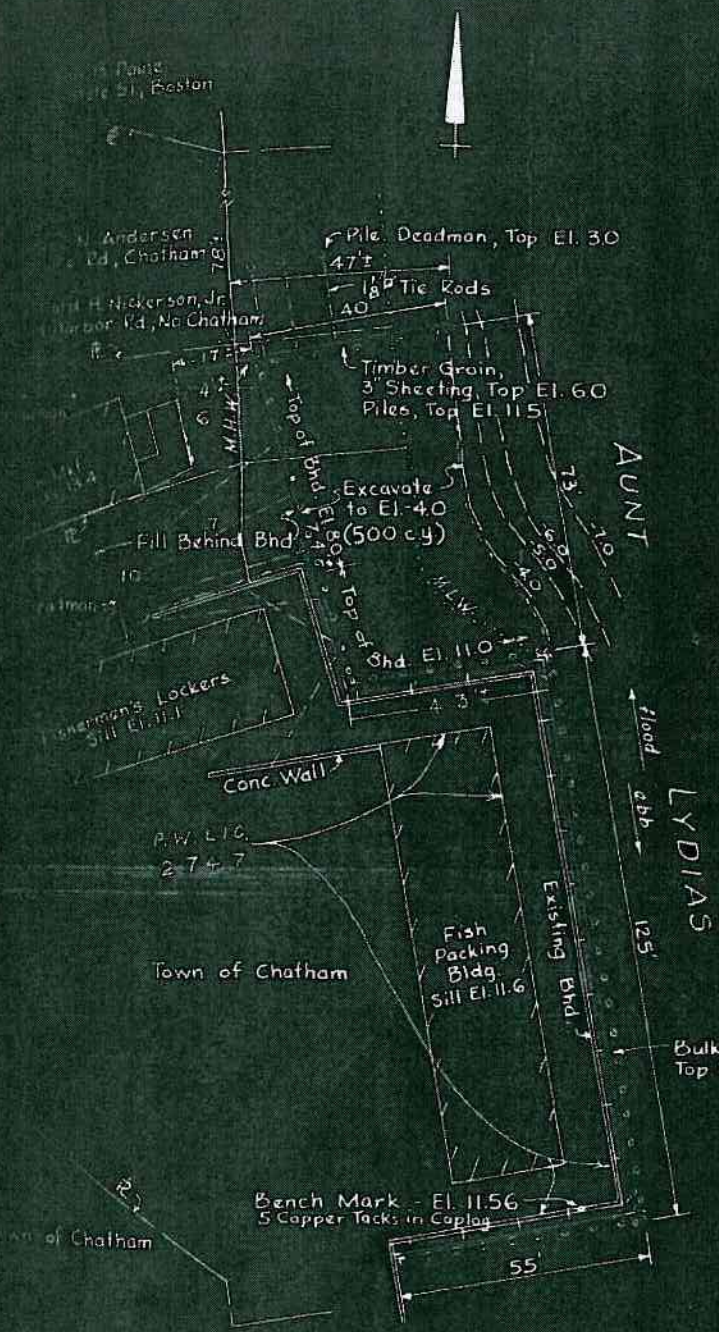
LICENSE PLAN NO. 2078

Approved by Department of Environmental Protection

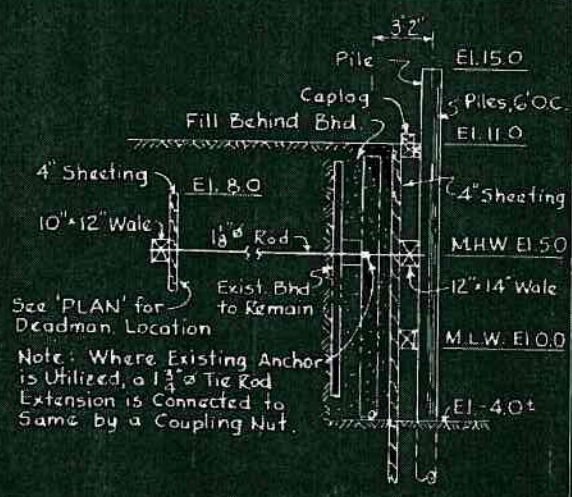
Date: OCT 26 1989

610-16F-PIER-005-100

DEPARTMENT OF PUBLIC WORKS



Traced from USGS "Chatham, Mass" Scale 1"=2000'



SCALE 1"=10'

Note: Elevations are in feet and refer to the plane of Mean Low Water. Minus figures are depths below that plane.

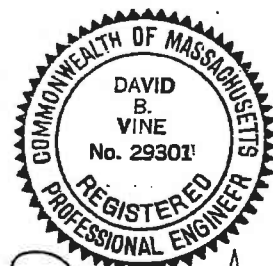
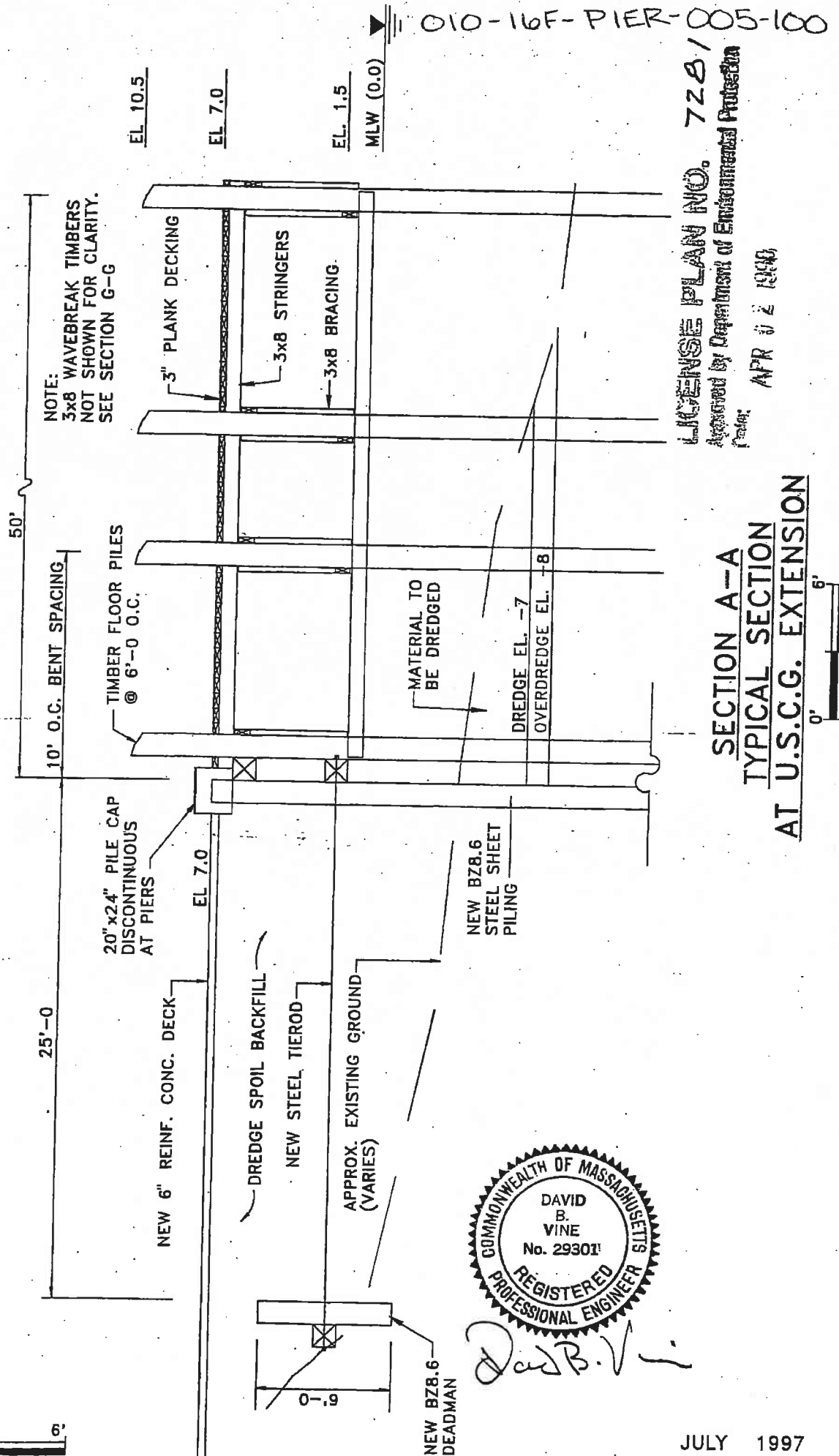
Existing Bulkhead License No. 2747, dated April 12, 1945.

LICENSE PLAN NO. 5330
APPROVED BY DEPARTMENT OF PUBLIC WORKS OF MASSACHUSETTS JANUARY 3, 1968
COMMISSIONER - DEPT. OF PUBLIC WORKS
ASSOCIATE COMMISSIONERS
Charles A. Beshy
Ed. Sonoda
Robert S. Foster

MSA
Z 1
D/C/B



- JULY 1997



David B. Vine

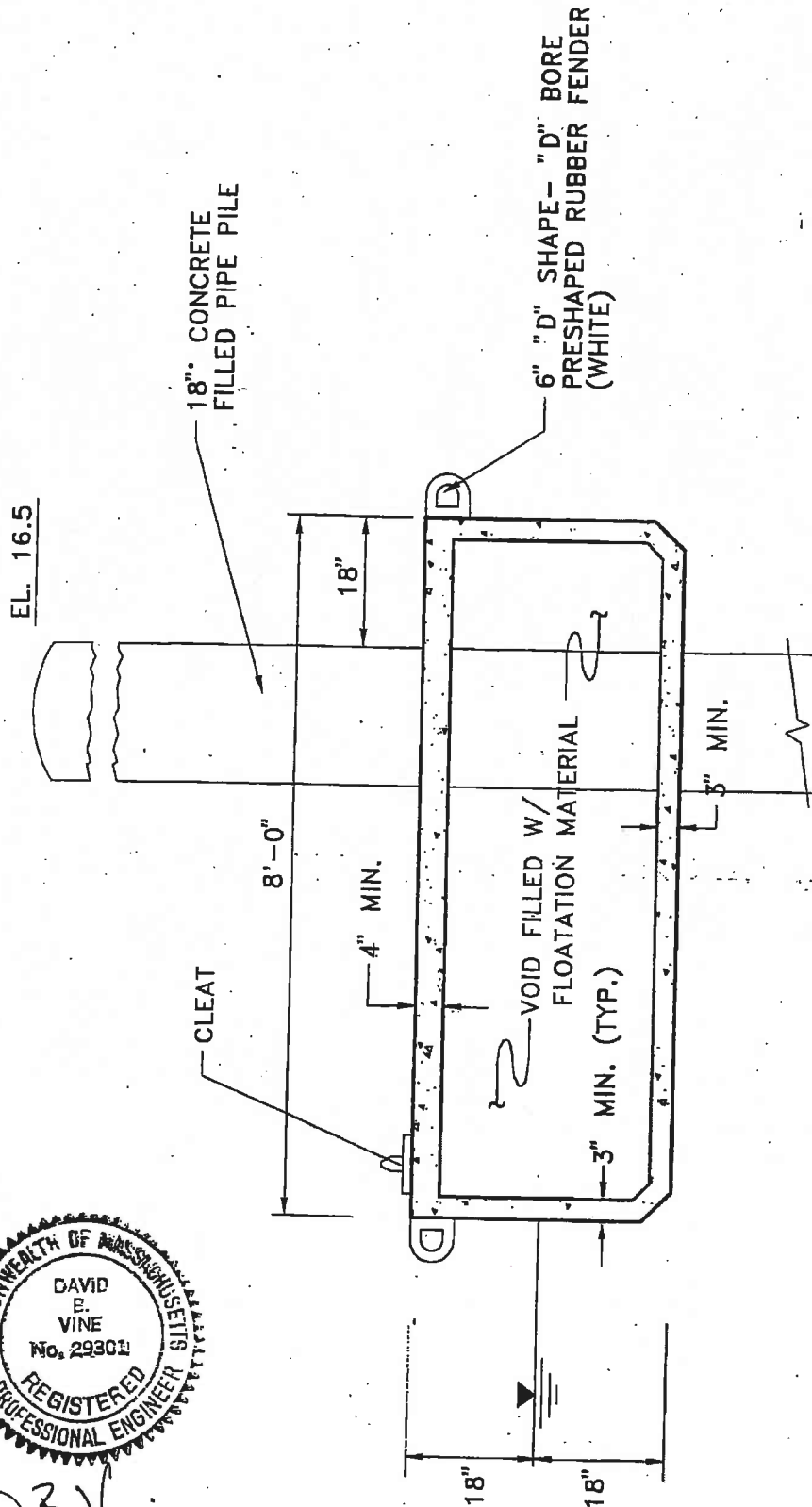
JULY 1997

SECTION A-A
TYPICAL SECTION
AT U.S.C.G. EXTENSION

LICENSE PLAN NO. 728/
Approved by Department of Environmental Protection
DATE: APR 02 1998



LICENSE PLAN NO. 7281
 Approved by Department of Environmental Protection
 Date: APR 02 1993



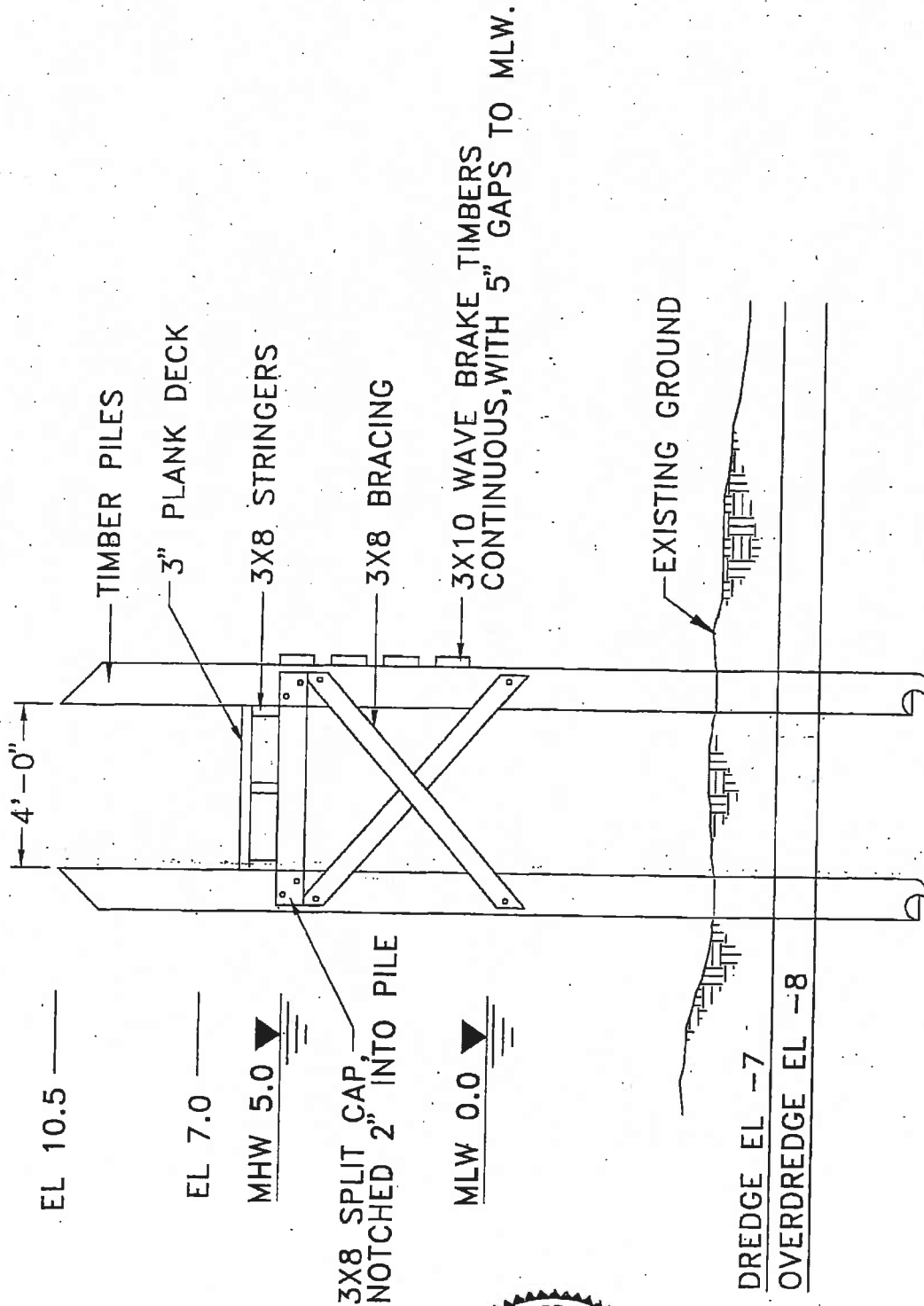
SECTION B-B
 CONCRETE FLOAT



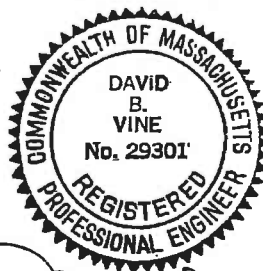
David E. Vine

010-16F-PIER-005-100

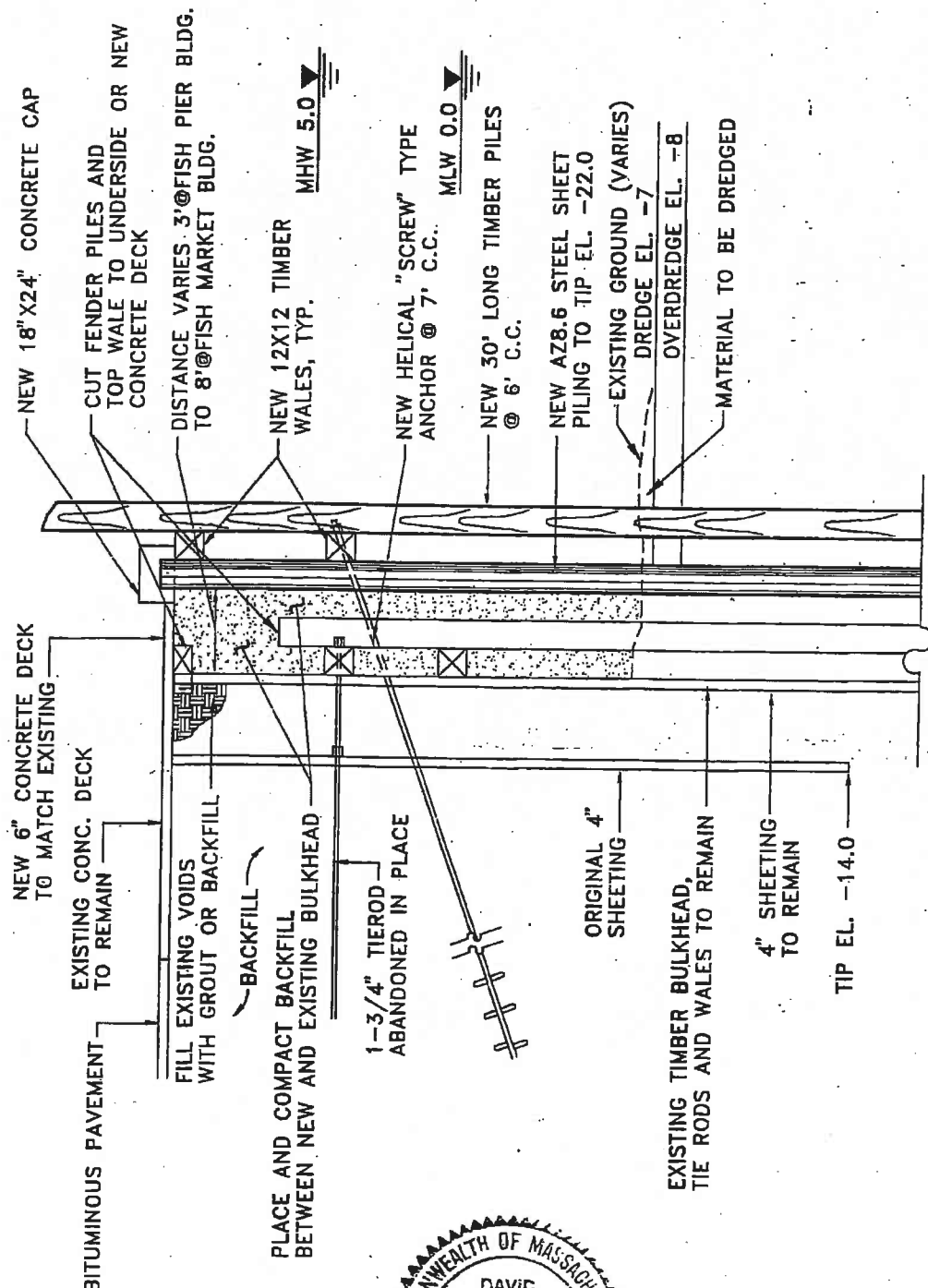
LICENSE PLAN NO. 7281
Approved by Department of Environmental Protection
Date: APR 02 1996



SECTION C-C
TYPICAL SECTION
AT TIMBER PIER



David B. Vine



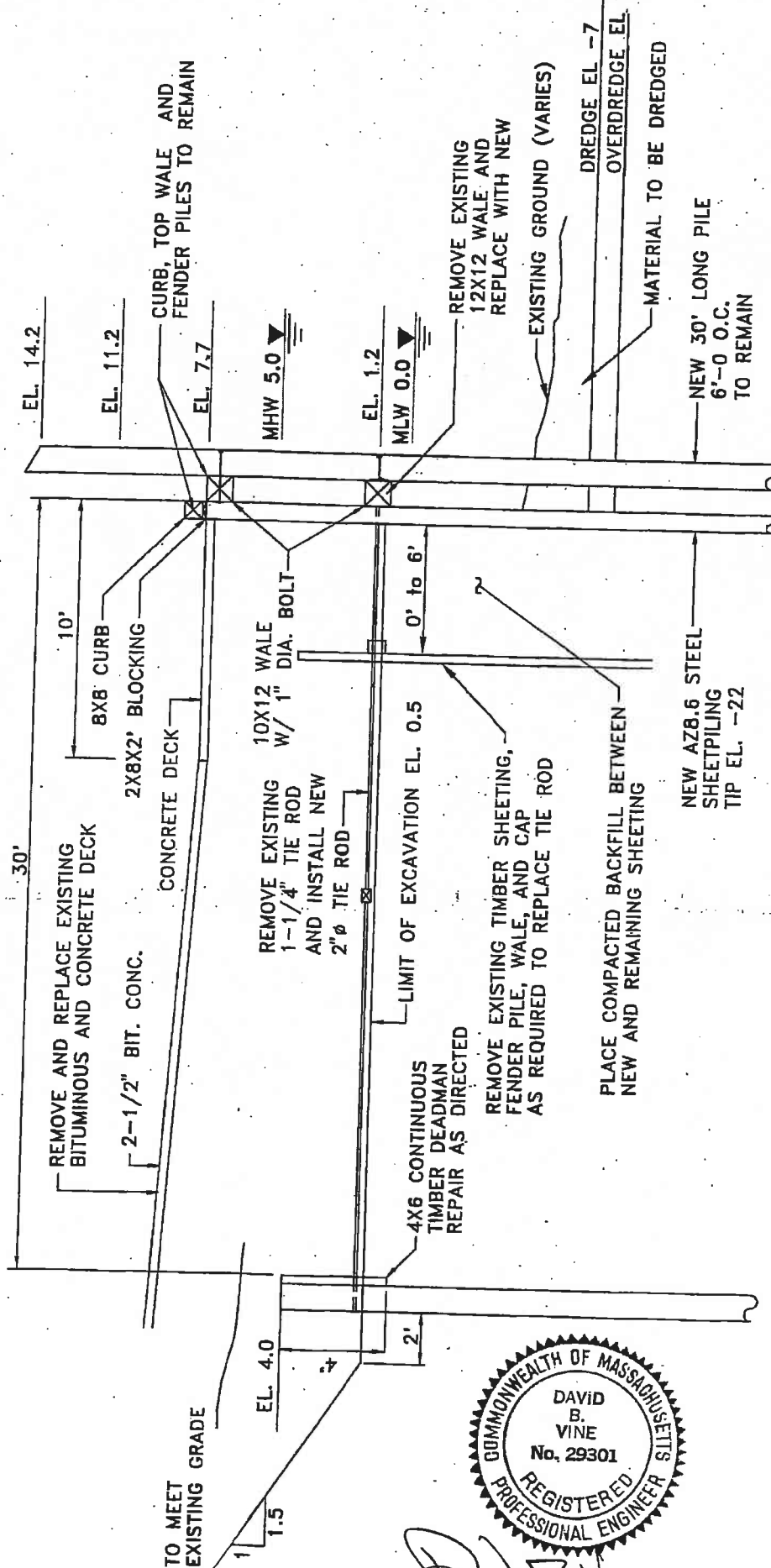
SECTION D-D
TYPICAL SECTION
ANCHORED BULKHEAD WITH
'SCREW' TYPE ANCHORAGE

0' 6'

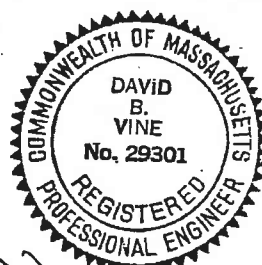
LICENSE PLAN NO. 7281
 Approved by Department of Environmental Protection
 Date: APR 02 1998



David B. Vine



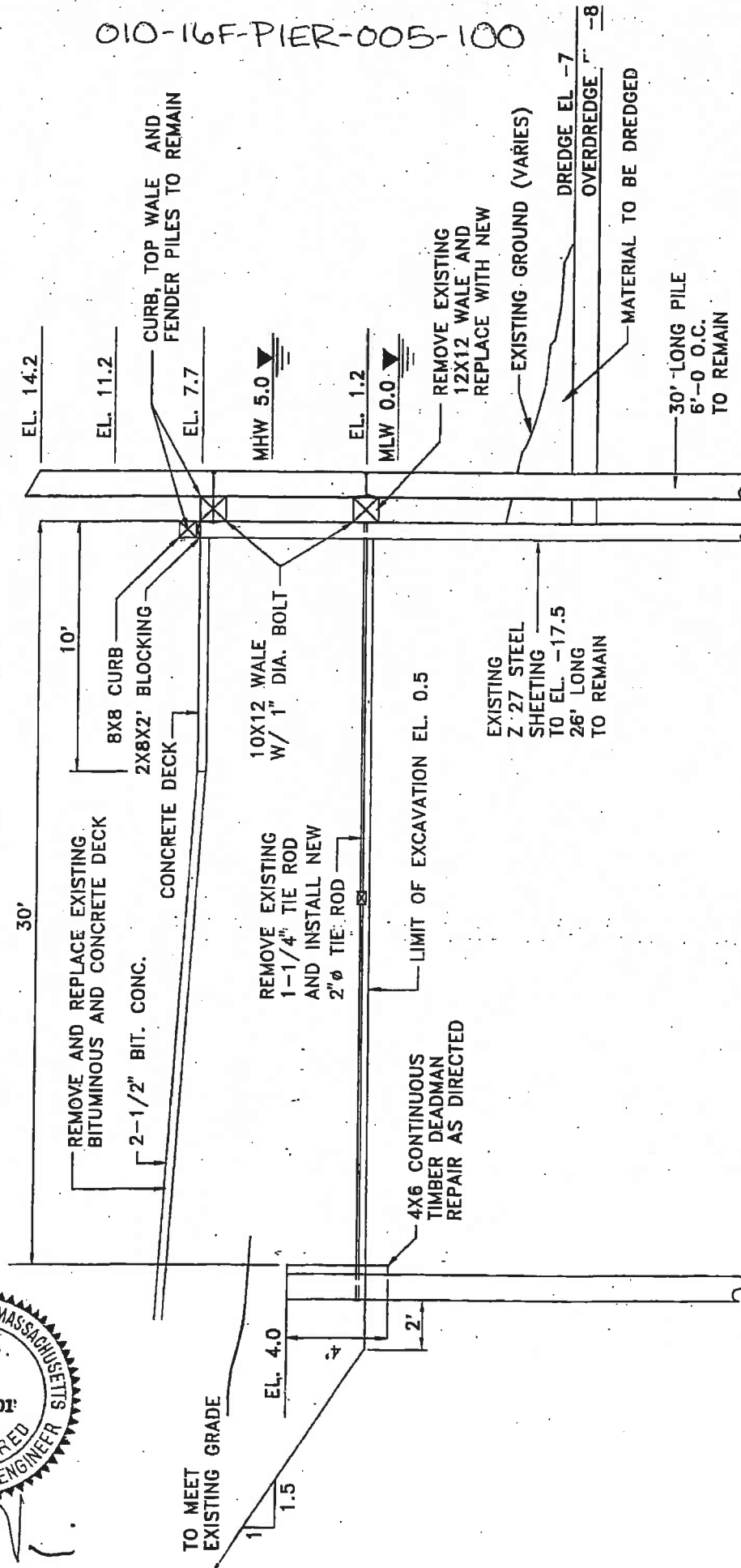
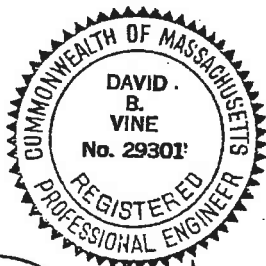
**SECTION E-E
TYPICAL SECTION
NEW STEEL BULKHEAD**



