South Shore Coastal Infrastructure Inventory and Assessment Demonstration Project

Coastal Hazards Commission

Town of Plymouth

Prepared for:
Office of Coastal Zone Management
Boston, MA

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Alpha Land Surveying & Engineering Associates

BCE **Bourne Consulting Engineering**
Waterfront Engineers

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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 region included in the demonstration project was identified as the South Shore and included the eight communities of Hingham, Hull, Cohasset, Scituate, Marshfield, Duxbury, Kingston and Plymouth.

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, research and field assessments. Assisting ***BCE*** was Applied Coastal Research and Engineering, Inc. of Mashpee, MA who was responsible for field assessments and GIS data conversion. Alpha Land Surveying and Engineering of Middleboro, MA also supported the Team with field GPS survey.

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 is the performance of a demonstration project for coastal structures located on the South Shore. The demonstration project will identify existing structures, their general conditions, ability to provide coastal protection and the probable cost for repairs. The information collected and developed will be incorporated into the MassGIS system to allow use for developing a 20 Year Coastal Infrastructure Plan.

As this is a demonstration project, it will serve as the basis for development of a statewide inventory and assessment of all Commonwealth coastal structures and the needs for their maintenance and/or repair. Incorporated into this project will be the identification of issues and limitations of the investigation and

assessment to achieve the overall goals and what should be included in future investigations/assessments of coastal structures for the other regions.

Goals of Study

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

- To be used as the model to go forward for assessment of coastal structures for the remainder of the coastal regions
- To identify areas of research and/or assessment that need to be modified for future phases that were not included within the demonstration project
- Complete the study with the final report by November 15, 2006 for submission to the Coastal Hazards Commission
- To identify all the coastal structures the state either owns or has responsibility to maintain for the eight communities 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.
    - Federal structures were identified but no assessment of conditions or priority was performed.
    - 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. No investigation of state archives was performed. Research at MA DEP Chp 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-PPP-BBB-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 the state.

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 were 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 were 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 is 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 is 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

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	E
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
REVETMENT	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	$157	$664	$1,328	$1,460
		5 To 10 Feet	$0	$157	$1,201	$2,402	$2,600
		10 To 15 Feet	$0	$157	$1,564	$3,128	$3,392
		Over 15 Feet	$0	$157	$2,468	$4,937	$5,333

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

Section II

Town of Plymouth

Community Findings

Section II – Community Findings – Town of Plymouth

COMMUNITY DESCRIPTION

The Town of Plymouth consists of a land area of 96.5 square miles out of a total area of 134 square miles and had a population of 51,701 in the 2000 census. The Town is located on the South Shore of Massachusetts and its location can be seen on this report's cover. The estimated length of shoreline that is directly exposed to open ocean waves is 19.0 miles with the remaining shoreline semi-protected by offshore structures or landforms. 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 Plymouth, there were 43 structures which had public or unknown ownership identified which provide significant coastal protection. The location of the structures can be seen in Sheets 1 through Sheet 11 in Section III 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 Plymouth

Primary Structure (1)	Total Structures	Structure Condition Rating A	B	C	D	F	Total Length (feet)
Bulkhead / Seawall	4			3	1		1835
Revetment	30		11	16	2	1	32567
Groin / Jetty	8		1	1	3	3	5415
Breakwater	1			1			2900
Coastal Dune							
Coastal Beach							
	43		12	21	6	4	42717

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 Plymouth's case there are a total of 43 structures which would require approximately $27.2 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 $11.2 million would be required to upgrade the Town's coastal protection.

STRUCTURE REPAIR / RECONSTRUCTION COST - Town of Plymouth

Primary Structure (1)	Total Structures	Structure Condition Rating A	B	C	D	F	Total Cost
Bulkhead / Seawall	4			$ 1,155,396	$ 333,960		$ 1,489,356
Revetment	30		$ 938,308	$ 9,093,916	$ 4,840,572	$ 335,782	$ 15,208,578
Groin / Jetty	8		$ 117,810	$ 76,355	$ 5,145,690	$ 583,968	$ 5,923,823
Breakwater	1			$ 4,536,180			$ 4,536,180
Coastal Dune							$ -
Coastal Beach							$ -
	43	$ -	$ 1,056,118	$ 14,861,847	$10,320,222	$ 919,750	$ 27,157,937

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 Plymouth the breakdown of structures by assumed ownership is as follows:

STRUCTURE OWNERSHIP / REPAIR COST - Town of Plymouth

Primary Structure (1)	Total Structures	Structure Condition Rating A	B	C	D	F	Total Cost
Town Owned	43		$ 1,056,118	$ 14,861,847	$10,320,222	$ 846,754	$ 27,084,941
Commonwealth of Massachusetts							$ -
Federal Government Owned							$ -
Unknown Ownership	1					$ 72,996	$ 72,996
							$ -
	44	$ -	$ 1,056,118	$ 14,861,847	$10,320,222	$ 919,750	$ 27,157,937

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 which contains Structure Assessment Reports for each individual structure found.

SUMMARY

The enclosed reports and associated documents reflects the Town of Plymouth'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

Town of Plymouth

Structure Assessment Reports

COASTAL STRUCTURE LOCATION PLAN

TOWN OF PLYMOUTH

SOUTH SHORE COASTAL INFRASTRUCTURE INVENTORY
AND ASSESSMENT DEMONSTRATION PROJECT

AUGUST 2006

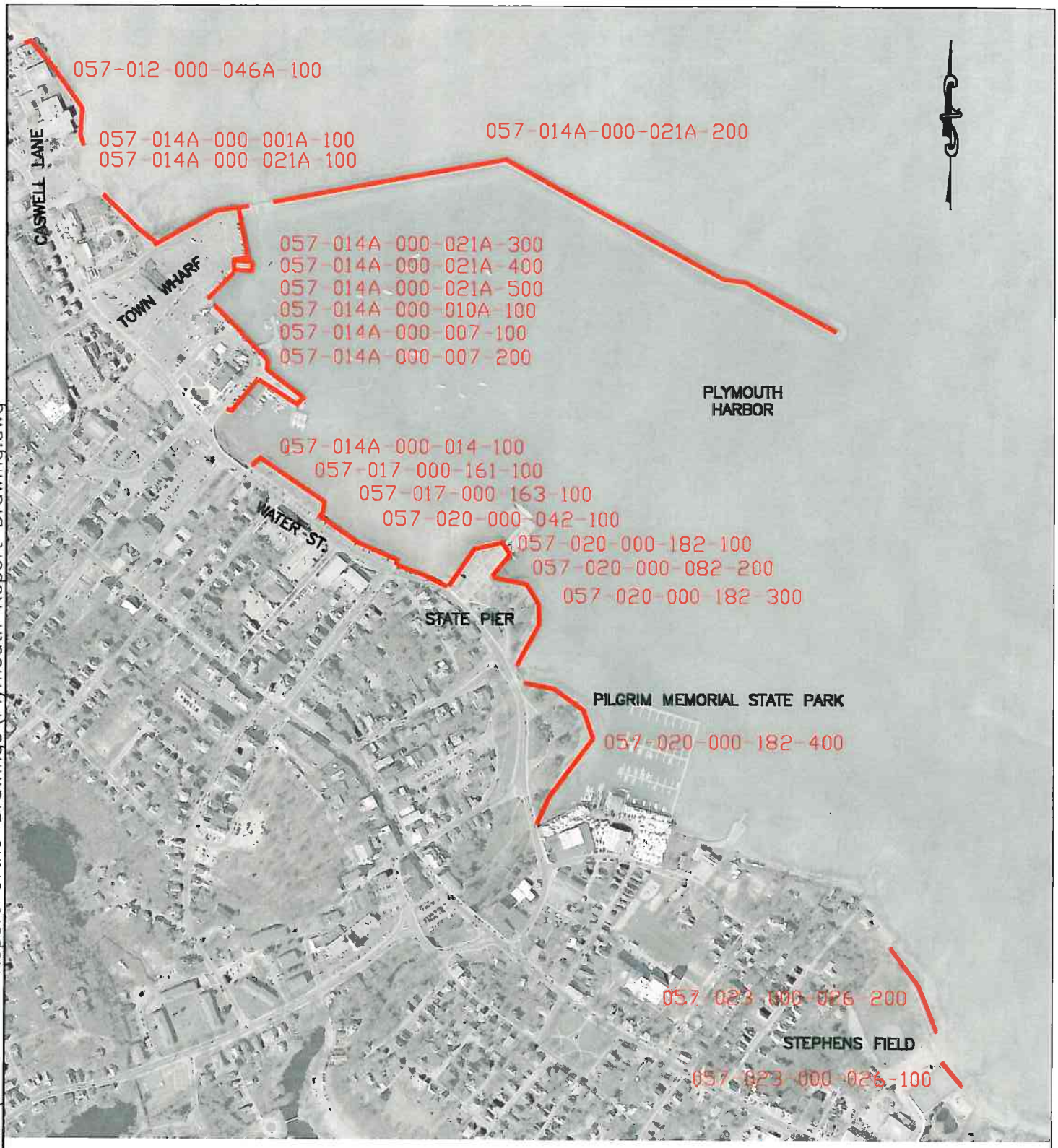
0 200

SCALE: 1" = 200'