David B. Vine

LICENSE PLAN NO. 7281
 Approved by Department of Environmental Protection
 Date: APR 10 1997

010-16F-PIER-005-100

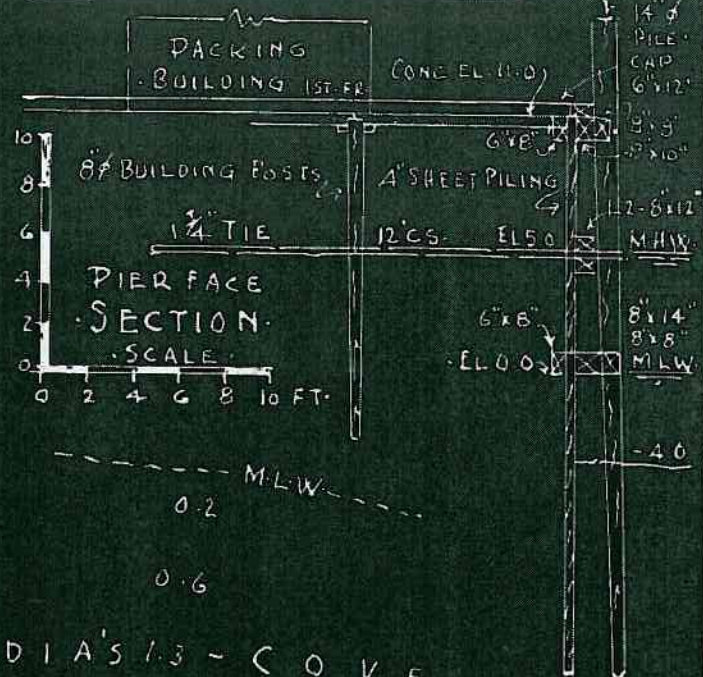
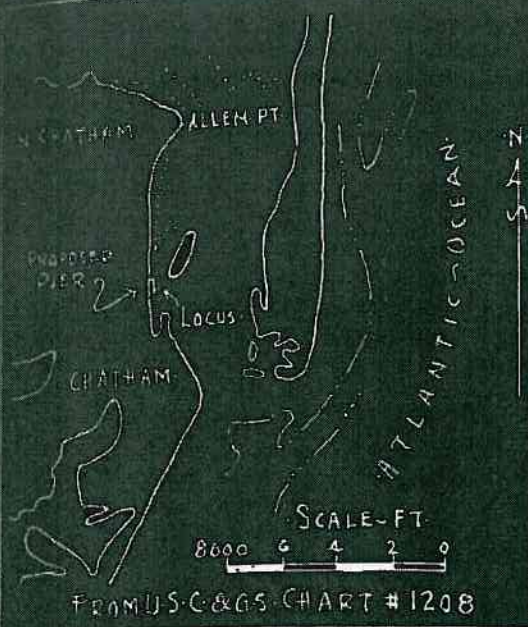


**SECTION F-F
TYPICAL SECTION
ANCHORED BULKHEAD WITH
REPLACEMENT OF EXISTING TIERODS**

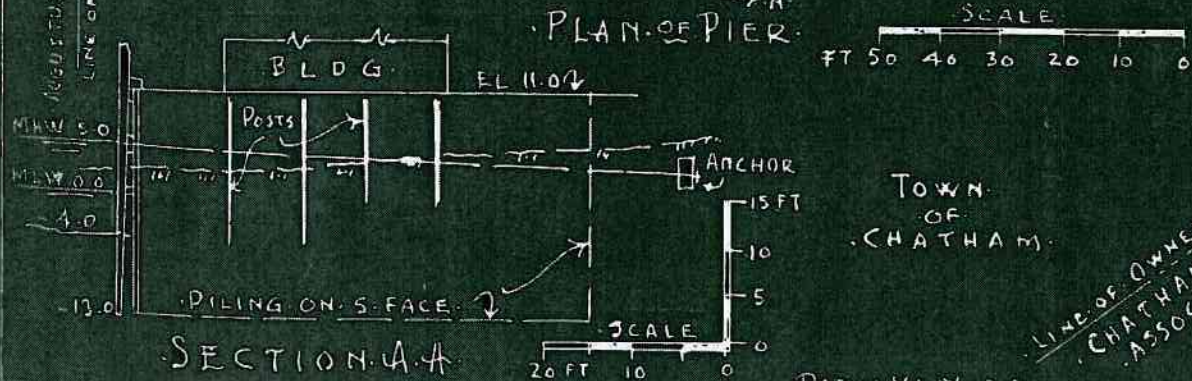
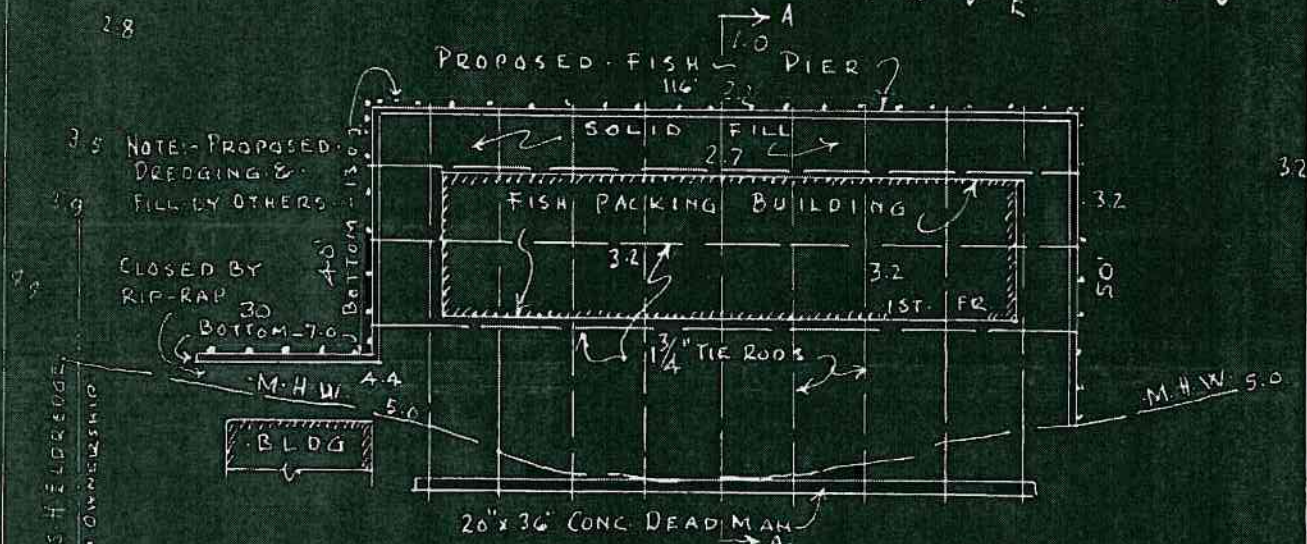


LICENSE PLAN NO. 7281
Approved by Department of Environmental Protection
APR 11 1997

010-16F-PIER-005-100



AUNT LYDIA'S COVE



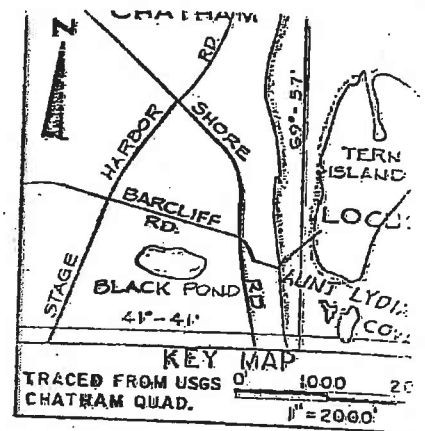
PLAN ACCOMPANYING PETITION
OF TOWN OF CHATHAM - MASS.
TO BUILD A FISH PIER AND
FISH PACKING BUILDINGS
AT AUNT-LYDIA'S COVE
CHATHAM - MASS - MAR 15 1945.

NO. 2747
APPROVED BY DEPARTMENT OF PUBLIC WORKS
APRIL 12 1945

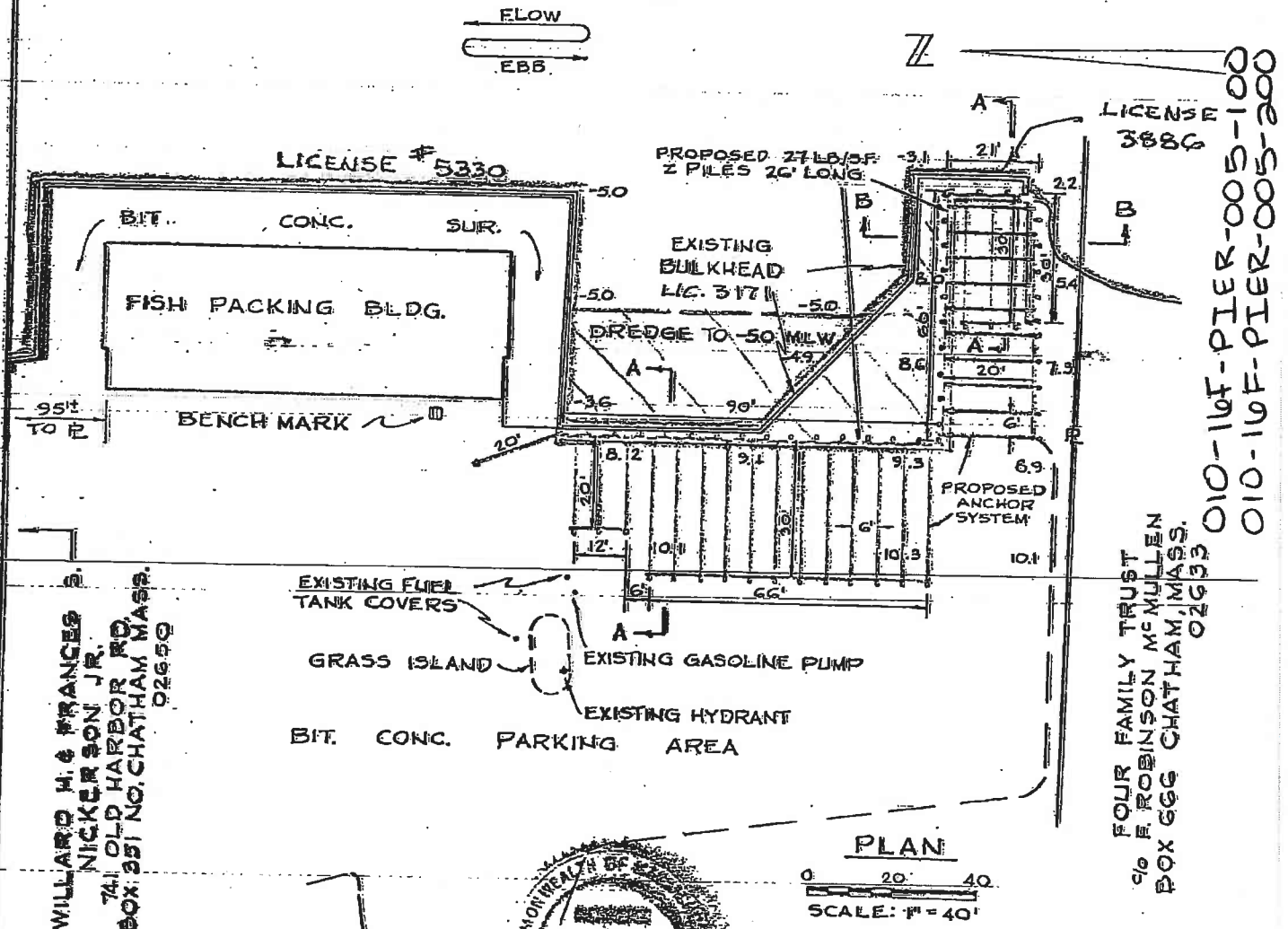
Raymond W. Cohn
George W. Schuyler
Richard K. Star

ACTING
COMMISSIONER OF
PUBLIC WORKS
ASSOCIATE
COMMISSIONERS
DIRECTOR - DIVISION
OF WATERWAYS

1. ELEVATIONS ARE IN FEET & TENTHS ABOVE THE PLANE OF MEAN LOW WATER. MINUS FIGURES INDICATE DEPTHS BELOW THAT SAME PLANE.
2. BENCH MARK: TOP OF CATCH BASIN FRAME - EL. 73.6 M.L.W.
3. ALL FENDER PILES & WALES TO BE C.C.A. PRESSURE TREATED TO 2.5 LB/C.F.
4. ALL ANCHOR PILES, DEADMEN, CAPLOGS & SPACERS TO BE C.C.A. PRESSURE TREATED TO 0.6 LB/C.F.
5. EXCAVATED MATERIAL TO BE DISPOSED OF AT TOWN DISPOSAL AREA LOCATED ON SAM RYDER ROAD 3 1/2 MILES FROM SITE.



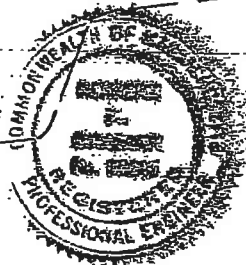
AUNT LYDIA'S COVE



WILLARD H. & FRANCES B.
NICKERSON JR.
741 OLD HARBOR RD.
BOX 351 NO. CHATHAM MASS.
02650

FOUR FAMILY TRUST
c/o F. ROBINSON McMULLEN
BOX 666 CHATHAM, MASS.
02633

010-16F-PIER-005-100
010-16F-PIER-005-200



Robert A. Braman

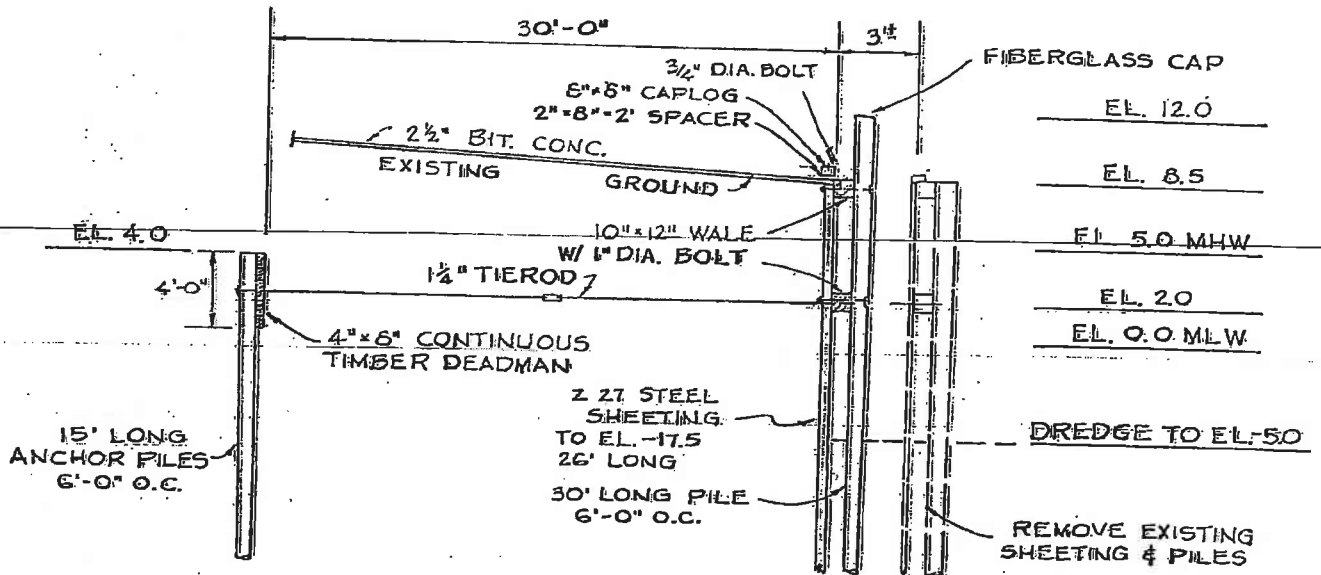
79W-0005

PLAN ACCOMPANYING PETITION OF
TOWN OF CHATHAM
TO INSTALL A SHEET STEEL
BULKHEAD AND TO DREDGE IN
AUNT LYDIA'S COVE
CHATHAM, MASS.

JANUARY 23, 1979 SHEET 1 OF 2
ROBERT A. BRAMAN
CIVIL ENGINEER & SURVEYOR

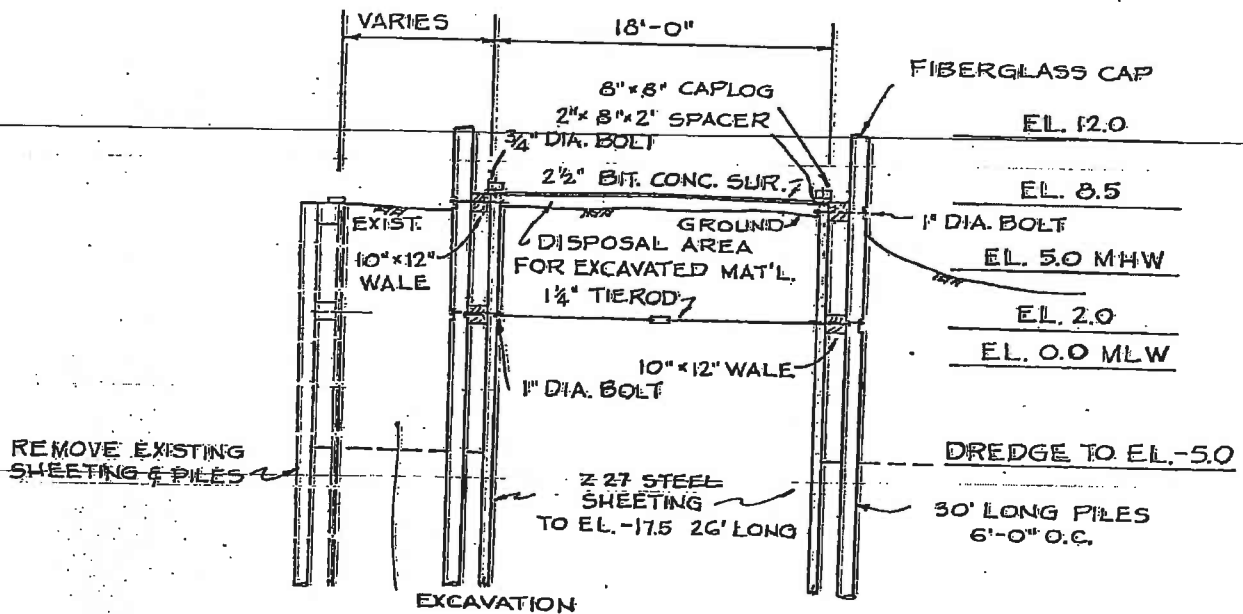
LICENSE PLAN NO. 560
Approved by Department of Environmental Quality Engineering
of Massachusetts APRIL 15, 1979
COMMISSIONER
CHIEF ENGINEER

010-16F-PIER-005-100
010-16F-PIER-005-200



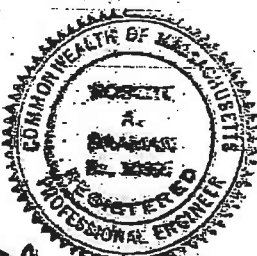
SECTION "A-A"

0 5 10
SCALE: 1" = 10'



SECTION "B-B"

0 5 10
SCALE: 1" = 10'



Robert A. Braman

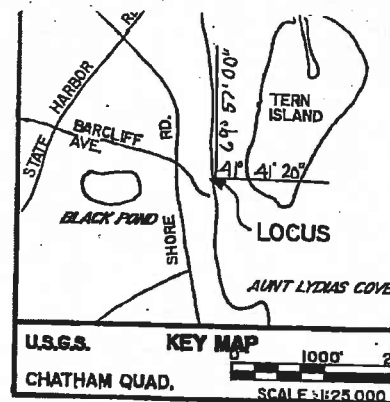
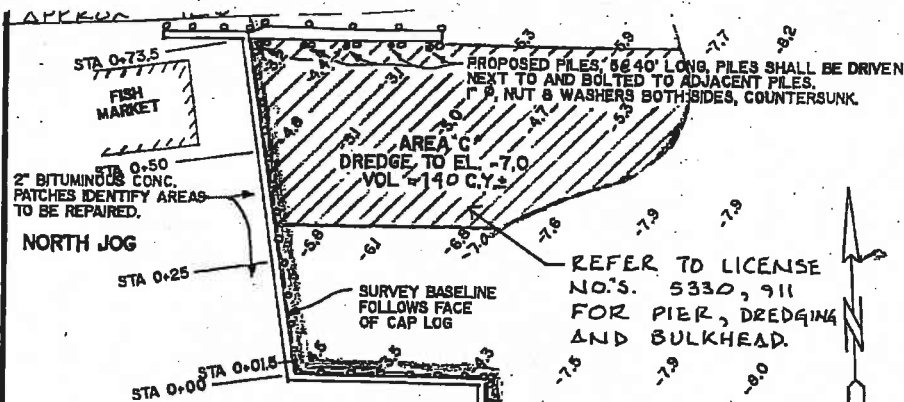
TOWN OF CHATHAM

LICENSE PLAN NO. 560

Approved by Department of Environmental Quality Engineering

APRIL 15, 1979

79W-0005



NOTES

1. SOUNDINGS ARE BASED UPON THE LOW OBSERVED TIDE AND INDICATE THE DEPTH OF WATER BASED ON OBSERVATIONS MADE BY DR. GRAHAM GRIESE FROM APR. 4-13. READINGS WERE TAKEN FROM THE TIDE GAUGE BASED ON MEAN SEA LEVEL SET THE SOUTH JOG. THE LOWEST OBSERVED TIDE WAS -1.57, THE HIGHEST OBSERVED TIDE WAS +3.57.

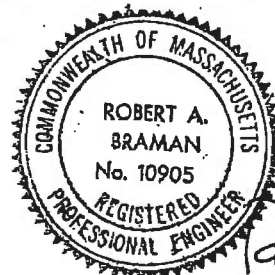
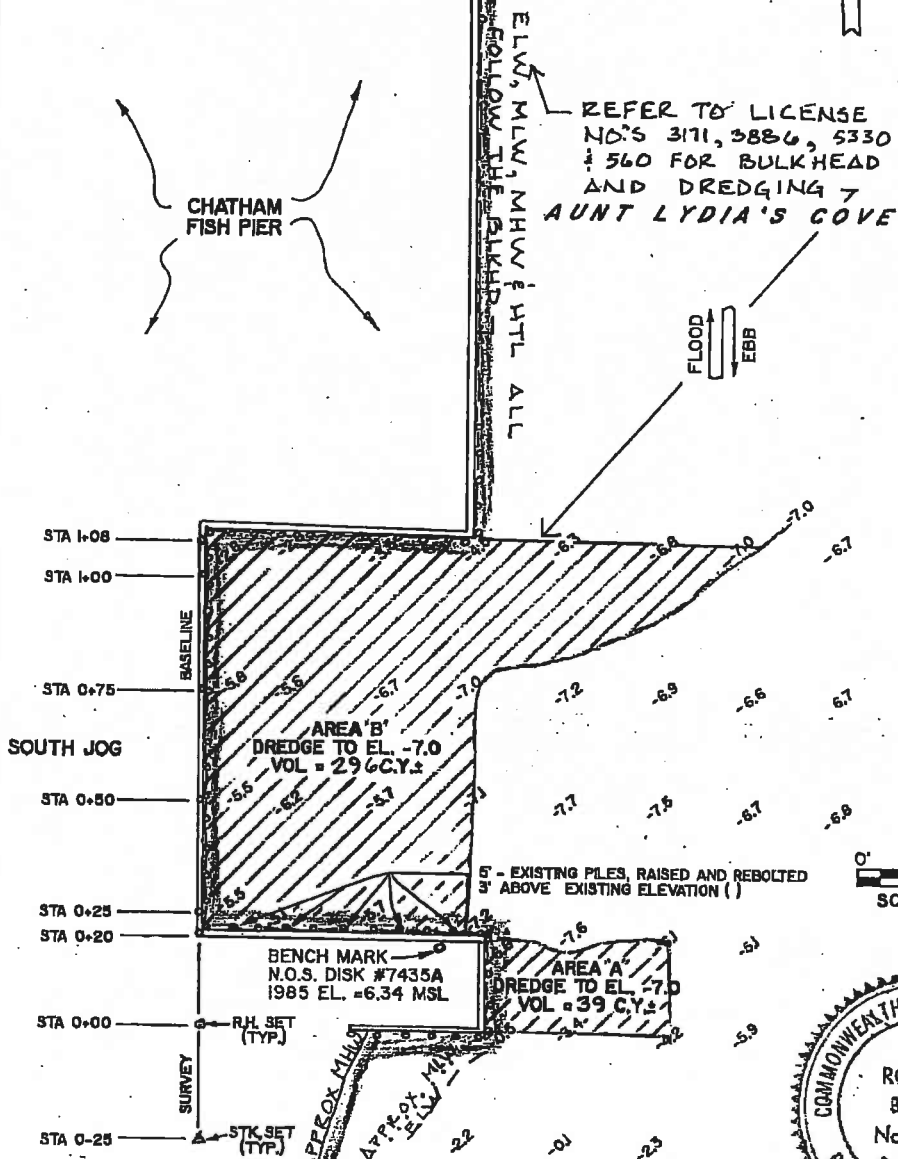
2. PROPOSED TIMBER PILES TO BE CCA TREATED @ 2.5 PCF. ALL OTHER TIMBER TO BE CCA TREATED @ 1.0 PCF.

3. ALL HARDWARE TO BE GALVANIZED.

4. EXISTING PILE (O).

NORTHERLY ABUTER
BERQUIST,

SOUTHERLY ABUTER
F.F. TRUST
E.R. McMULLEN & SE BECK TRS
BOX 666
CHATHAM, MA 02633



PLAN ACCOMPANYING PETITION OF
TOWN OF CHATHAM
TO INSTALL PILES & MAINTENANCE DREDGE
IN
AUNT LYDIA'S COVE
CHATHAM, BARNSTABLE CO., MA.

APRIL 4, 1988

SHEET 1 OF 2

BRAMAN ENGINEERING COMPANY LTD
CIVIL ENGINEERS & SURVEYORS
258 MAIN ST. BUZZARDS BAY, MA.

LICENSE PLAN NO. 2078

Approved by Department of Environmental Protection
of Massachusetts

COMMISSIONER

DIVISION DIRECTOR

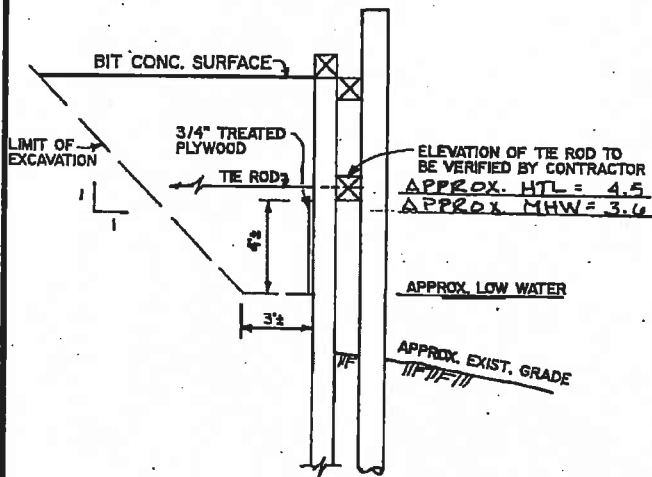
SECTION CHIEF

DATE

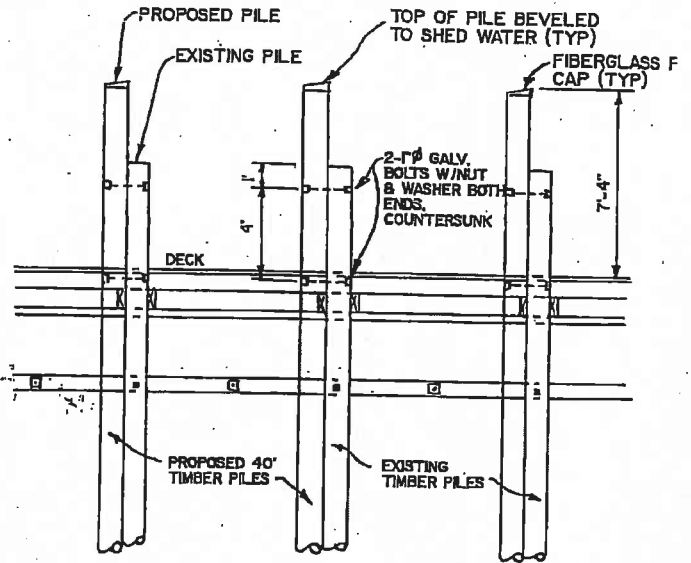
001201988

TREATED PLYWOOD SHALL BE PLACED BEHIND ANY PERFORATION IN BULKHEAD AND SECURED,

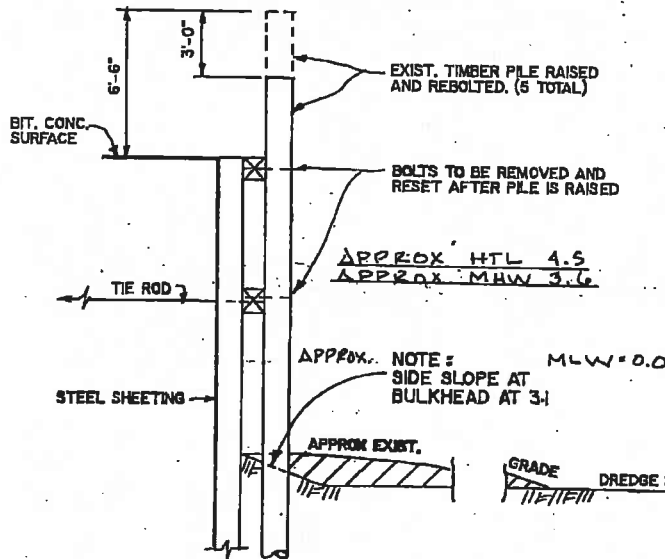
010-16F-PIER-005-100
010-16F-PIER-005-200



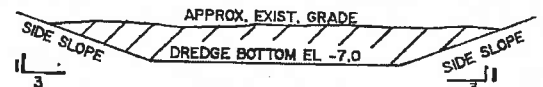
REPAIR DETAIL
SCALE 1/8" = 1'-0"



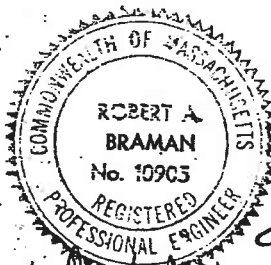
ELEVATION OF CATWALK
SCALE 1/8" = 1'-0"



DREDGE SECTION AT BULKHEAD
SCALE 1/8" = 1'-0"



TYPICAL DREDGE SECTION
SCALE 1/8" = 1'-0"



Robert A. Braman

LICENSE PLAN NO. 2078

Approved by Department of Environmental Protection

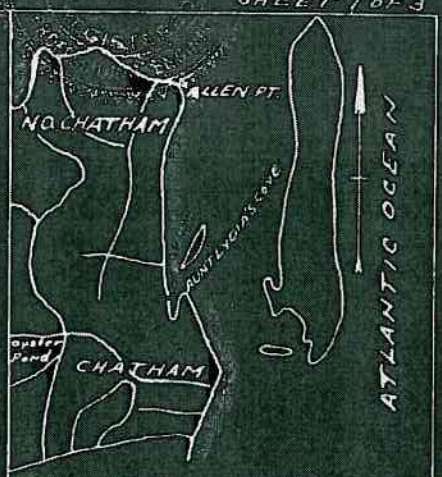
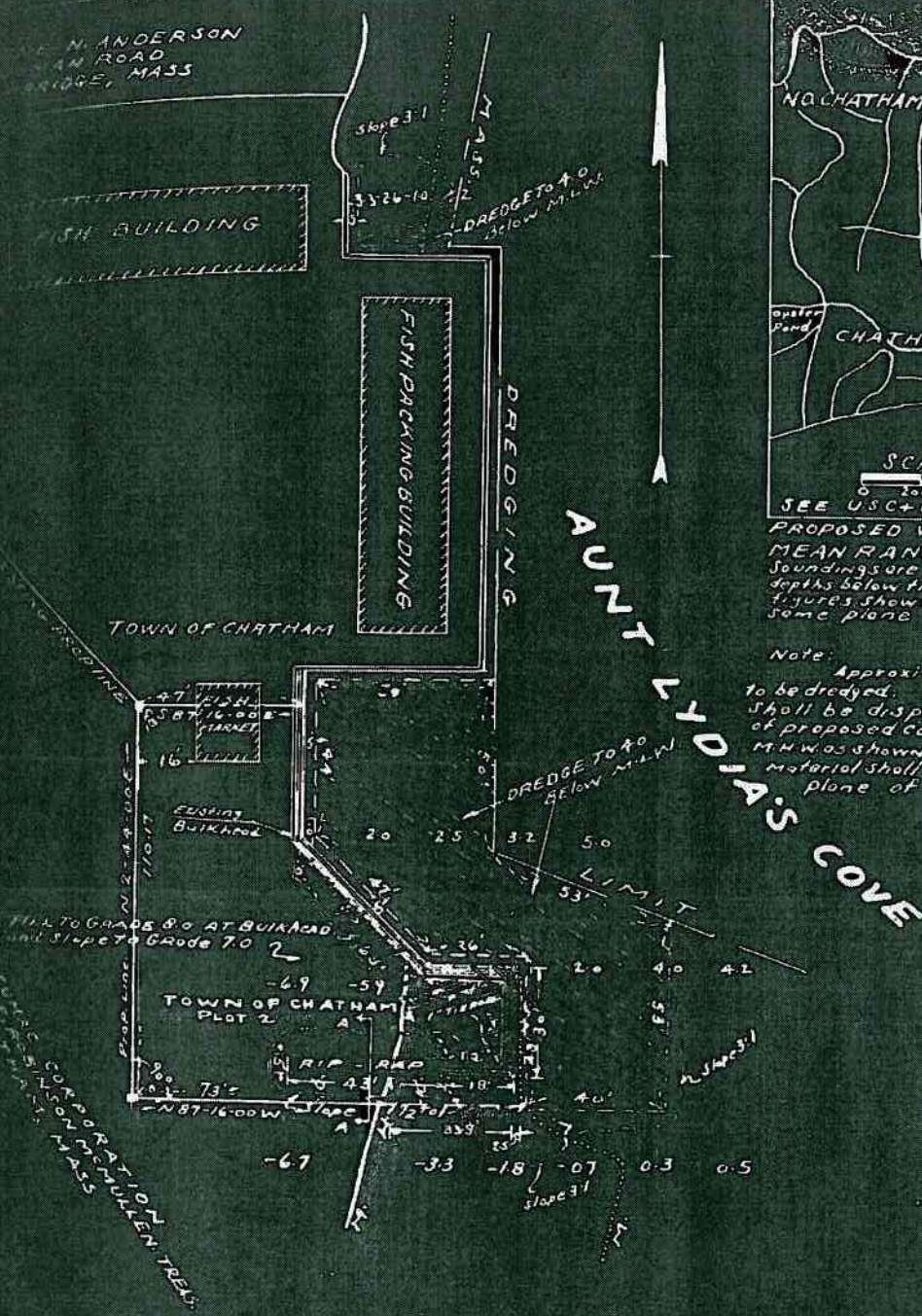
Date: OCT 26 1989

010-16F-PIER-005-200
010-16F-PIER-005-300



SHEET 1 OF 3

N. ANDERSON
MAIN ROAD
BRIDGE, MASS



SCALE FEET
0 100 200 300 400 500
SEE U.S.C. & G.S. CHART NO. 1208
PROPOSED WORK SHOWN IN RED
MEAN RANGE OF TIDE 5.0
Soundings are in feet and tenths and show
depths below the plane of M.H.W. minus
figures show elevations above the
same plane

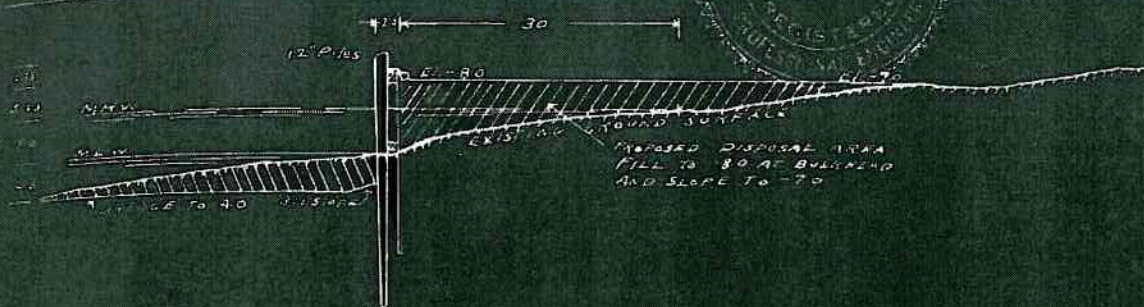
Note:
Approximately 850 cubic yards
to be dredged. 150 cubic yards
shall be disposed of within limits
of proposed construction below
M.H.W. as shown in Red. Surplus dredged
material shall be disposed of above
plane of M.H.W.

PLAN
SCALE FEET
0 1"=50' 50'

ACCOMPANYING PETITION OF
TOWN OF CHATHAM
TO BUILD AND MAINTAIN A TIMBER
HEAD, RIP-RAP, DREDGE AND FILL SOLID IN
MOUNT LYDIA'S COVE
AT
CHATHAM
SCALE AS SHOWN
1956

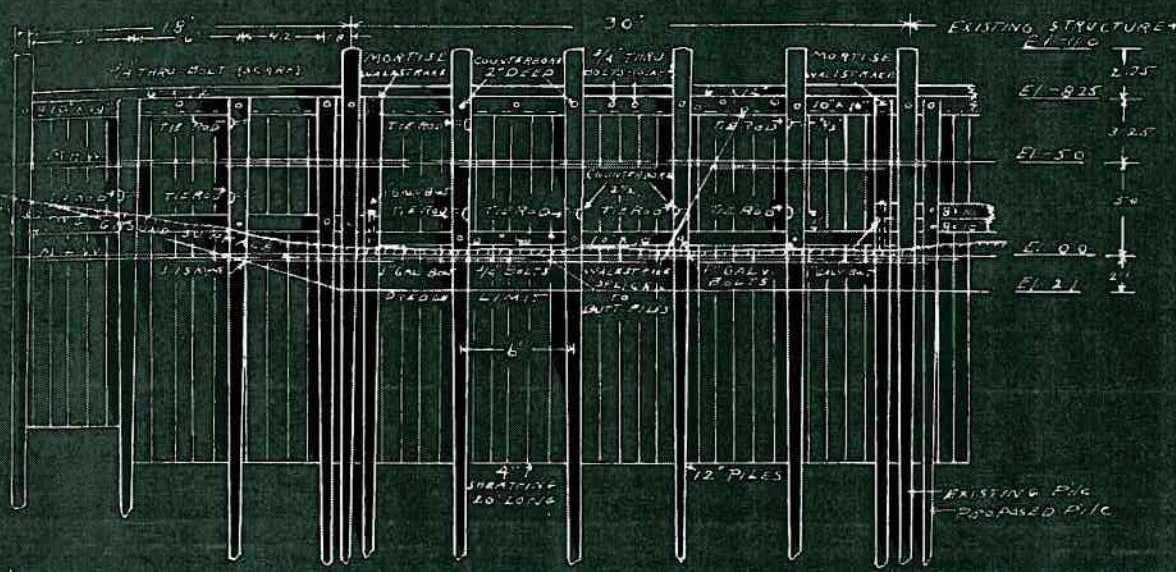
NO. 3886
APPROVED BY DEPARTMENT OF PUBLIC WORKS
OCTOBER 1, 1956
John W. [Signature]
Ed [Signature]
[Signature]
COMMISSIONER OF
PUBLIC WORKS
ASSOCIATE
COMMISSIONERS
DIRECTOR DIVISION
OF WATERWAYS

010-16F-PIER-005-200
010-16F-PIER-005-300



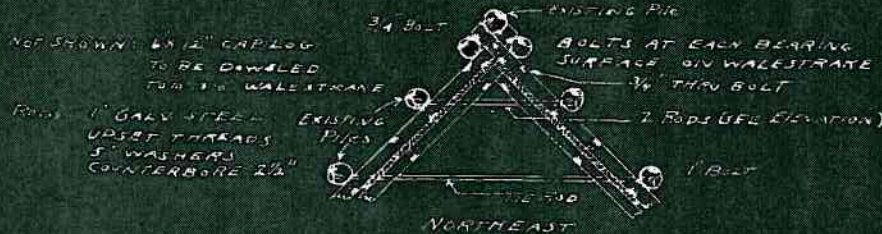
TYPICAL SECTION

SCALE
0 10 20 FEET



ELEVATION

SCALE
0 10 20 FEET



CORNER DETAIL

SCALE
0 10 20 FEET

AN ACCOMPANYING PETITION OF
OWN OF CHATHAM
BUILD AND MAINTAIN A TIMBER
HEAD RIVER, DREDGE AND FILL SOLID IN
MOUNT LYDIA'S COVE
AT
CHATHAM
SCALE AS SHOWN
1956

LICENSE PLAN NO. 3886
APPROVED - OCTOBER 1, 1956

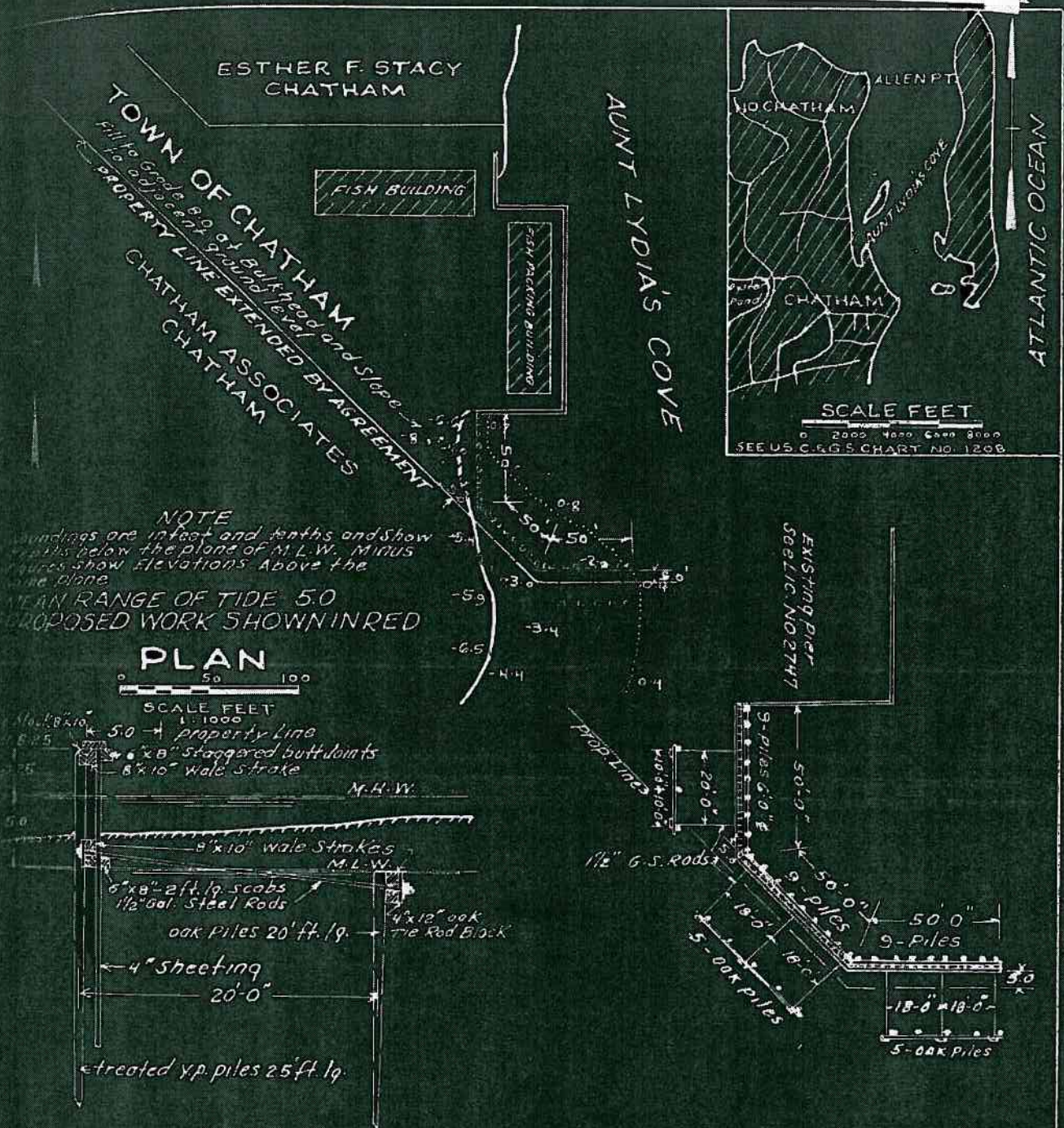
010-16F-PIER-005-300



1956

APPROVED - OCTOBER 1, 1956

010-16F-PIER-005-200



PLAN ACCOMPANYING PETITION OF
TOWN OF CHATHAM
 TO BUILD AND MAINTAIN A TIMBER BULKHEAD
 AND FILL SOLID IN
AUNT LYDIA'S COVE
 AT
CHATHAM
 SCALE AS SHOWN
 1949

NO. 3171
 APPROVED BY DEPARTMENT OF PUBLIC WORKS
 SEPTEMBER 20, 1949

W. J. Coleman COMMISSIONER OF PUBLIC WORKS

W. J. Coleman ASSOCIATE COMMISSIONERS

Stanley Waters DIRECTOR-DIVISION OF WATERWAYS

K. H. H. H.

010-16F-PIER-005-200
010-16F-PIER-005-300



SHEET 1 OF 3

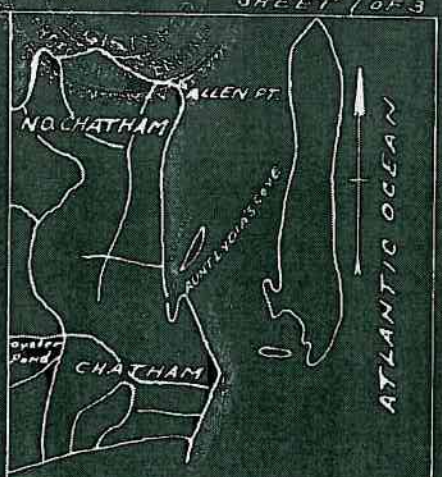
W. H. ANDERSON
BANK ROAD
BRIDGE, MASS

FISH BUILDING

FISH PACKING BUILDING

DREDGING

AUNT LYDIA'S COVE

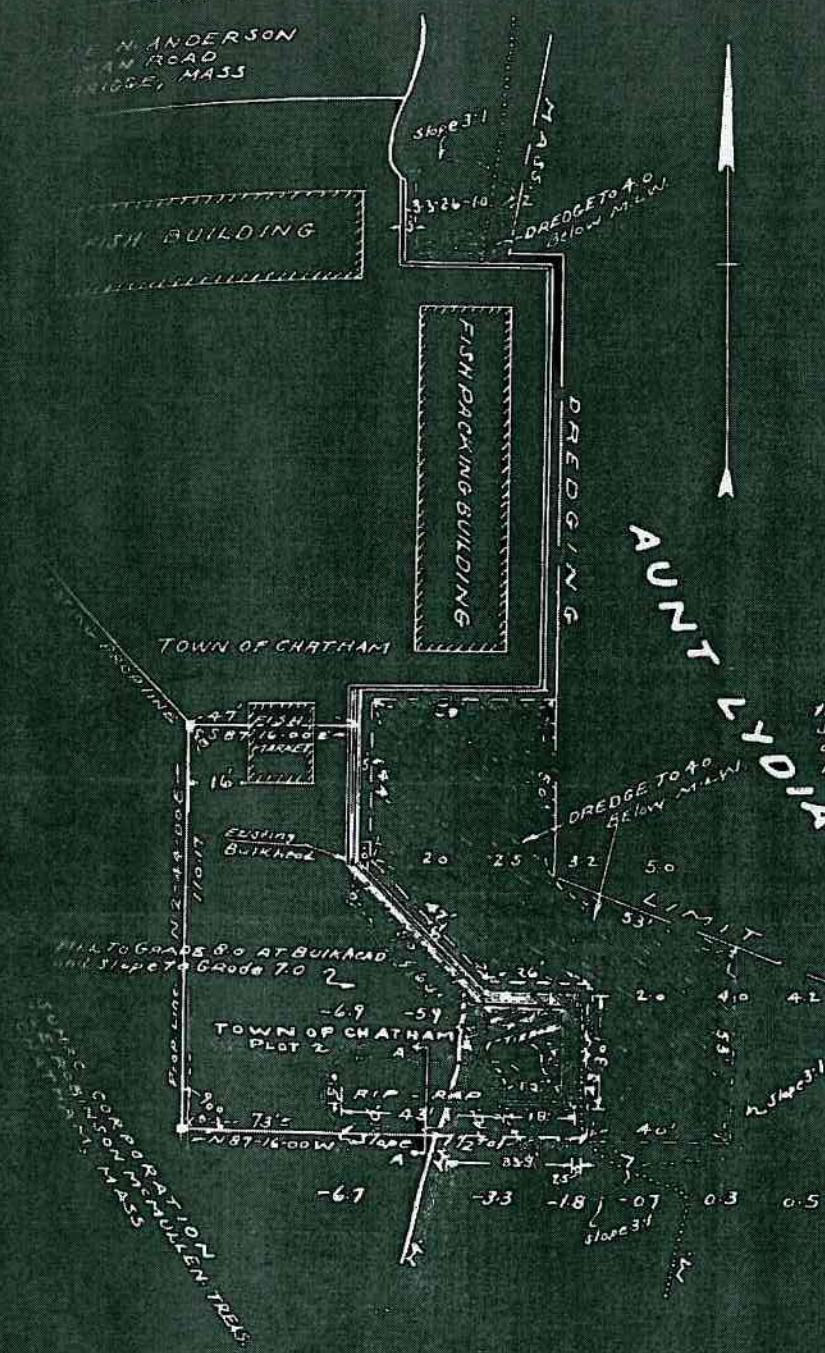


SCALE FEET

SEE U.S.C. & G.S. CHART NO. 1208

PROPOSED WORK SHOWN IN RED
MEAN RANGE OF TIDE 5.0
Soundings are in feet and tenths and show
depths below the plane of M.L.W. minus
figures show elevations above the
same plane

Note:
Approximately 850 cubic yds
to be dredged. 150 cubic yards
shall be disposed of within limits
of proposed construction below
M.H.W. as shown in Red. Surplus dredged
material shall be disposed of above
plane of M.H.W.



PLAN

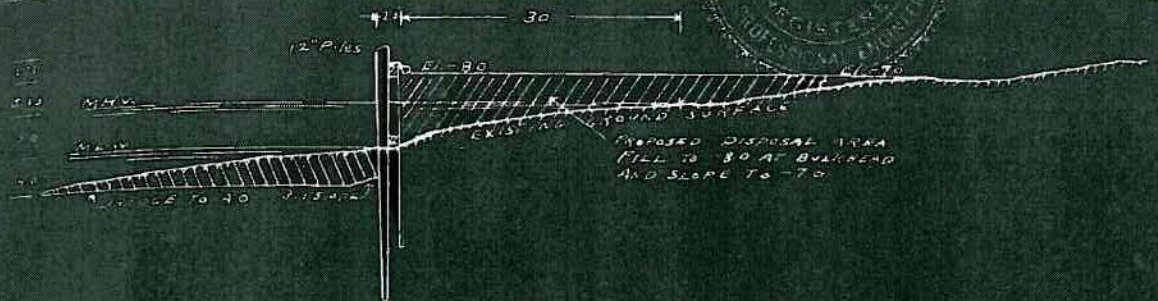
SCALE FEET
0 1"=50' 50'

ACCOMPANYING PETITION OF
TOWN OF CHATHAM
TO BUILD AND MAINTAIN A TIMBER
BULKHEAD, RIP-RAP, DREDGE AND FILL SOLID IN
AUNT LYDIA'S COVE
AT
CHATHAM
SCALE AS SHOWN
1956

NO 3886
APPROVED BY DEPARTMENT OF PUBLIC WORKS
OCTOBER 1, 1956

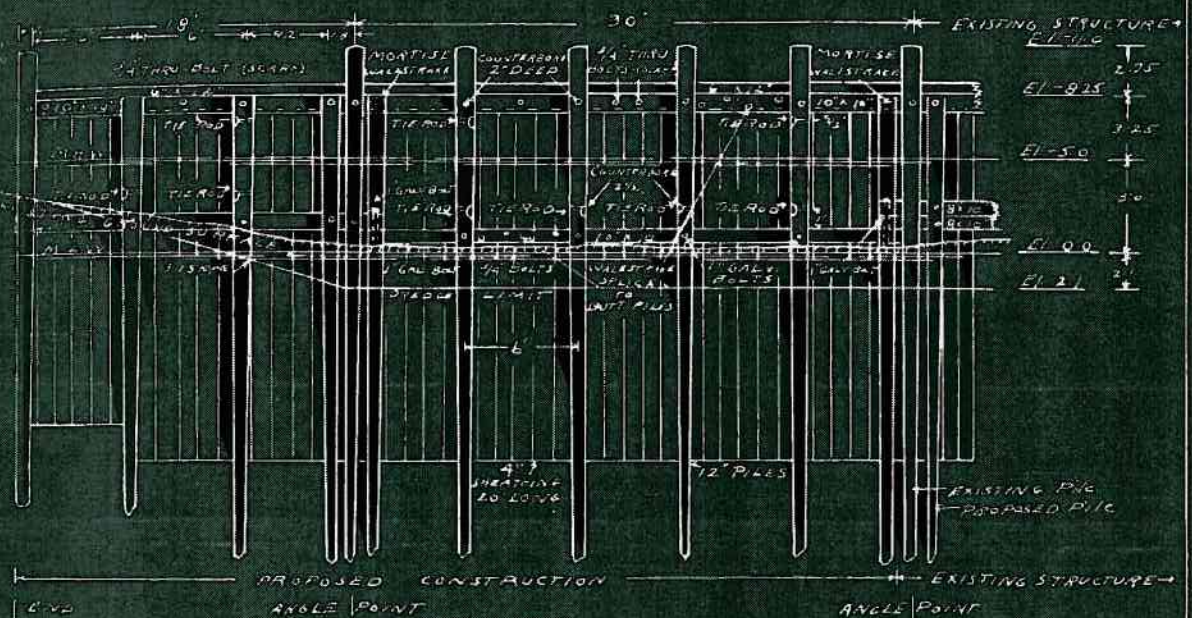
John A. ...
Frederic B. ...
William J. ...
Edgar ...
COMMISSIONER OF PUBLIC WORKS
ASSOCIATE COMMISSIONERS
DIRECTOR-DIVISION OF WATERWAYS

010-16F-PIER-005-200
010-16F-PIER-006-300



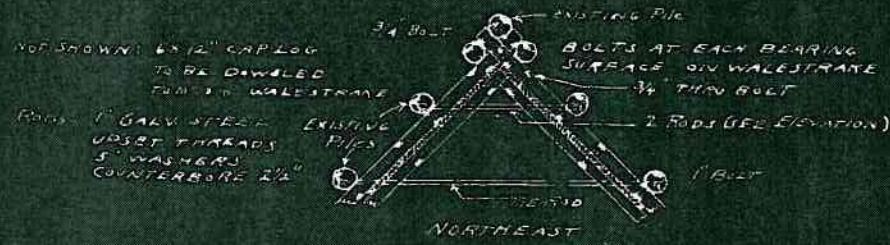
TYPICAL SECTION

SCALE
0 10' 20'



ELEVATION

SCALE
0 10' 20'