Bourne Consulting Engineering

SHEET 1 OF 11

File: X:\26600-\26637\Final Town Report Ortho Drawings\Plymouth Report Drawing.dwg



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COASTAL STRUCTURE LOCATION PLAN

TOWN OF PLYMOUTH

SOUTH SHORE COASTAL INFRASTRUCTURE INVENTORY AND ASSESSMENT DEMONSTRATION PROJECT

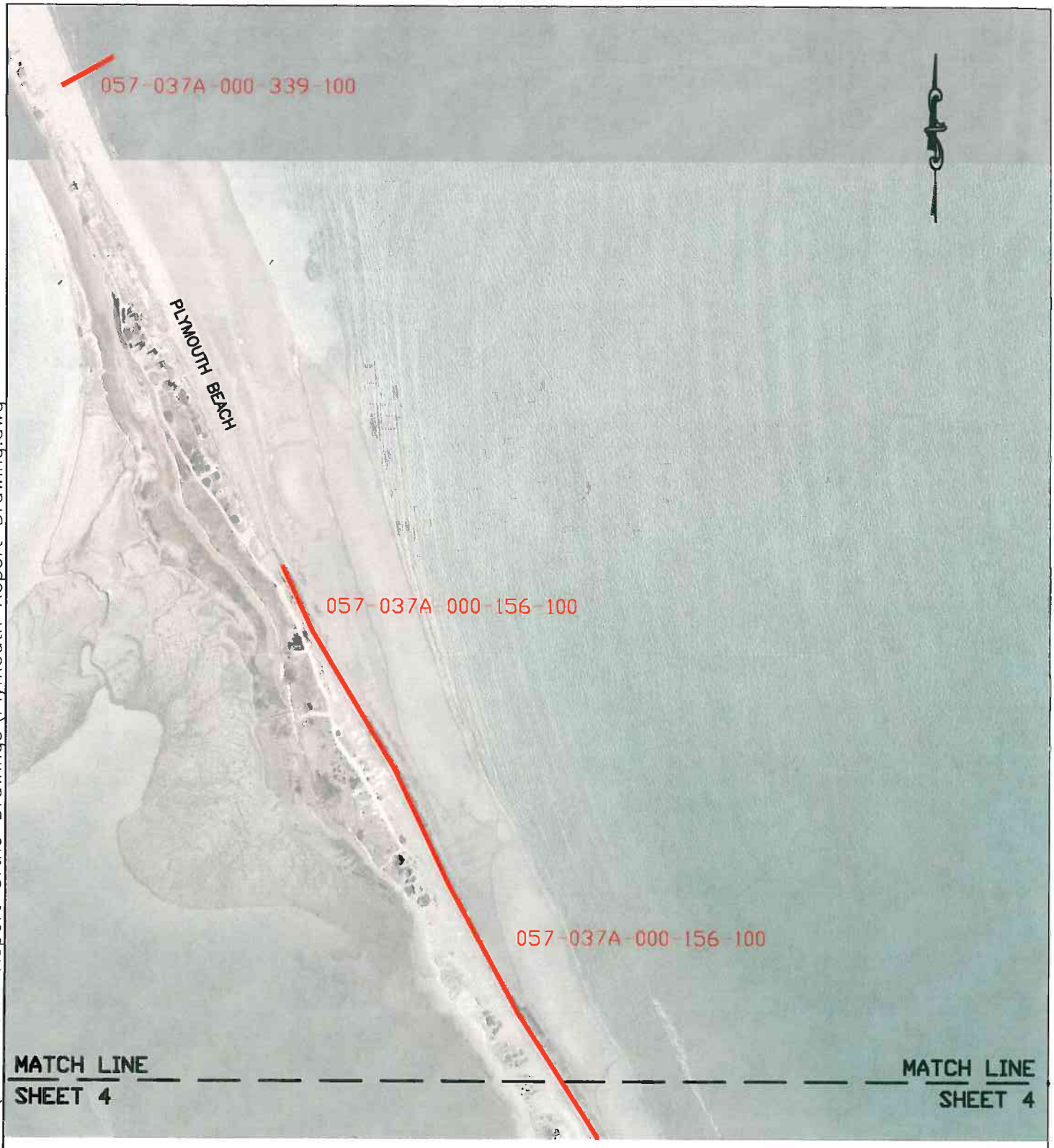
AUGUST 2006

0 200

SCALE: 1" = 200'

Bourne Consulting Engineering

SHEET 2 OF 11



COASTAL STRUCTURE LOCATION PLAN

TOWN OF PLYMOUTH

SOUTH SHORE COASTAL INFRASTRUCTURE INVENTORY
AND ASSESSMENT DEMONSTRATION PROJECT

AUGUST 2006

0 200

SCALE: 1" = 200'

BCE Bourne Consulting Engineering

SHEET 3 OF 11

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COASTAL STRUCTURE LOCATION PLAN

TOWN OF PLYMOUTH

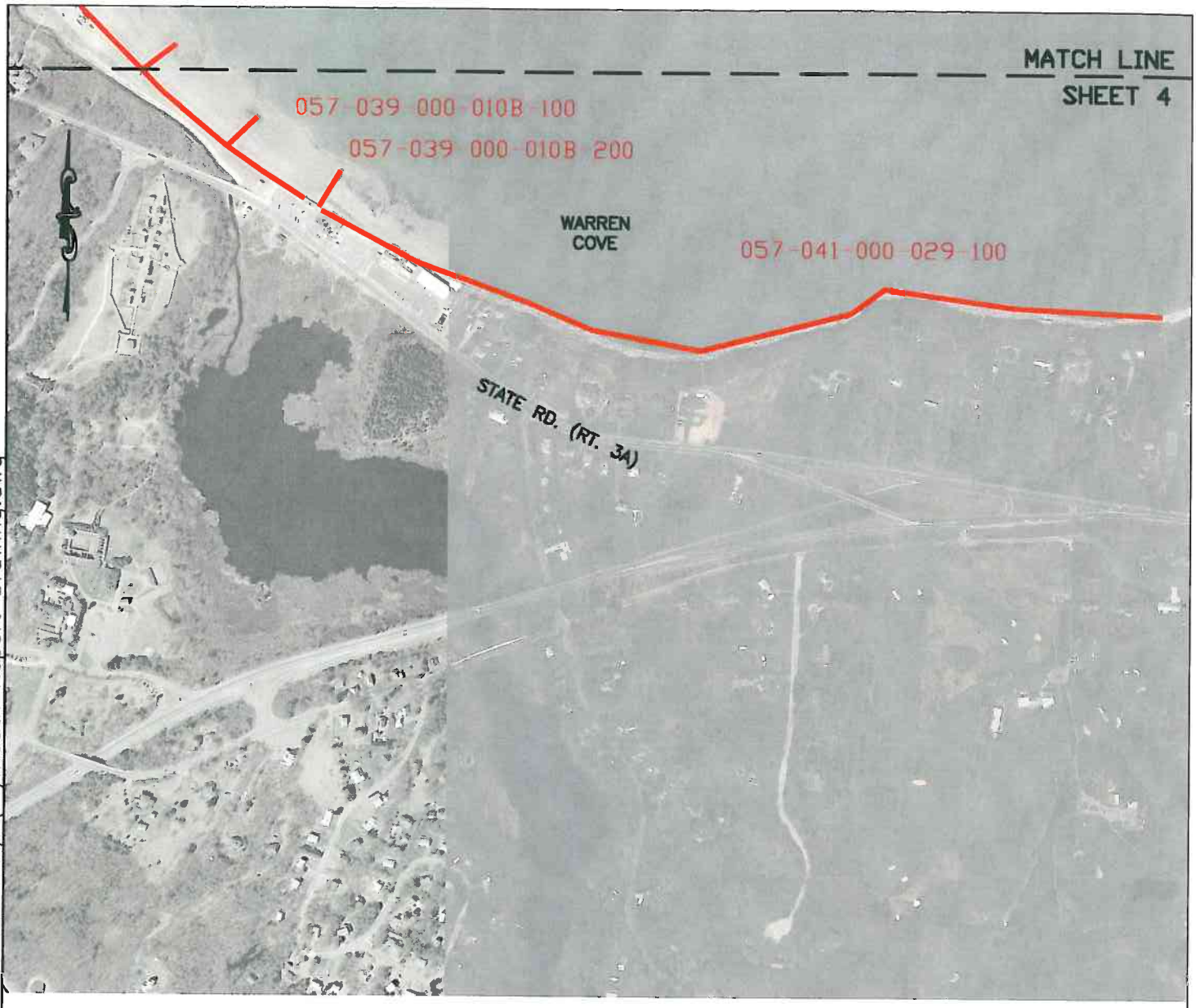
SOUTH SHORE COASTAL INFRASTRUCTURE INVENTORY
AND ASSESSMENT DEMONSTRATION PROJECT