CORNER DETAIL

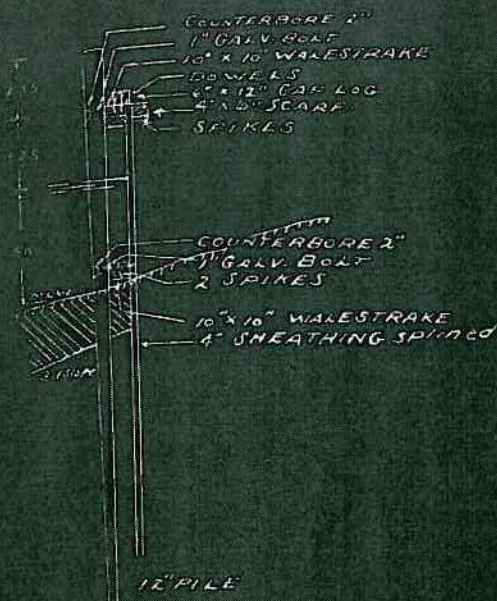
SCALE
0 10' 20'

IN ACCOMPANYING PETITION OF
OWN OF CHATHAM
BUILD AND MAINTAIN A TIMBER
HEADRIAP, DREDGE AND FILL SOLID IN
MOUNT LYDIA'S COVE
AT
CHATHAM
SCALE AS SHOWN
1956

LICENSE PLAN NO. 3886
APPROVED - OCTOBER 1, 1956

010-16F-PIER-005-200
010-16F-PIER-005-300

SHEET 3 OF 3



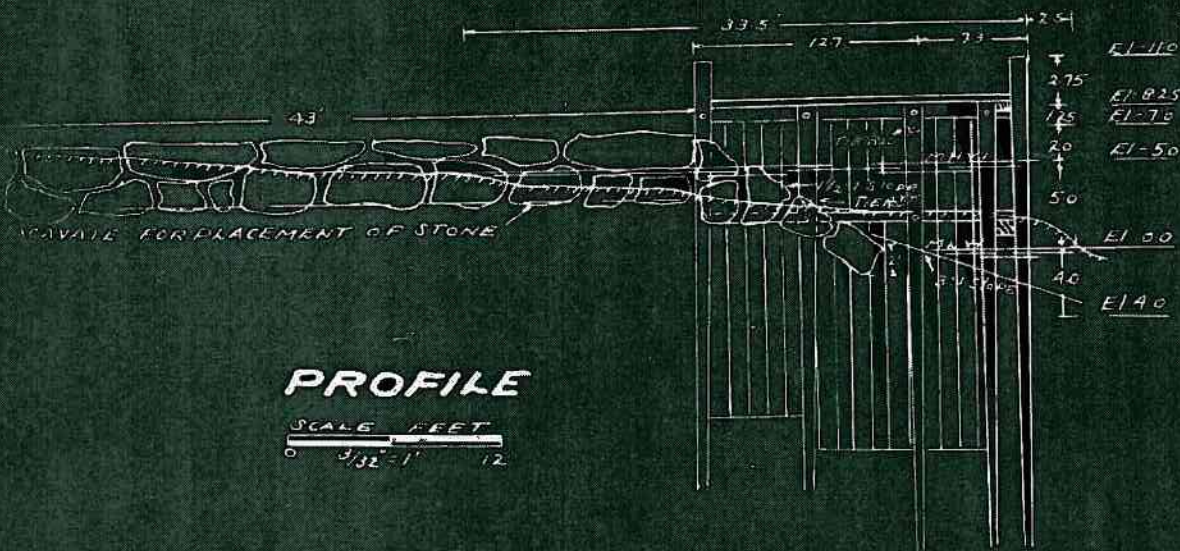
SECTION

SCALE FEET
0 1"=8' 8



SECTION A-A

SCALE FEET
0 1"=8' 8



PROFILE

SCALE FEET
0 3/32"=1' 12

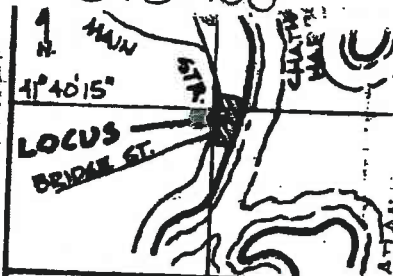
ACCOMPANYING PETITION OF
TOWN OF CHATHAM
TO BUILD AND MAINTAIN A TIMBER
HEAD RIP-RAP, DREDGE AND SOLID FILL IN
AUNT LYDIA'S COVE
AT
CHATHAM
SCALE AS SHOWN
1956

LICENSE PLAN NO 3886
APPROVED - OCTOBER 1, 1956

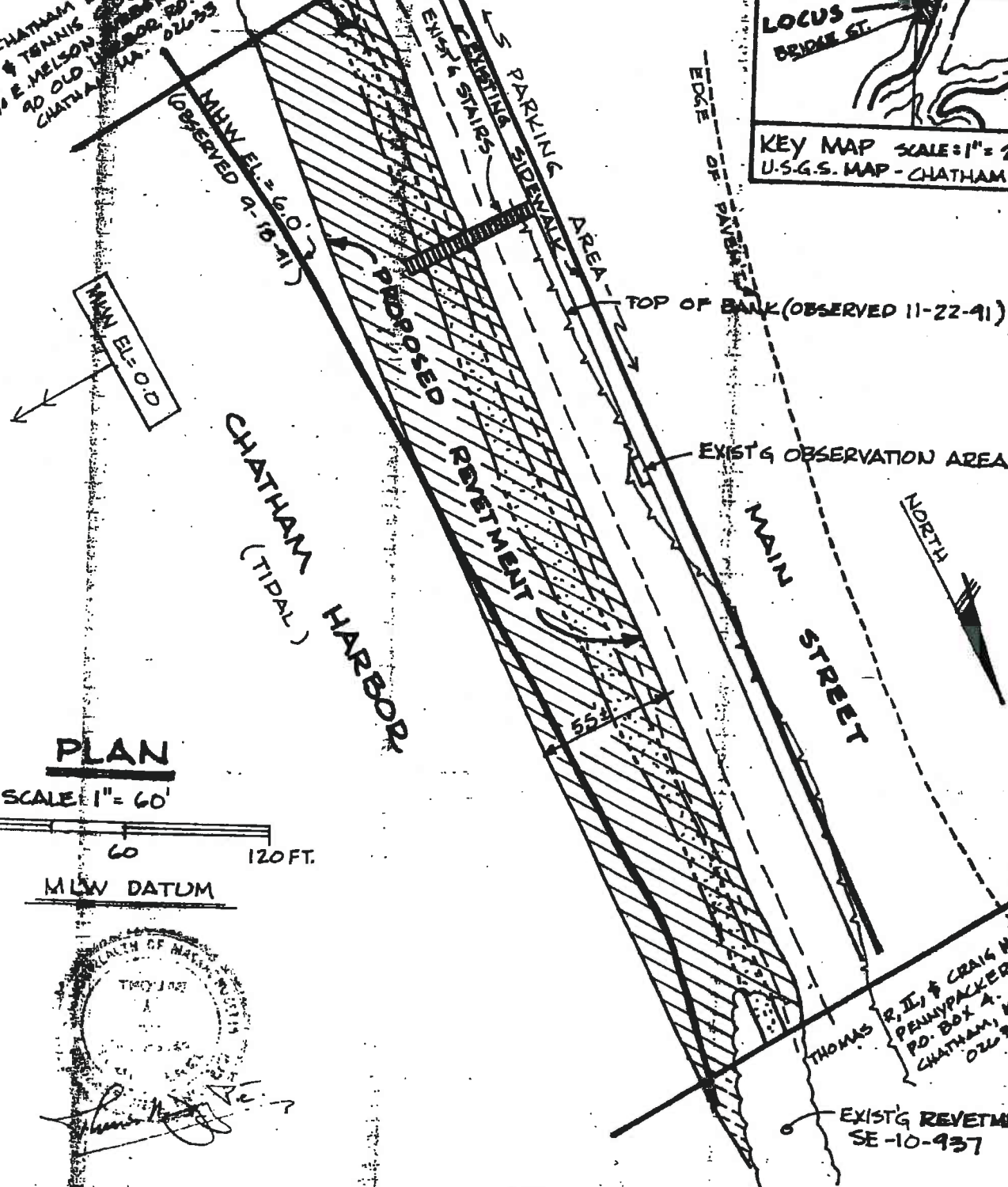
010-178-000-075-100

APPROX LOC. OF EXIST'G
REVEMENT

CHATHAM BEACH
& TENNIS CLUB
% E. NELSON ARCHT. R.
90 OLD HARBOR RD.
CHATHAM, MA. 02633

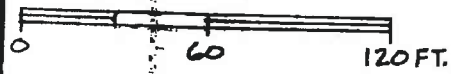


KEY MAP SCALE: 1" = 200'
U.S.G.S. MAP - CHATHAM QUA

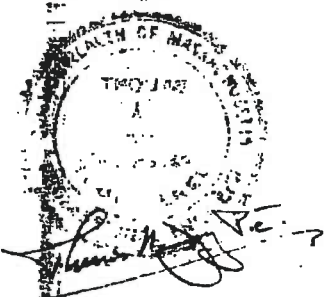


PLAN

SCALE 1" = 60'



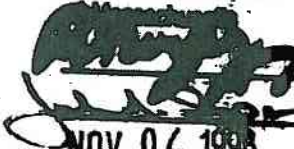
MHW DATUM



PLAN ACCOMPANYING PETITION OF
TOWN OF CHATHAM
TO RECONSTRUCT & MAINTAIN A
ROCK REVEMENT
AT CHATHAM HARBOR, CHATHAM,
BARNSTABLE COUNTY, MASSACHUSETTS
COASTAL ENGINEERING CO., INC., ORLEANS, MA.

SHEET 1 OF 2 SHEETS # C12-317
LICENSED ON NO. 5976

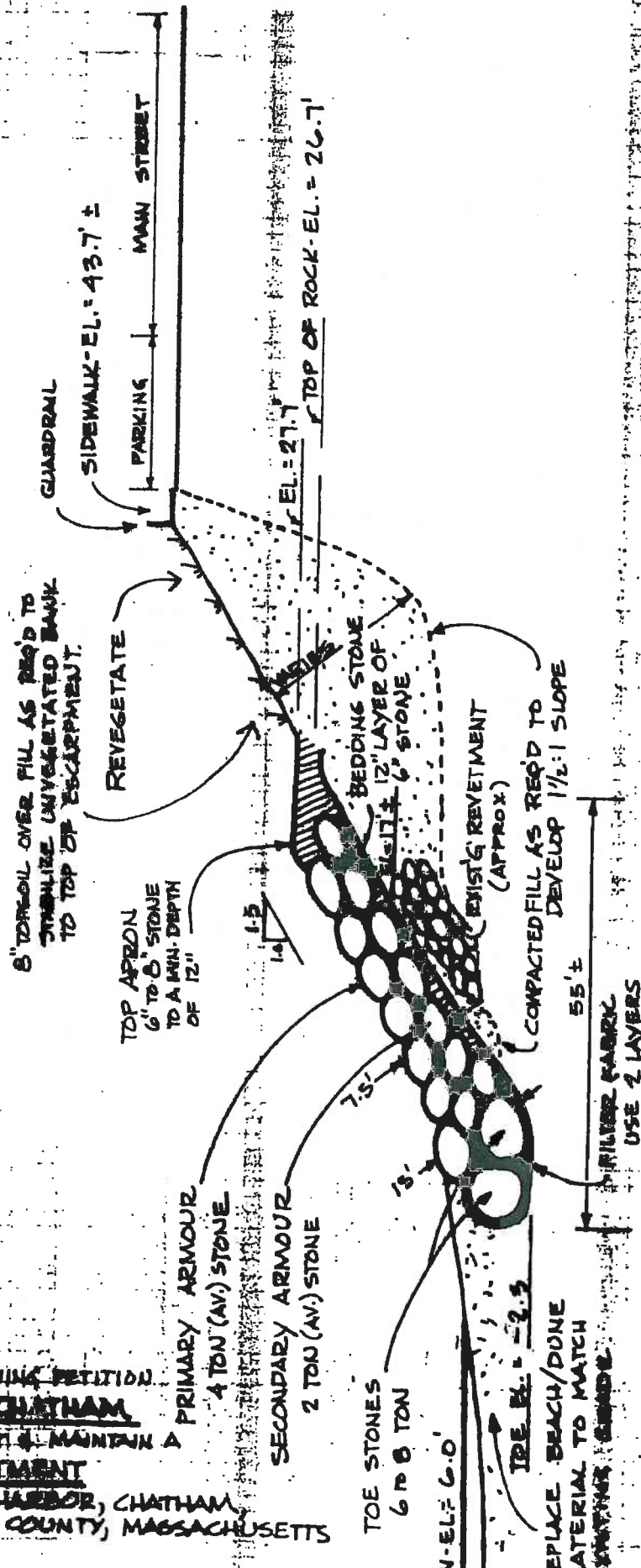
Approved by Department of Environmental Protection



DIVISION DIRECTOR

PROGRAM CHIEF

NOV 06 1998 DATE



PLAN ACCOMPANYING PETITION
OF TOWN OF CHATHAM
TO RECONSTRUCT & MAINTAIN A
ROCK EMBANKMENT
AT CHATHAM HARBOR, CHATHAM,
BARNSTABLE COUNTY, MASSACHUSETTS

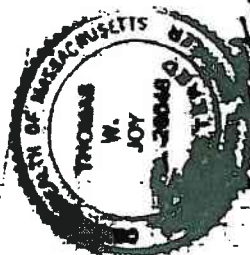
LICENSE PLAN NO. 5976

Approved by Department of Environmental Protection

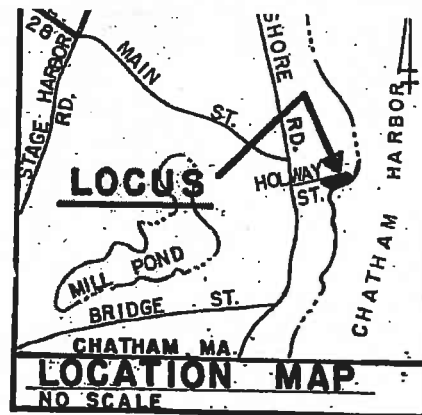
Date: NOV 06 1996

TYPICAL SECTION

Scale: 1" = 20'



**LIMIT OF WORK
NEW PAVEMENT**



PLAN
SCALE: 1" = 40'

FAIRFIED & MARION
WHITING
DRAWER W
HILLSBORO, NH
03244

GRACE B. COXHEAD
97B FOREST DR.
SPRINGFIELD, NJ
07081

BENCHMARK
SPIKE IN POLE
EL = 16.5 MSL

UTILITY
POLE
49-1

**EXIST. REVETMENT
TO BE REMOVED AND
RECONSTRUCTED**

**PROPOSED
ROCK REVETMENT**

EFFIE M. BUTLER
865 CENTRAL ST.
NEEDHAM, MA.

HAZEL L. WITHERBEE
166 HOLWAY ST.
BOX 242
CHATHAM, MA.
02633

NANCY K. NELSON
58 HOLWAY ST.
CHATHAM, MA. 02633

EXISTING
DWELLING

CHATHAM
CONSERVATION
FOUNDATION, INC.

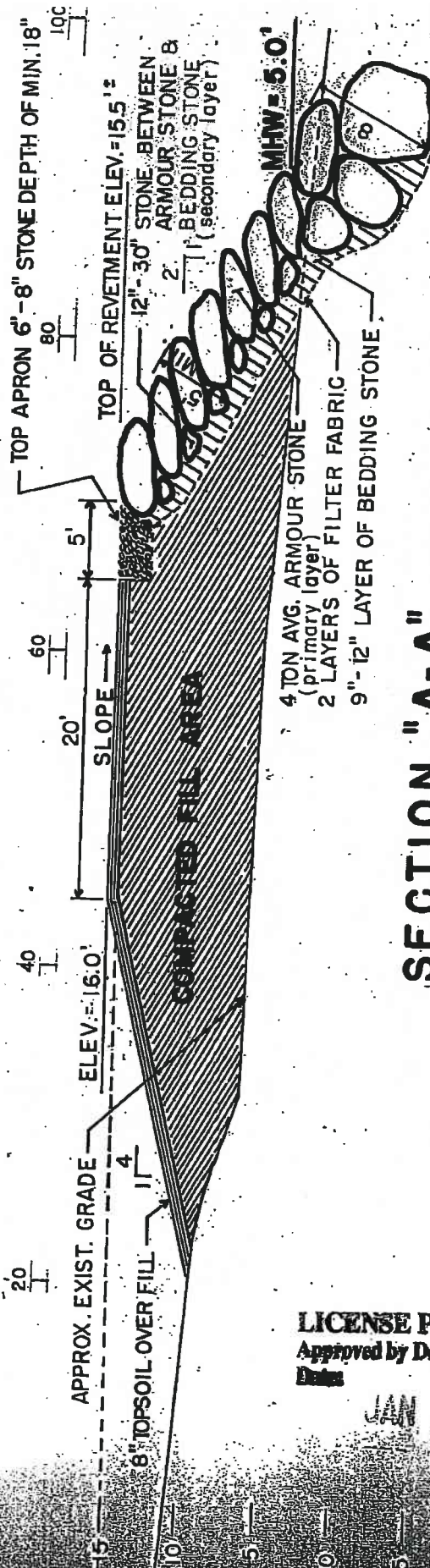
J. L. WHELAN
LES A. WHELAN
504 HIGHLAND AVE
UPPER MONTCLAIR

HOLWAY STREET
EDGE OF PAVEMENT
EDGE OF PAVEMENT

PLAN TO ACCOMPANY PETITION OF
TOWN OF CHATHAM
TO CONSTRUCT & MAINTAIN A ROCK REVETMENT IN CHATHAM HARBOR, CHATHAM, MASS
IN THE COUNTY OF BARNSTABLE
COASTAL ENGINEERING CO., INC.
ORLEANS, MASS.

LICENSE PLAN NO. 11618
Approved by Department of Environmental Protection
of Massachusetts JAN 2 1997
Mitch Zancera
Ann [Signature]

HOLWAY STREET (beyond)
elev. = 13.5'



SECTION "A-A"

SCALE: 1" = 10' HORZ & VERT.

LICENSE PLAN NO. 11618
Approved by Department of Environmental Protection
Date

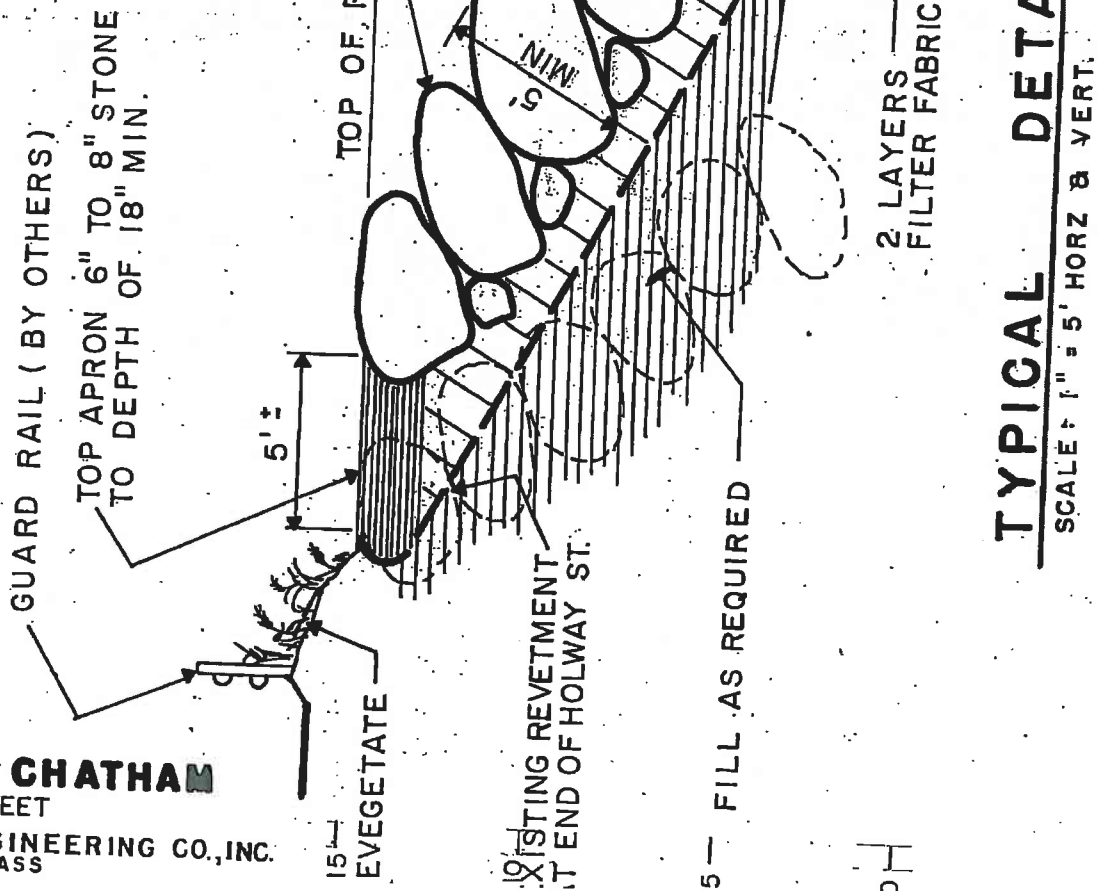
JAN 26 2007

TOWN OF CHATHAM
HOLWAY STREET
COASTAL ENGINEERING CO., INC.

010-17C-034-018-100

LICENSE PLAN NO. 11618
Approved by Department of Environmental Protection
Date:

JAN 26 2007



TYPICAL DETAIL

SCALE: 1" = 5' HORIZ & VERT.

ELEV. = -3.5' MLW

010-17C-034-018-100

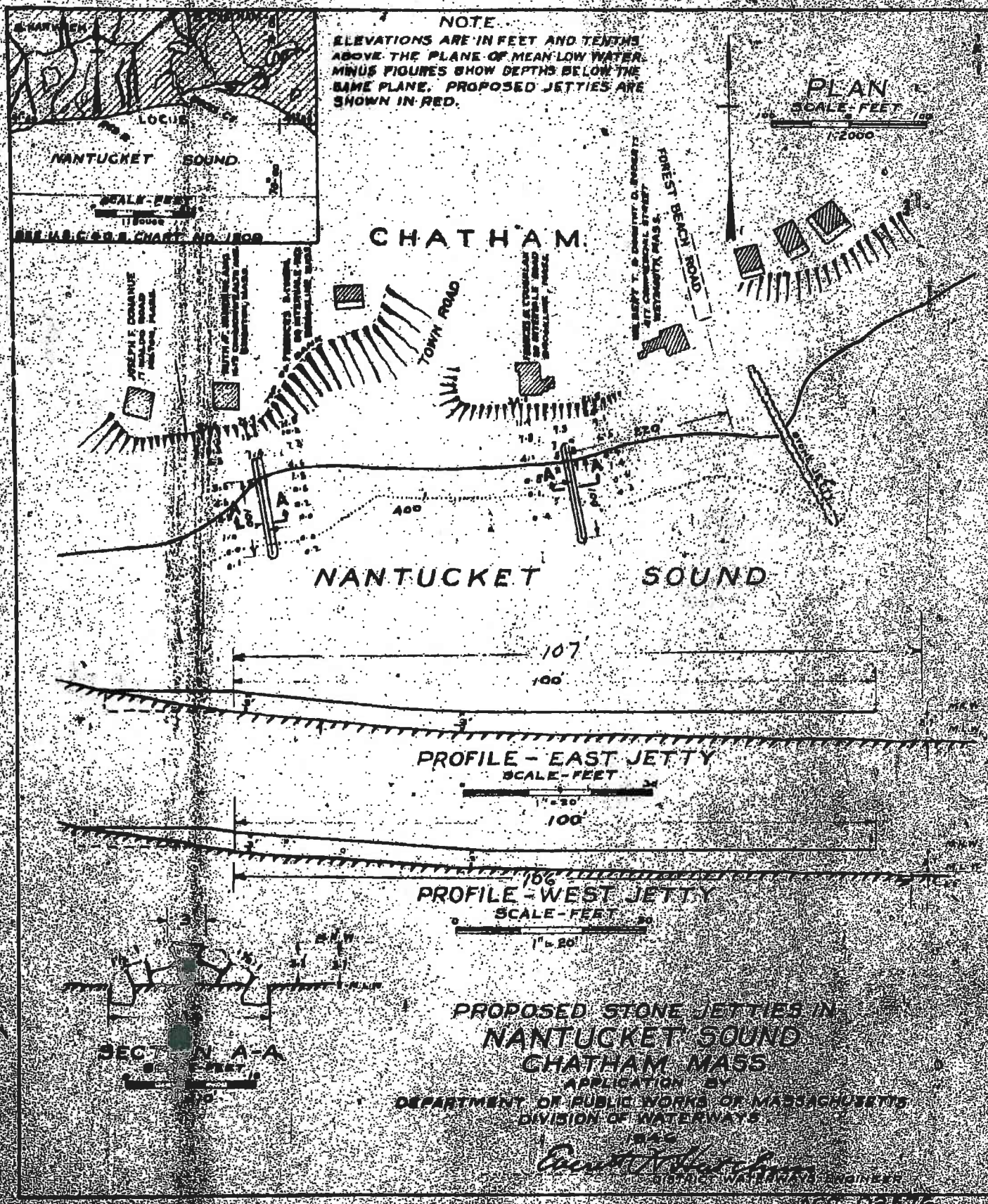
TOWN OF CHATHAM

HOLWAY STREET

COASTAL ENGINEERING CO., INC.
ORLEANS, MASS

BCE Structure No	Document No	Contract/ Drawing Number	Entity	Municipality	Date	Title	Sheets	Location	Description
010-03A-001-015-100	010-03A-001-015-100-COE1A	47-2	USACE	Chatham	December 1946	Proposed Stone Jetty in Nantucket Sound - Chatham, Massachusetts - Application by the DPW of Massachusetts - Division of Waterways	1	Forest Beach	Groins
010-03A-001-015-100	010-03A-001-015-100-COE1B	57-346	USACE	Chatham	November 1957	Proposed Groins and Sand Fill - Nantucket Sound - Pleasant Street Beach - Chatham, Massachusetts	1	Forest Beach	Groins
010-03A-001-015-100	010-03A-001-015-100-COE1C	59-2	USACE	Chatham	October 1958	Proposed Groins and Sand Fill - Forest Beach Road - Nantucket Sound - Chatham, Massachusetts - Application by the DPW of Massachusetts - Division of Waterways	1	Forest Beach	Groins
010-03A-001-015-100	010-03A-001-015-100-COE1D	60-221	USACE	Chatham	May 1960	Proposed Stone Groins and Sand Fill - Vicinity of Forest Beach Road - Nantucket Sound - Chatham, Massachusetts - Application by the DPW of Massachusetts - Division of Waterways	1	Forest Beach	Groins
010-03A-001-015-100	010-03A-001-015-100-COE1E	65-141	USACE	Chatham	April 1965	Proposed Shore Protection - Stone Groins and Revetment - Forest Beach - Chatham, Massachusetts - Application by the DPW of Massachusetts - Division of Waterways	1	Forest Beach	Groins
010-095-031-014-100	010-095-031-014-100-COE1A	87-217	USACE	Chatham	November 1986	To Construct Concrete Boat Ramp, Timber Bulkhead, Place Floats and to Dredge in Oyster Pond River - Chatham, Barnstable County, Massachusetts	2	Barn Hill Road	Replace Steel Bulkhead
010-11J-006-006-100	010-11J-006-006-100-COE1A	87-218	USACE	Chatham	November 1986	To Construct Concrete Ramp, Timber Bulkhead, Place Float, Gangway and Dredge in Ryder's Cove - Chatham, Barnstable County, Massachusetts	2	Ryder's Cove Road	Timber Bulkhead
010-16F-PIER-005-100	010-16F-PIER-005-100-COE1A	68-34	USACE	Chatham	October 1967	Proposed Bulkhead, Groin, Excavation and Fill in Aunt Lydia's Cove at Chatham, County of Barnstable, Massachusetts	1	Fish Pier	Timber Bulkhead
010-16F-PIER-005-200	010-16F-PIER-005-200-COE2A	49-201	USACE	Chatham	November 1949	To Build and Maintain a Timber Bulkhead and Fill Solid in Aunt Lydia's Cove - Chatham, Massachusetts	1	Fish Pier	Timber Bulkhead
010-16F-PIER-005-200	010-16F-PIER-005-200-COE2B	56-260	USACE	Chatham	July 1956	Proposed Riprap, Timber Bulkhead, Dredge and Fill Solid in Aunt Lydia's Cove - Chatham, Massachusetts	4	Fish Pier	Riprap and Timber Bulkhead
010-16F-PIER-005-200	010-16F-PIER-005-200-COE2C	79-176	USACE	Chatham	January 1979	To install a Sheet Steel Bulkhead and to Dredge in Aunt Lydia's Cove - Chatham, Barnstable County, Massachusetts	2	Fish Pier	Steel Bulkhead
010-16F-PIER-005-300	010-16F-PIER-005-300-COE3A	56-260	USACE	Chatham	July 1956	Proposed Riprap, Timber Bulkhead, Dredge and Fill Solid in Aunt Lydia's Cove - Chatham, Massachusetts	4	Fish Pier	Riprap and Timber Bulkhead
010-17B-000-075-100	010-17B-000-075-100-COE1A	199102562	USACE	Chatham	November 1991	Plan and Details of Proposed Rock Revetment - Town of Chatham Lighthouse Beach - Shore Front Protection	3	Lighthouse Beach	Revetment