AUGUST 2006

0 200

SCALE: 1" = 200'

BCE Bourne Consulting Engineering



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COASTAL STRUCTURE LOCATION PLAN

TOWN OF PLYMOUTH

SOUTH SHORE COASTAL INFRASTRUCTURE INVENTORY AND ASSESSMENT DEMONSTRATION PROJECT

AUGUST 2006

0 200

SCALE: 1" = 200'

BCE Bourne Consulting Engineering

File: X:\26600-\26637\Final Town Report Ortho Drawings\Plymouth Report Drawing.dwg

COASTAL STRUCTURE LOCATION PLAN

TOWN OF PLYMOUTH

SOUTH SHORE COASTAL INFRASTRUCTURE INVENTORY
AND ASSESSMENT DEMONSTRATION PROJECT
AUGUST 2006

0 200
SCALE: 1" = 200'

BCE Bourne Consulting Engineering

COASTAL STRUCTURE LOCATION PLAN

TOWN OF PLYMOUTH

SOUTH SHORE COASTAL INFRASTRUCTURE INVENTORY
AND ASSESSMENT DEMONSTRATION PROJECT

AUGUST 2006

0 200

SCALE: 1" = 200'

Bourne Consulting Engineering

SHEET 7 OF 11

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COASTAL STRUCTURE LOCATION PLAN

TOWN OF PLYMOUTH

SOUTH SHORE COASTAL INFRASTRUCTURE INVENTORY
AND ASSESSMENT DEMONSTRATION PROJECT

AUGUST 2006

0 200

SCALE: 1" = 200'

BCE Bourne Consulting Engineering

COASTAL STRUCTURE LOCATION PLAN

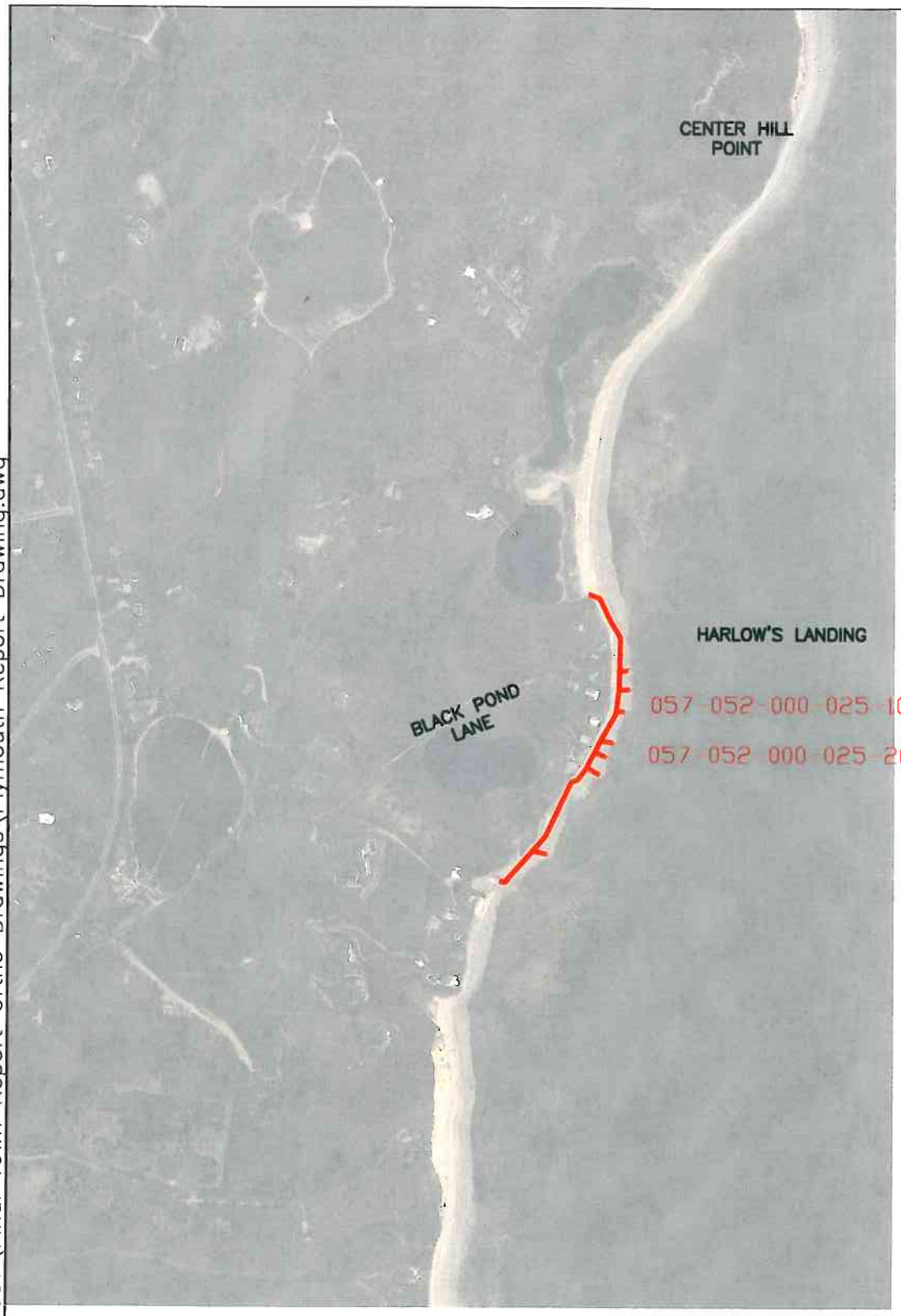
TOWN OF PLYMOUTH

SOUTH SHORE COASTAL INFRASTRUCTURE INVENTORY
AND ASSESSMENT DEMONSTRATION PROJECT
AUGUST 2006

0 200
SCALE: 1" = 200'

Bourne Consulting Engineering

File: X:\26600-\26637\Final Town Report Ortho Drawings\Plymouth Report Drawing.dwg



COASTAL STRUCTURE LOCATION PLAN

TOWN OF PLYMOUTH

SOUTH SHORE COASTAL INFRASTRUCTURE INVENTORY AND ASSESSMENT DEMONSTRATION PROJECT

AUGUST 2006

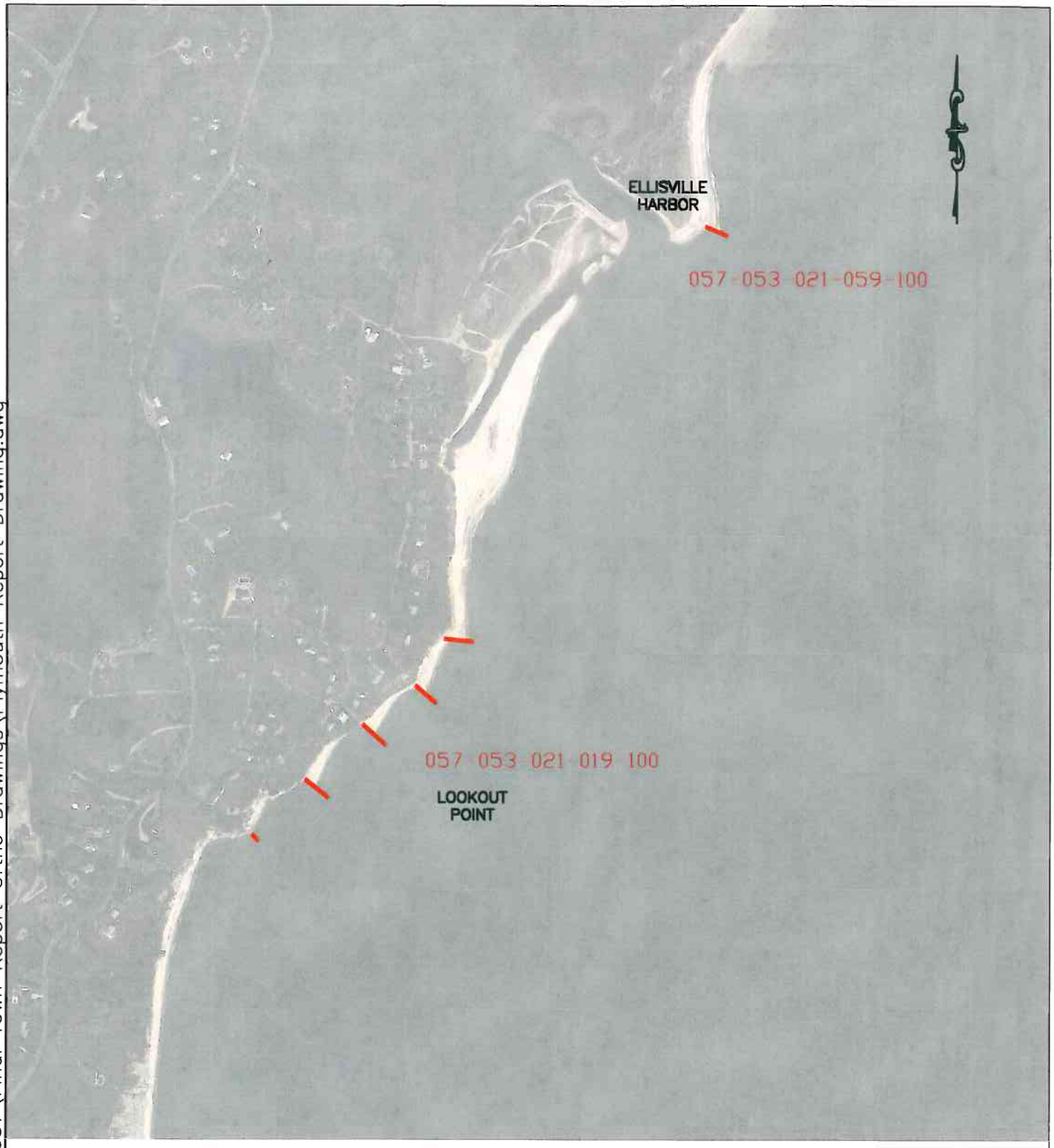
0 200

SCALE: 1" = 200'

BCE Bourne Consulting Engineering

SHEET 10 OF 11

File: X:\26600-\26637\Final Town Report Ortho Drawings\Plymouth Report Drawing.dwg



COASTAL STRUCTURE LOCATION PLAN

TOWN OF PLYMOUTH

SOUTH SHORE COASTAL INFRASTRUCTURE INVENTORY
AND ASSESSMENT DEMONSTRATION PROJECT

AUGUST 2006

0 200

SCALE: 1" = 200'

Bourne Consulting Engineering

SHEET 11 OF 11

File: X:\26600-\26637\Final Town Report Ortho Drawings\Plymouth Report Drawing.dwg

CZM South Shore Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Plymouth

Structure ID: 057-001-000-010-100

Key: community-map-block-parcel-structure

Property Owner: Local

Location: High Cliff

Date: 8/31/2006

Presumed Structure Owner: Local

Based On Comment: Property Ownership

Owner Name: Plymouth

Earliest Structure Record: 0

Estimated Reconstruction/Repair Cost: $103,904.00

Length: 173 Feet

Top Elevation: Feet NAVD 88

FIRM Map Zone: V4

FIRM Map Elevation: 15 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 fronting a concrete seawall. The stone is weathered and becoming unraveled. The wall is not visible for evaulation.

Condition Rating	C
	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 Rating	III
	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:

057-001-000-010-100-PHO1A.jpg

Structure Documents:

MA DPW	OCT 1956	Proposed Drainage,	057-001-000-010-100-DCR1A
MA DPW	OCT 1956	Proposed Drainage,	057-001-000-010-100-TWN1A

Prepared By: Bourne Consulting Engineering

CZM South Shore Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Plymouth

Structure ID: 057-006-062-019-100

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	High Cliff	8/31/2006

Presumed Structure Owner:	Based On Comment:
Local	Property Ownership

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Plymouth	0	$63,664.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
530 Feet	Feet NAVD 88	V4	15 Feet NGVD

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

Secondary Type:	Secondary Material:	Secondary Height:
		5 to 10 Feet

Structure Summary :

This structure is a stone revetment. The side slopes and crest are in excellent condition. There is minor and isolated cracking and displacement of some armor stones.

Condition Rating	B 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 Rating	III 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:

057-006-062-019-100-PHO1A.jpg

Structure Documents:

MA DPW	APR 1967	Proposed Shore	057-006-062-019-100-DCR1A

Prepared By: Bourne Consulting Engineering

CZM South Shore Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Plymouth

Structure ID: 057-007-000-042-100

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	Atlantic Ave.	8/31/2006

Presumed Structure Owner:	Based On Comment:
Local	DPW - Drawings

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Plymouth	1957	$158,004.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
475 Feet	Feet NAVD 88	V4	15 Feet NGVD

Primary Type:	Primary Material:	Primary Height:
Revetment	Stone	Under 5 Feet

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

This structure is a stone revetment. There are shifted armor stone and slumping of the side slopes evident, conditions worsens towards the south end of the structure.

Condition Rating	C
	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 Rating	IV
	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:

057-007-000-042-100-PHO1A.jpg

Structure Documents:

MA DPW	SEP 1957	Proposed Shore	057-007-000-042-100-DCR1A
MA DPW	SEP 1957	Proposed Shore	057-007-000-042-100-TWN1A

Prepared By: Bourne Consulting Engineering

CZM South Shore Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Plymouth

Structure ID: 057-012-000-046A-100

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	Caswell Lane	8/31/2006

Presumed Structure Owner:	Based On Comment:
Local	USACE – Permits

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Plymouth	1974	$360,360.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
600		V4	14
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 :

This structure is a stone revetment. The side slopes are very steep and also vertical in some sections. The northern corner is grouted. There are many areas of shifted and displaced armor stones. The oversteepened side slopes are a stability concern.

Condition Rating	C	*Priority Rating*	IV
	Fair		High Priority
Level of Action	Moderate	*Action*	Consider for Next Project Construction Listing
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.	*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:

057-012-000-046A-100-PHO1A.jpg

057-012-000-046A-100-PHO1B.jpg

Structure Documents:

Prepared By: Bourne Consulting Engineering

CZM South Shore Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Plymouth

Structure ID: 057-014A-000-001A-100

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	Caswell Lane	8/31/2006

Presumed Structure Owner:	Based On Comment:
Local	DEP – Ch 91 License

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Plymouth	1983	$116,424.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
350 Feet	Feet NAVD 88	V4	14 Feet NGVD

Primary Type:	Primary Material:	Primary Height:
Revetment	Stone	Under 5 Feet

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

This structure is a small stone revetment fronting a parking lot. The stone is weathered and the side slopes have slumped along most of the section.

Condition Rating	C Fair	*Priority Rating*	II Low Priority
Level of Action	Moderate	*Action*	Future Project Consideration
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.	*Description*	Inshore Structures Present with Limited potential for Significant Infrastructure Damage

Structure Images:

057-014A-000-001A-100-PHO1A.jpg

Structure Documents:

Prepared By: Bourne Consulting Engineering

CZM South Shore Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Plymouth

Structure ID: 057-014A-000-007-100

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	Town Wharf	8/31/2006

Presumed Structure Owner:	Based On Comment:
Local	USACE – Permits

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Plymouth	1959	$175,824.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
225		A5	12
Feet	Feet NAVD 88		Feet NGVD

Primary Type:	Primary Material:	Primary Height:
Revetment	Stone	10 to 15 Feet

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

This structure is a stone revetment beneath a wooden quay wall supported by timber piles. There is no access to evaluate the structure. Even visual assessment is difficult.

Condition Rating	C 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 Rating	III 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:

057-014A-000-007-100-PHO1A.jpg

Structure Documents:

MA DEQE	FEB 1971	Proposed Harbor	057-014A-000-007-100-DCR1A
USACE	JUN 1935	Proposed Fill in	057-014A-000-007-100-COE1A
MADPW	FEB 1959	Proposed Town	057-014A-000-007-100-COE1B

Prepared By: Bourne Consulting Engineering

CZM South Shore Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Plymouth

Structure ID: 057-014A-000-010A-100

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	Town Wharf	8/31/2006

Presumed Structure Owner:	Based On Comment:
Local	USACE – Permits

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Plymouth	1935	$136,752.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
175		A5	12
Feet	Feet NAVD 88		Feet NGVD

Primary Type:	Primary Material:	Primary Height:
Revetment	Stone	10 to 15 Feet

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

This structure is a stone revetment with a wave return face concrete cap. The cap is weathered and shows some spalling. Certain sections appear tilted forward somewhat. The stone sideslopes have slumped in some sections, appearing to create a gap between the top of the stone armor and the bottom of the concrete cap.

Condition Rating	C
	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 Rating	IV
	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:

057-014A-000-010A-100-PHO1A.jpg

Structure Documents:

USACE	JUN 1935	Proposed Fill in	057-014A-000-010A-100-COE1A
MADPW	FEB 1959	Proposed Town	057-014A-000-010A-100-COE1B

Prepared By: Bourne Consulting Engineering

CZM South Shore Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Plymouth

Structure ID: 057-014A-000-014-100

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	Water St.	8/31/2006

Presumed Structure Owner:	Based On Comment:
Local	USACE – Permits

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Plymouth	1935	$33,772.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
215 Feet	Feet NAVD 88	A5	12 Feet NGVD

Primary Type:	Primary Material:	Primary Height:
Revetment	Stone	10 to 15 Feet

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

This structure is a stone revetment. The sideslopes show some weathering but are generally in good condition.

Condition Rating	B Good	*Priority Rating*	III 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:

057-014A-000-014-100-PHO1A.jpg

Structure Documents:

USACE	JUN 1935	Proposed Fill in	057-014A-000-014-100-COE1A
USACE	SEP 1952	Proposed Fill and	057-014A-000-014-100-COE1B

Prepared By: Bourne Consulting Engineering

CZM South Shore Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Plymouth

Structure ID: 057-014A-000-021A-100

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	Caswell Lane	8/31/2006

Presumed Structure Owner:	Based On Comment:
Local	Property Ownership

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Plymouth	0	$59,459.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
495 Feet	Feet NAVD 88	V4	15 Feet NGVD

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

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

This structure is a stone revetment along the northwest corner of Plymouth Harbor Town boat ramp parking lot. The side slopes and crest are in good condition. The armor stone shows minor weathering.