010-03A-001-015-100

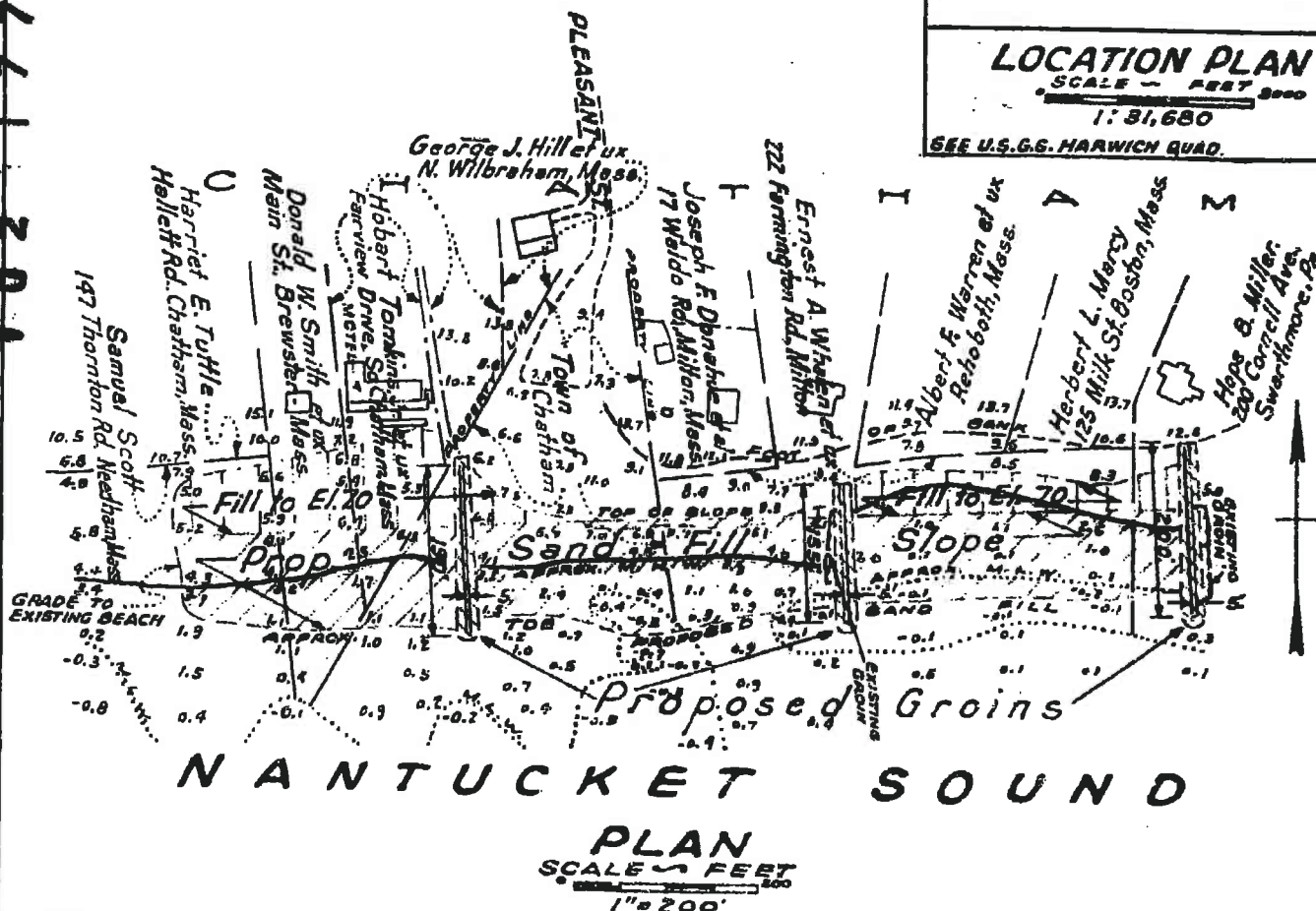
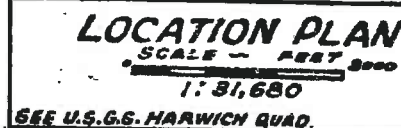
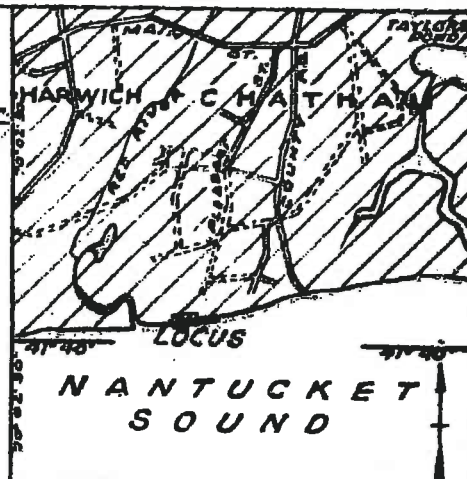
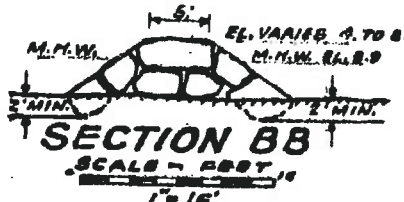
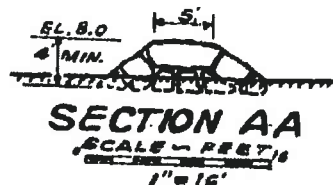
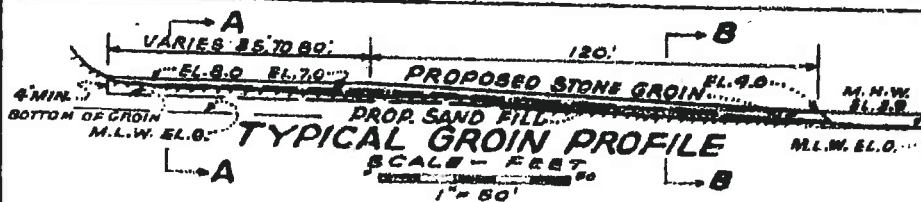


PROPOSED STONE JETTIES IN
NANTUCKET SOUND
CHATHAM MASS
APPLICATION BY
DEPARTMENT OF PUBLIC WORKS OF MASSACHUSETTS
DIVISION OF WATERWAYS

Edward J. McLaughlin
DISTRICT ENGINEER


ACC 02576

010-03A-001-015-100



NOTE

ELEVATIONS ARE IN FEET AND TENTHS AND REFER TO PLANE OF MEAN LOW WATER. MINUS FIGURES SHOW DEPTHS BELOW THE SAME PLANE.

APPROX. EXISTING GROUND SHOWN THUS  EXISTING GROINS TO BE REMOVED AND STONE USED IN NEW GROINS.

SIDE AND END SLOPES FOR GROINS 1.5 TO 1.0 LOCATION OF PROPOSED WORK SHOWN IN RED. SPACES BETWEEN THE LARGER STONES IN GROINS TO BE FILLED WITH STONE CHIPS.

PROPOSED
GROINS AND SAND FILL
NANTUCKET SOUND
PLEASANT ST. BEACH-CHATHAM, MASS.
APPLICATION BY
DEPARTMENT OF PUBLIC WORKS-MASSACHUSETTS
DIVISION OF WATERWAYS
NOVEMBER-1957

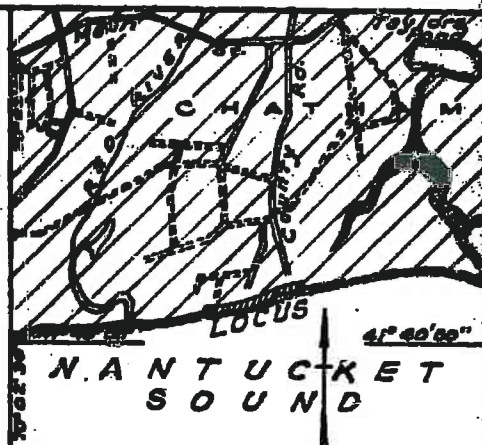
Robert B. MacInnon
CHIEF WATERWAYS ENGINEER.

003 0179

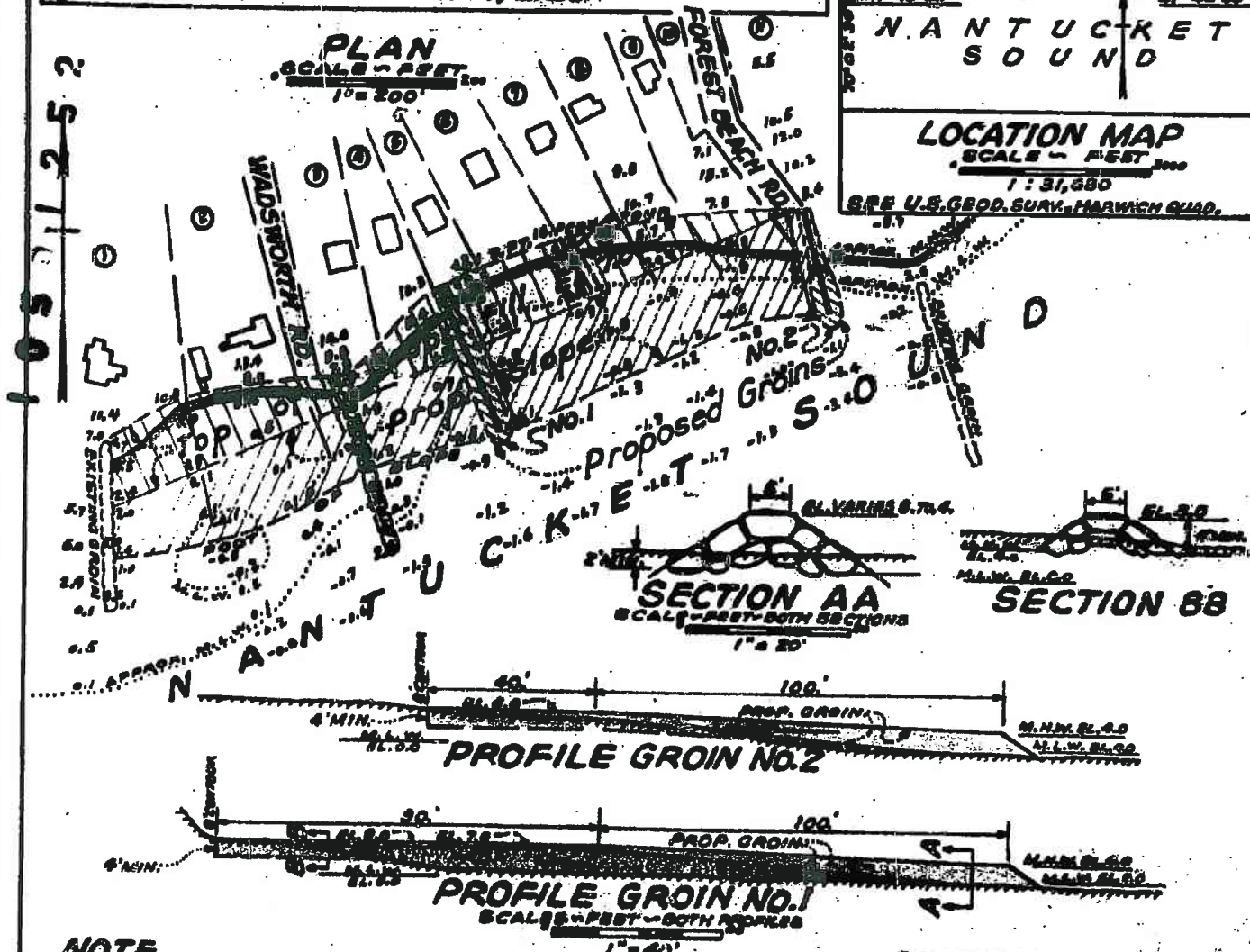
010-03A-001-015-100

PROPERTY OWNERS

① HOPE B. MILLER	200 CORNEL AVE., SWARTHMORE, PA.
② WILBUR T. ROBERTS	Rd. DRAVER 2, SO. CHATHAM, MASS.
③ GEORGE A. MORIN	18 NORFOLK RD., CHESTNUT HILL, MASS.
④ L. WILBUR FLORIDIS	PLEASANT ST., SO. CHATHAM, MASS.
⑤ HENRY A. MASSEY	21 FORSTER PLACE, MONTCLAIR, N.J.
⑥ WILLIAM D. DOGARDAU	74 SUNSET RD., WESTON, MASS.
⑦ JENNIS M. MELBAN	SOUTH CHATHAM, MASS.
⑧ CONSTANCE B. ARDEN	81 HARTFORD ST. NANTUCKET, MASS.
⑨ ESTHER R. NOYES	SOUTH CHATHAM, MASS.
⑩ CYRUS F. BAKER	MAIN ST., SO. CHATHAM, MASS.
⑪ R.C.A. COMMUNICATIONS, INC.	66 BROAD ST., N.Y. 4, N.Y.
⑫ HARRIST TUTTLE	CHATHAM, MASS.



LOCATION MAP
SCALE - FEET
1" = 31,680
SEE U.S. GEOD. SURV. HARWICH QUAD.

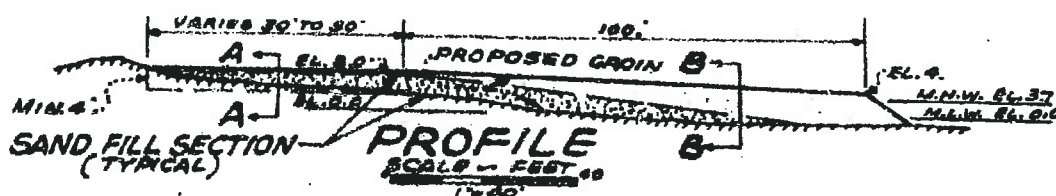
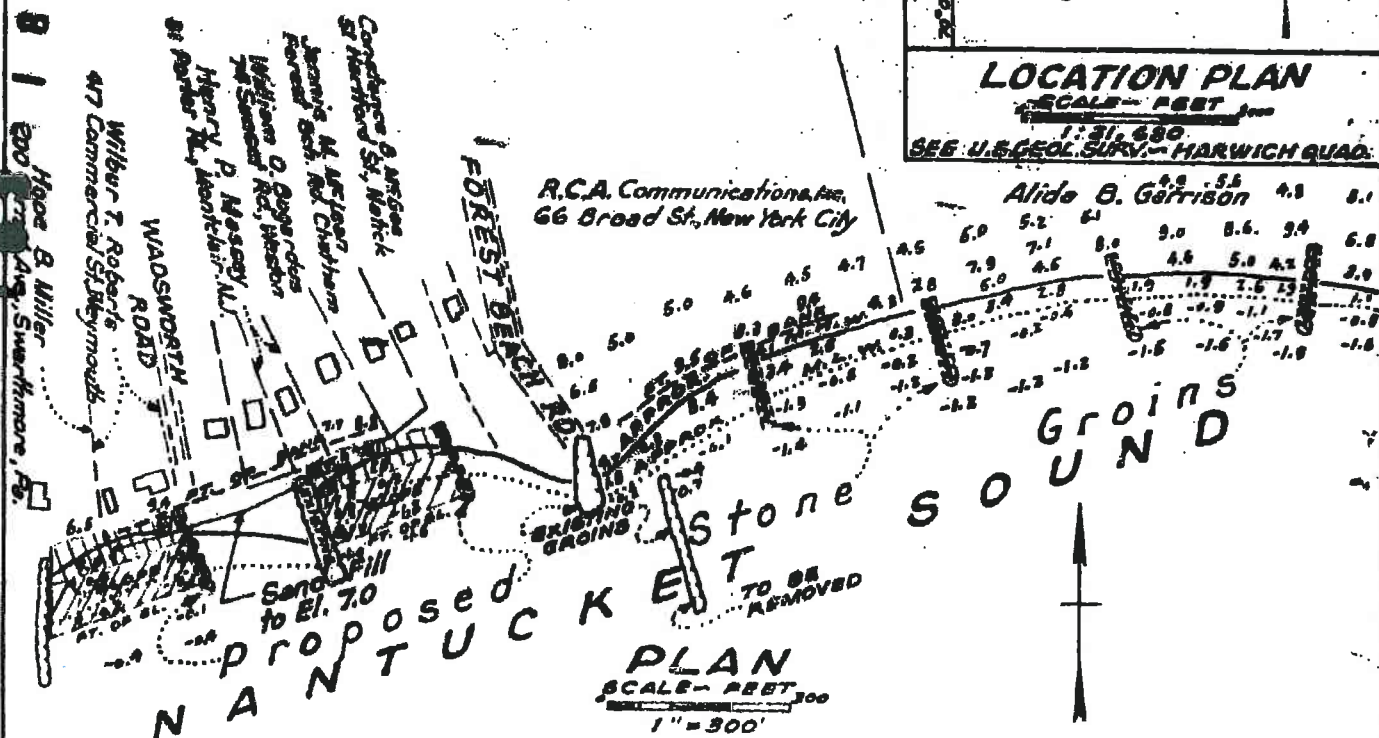
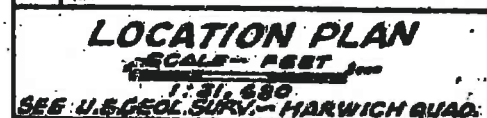
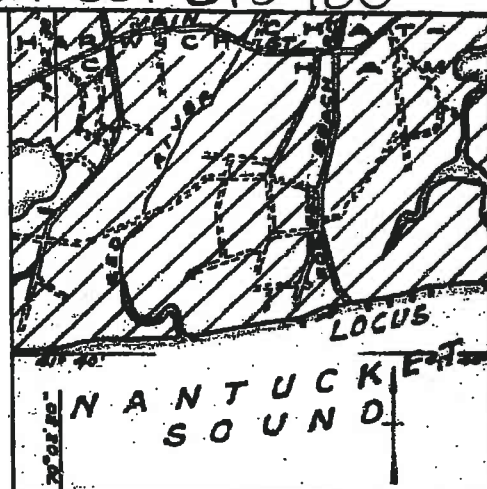
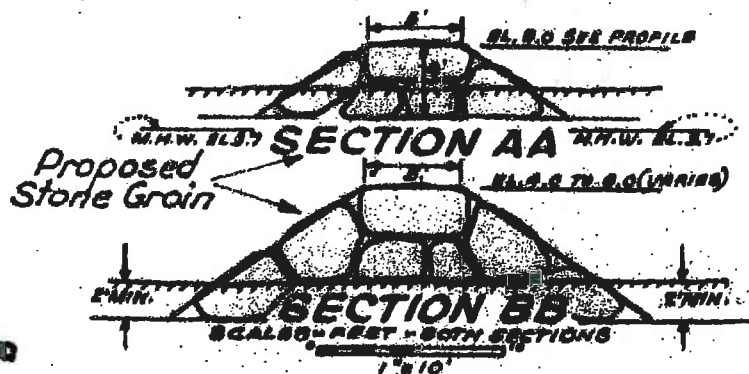


NOTE
ELEVATIONS ARE IN FEET AND TENTHS
AND REFER TO PLANE OF MEAN LOW
WATER. MINUS FIGURES SHOW DEPTHS
BELOW THE SAME PLANE.
APPROX. EXISTING GROUND THUS
ALL SLOPE AND END SLOPES FOR GROINS
ARE 1.5 TO 1.0
LOCATION OF PROPOSED WORK SHOWN
IN RED.

PROPOSED
GROINS AND SAND FILL
FOREST BEACH ROAD
NANTUCKET SOUND
CHATHAM - MASS.
APPLICATION BY
DEPARTMENT OF PUBLIC WORKS OF MASSACHUSETTS
DIVISION OF WATERWAYS
OCTOBER - 1958
Robert B. McKinnon
CHIEF WATERWAYS ENGINEER

ACC 00010

010-03A-001-015-100



NOTE

ELEVATIONS ARE IN FEET AND TENTHS
ABOVE PLANE OF MEAN LOW WATER.
MINUS FIGURES SHOW DEPTHS BELOW
THE SAME PLANE.
APPROX. EXISTING GROUND THUS ~~THUS~~
ALL SIDE AND END SLOPES FOR GROINS
ARE 1.5 TO 1.0
LOCATION OF PROPOSED WORK IS
SHOWN IN RED

PROPOSED
STONE GROINS-SAND FILL
VICINITY OF FOREST BEACH RD.
NANTUCKET SOUND

CHATHAM - MASS.
APPLICATION BY
DEPARTMENT of PUBLIC WORKS of MASSACHUSETTS
DIVISION of WATERWAYS
MAY - 1960

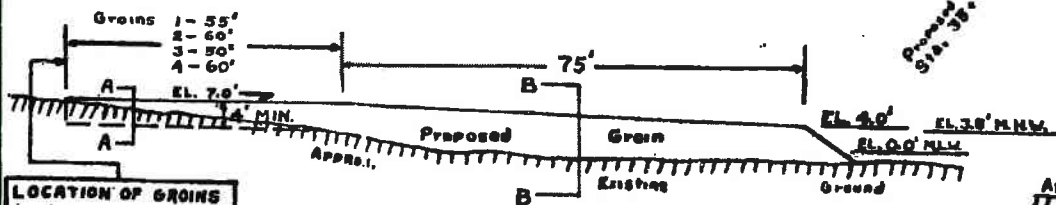
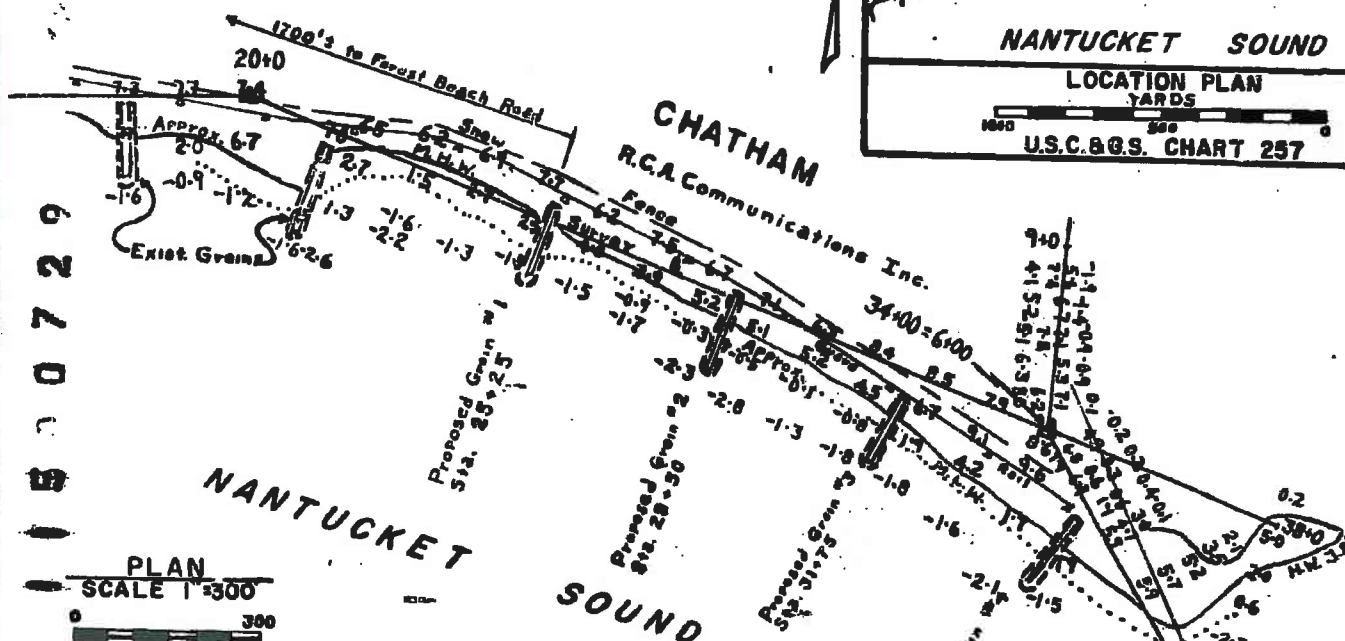
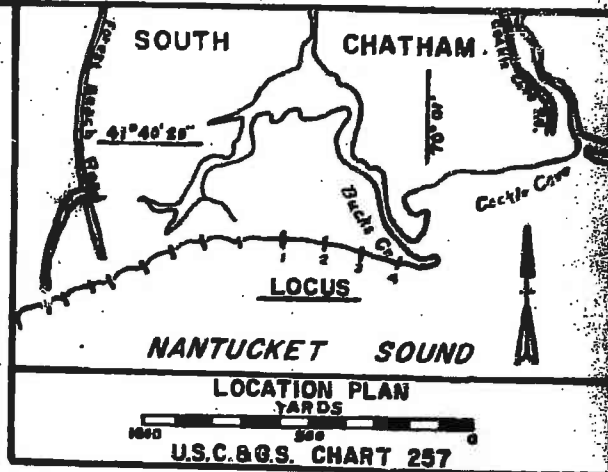
Robert B. MacKinnon
Chief Waterways Engineer

010-03A-001-015-100

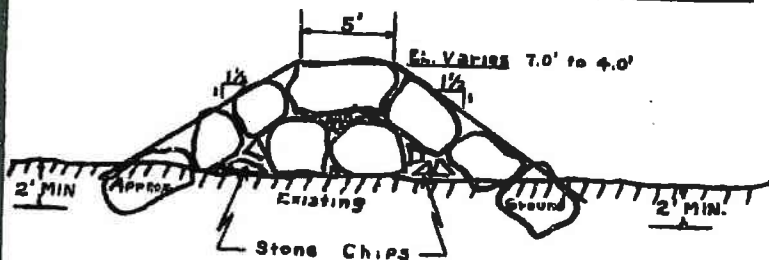
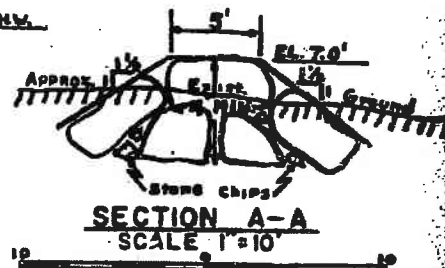
072 0879

GENERAL NOTES:

Elevations are in feet & tenths & refer to the plane of mean low water, minus figures denote depths below that plane
Date of survey January 1965
Refer to transit books 873 & 996



LOCATION OF GROINS	
GROIN No	STA. OFFSET
1	25+25 30' LT.
2	28+50 10' LT.
3	31+75 40' RT.
4	38+00 115' RT.

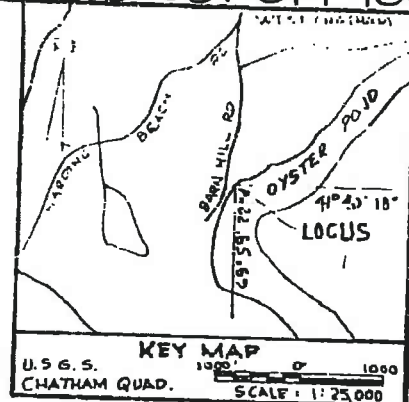


PROPOSED SHORE PROTECTION
STONE GROINS & REVETMENT
FOREST BEACH
CHATHAM MASS.