Condition Rating	B 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 Rating	IV 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:

057-014A-000-021A-100-PHO1A.jpg

Structure Documents:

Prepared By: Bourne Consulting Engineering

CZM South Shore Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Plymouth

Structure ID: 057-014A-000-021A-200

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	Plymouth Harbor	8/31/2006

Presumed Structure Owner:	Based On Comment:
Local	USACE – Permits

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Plymouth	1974	$4,536,180.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
2900		V4	14
Feet	Feet NAVD 88		Feet NGVD

Primary Type:	Primary Material:	Primary Height:
Breakwater	Stone	10 to 15 Feet

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

This structure is a rubble mound breakwater around the northern side of Plymouth Harbor. There is a scour apron along the inside and outside toe for the outer 175 yards of the structure. Overall the crest and sideslopes appear in good condition. However there are many small regions of slumped crest elevation and displaced armor stone.

Condition Rating	C
	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 Rating	IV
	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:

057-014A-000-021A-200-PHO2A.jpg

057-014A-000-021A-200-PHO2B.jpg

Structure Documents:

COE	JUN 1955	Plymouth Harbor	057-014A-000-021A-200-TWN2A

Prepared By: Bourne Consulting Engineering

CZM South Shore Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Plymouth

Structure ID: 057-014A-000-021A-300

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	Town Wharf	8/31/2006

Presumed Structure Owner:	Based On Comment:
Local	USACE – Permits

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Plymouth	1974	$36,036.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
300		A5	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:
	Concrete	

Structure Summary :

This structure is a stone revetment topped with wave return face concrete sections. The concrete cap shows minor cracking. The stone side slopes are in good condition and the stone itself shows some weathering.

Condition Rating	B 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 Rating	III 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:

057-014A-000-021A-300-PHO3A.jpg

Structure Documents:

MA DEQE	SEP 1970	Proposed Shore	057-014A-000-021A-300-DCR3A
USACE	OCT 1974	Proposed Public	057-014A-000-021A-300-COE3A

Prepared By: Bourne Consulting Engineering

CZM South Shore Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Plymouth

Structure ID: 057-014A-000-021A-400

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	Town Wharf	8/31/2006

Presumed Structure Owner:	Based On Comment:
Local	USACE – Permits

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Plymouth	1974	$9,610.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
80		A5	12
Feet	Feet NAVD 88		Feet NGVD

Primary Type:	Primary Material:	Primary Height:
Revetment	Concrete	5 to 10 Feet

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

This structure is a concrete boat ramp for the town. There is some cracking along the surface of the ramp. It is generally in good condition.

Condition Rating	B Good	*Priority Rating*	III 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:

057-014A-000-021A-400-PHO4A.jpg

Structure Documents:

MA DEQE	SEP 1970	Proposed Shore	057-014A-000-021A-400-DCR4B
USACE	OCT 1974	Proposed Public	057-014A-000-021A-400-COE4A

Prepared By: Bourne Consulting Engineering

CZM South Shore Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Plymouth

Structure ID: 057-014A-000-021A-500

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	Town Wharf	8/31/2006

Presumed Structure Owner:	Based On Comment:
Local	USACE – Permits

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Plymouth	1974	$27,489.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
175		A5	12
Feet	Feet NAVD 88		Feet NGVD

Primary Type:	Primary Material:	Primary Height:
Revetment	Stone	10 to 15 Feet

Secondary Type:	Secondary Material:	Secondary Height:
	Concrete	

Structure Summary :

This structure is a stone revetment with a wave return face concrete cap. The concrete cap shows spalling and discoloration. The stone is weathered but in good condition. The side slopes remain entirely intact.

Condition Rating	B Good	*Priority Rating*	III 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:

057-014A-000-021A-500-PHO5A.jpg

Structure Documents:

MA DEQE	SEP 1970	Proposed Shore	057-014A-000-021A-500-DCR5A
USACE	OCT 1974	Proposed Public	057-014A-000-021A-500-COE5A

Prepared By: Bourne Consulting Engineering

CZM South Shore Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Plymouth

Structure ID: 057-017-000-161-100

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	Water St.	8/31/2006

Presumed Structure Owner:	Based On Comment:
Local	DCR – Contract Drawings

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Plymouth	1948	$371,184.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
475 Feet	Feet NAVD 88	A5	13 Feet NGVD

Primary Type:	Primary Material:	Primary Height:
Revetment	Stone	10 to 15 Feet

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

This structure is a stone revetment fronting a small park. The bottom half of the armor stone is grouted. The top and bottom sections are not well connected, with the top being slumped in sections.

Condition Rating	C 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 Rating	III 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:

- 057-017-000-161-100-PHO1A.jpg
- 057-017-000-161-100-PHO1B.jpg

Structure Documents:

MA DPW	JUL 1948	Proposed Bank	057-017-000-161-100-DCR1A
MA DPW	JUL 1948	Proposed Bank	057-017-000-161-100-TWN1A
DEP CH.91	SEP 1935	PLAN	057-017-000-161-100-LIC1A
USACE	JUN 1935	Proposed Fill in	057-017-000-161-100-COE1A

Prepared By: Bourne Consulting Engineering

CZM South Shore Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Plymouth

Structure ID: 057-017-000-163-100

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	Water St.	8/31/2006

Presumed Structure Owner:	Based On Comment:
Local	Property Ownership

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Plymouth	0	$583,110.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
465		A5	13
Feet	Feet NAVD 88		Feet NGVD

Primary Type:	Primary Material:	Primary Height:
Bulkhead/ Seawall	Stone	10 to 15 Feet

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

This structure is a grouted stone seawall with rip rap along the toe. The stone along the toe is slumped and unraveled to the point where it no longer protects the base of the wall. The base of the wall shows some missing grout between stones and other damage.

Condition Rating	C
	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 Rating	III
	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:

057-017-000-163-100-PHO1A.jpg

Structure Documents:

DEP CH.91	SEP 1935	PLAN	057-017-000-163-100-LIC1A
USACE	JUN 1935	Proposed Fill in	057-017-000-163-100-COE1A

Prepared By: Bourne Consulting Engineering

CZM South Shore Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Plymouth

Structure ID: 057-020-000-042-100

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	Water St.	8/31/2006

Presumed Structure Owner:	Based On Comment:
Local	USACE – Permits

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Plymouth	1935	$189,750.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
250 Feet	Feet NAVD 88	A5	13 Feet NGVD

Primary Type:	Primary Material:	Primary Height:
Bulkhead/ Seawall	Stone	5 to 10 Feet

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

This structure is a seawall of grouted stone. The stone is stacked at the bottom and has a cap of random placed grouted stone. There is grout missing and/or broken along the base of the wall.

Condition Rating	C
Level of Action	Fair
Description	Moderate
	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 Rating	III
	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:

057-020-000-042-100-PHO1A.jpg

Structure Documents:

USACE	JUN 1935	Proposed Fill in	057-020-000-042-100-COE1A

Prepared By: Bourne Consulting Engineering

CZM South Shore Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Plymouth

Structure ID: 057-020-000-182-100

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	State Pier	8/31/2006

Presumed Structure Owner:	Based On Comment:
Local	USACE – Permits

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Plymouth	1954	$333,960.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
220 Feet	Feet NAVD 88	V4	14 Feet NGVD

Primary Type:	Primary Material:	Primary Height:
Bulkhead/ Seawall	Concrete	5 to 10 Feet

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

This structure is a short concrete seawall with a wave return face cap and small armor stone strewn along the base. The wall shows severe cracking and spalling along the face. The northern end is slumped.

Condition Rating	D 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 Rating	III 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:

057-020-000-182-100-PHO1A.jpg

Structure Documents:

MA DPW	Nov 1945	Concrete Retaining	057-020-000-182-100-DCR1A
MA DPW	MAY 1956	Proposed Shore	057-020-000-182-100-TWN1A
MADPW	JUL 1954	Proposed Seawall	057-020-000-182-100-COE1A

Prepared By: Bourne Consulting Engineering

CZM South Shore Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Plymouth

Structure ID: 057-020-000-182-200

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	State Pier	8/31/2006

Presumed Structure Owner:	Based On Comment:
Local	USACE – Permits

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Plymouth	1954	$1,173,572.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
1954		V4	14
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 :

This structure is a stone revetment fronting a park. Some armor stone along the crest has slumped. Minor cracking of the armor stone evident.

Condition Rating	C 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 Rating	III 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:

057-020-000-182-200-PHO2A.jpg

057-020-000-182-200-PHO2B.jpg

Structure Documents:

Prepared By: Bourne Consulting Engineering

CZM South Shore Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Plymouth

Structure ID: 057-020-000-182-300

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	State Pier	8/31/2006

Presumed Structure Owner:	Based On Comment:
Local	USACE – Permits

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Plymouth	1954	$461,050.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
590		V4	14
Feet	Feet NAVD 88		Feet NGVD

Primary Type:	Primary Material:	Primary Height:
Revetment	Stone	10 to 15 Feet

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

This structure is a stone revetment fronting a park. The sideslopes have slumped in some sections and the armor stone has shifted.

Condition Rating	C
	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 Rating	III
	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:

057-020-000-182-300-PHO3A.jpg

Structure Documents:

Prepared By: Bourne Consulting Engineering

CZM South Shore Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Plymouth

Structure ID: 057-020-000-182-400

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	Pilgrim Memorial State Park	8/31/2006

Presumed Structure Owner:	Based On Comment:
Local	USACE – Permits

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Plymouth	1954	$742,368.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
950		V4	14
Feet	Feet NAVD 88		Feet NGVD

Primary Type:	Primary Material:	Primary Height:
Revetment	Stone	10 to 15 Feet

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

The structure is a stone revetment fronting a park. The stone is weathered and slumped. A backing of granite stone has become exposed. There is no defined side slope.

Condition Rating	C
	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 Rating	III
	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:

057-020-000-182-400-PHO4A.jpg

Structure Documents:

Prepared By: Bourne Consulting Engineering

CZM South Shore Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Plymouth

Structure ID: 057-023-000-026-100

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	Stephens Field	8/31/2006

Presumed Structure Owner:	Based On Comment:
Local	DEP – Ch 91 License

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Plymouth	1998	$49,896.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
150		V4	14
Feet	Feet NAVD 88		Feet NGVD

Primary Type:	Primary Material:	Primary Height:
Revetment	Stone	Under 5 Feet

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

This structure is a small stone revetment fronting tennis courts. The crest is failed in one area and has slumped down.

Condition Rating	C
	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 Rating	III
	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:

057-023-000-026-100-PHO1A.jpg

Structure Documents:

DEP CH.91	JAN 15 1998	PLANS	057-023-000-026-100-LIC1A

Prepared By: Bourne Consulting Engineering

CZM South Shore Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Plymouth

Structure ID: 057-023-000-026-200

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	Stephens Field	8/31/2006

Presumed Structure Owner:	Based On Comment:
Local	DEP – Ch 91 License

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Plymouth	1998	$335,782.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
460		V4	14
Feet	Feet NAVD 88		Feet NGVD

Primary Type:	Primary Material:	Primary Height:
Revetment	Stone	Under 5 Feet

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

This structure is line of strewn rubble and stone lying parallel to the shoreline. The is no slope or interlocking of stones/debris.

Condition Rating	F Critical	*Priority Rating*	II Low Priority
Level of Action	Immediate	*Action*	Future Project Consideration
Description	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.	*Description*	Inshore Structures Present with Limited potential for Significant Infrastructure Damage

Structure Images:

057-023-000-026-200-PHO2A.jpg

057-023-000-026-200-PHO2B.jpg

Structure Documents:

Prepared By: Bourne Consulting Engineering

CZM South Shore Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Plymouth

Structure ID: 057-037A-000-156-100

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	Plymouth Beach	9/1/2006

Presumed Structure Owner:	Based On Comment:
Local	Property Ownership

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Plymouth	0	$4,780,512.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
7200 Feet	Feet NAVD 88	V2	19 Feet NGVD

Primary Type:	Primary Material:	Primary Height:
Revetment	Stone	Under 5 Feet

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

This structure is a stone dike that lies along the eastern edge of Plymouth Long Beach. The southern end of the dike is in fair condition but deteriorates to the north. There are multiple sections of failure with evidence of overwash events behind the dike.

Condition Rating	D
	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 Rating	III
	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:

057-037A-000-156-100-PHO1A.jpg

057-037A-000-156-100-PHO1B.jpg

Structure Documents:

Prepared By: Bourne Consulting Engineering

CZM South Shore Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Plymouth

Structure ID: 057-037A-000-339-100

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	Plymouth Beach	9/1/2006

Presumed Structure Owner:	Based On Comment:
Local	DPW - Drawings

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Plymouth	1970	$401,500.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
275 Feet	Feet NAVD 88	V2	19 Feet NGVD

Primary Type:	Primary Material:	Primary Height:
Groin/ Jetty	Concrete	Under 5 Feet

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

This structure is the remains of an adjustable groin. All that remains are the concrete posts. All evidence of the insert panels is removed. The structure has completely failed and is non-functional.

Condition Rating	F Critical	*Priority Rating*	I None
Level of Action	Immediate	*Action*	Long Term Planning Considerations
Description	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.	*Description*	No Inshore Structures or Residential Dwelling Units Present

Structure Images:

057-037A-000-339-100-PHO1A.jpg

Structure Documents:

COE	APR 1970	Plymouth Harbor MA,	057-037A-000-339-100-TWN1A

Prepared By: Bourne Consulting Engineering

CZM South Shore Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Plymouth

Structure ID: 057-039-000-010B-100

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	Eel River	9/1/2006

Presumed Structure Owner:	Based On Comment:
Local	Property Ownership

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Plymouth	0	$382,536.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
900		V2	19
Feet	Feet NAVD 88		Feet NGVD

Primary Type:	Primary Material:	Primary Height:
Bulkhead/ Seawall	Concrete	Under 5 Feet

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

This structure is a concrete seawall fronting a dirt parking lot. The wall shows minor cracking and spalling. The toe of the wall is becoming exposed at the southern end. Each groin is approximately 75 to 180 feet long.

Condition Rating	C
Level of Action	Fair
Description	Moderate
	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 Rating	II
Action	Low Priority
Description	Future Project Consideration
	Inshore Structures Present with Limited potential for Significant Infrastructure Damage

Structure Images:

057-039-000-010B-100-PHO1A.jpg

057-039-000-010B-100-PHO1B.jpg

Structure Documents:

MA DPW	MAR 1940	Proposed Shore	057-039-000-010B-100-DCR1A
MA DPW	SEP 1940	Proposed Shore	057-039-000-010B-100-DCR1B
MA DPW	JUL 1946	Proposed Repairs to	057-039-000-010B-100-DCR1C
MA DPW	OCT 1954	Proposed Shore	057-039-000-010B-100-DCR1D
MA DPW	SEP 1956	Proposed Shore	057-039-000-010B-100-DCR1E
MA DPW	SEP 1957	Proposed Shore	057-039-000-010B-100-DCR1F
MA DPW	MAY 1959	Proposed Shore	057-039-000-010B-100-DCR1G
MA DPW	MAR 1968	Proposed Shore	057-039-000-010B-100-DCR1H
MA DPW	MAY 1952	Proposed Shore	057-039-000-010B-100-DCR1I
MA DPW	APR 1965	Proposed Shore	057-039-000-010B-100-DCR1J
MA DPW	MAY 1952	Proposed Shore	057-039-000-010B-100-TWN1A

Prepared By: Bourne Consulting Engineering

MA DPW	SEP 1957	Proposed Shore	057-039-000-010B-100-TWN1B
MA DPW	APR 1965	Proposed Shore	057-039-000-010B-100-TWN1C
MA DPW	MAR 1968	Proposed Shore	057-039-000-010B-100-TWN1D
COE	DEC 1956	Plymouth Harbor,	057-039-000-010B-100-TWN1E
PLY DPW	OCT 1978	Contract 2851,	057-039-000-010B-100-TWN1F

CZM South Shore Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Plymouth

Structure ID: 057-039-000-010B-200

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	Eel River	9/1/2006

Presumed Structure Owner:	Based On Comment:
Local	Property Ownership

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Plymouth	0	$3,054,216.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
2300 Feet	Feet NAVD 88	V2	19 Feet NGVD

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

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

This is a field of 5 stone groins. The stones have become largely unraveled so that no crest or side slopes are discernable. The groins are not serving much purpose.

Condition Rating	D	*Priority Rating*	II
	Poor		Low Priority
Level of Action	Major	*Action*	Future Project Consideration
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.	*Description*	Inshore Structures Present with Limited potential for Significant Infrastructure Damage

Structure Images:

057-039-000-010B-200-PHO2A.jpg

Structure Documents:

Prepared By: Bourne Consulting Engineering

CZM South Shore Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Plymouth

Structure ID: 057-041-000-029-100

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	Warren Cove	9/1/2006

Presumed Structure Owner:	Based On Comment:
Local	DPW - Drawings

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Plymouth	1956	$2,162,160.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
3600 Feet	Feet NAVD 88	V2	19 Feet NGVD

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

Secondary Type:	Secondary Material:	Secondary Height:
Bulkhead/ Seawall	Concrete	

Structure Summary :

This structure is a stone revetment. It fronts a concrete seawall and has a wave return face in some sections. Along the center of the structure there are armor stone along the toe which have become displaced. This has resulted in some areas of a slumping crest.