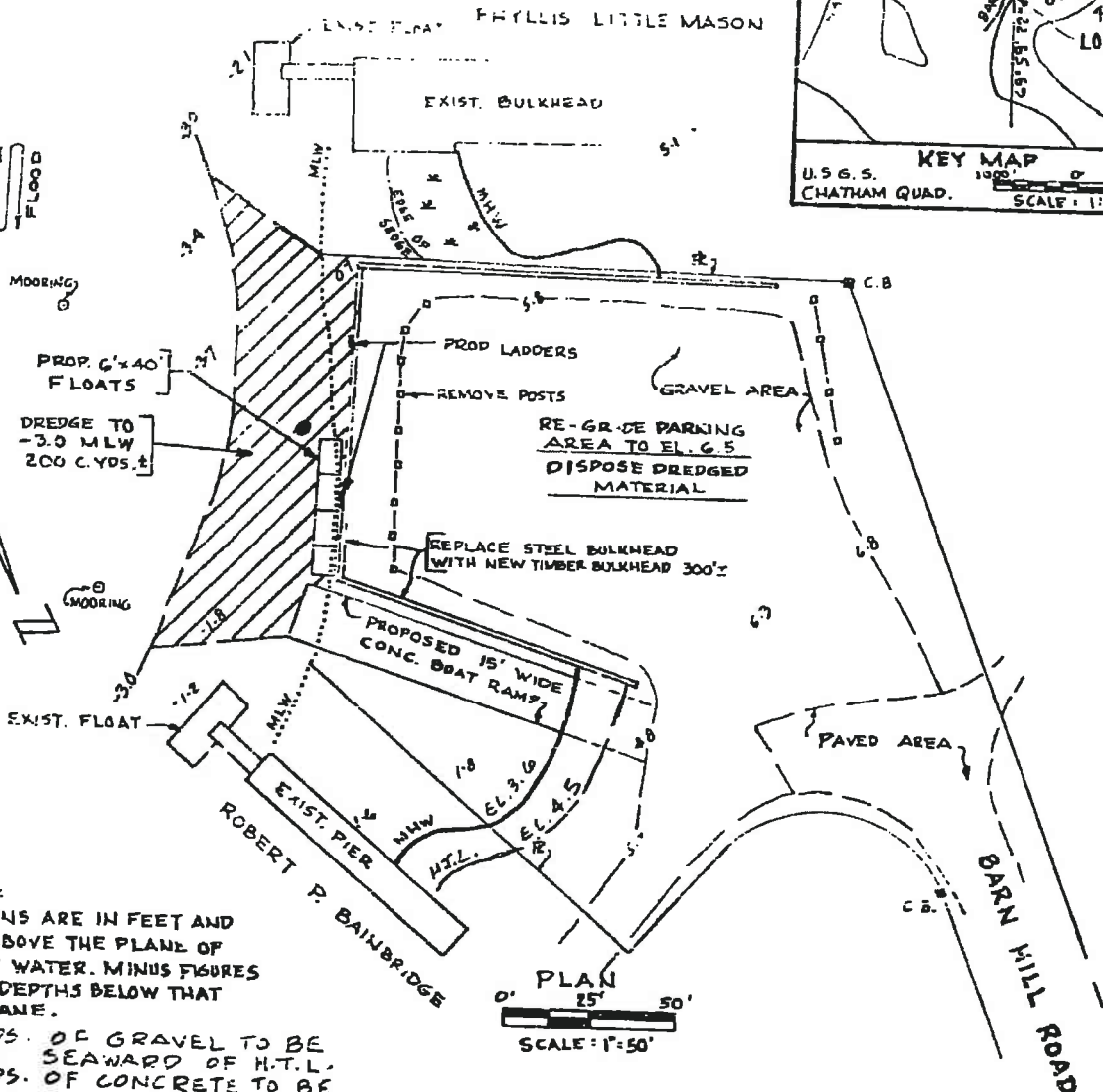
APPLICATION BY
DEPARTMENT OF PUBLIC WORKS OF MASSACHUSETTS
DIVISION OF WATERWAYS
APRIL 1965

Blair T. Hammond

010-09B-031-014-100



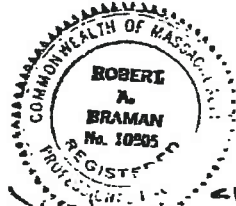
OYSTER POND RIVER



NOTES:

ELEVATIONS ARE IN FEET AND TENTHS ABOVE THE PLANE OF MEAN LOW WATER. MINUS FIGURES INDICATE DEPTHS BELOW THAT SAME PLANE.

77 C.YDS. OF GRAVEL TO BE PLACED SEAWARD OF H.T.L.
40 C.YDS. OF CONCRETE TO BE PLACED SEAWARD OF H.T.L.



Robert A. Braman

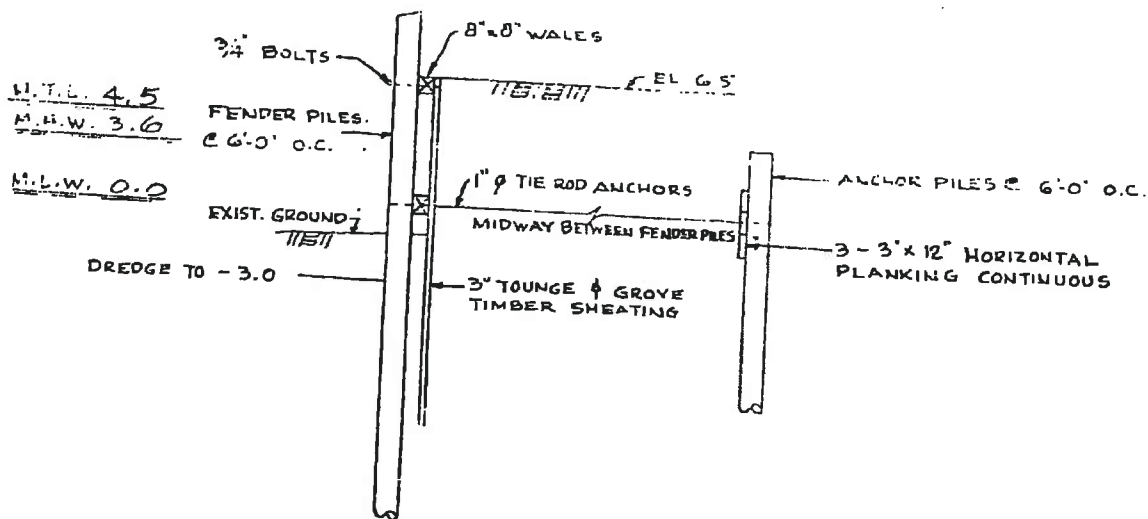
TO CONSTRUCT CONCRETE BOAT RAMP, TIMBER BULKHEAD, PLACE FLOATS AND TO DREDGE IN OYSTER POND RIVER CHATHAM, BARNSTABLE CO., MA. APPLICATION BY TOWN OF CHATHAM

NOV. 18, 1986

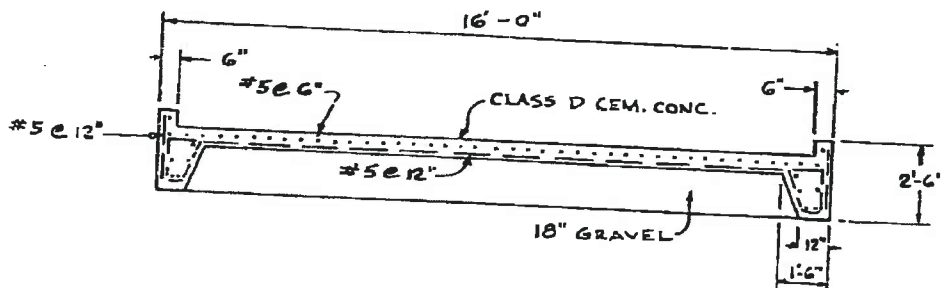
SHEET 1 of 2

BRAMAN ENGINEERING CO.
CIVIL ENGINEERS & SURVEYORS
258 MAIN ST. BUZZARDS BAY, MA.

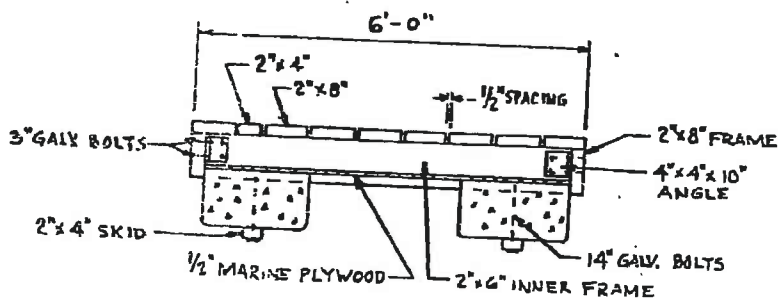
010-09B-031-014-100



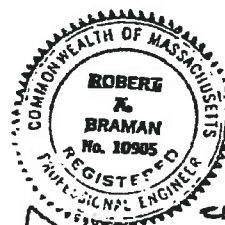
BULKHEAD SECTION
SCALE: 1" = 8'



RAMP SECTION
NOT TO SCALE



FLOAT SECTION
SCALE: 3/8" = 1'-0"

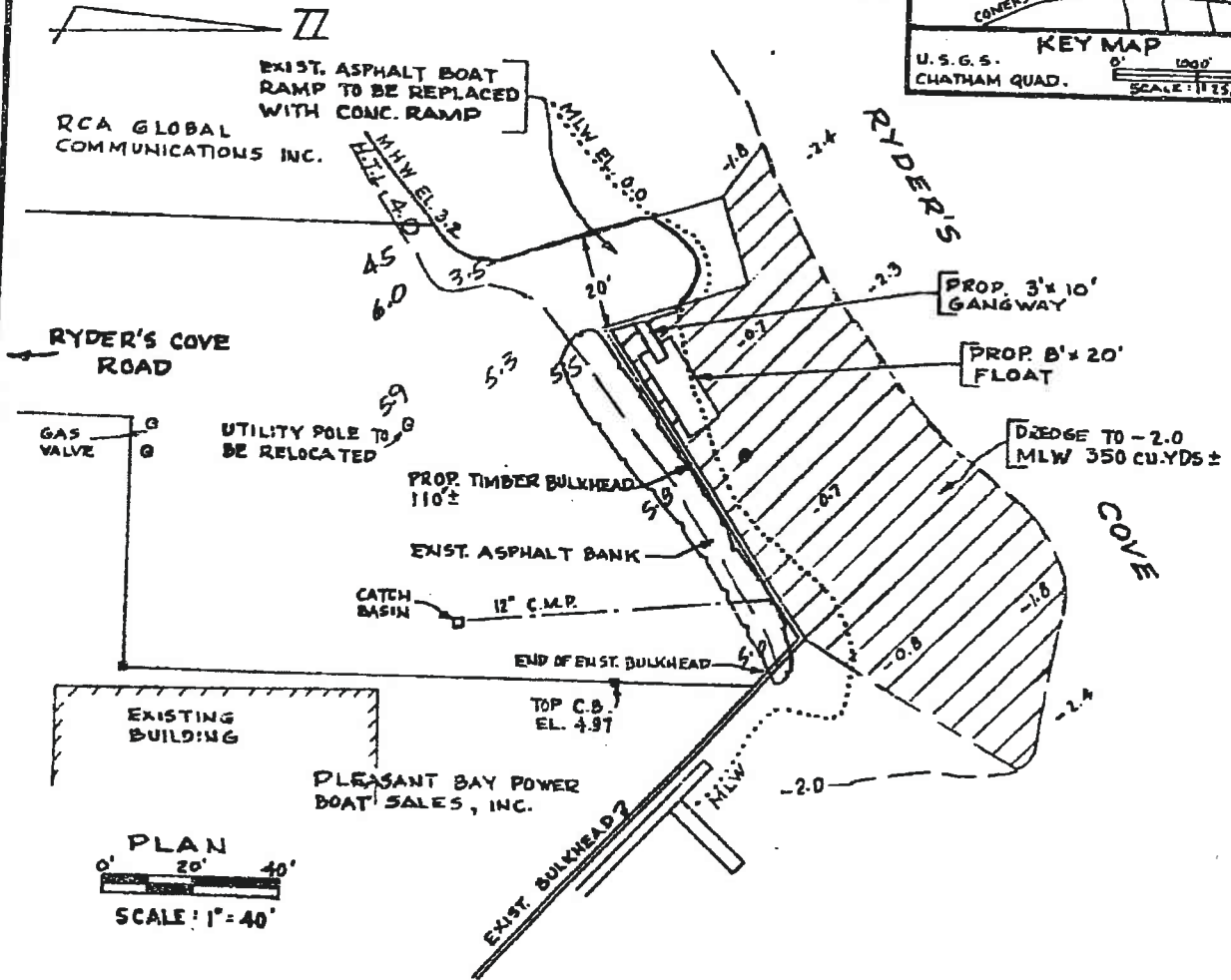
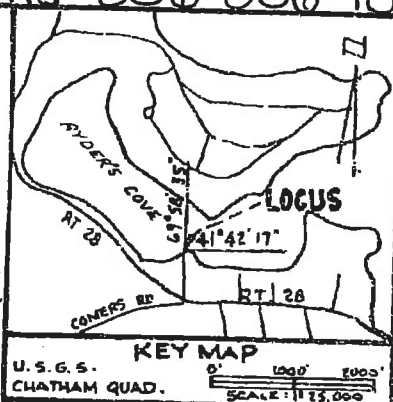


Robert A. Braman

010-11J-006-006-100

NOTES:

1. ELEVATIONS ARE IN FEET AND TENTHS ABOVE THE PLANE OF MEAN LOW WATER. MINUS FIGURES INDICATE DEPTHS BELOW THAT SAME PLANE.
2. 350 CU.YDS TO BE DREDGED, 100 CU.YDS TO BE USED FOR FILL BEHIND PROPOSED BULKHEAD. REMAINDER OF DREDGED MATERIAL TO BE TAKEN TO AN IN-LAND DISPOSAL SITE. (50 C.YDS. ± OF DREDGED MATERIAL TO BE PLACED BELOW H.T.L.)
3. 47 C.YDS. ± OF GRAVEL TO BE PLACED BELOW H.T.L.
27 C.YDS. ± OF CONCRETE TO BE PLACED BELOW H.T.L.



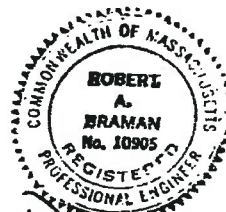
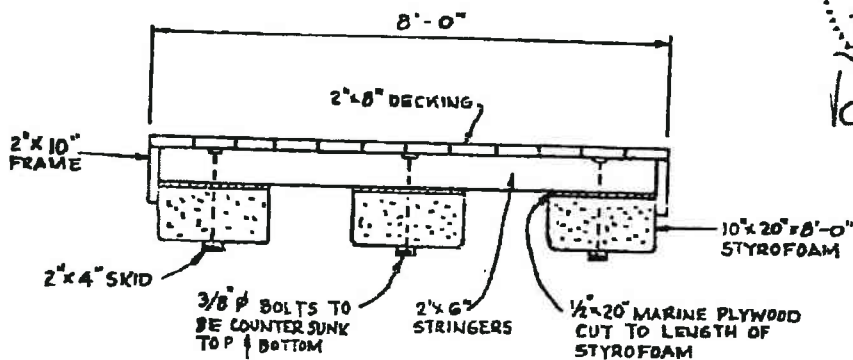
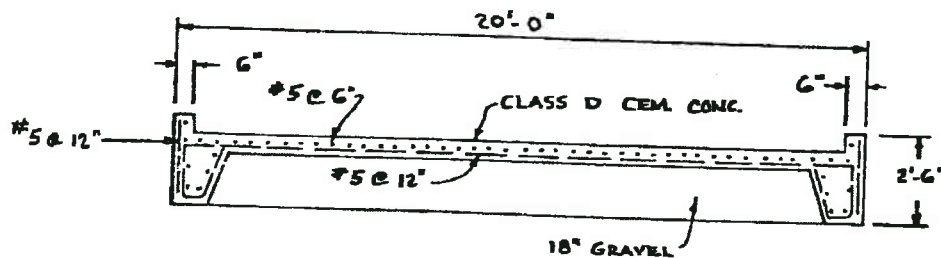
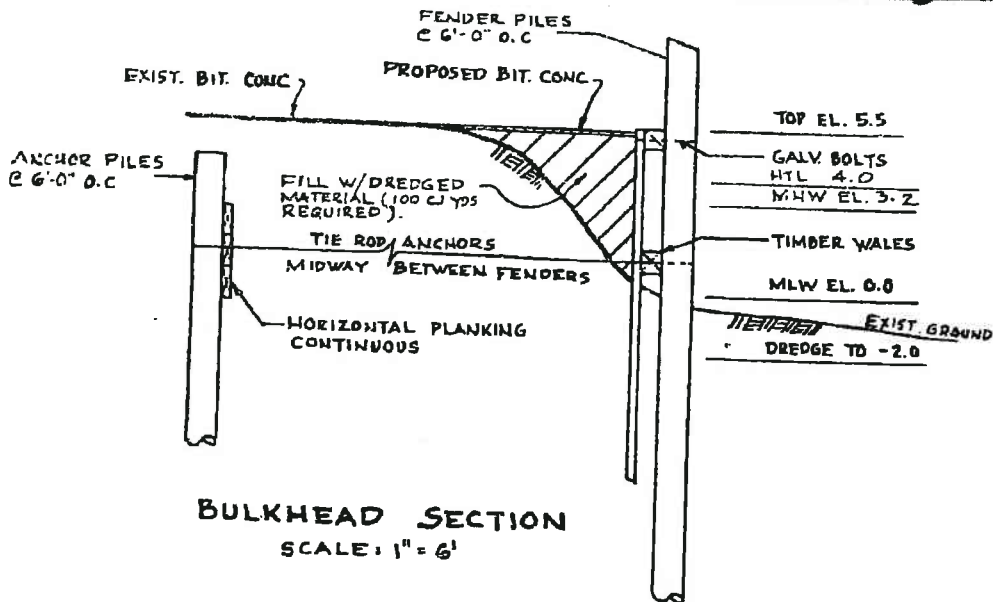
PLAN
0' 20' 40'
SCALE: 1" = 40'

COMMONWEALTH OF MASSACHUSETTS
ROBERT A. BRAMAN
No. 10905
REGISTERED
PROFESSIONAL ENGINEER
Robert A. Braman

TO CONSTRUCT CONCRETE RAMP, TIMBER BULKHEAD, PLACE FLOAT, GANGWAY AND DREDGE IN RYDER'S COVE. CHATHAM, BARNSTABLE CO., MA.
APPLICATION BY
TOWN OF CHATHAM

NOV. 24, 1986
SHEET 1 of 2
BRAMAN ENGINEERING CO.
CIVIL ENGINEERS & SURVEYORS
258 MAIN ST. BUZZARDS BAY, MA.

010-11J-006-006-100

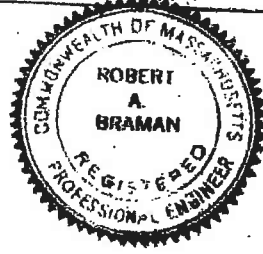


Robert A. Braman

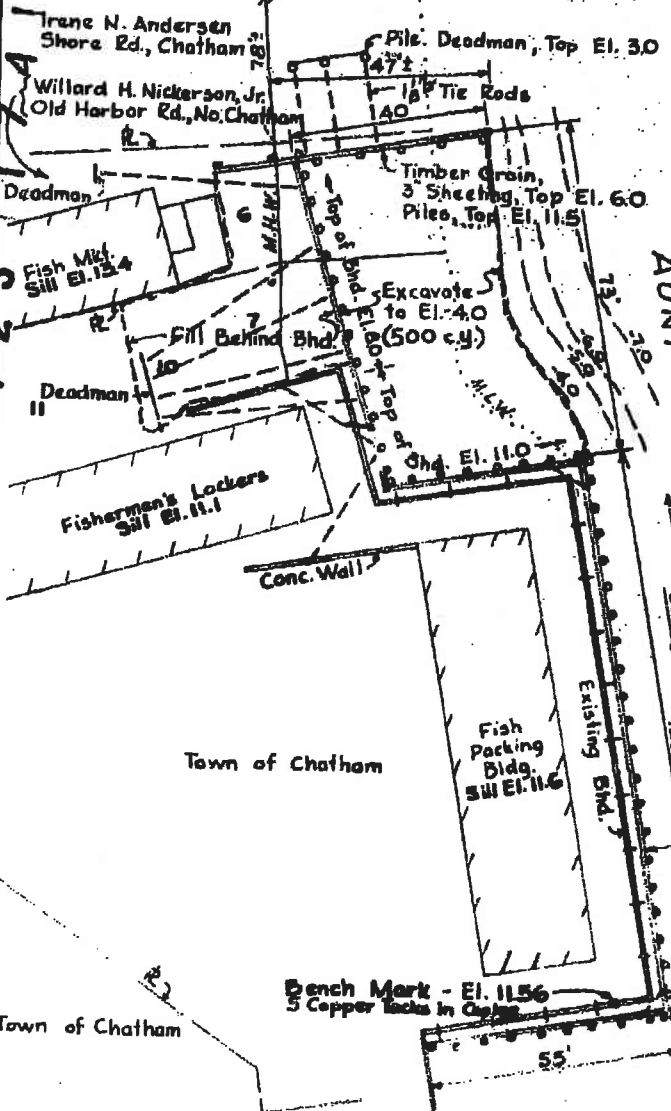
010-16F-PIER-005-100

U 6 1 1 4 5 4

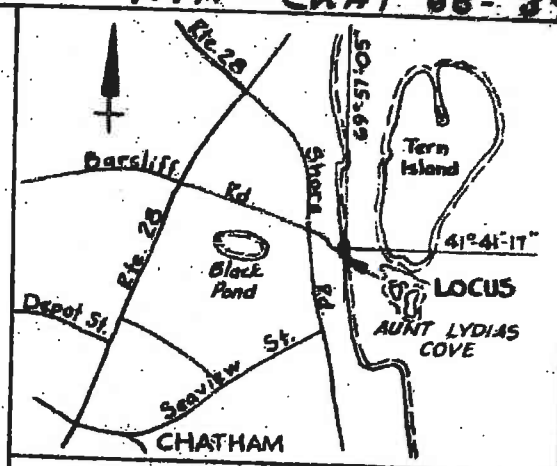
7 Feb - 68
MA - Chat 68-34



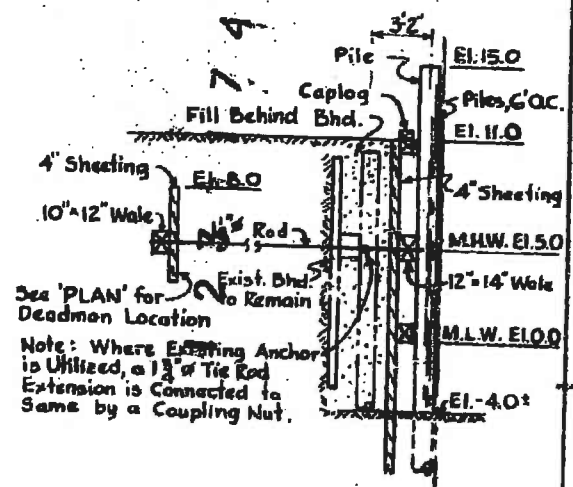
John B. Paine
84 State St., Boston



PLAN
SCALE 1"=40'



LOCATION PLAN
Traced from U.S.G.S. "Chatham, Mass." Scale 1"=2000'



TYPICAL SECTION
SCALE 1"=10'

Note: Elevations are in feet and refer to the plane of Mean Low Water. Minus figures are depths below that plane.

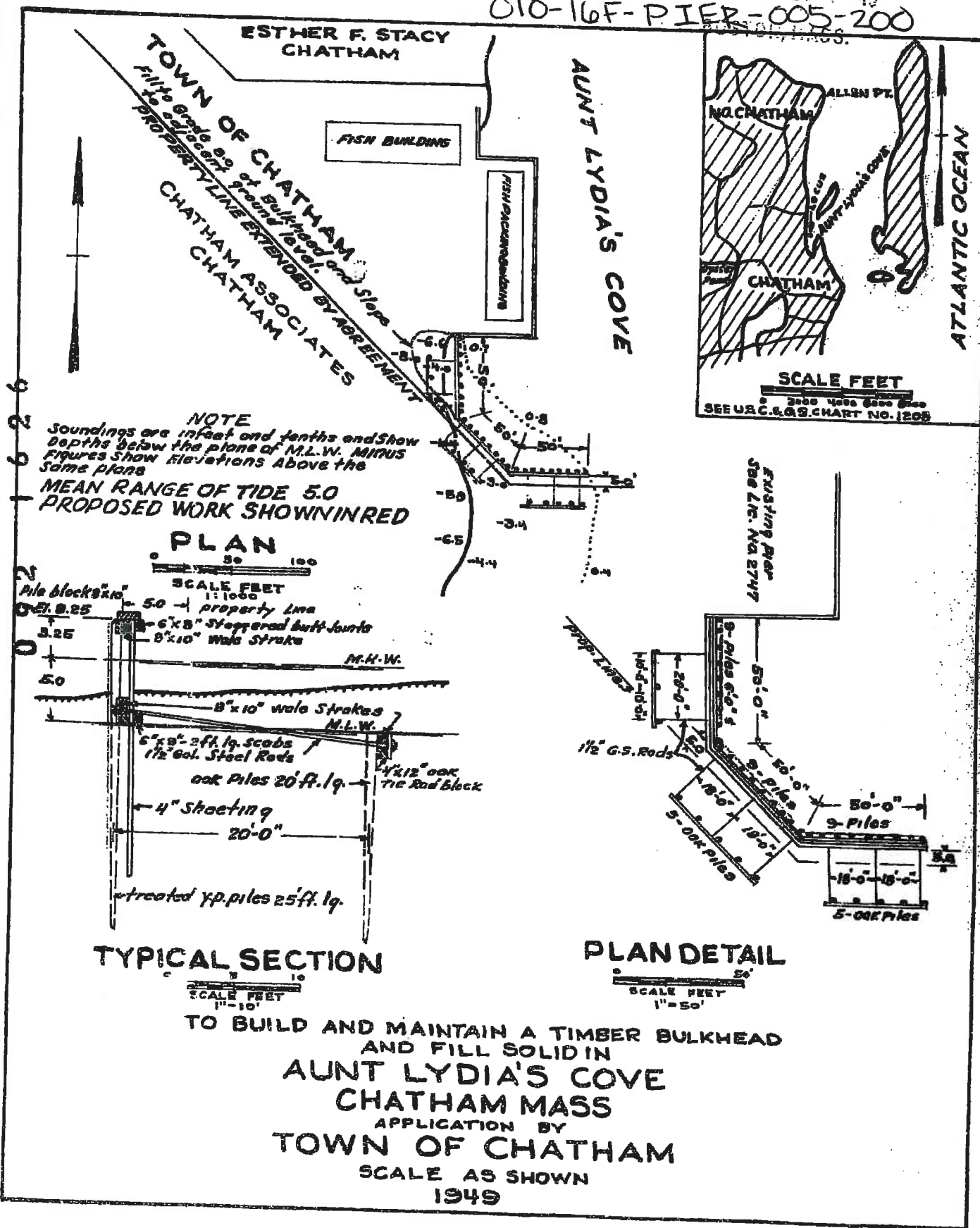
Existing Bulkhead License No. 2747, dated April 12, 1945.

PROPOSED BULKHEAD, GRON, EXCAVATION & FILL
IN
AT
AUNT LYDIAS COVE
CHATHAM
COUNTY OF DAKENSTABLE, MASS.
APPLICATION BY TOWN OF CHATHAM
OCTOBER 10, 1967

Walter E. Rowley & Associates, West Wareham, Mass.