Condition Rating	C 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 Rating	IV 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:

057-041-000-029-100-PHO1A.jpg

057-041-000-029-100-PHO1B.jpg

Structure Documents:

MA DPW	JUL 1946	Proposed Repairs to	057-041-000-029-100-DCR1A
MA DPW	OCT 1932	Proposed Rip Rap	057-041-000-029-100-DCR1B
MA DPW	MAR 1940	Proposed Shore	057-041-000-029-100-DCR1C
MA DPW	SEP 1940	Proposed Shore	057-041-000-029-100-DCR1D
MA DPW	OCT 1956	Proposed Shore	057-041-000-029-100-DCR1E
MA DPW	FEB 1960	Proposed Shore	057-041-000-029-100-DCR1F
MA DPW	MAR 1964	Proposed Shore	057-041-000-029-100-DCR1G
DEP CH.91	JAN 30 1990	PLANS	057-041-000-029-100-LIC1A
MA DPW	OCT 1956	Proposed Shore	057-041-000-029-100-TWN1A
MA DPW	FEB 1960	Proposed Shore	057-041-000-029-100-TWN1B
MA DPW	MAR 1964	Proposed Shore	057-041-000-029-100-TWN1C

Prepared By: Bourne Consulting Engineering

Structure Assessment Form

Town: Plymouth

Structure ID: 057-041-000-029-100

Key: community-map-block-parcel-structure

MADPW	OCT 1956	Proposed Stone	057-041-000-029-100-COE1A
TOWN	SEP 2001	Town of Plymouth for	057-041-000-029-100-COE1B

CZM South Shore Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Plymouth

Structure ID: 057-044-000-025-100

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	White Horse Beach	8/31/2006

Presumed Structure Owner:	Based On Comment:
Local	DCR – Contract Drawings

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Plymouth	1957	$20,420.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
130 Feet	Feet NAVD 88	V2	24 Feet NGVD

Primary Type:	Primary Material:	Primary Height:
Revetment	Stone	10 to 15 Feet

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

This structure is a rubble mound revetment. The sideslope is in good condition. There are single armor stones which are cracked.

Condition Rating	B Good	*Priority Rating*	IV High Priority
Level of Action	Minor	*Action*	Consider for Next Project Construction 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*	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:

057-044-000-025-100-PHO1A.jpg

Structure Documents:

MA DPW	JUN 1957	Proposed Shore	057-044-000-025-100-DCR1A

Prepared By: Bourne Consulting Engineering

CZM South Shore Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Plymouth

Structure ID: 057-045A-000-100-100

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	White Horse Beach	8/31/2006

Presumed Structure Owner:	Based On Comment:
Local	Property Ownership

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Plymouth	0	$86,486.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
720 Feet	Feet NAVD 88	V2	24 Feet NGVD

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

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

This structure is a stone revetment. The sideslopes are in good condition. There are some armor stones along the bottom which have cracked.

Condition Rating	B Good	*Priority Rating*	IV High Priority
Level of Action	Minor	*Action*	Consider for Next Project Construction 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*	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:

057-045A-000-100-100-PHO1A.jpg

Structure Documents:

Prepared By: Bourne Consulting Engineering

CZM South Shore Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Plymouth

Structure ID: 057-045A-000-100-200

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	White Horse Beach	8/31/2006

Presumed Structure Owner:	Based On Comment:
Local	DCR – Contract Drawings

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Plymouth	1952	$796,752.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
600		V2	24
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 is a field of 6 stone groins, with approximately 200 foot spacing between them. The groins show no crest or side slopes and appear instead to be a linear pile of large stone. A majority of the length of each groin is above mean low water, so they have little to no impact on sediment transport along the beach. Each groin is approximately 100 feet long.

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

Structure Images:

057-045A-000-100-200-PHO2A.jpg

Structure Documents:

MA DPW	JAN 1952	Proposed Stone	057-045A-000-100-200-DCR1A

Prepared By: Bourne Consulting Engineering

CZM South Shore Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Plymouth

Structure ID: 057-045A-000-113-100

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	White Horse Beach	8/31/2006

Presumed Structure Owner:	Based On Comment:
Local	Property Ownership

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Plymouth	0	$33,772.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
215 Feet	Feet NAVD 88	V2	24 Feet NGVD

Primary Type:	Primary Material:	Primary Height:
Revetment	Stone	10 to 15 Feet

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

This structure is a stone revetment. The side slope is in good condition. Some armor stone is cracked.

Condition Rating	B Good	*Priority Rating*	IV High Priority
Level of Action	Minor	*Action*	Consider for Next Project Construction 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*	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:

057-045A-000-113-100-PHO1A.jpg

Structure Documents:

Prepared By: Bourne Consulting Engineering

CZM South Shore Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Plymouth

Structure ID: 057-045B-000-014A-100

Key: community-map-block-parcel-structure

Property Owner: Local

Location: White Horse Beach

Date: 8/31/2006

Presumed Structure Owner: Local

Based On Comment: Property Ownership

Owner Name: Plymouth

Earliest Structure Record: 0

Estimated Reconstruction/Repair Cost: $283,800.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
4300 Feet	Feet NAVD 88	V4	15 Feet NGVD

Primary Type:	Primary Material:	Primary Height:
Revetment	Stone	Under 5 Feet

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

This structure is the western reveted side slope of a small channel which connects Barlett's Pond to Cape Cod Bay. The side slope and crest are in good condition with some minor loss of crest elevation.

Condition Rating	B Good	*Priority Rating*	II Low Priority
Level of Action	Minor	*Action*	Future Project Consideration
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 Present with Limited potential for Significant Infrastructure Damage

Structure Images:

057-045B-000-014A-100-PHO1A.jpg

Structure Documents:

Prepared By: Bourne Consulting Engineering

CZM South Shore Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Plymouth

Structure ID: 057-045B-000-014A-200

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	White Horse Beach	8/31/2006

Presumed Structure Owner:	Based On Comment:
Local	Property Ownership

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Plymouth	0	$283,800.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
4300 Feet	Feet NAVD 88	V4	15 Feet NGVD

Primary Type:	Primary Material:	Primary Height:
Revetment	Stone	Under 5 Feet

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

This structure is the eastern reveted side slope of a small channel which connects Barlett's Pond to Cape Cod Bay. The side slope and crest are in good condition with some minor loss of crest elevation.

Condition Rating	B Good	*Priority Rating*	II Low Priority
Level of Action	Minor	*Action*	Future Project Consideration
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 Present with Limited potential for Significant Infrastructure Damage

Structure Images:

057-045B-000-014A-200-PHO2A.jpg

Structure Documents:

Prepared By: Bourne Consulting Engineering

CZM South Shore Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Plymouth

Structure ID: 057-046-000-002A-100

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	Manomet Point	9/1/2006

Presumed Structure Owner:	Based On Comment:
Local	Property Ownership

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Plymouth	0	$1,049,070.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
850 Feet	Feet NAVD 88	V2	28 Feet NGVD

Primary Type:	Primary Material:	Primary Height:
Revetment	Stone	Over 15 Feet

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

This structure is a grouted stone revetment along the base of the bluff between Stage Point and Manomet Point. There are many areas of shifted and failing armor along the base of the structure.

Condition Rating	C Fair	*Priority Rating*	IV High Priority
Level of Action	Moderate	*Action*	Consider for Next Project Construction Listing
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.	*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:

Structure Documents:

Prepared By: Bourne Consulting Engineering

CZM South Shore Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Plymouth

Structure ID: 057-046-000-003-100

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	Manomet Point	9/1/2006

Presumed Structure Owner:	Based On Comment:
Local	DEP – Ch 91 License

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Plymouth	1999	$60,060.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
50 Feet	11 Feet NAVD 88	V2	28 Feet NGVD

Primary Type:	Primary Material:	Primary Height:
Revetment	Concrete	5 to 10 Feet

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

This is a stone/dirt/concrete ramp from street level down to the eastern end of White Horse Beach. There is some shifting and cracking of the concrete. The ramp is still functional, but poor condition.

Condition Rating	D 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 Rating	III 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:

057-046-000-003-100-PHO1A.jpg

Structure Documents:

MA DPW	AUG 1952	Proposed Shore	057-046-000-003-100-DCR1A
DEP CH.91	JUNE 15 19	PLANS	057-046-000-003-100-LIC1A
MA DPW	AUG 1934	Proposed Shore	057-046-000-003-100-TWN1A
MADPW		Proposed Stone	057-046-000-003-100-COE1A

Prepared By: Bourne Consulting Engineering

CZM South Shore Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Plymouth

Structure ID: 057-046-000-083-100

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	Manomet Point	9/1/2006

Presumed Structure Owner:	Based On Comment:
Local	Property Ownership

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Plymouth	0	$324,298.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
415 Feet	Feet NAVD 88	V2	28 Feet NGVD

Primary Type:	Primary Material:	Primary Height:
Revetment	Stone	10 to 15 Feet

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

This structure is a stone revetment along the base of the the northern face of Manomet Point. The stone appears to have been dumped rather than placed and thus the interlocking of the armor layer is poor. There is some shifting and cracking of armor stone evident.