0 9 8 0 5 6 6

010-16F-PIER-005-200



010-16F-PIER-005-200
010-16F-PIER-005-300

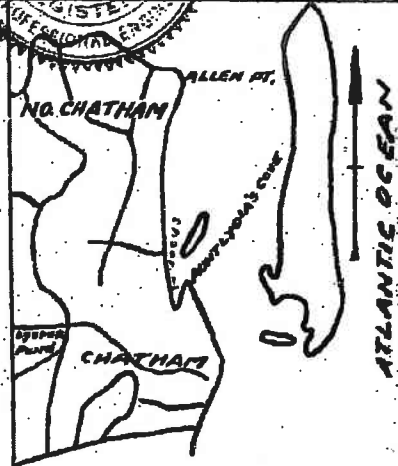
0891568



IRENE N. ANDERSON
9 WYMAN ROAD
CAMBRIDGE, MASS

FISH BUILDING

FISH PACKING BUILDING

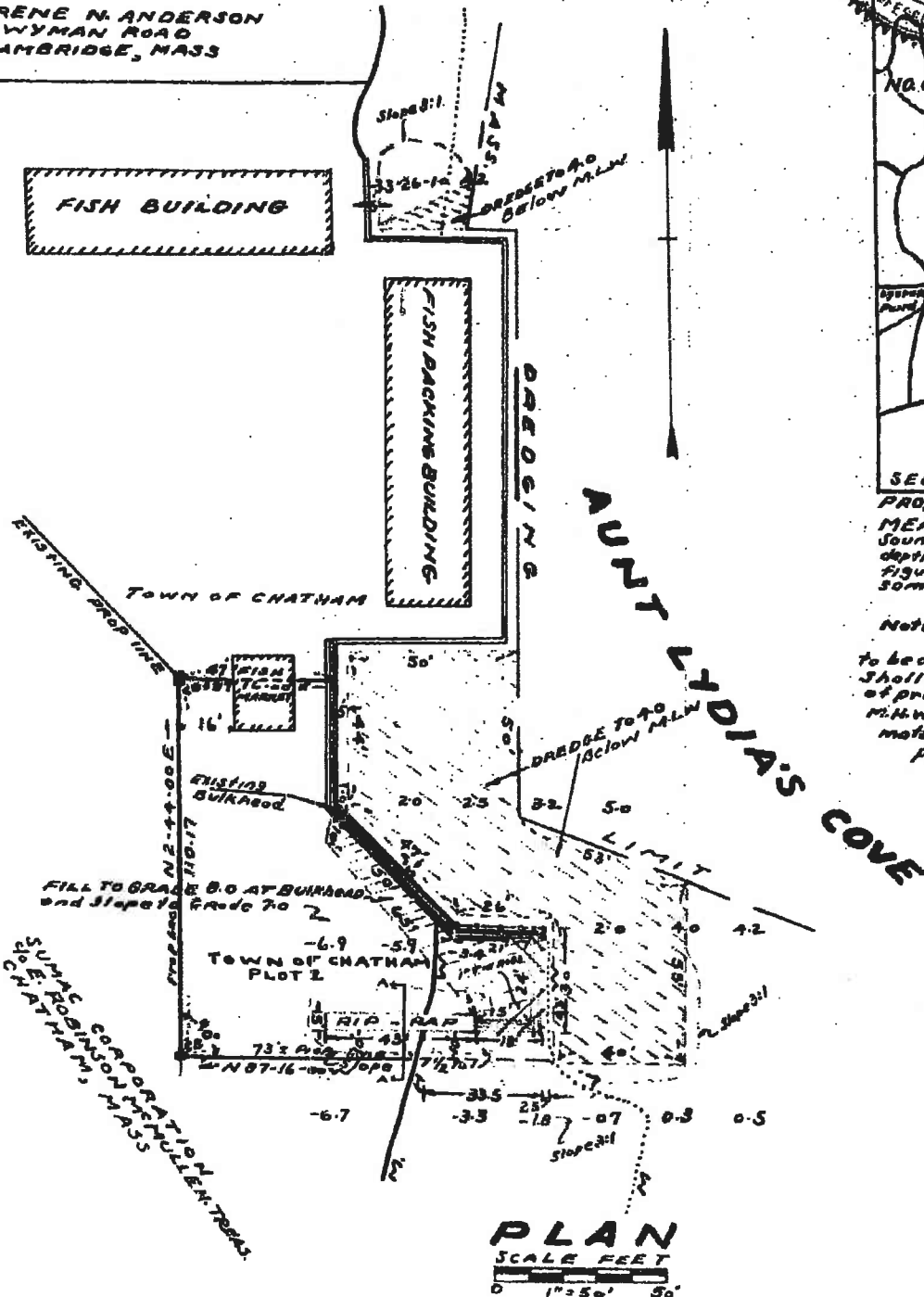


SCALE FEET

SEE U.S.C. & G.S. CHART NO. 1208
PROPOSED WORK SHOWN IN RED
MEAN RANGE OF TIDE 5.0
Soundings are in feet and tenths and are
depths below the plane of M.L.W. minus
figures show elevations above the
same plane.

Note: Approximately 850 cubic yards
to be dredged. 150 cubic yards
shall be disposed of within limits
of proposed construction below w
M.L.W. as shown in Red. Surplus dredge
material shall be disposed of above
plane of M.L.W.

1010057



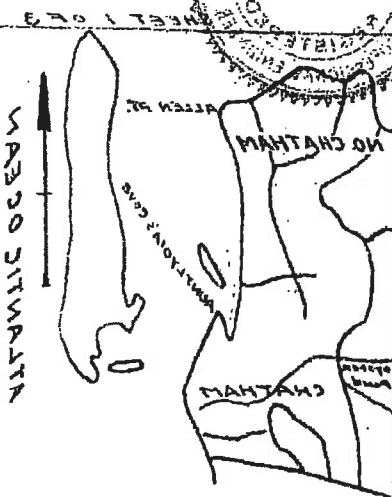
PLAN
SCALE FEET
0 1"=50' 50'

PROPOSED RIP-RAP, TIMBER BULKHEAD,
DREDGE AND FILL SOLID IN
AUNT LYDIA'S COVE
CHATHAM MASS
APPLICATION BY
TOWN OF CHATHAM
SCALE AS SHOWN



1 5 6 9 8 6 1 9 8 0

010-16F-PIER-005-200
010-16F-PIER-005-300



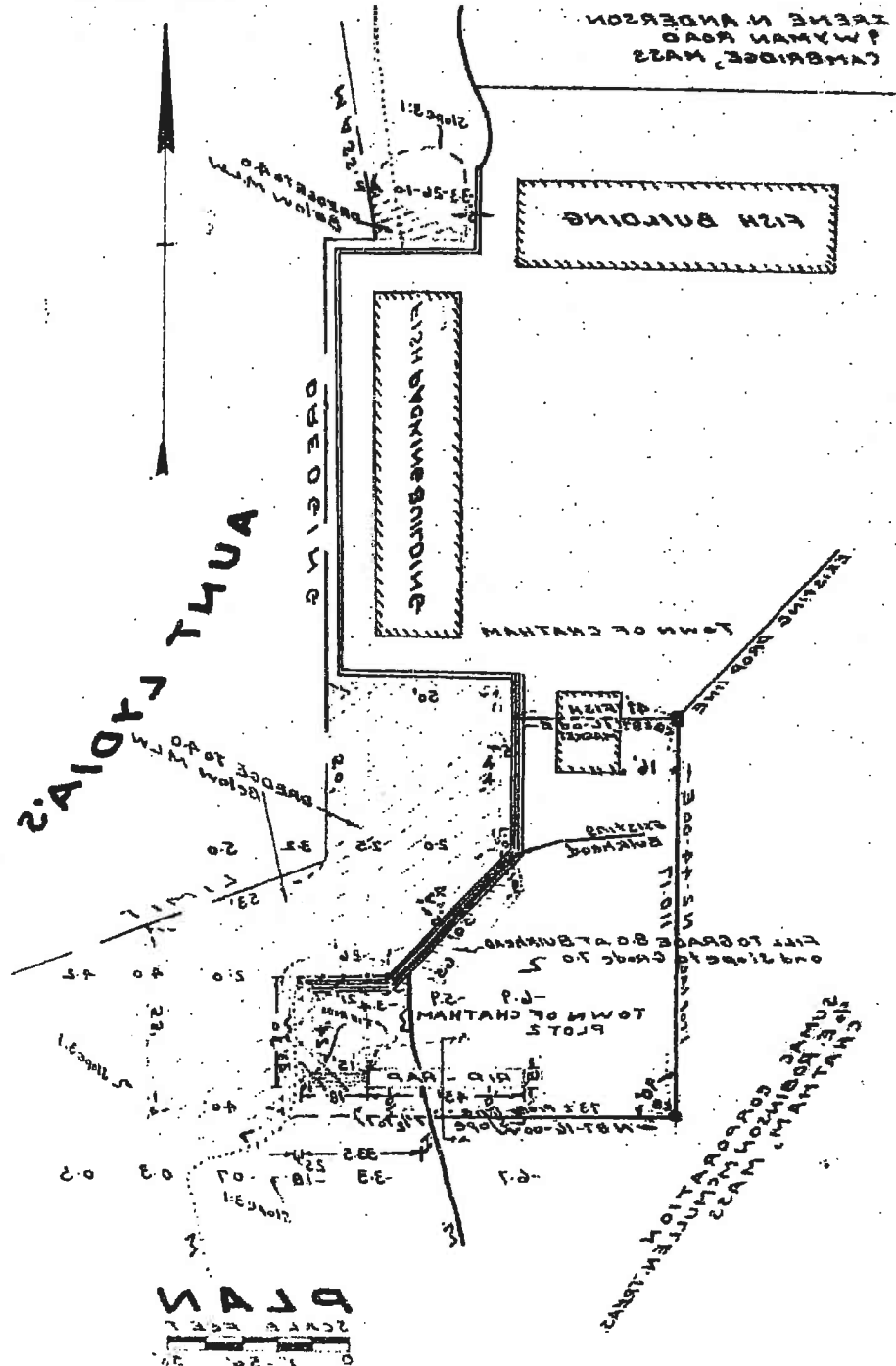
MASSACHUSETTS

SCALE FEET

SEE U.S.C. CHART NO. 1208
PROPOSED WORK SHOWN IN RED
MEAN RANGE OF TIDE 2.0
Soundings are in feet and fathoms
depths below the datum of the mean
low water of the spring tide
figures show elevations above the
same plane

Note:
Approximately 820 cubic yards
of dredged material
will be disposed at existing limits
of proposed construction below
M.H.W. as shown in red. Surplus dredge
material will be disposed of above
plane of M.H.W.

AUNT LYDIA'S COVE



PLAN
SCALE FEET

ERNE W. ANDERSON
WYMAN ROAD
CAMBRIDGE, MASS.

FISH BUILDING

FISH PACKING BUILDING

TOWN OF CHATHAM

EXISTING PROPOSED LINE

EXISTING

PROPOSED

LINE TO GRADE

AND FILL

8.0 AT BUILDING

CHATHAM, MASS.

CHATHAM, MASS.

CHATHAM, MASS.

CHATHAM, MASS.

CHATHAM, MASS.

CHATHAM, MASS.

CHATHAM, MASS.

CHATHAM, MASS.

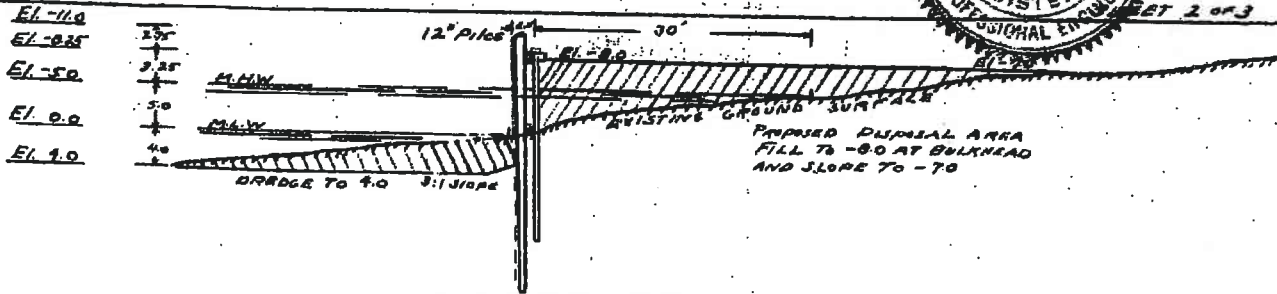
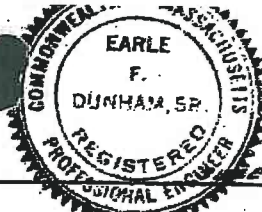
CHATHAM, MASS.

101 101 101

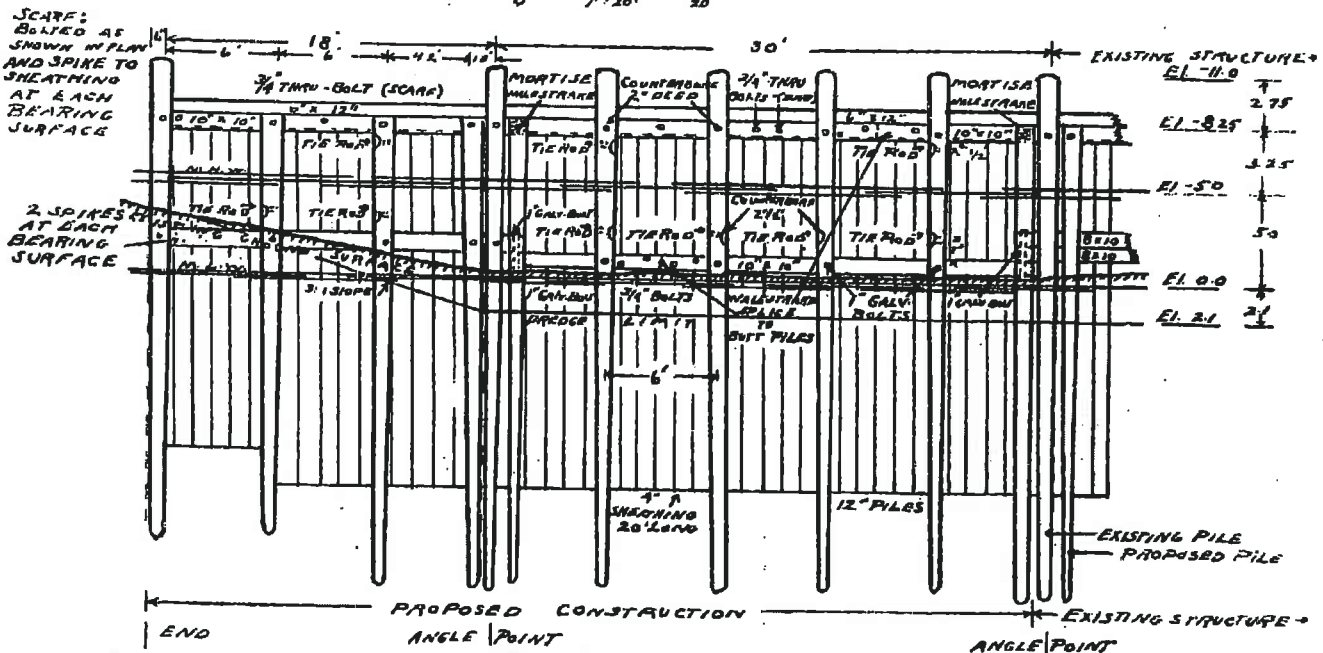
TOWN OF CHATHAM
APPLICATION BY
CHATHAM MASS
AUNT LYDIA'S COVE
DREDGE AND FILL SOLID IN
PROPOSED RIP-RAP TIMBER BULKHEAD,
SCALE AS SHOWN

010-16F-PIER-005-200
010-16F-PIER-005-300

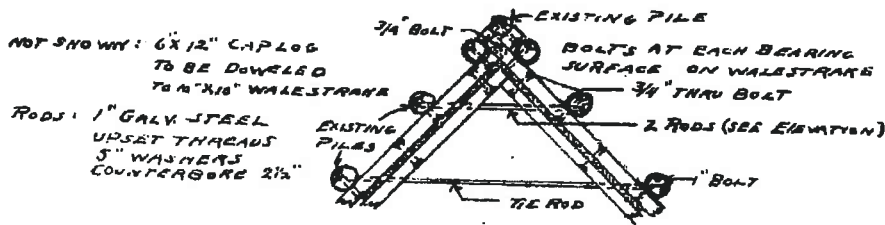
0891570



TYPICAL SECTION



ELEVATION

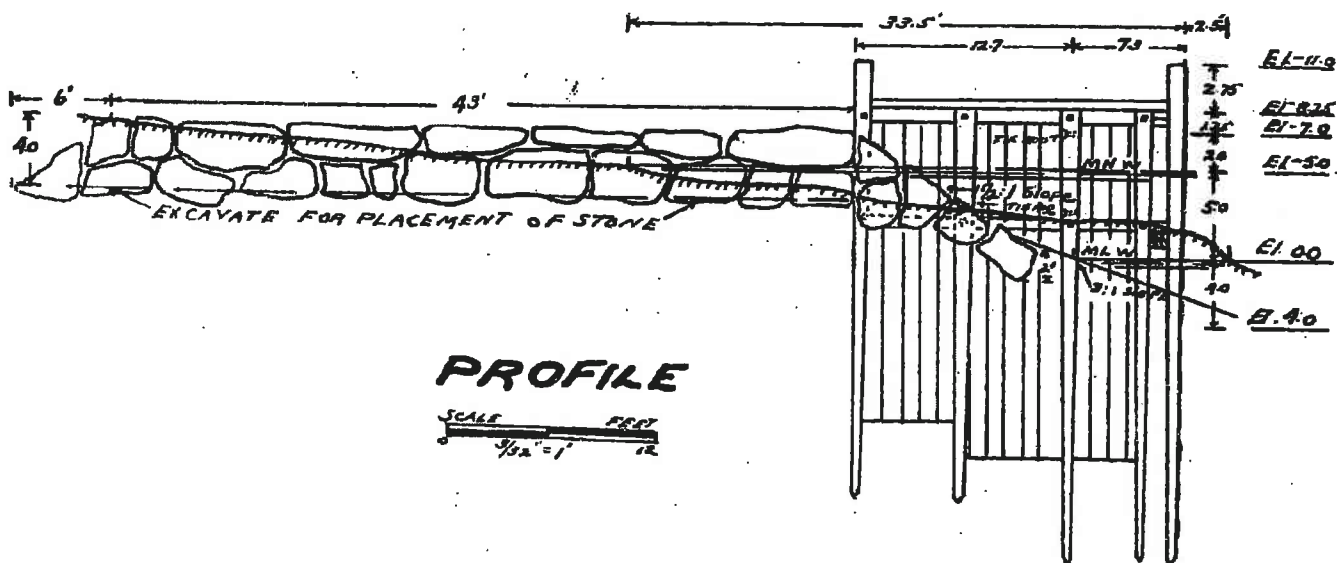
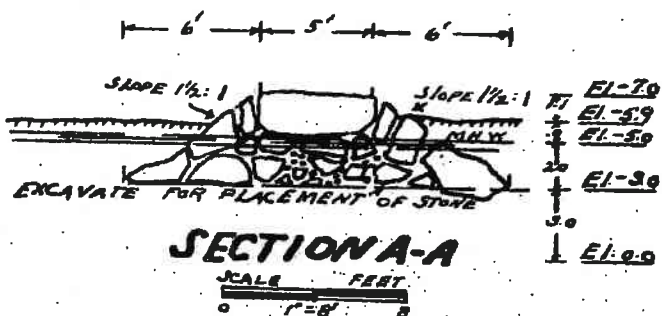
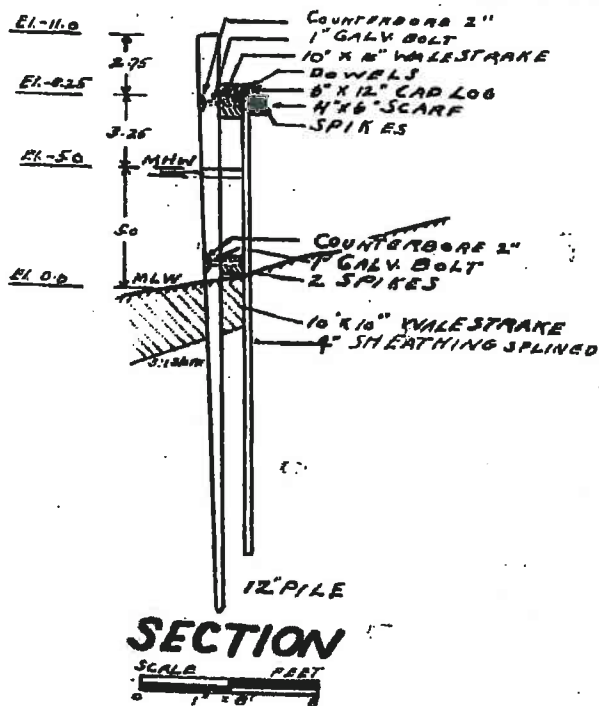


CORNER DETAIL

PROPOSED RIP-RAP, TIMBER BULKHEAD,
DREDGE AND FILL SOLID IN
AUNT LYDIA'S COVE
CHATHAM MASS
APPLICATION BY
TOWN OF CHATHAM

010-16F-PIER-005-300

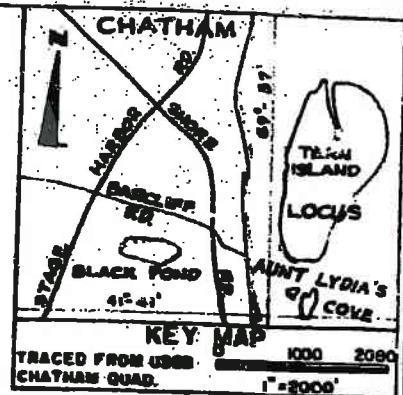
0 8 9 1 5 7 3



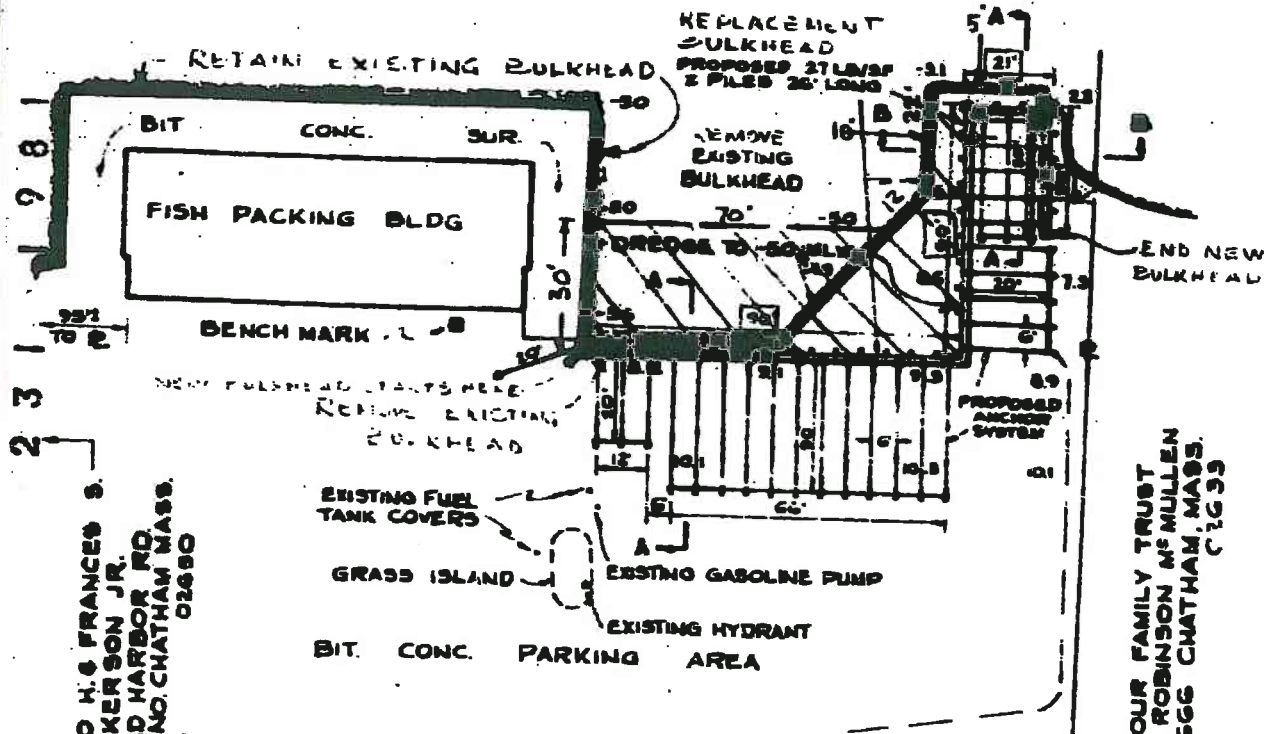
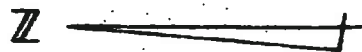
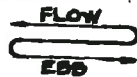
PROPOSED RIP-RAP, TIMBER BULKHEAD,
DREDGE AND FILL SOLID IN
AUNT LYDIA'S COVE
CHATHAM MASS
APPLICATION BY
TOWN OF CHATHAM

010-16F-PIER-005-200

1. ELEVATIONS ARE IN FEET & TENTHS ABOVE THE PLANE OF MEAN LOW WATER MINUS FIGURES INDICATE DEPTHS BELOW THAT SAME PLANE.
2. BENCH MARK TOP OF LATCH BASIN FRAME - EL. 73.6 MLW
3. ALL FENDER PILES & WALES TO BE CCA. PRESSURE TREATED TO 25 LB/C.F.
4. ALL ANCHOR PILES, DEADMEN, CAPLOSS & SPACERS TO BE CCA. PRESSURE TREATED TO 0.6 LB/C.F.
5. EXCAVATED MATERIAL TO BE DISPOSED OF AT TOWN DISPOSAL AREA LOCATED ON SAM RYDER ROAD 3 1/2 MILES FROM SITE.



AUNT LYDIA'S COVE



WILLARD H. & FRANCES S.
NICKERSON JR.
741 OLD HARBOR RD.
BOX 551 NO. CHATHAM MASS.
02630

FOUR FAMILY TRUST
46 F. ROBINSON & MULLEN
BOX 666 CHATHAM, MASS.
01633



Robert A. Braman

PLAN

0 20 40
SCALE: 1" = 40'

TO INSTALL A SHEET STEEL BULKHEAD, AND TO DREDGE IN
AUNT LYDIA'S COVE
CHATHAM, BARNSTABLE COUNTY, MASS.

APPLICATION BY

TOWN OF CHATHAM

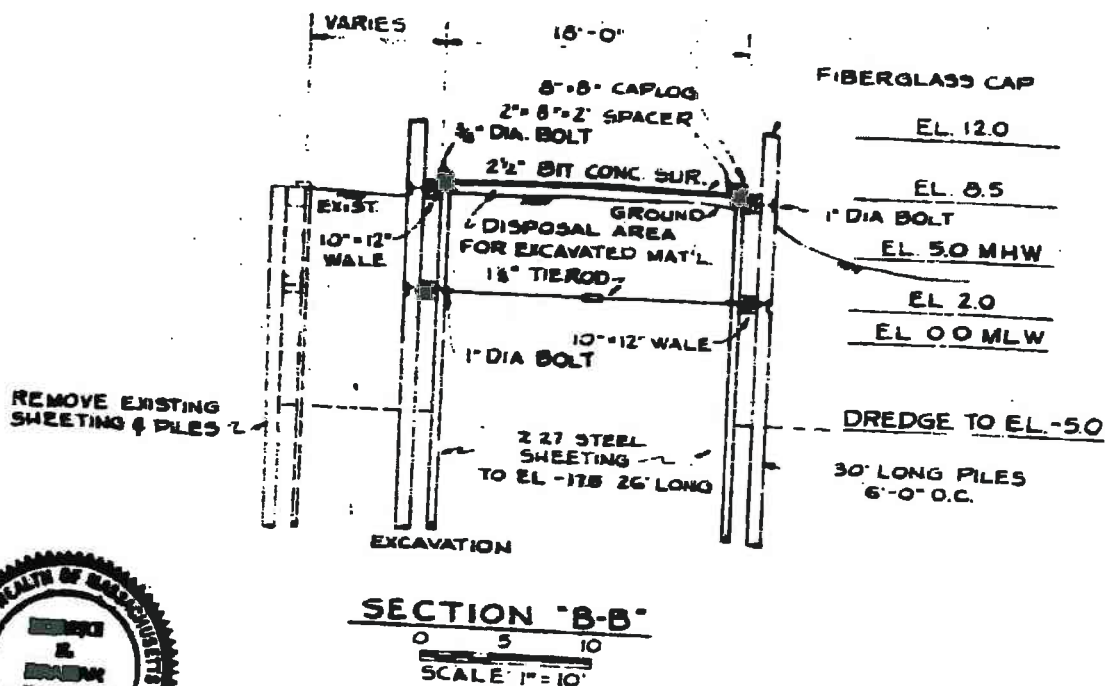
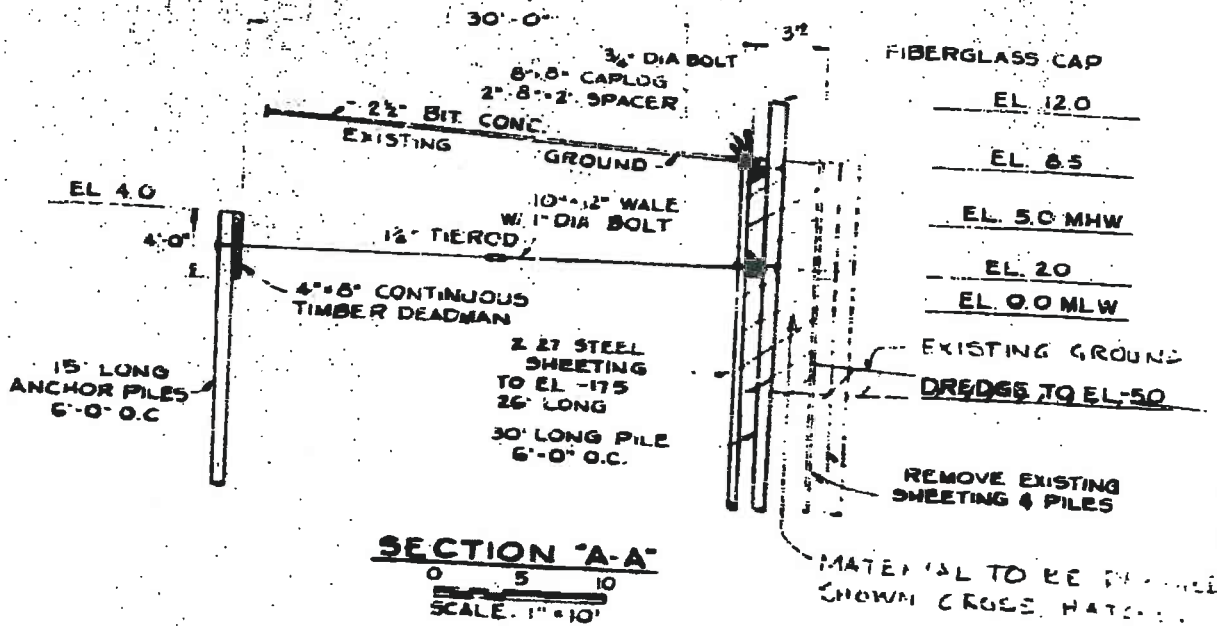
JANUARY 23, 1979

SHEET 1 OF 2

ROBERT A. BRAMAN
CIVIL ENGINEER & SURVEYOR
WAREHAM, MASS.

78156

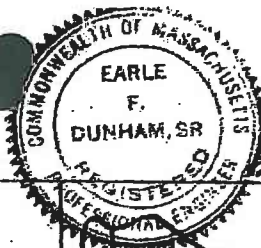
010-16F-PIER-005-200



Robert A. Braman

010-16F-PIER-005-200
010-16F-PIER-005-300

0891568

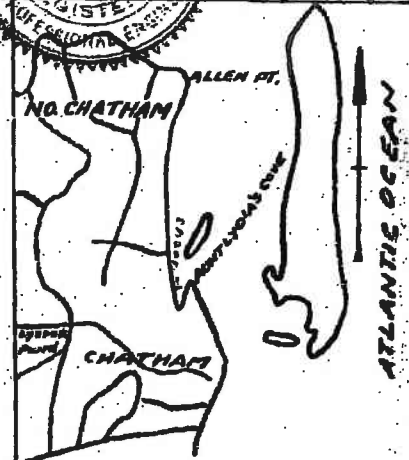


SHEET 1 OF 3

IRENE N. ANDERSON
9 WYMAN ROAD
CAMBRIDGE, MASS

FISH BUILDING

FISH PACKING BUILDING

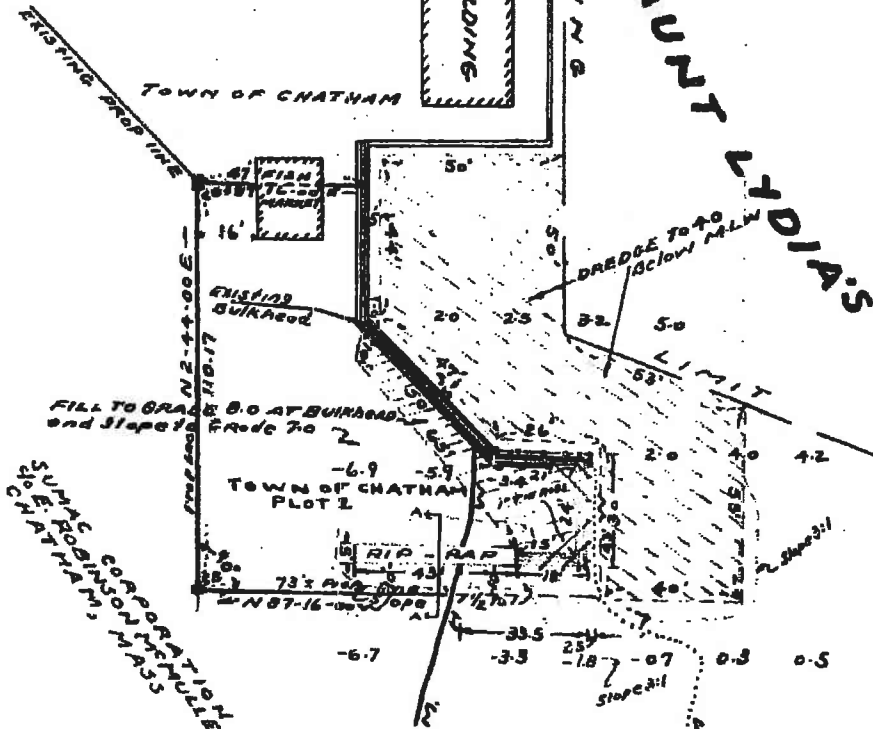


SCALE FEET

SEE U.S.C. & S. CHART NO. 1208

PROPOSED WORK SHOWN IN RED
MEAN RANGE OF TIDE 5.0
Soundings are in feet and tenths and are
depths below the plane of M.H.W. minus
figures show elevations above the
same plane.

Note:
Approximately 850 cubic yards
to be dredged. 150 cubic yards
shall be disposed of within limits
of proposed construction below
M.H.W. as shown in Red. Surplus dredge
material shall be disposed of above
plane of M.H.W.



PLAN
SCALE FEET
0 1"=50' 50'

PROPOSED RIP-RAP, TIMBER BULKHEAD,
DREDGE AND FILL SOLID IN
AUNT LYDIA'S COVE
CHATHAM MASS
APPLICATION BY
TOWN OF CHATHAM
SCALE AS SHOWN

1010057

010-16F-PIER-005-300



CAMBRIDGE, MASS
9 WYMAN ROAD
IRVING N. ANDERSON

4217 BULDOING

ELIZABETH BARLOWE

00000000

MAINTAIN TO ORDER

Y.S-
AND TO MWO

[illegible]

100-100000

CONFIDENTIAL

W A L Q

2025 11 11 10:11:11

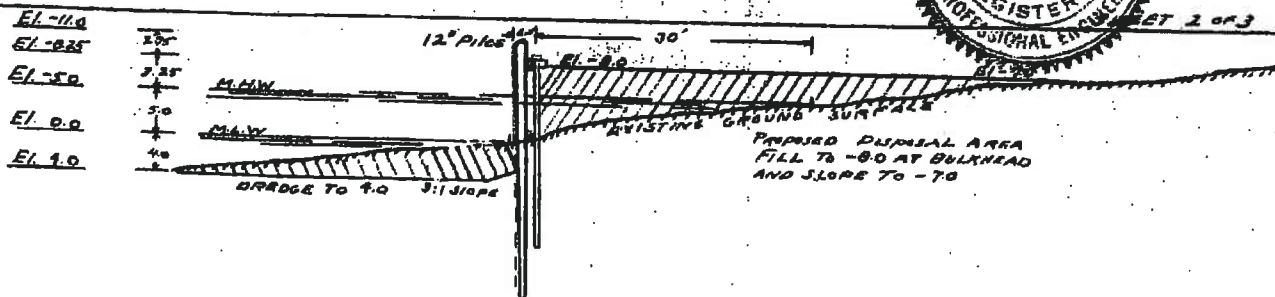
PROPOSED R.I.P. TINDER BURNHEAD,
DREDGE AND FILL SOLID IN
AUNT LUDY'S COVE
CHATHAM MASS
APPLICATION BY
TOWN OF CHATHAM
SCALE AS SHOWN

010-16F-PIER-005-300

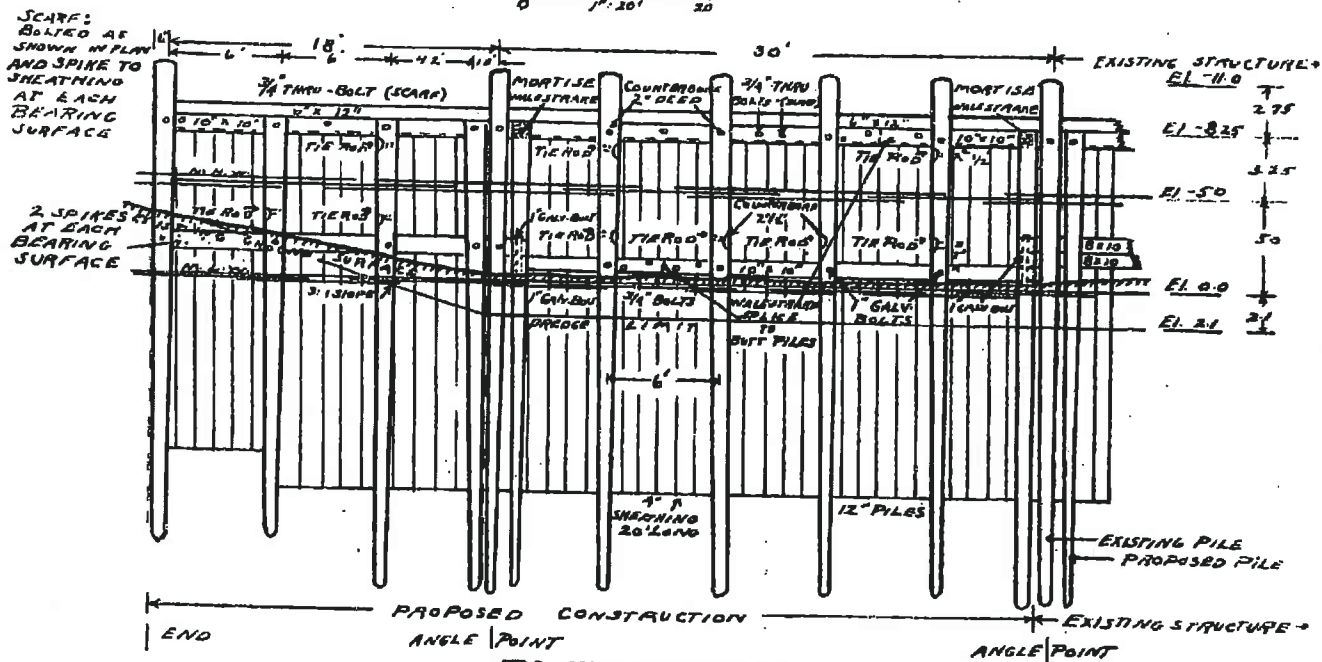
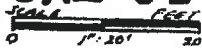
0 8 9 1 5 7 0



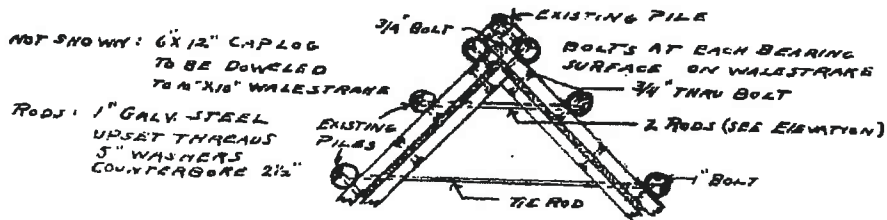
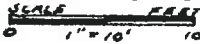
Set 2 of 3



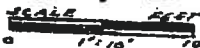
TYPICAL SECTION



ELEVATION



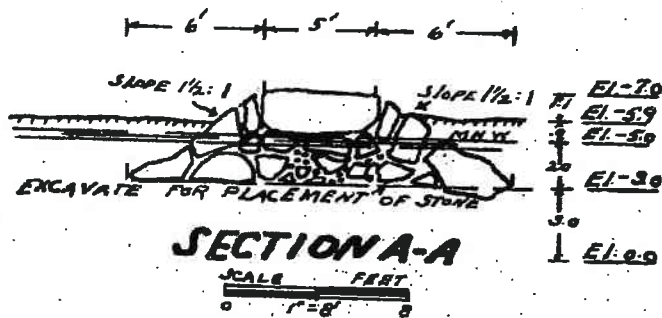
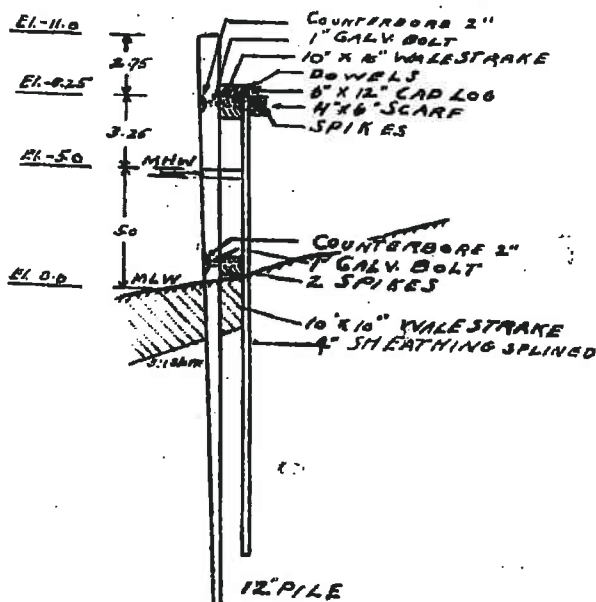
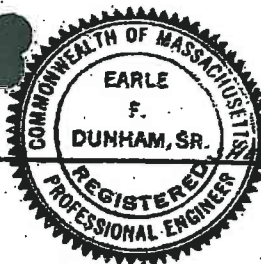
**NORTHEAST
CORNER DETAIL**



PROPOSED RIP-RAP, TIMBER BULKHEAD,
DREDGE AND FILL SOLID IN
AUNT LYDIA'S COVE
CHATHAM MASS
APPLICATION BY
TOWN OF CHATHAM

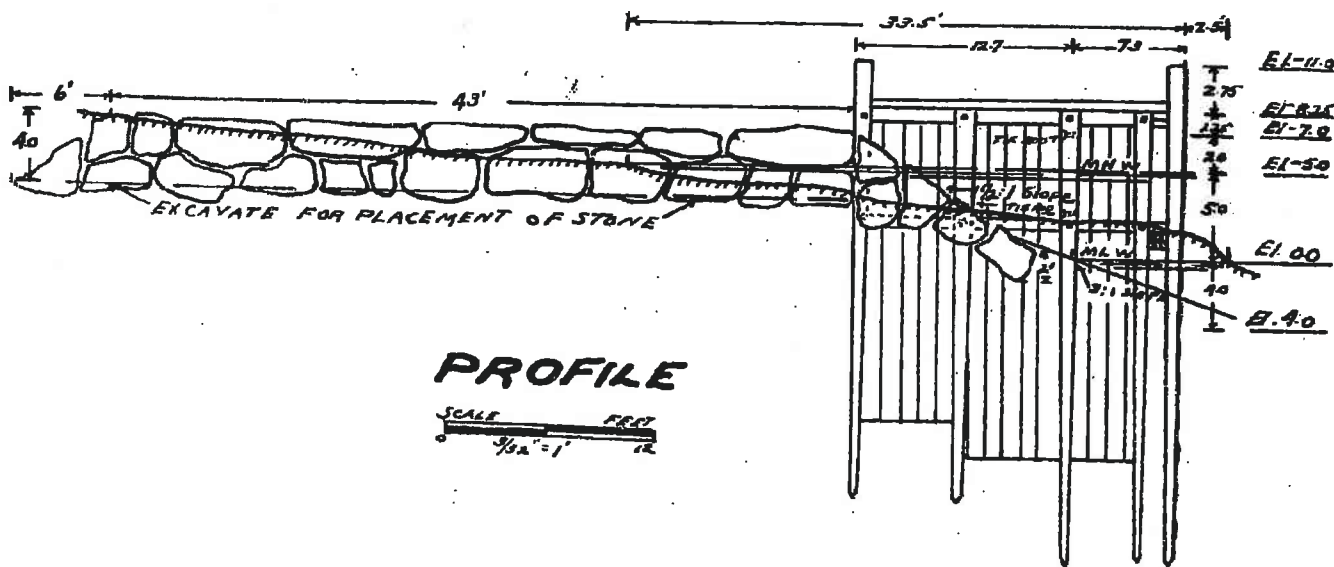
010-16F-PIER-005-200
010-16F-PIER-005-300

0 8 9 1 5 7 3



SECTION
SCALE FEET
1" = 8'

SECTION A-A
SCALE FEET
1" = 8'

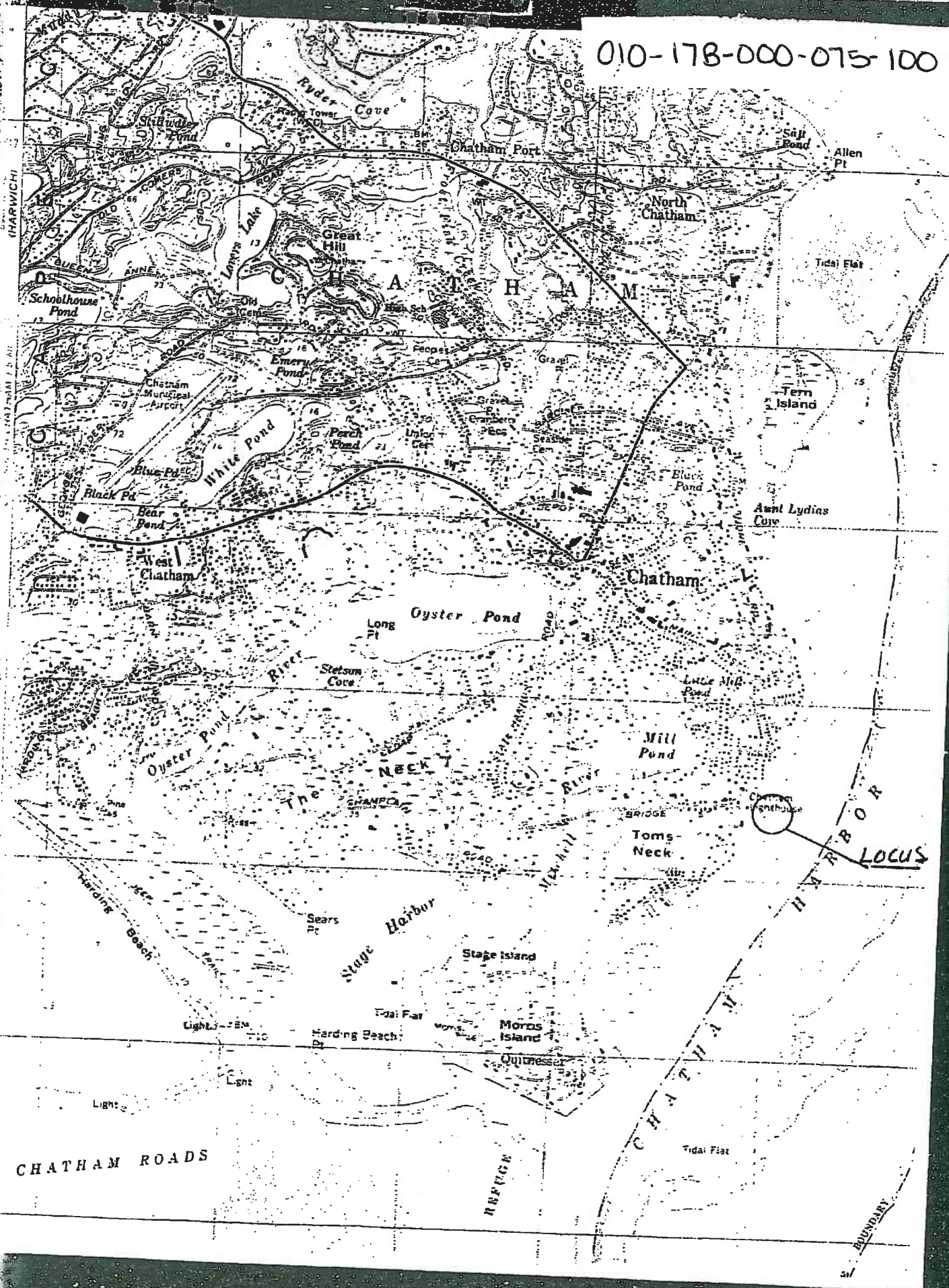


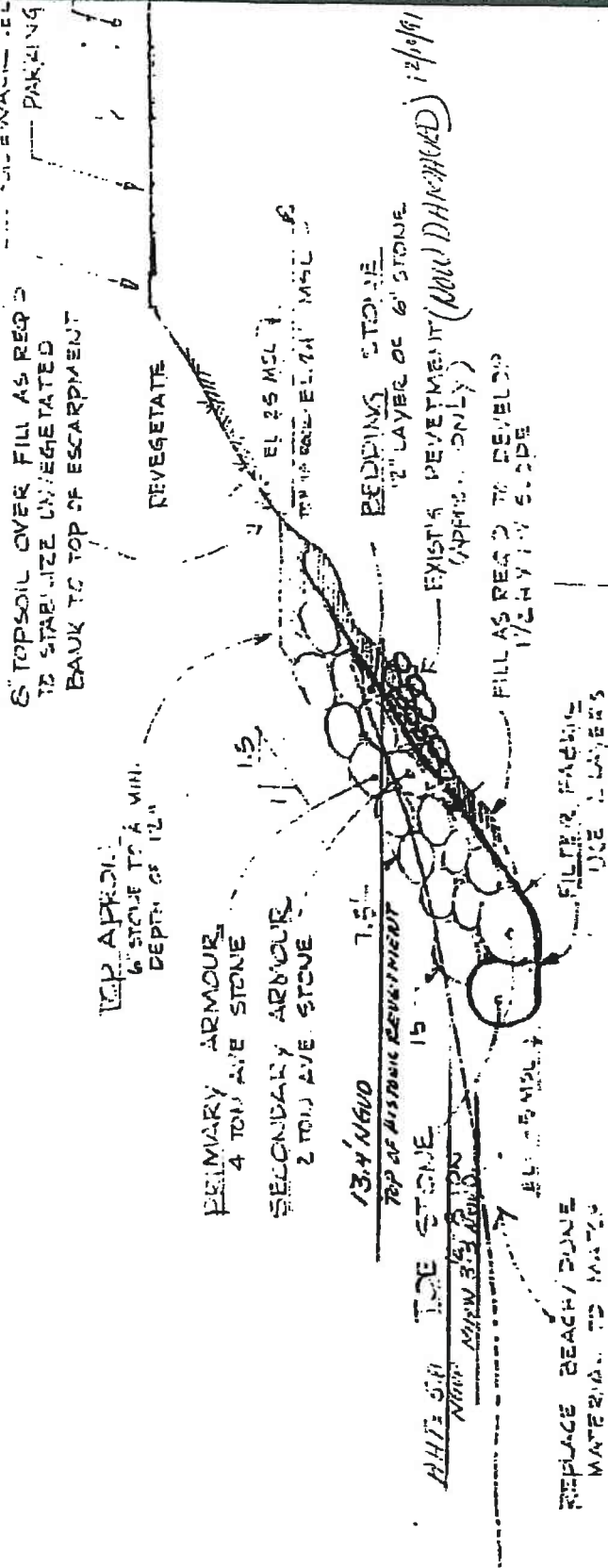
PROFILE
SCALE FEET
3/32" = 1'

PROPOSED RIP-RAP, TIMBER BULKHEAD,
DREDGE AND FILL SOLID IN
AUNT LYDIA'S COVE
CHATHAM MASS
APPLICATION BY
TOWN OF CHATHAM

101 0059

010-178-000-075-100





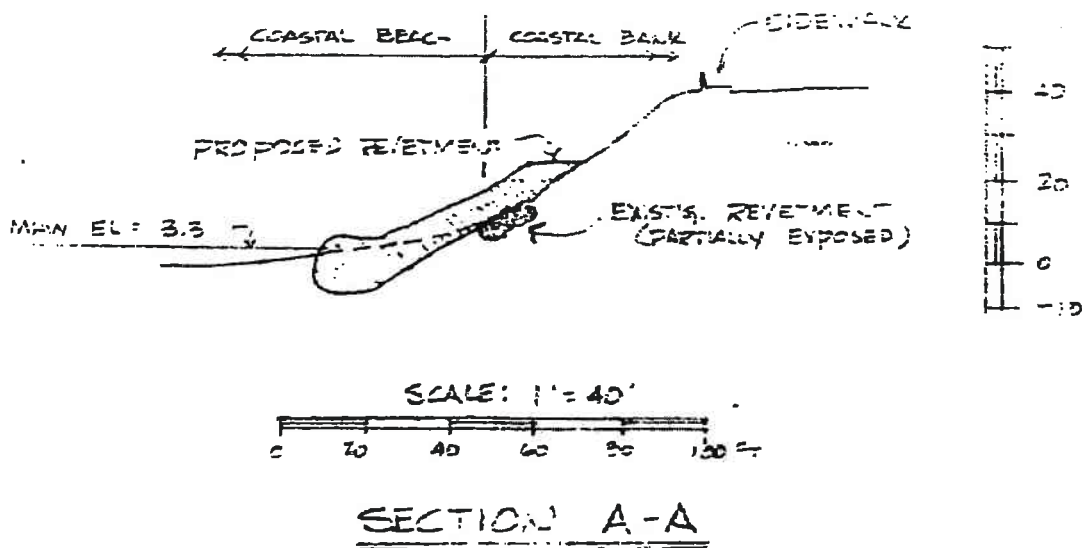
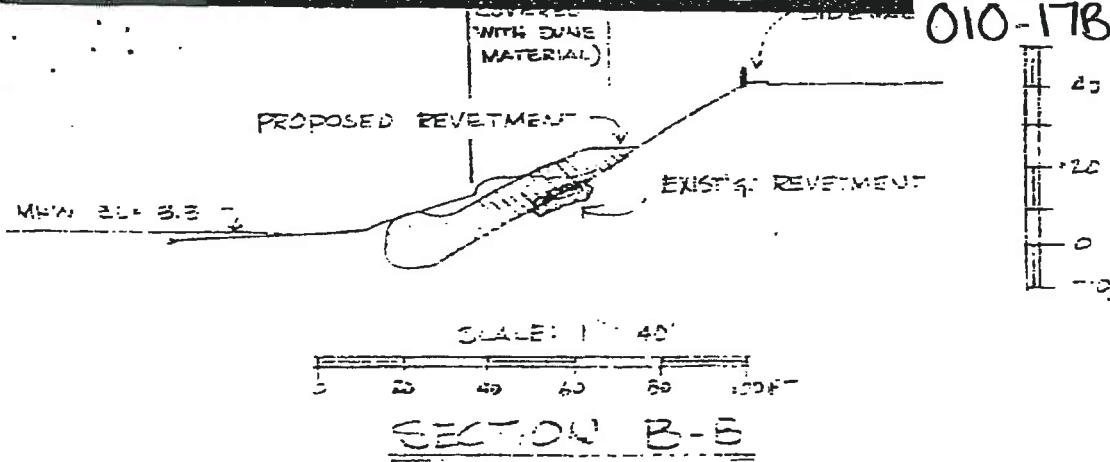
010-178-000-075-100

1	11-3-91	DATE	REVISION	11-3-91	DATE	REVISION	JFH.
PROJECT TITLE				PROJECT NO.			
PLAN AND DETAILS OF PROPOSED				G12-317			
ROCK RETEIMENT				SCALE			
TOWN OF CHATHAM				DATE			
LIGHTHOUSE BEACH				9-20-91			
SHOREFRONT PROTECTION				DRAWN BY			
JFH				CHECKED BY			
T.M.				DRAWING NO.			
Coastal Engineering Co. INC.				RR-1			
CIVIL - STRUCTURAL - ENVIRONMENTAL - ARCHITECTURAL				1 OF 1 SHEETS			
260 Cranberry Highway Orleans, MA 02653 (508) 255-6511							

1st/2nd
 $M/S = +0.5'$ above MHHW
 (FROM EXISTING PROFILES
 1/2" (1/4" - 5/8")
 $MHHW = 3.2$ (MHHW) 1/4"
 $MHT = 5.8$ (MHHW) 1/4"

TYPICAL DETAIL

010-178-000-075-100



1				11-3-91		RAISE TOP OF ROCK TO EL. 24' (MSL)		JFH.	
NO.		DATE		REVISION				BY	
SHEET TITLE								PROJECT NO.	
PLAN AND DETAILS OF PROPOSED								C12-317	
ROCK REVETMENT								SCALE NOTED	
								DATE 9-20-91	
PROJECT								DRAWN BY JFH.	
TOWN OF CHATHAM								CHECKED BY TmJ	
Lighthouse Beach								547.242	
SHOREFRONT PROTECTION									