Condition Rating	C
	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 Rating	IV
	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:

057-046-000-083-100-PHO1A.jpg

Structure Documents:

MA DPW	JAN 1954	Proposed Stone	057-046-000-083-100-TWN1A

Prepared By: Bourne Consulting Engineering

CZM South Shore Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Plymouth

Structure ID: 057-046C-000-027-100

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	White Horse Beach	8/31/2006

Presumed Structure Owner:	Based On Comment:
Local	Property Ownership

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Plymouth	0	$591,591.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
985 Feet	Feet NAVD 88	V2	17 Feet NGVD

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

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

This structure is an almost vertical stone revetment. There are areas of displaced armor stone and slumped crest.

Condition Rating	C
	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 Rating	IV
	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:

057-046C-000-027-100-PHO1A.jpg

Structure Documents:

Prepared By: Bourne Consulting Engineering

CZM South Shore Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Plymouth

Structure ID: 057-048-000-197-100

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	Manomet Bluffs	9/1/2006

Presumed Structure Owner:	Based On Comment:
Local	Property Ownership

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Plymouth	0	$1,294,722.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
975 Feet	Feet NAVD 88	V2	28 Feet NGVD

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

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

This is a field of 13 stone groins. The tips extend approximately to mean low water. A majority of the groins are unraveled and not trapping sand. Each groin is about 75 to 100 feet long.

Condition Rating	D 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 Rating	II Low Priority
Action	Future Project Consideration
Description	Inshore Structures Present with Limited potential for Significant Infrastructure Damage

Structure Images:

057-048-000-197-100-PHO1A.jpg

Structure Documents:

MA DPW	MAR 1955	Proposed Shore	057-048-000-197-100-DCR1A
MA DPW	JUN 1955	Proposed Shore	057-048-000-197-100-DCR1B
MA DPW	DEC 1953	Proposed Shore	057-048-000-197-100-DCR1C
MA DPW	AUG 1956	Proposed Shore	057-048-000-197-100-DCR1D
MA DPW	JUN 1955	Proposed Shore	057-048-000-197-100-TWN1A
PLY DPW	AUG 1979	Town of Plymouth	057-048-000-197-100-TWN1B
PLY DPW	MAY 1941	Shore protection	057-048-000-197-100-TWN1C

Prepared By: Bourne Consulting Engineering

CZM South Shore Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Plymouth

Structure ID: 057-050-000-003-100

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	Fisherman's Lane	9/1/2006

Presumed Structure Owner:	Based On Comment:
Unknown	

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
	0	$72,996.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
50 Feet	Feet NAVD 88	V2	20 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 a pile of stonea at a small bend in the beach. This could either be a very old groin or simply natural armoring of a small promontory.

Condition Rating	F	*Priority Rating*	I
Level of Action	Immediate	*Action*	Long Term Planning Considerations
Description	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.	*Description*	No Inshore Structures or Residential Dwelling Units Present

Structure Images:

057-050-000-003-100-PHO1A.jpg

Structure Documents:

Prepared By: Bourne Consulting Engineering

CZM South Shore Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Plymouth

Structure ID: 057-052-000-025-100

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	Harlow's Landing	9/1/2006

Presumed Structure Owner:	Based On Comment:
Local	DPW - Drawings

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Plymouth	1959	$1,117,459.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
1430 Feet	Feet NAVD 88	V2	19 Feet NGVD

Primary Type:	Primary Material:	Primary Height:
Revetment	Stone	10 to 15 Feet

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

This structure is a stone revetment. It is grouted at the southern end and not grouted at the northern end. There are areas of slumped armor and voids between the stones. An old concrete seawall is visible behind some secitons of the structure.

Condition Rating	C Fair	*Priority Rating*	IV High Priority
Level of Action	Moderate	*Action*	Consider for Next Project Construction Listing
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.	*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:

057-052-000-025-100-PHO1A.jpg

Structure Documents:

MA DPW	DEC 1959	Proposed Shore	057-052-000-025-100-DCR1A
MA DPW	SEP 1964	Proposed Shore	057-052-000-025-100-DCR1B
MA DPW	DEC 1959	Proposed Shore	057-052-000-025-100-TWN1A
MA DPW	SEP 1964	Proposed Shore	057-052-000-025-100-TWN1B

Prepared By: Bourne Consulting Engineering

CZM South Shore Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Plymouth

Structure ID: 057-052-000-025-200

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	Harlow's Landing	9/1/2006

Presumed Structure Owner:	Based On Comment:
Local	DPW - Drawings

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Plymouth	1953	$510,972.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
350 Feet	Feet NAVD 88	V2	19 Feet NGVD

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

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

This is a field of 7 stone groins. A majority of each groin is unraveled. The tips of the groins extend approximately to mean low water. The groins are essentially non-functional. Each groin is approximately 50 feet long.

Condition Rating	F Critical
Level of Action	Immediate
Description	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.

Priority Rating	III 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:

057-052-000-025-200-PHO2A.jpg

Structure Documents:

MA DPW	DEC 1953	Proposed Shore	057-052-000-025-200-DCR1C
MA DPW	DEC 1953	Proposed Shore	057-052-000-025-200-TWN2A

Prepared By: Bourne Consulting Engineering

CZM South Shore Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Plymouth

Structure ID: 057-053-021-019-100

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	Lookout Point	8/31/2006

Presumed Structure Owner:	Based On Comment:
Local	USACE – Permits

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Plymouth	1992	$117,810.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
750 Feet	Feet NAVD 88	V2	21 Feet NGVD

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

Secondary Type:	Secondary Material:	Secondary Height:

Structure Summary :

This is a field of 5 stone groins south of the entrance to Ellisville Harbor. The crests and sideslopes are in good condition. Outer head and toe of structures was not evaluated due to high tide. Each groin is approximately 150 feet long.

Condition Rating	B – Good	*Priority Rating*	IV – High Priority
Level of Action	Minor	*Action*	Consider for Next Project Construction 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*	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:

057-053-021-019-100-PHO1A.jpg

Structure Documents:

MA DPW	DEC 1951	Proposed Stone	057-053-021-019-100-DCR1A
MADPW	JAN 1952	Proposed Stone	057-053-021-019-100-COE1A

Prepared By: Bourne Consulting Engineering

CZM South Shore Coastal Infrastructure Inventory and Assessment

Structure Assessment Form

Town: Plymouth

Structure ID: 057-053-021-059-100

Key: community-map-block-parcel-structure

Property Owner:	Location:	Date:
Local	Ellisville Harbor	8/31/2006

Presumed Structure Owner:	Based On Comment:
Local	USACE – Permits

Owner Name:	Earliest Structure Record:	Estimated Reconstruction/Repair Cost:
Plymouth	1960	$76,355.00

Length:	Top Elevation:	FIRM Map Zone:	FIRM Map Elevation:
115 Feet	Feet NAVD 88	V2	21 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 a stone groin on the open beach just north of the entrance to Ellisville Harbor. The sideslopes and crest of the trunk are generally in good condition. The head of the groin has become unraveled.

Condition Rating	C 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 Rating	II Low Priority
Action	Future Project Consideration
Description	Inshore Structures Present with Limited potential for Significant Infrastructure Damage

Structure Images:

057-053-021-059-100-PHO1A.jpg

Structure Documents:

MA DPW	DEC 1939	Proposed Excavation	057-053-021-059-100-DCR1A
MA DPW	APR 1960	Proposed Harbor	057-053-021-059-100-DCR1B
MA DPW	DEC 1939	Proposed Excavation	057-053-021-059-100-TWN1A
MA DPW	APR 1960	Proposed Harbor	057-053-021-059-100-TWN1B
MADPW	JUN 160	Proposed Stone	057-053-021-059-100-COE1A

Prepared By: Bourne Consulting Engineering

Section IV

Town of Plymouth

Structure Photographs

TOWN: PLYMOUTH
SOURCE: BCE - FIELD PHOTOGRAPHS
LOCATION: Bourne Consulting Engineering
DATE OF RESEARCH: AUGUST 2006

BCE Structure No	Document No	Contract/ Drawing Number	Entity	Municipality	Date	Title	Sheets	Location	Description
057-001-000-010-100	057-001-000-010-100-PHO1A.jpg		Bourne Consulting Engineering	PLYMOUTH	August 2006	DIGITAL IMAGE	1	Structure Location	Structure Condtion Photo at Time of Survey
057-006-062-019-100	057-006-062-019-100-PHO1A.jpg		Bourne Consulting Engineering	PLYMOUTH	August 2006	DIGITAL IMAGE	1	Structure Location	Structure Condtion Photo at Time of Survey
057-007-000-042-100	057-007-000-042-100-PHO1A.jpg		Bourne Consulting Engineering	PLYMOUTH	August 2006	DIGITAL IMAGE	1	Structure Location	Structure Condtion Photo at Time of Survey
057-012-000-046A-100	057-012-000-046A-100-PHO1A.jpg		Bourne Consulting Engineering	PLYMOUTH	August 2006	DIGITAL IMAGE	1	Structure Location	Structure Condtion Photo at Time of Survey
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057-014A-000-001A-100	057-014A-000-001A-100-PHO1A.jpg		Bourne Consulting Engineering	PLYMOUTH	August 2006	DIGITAL IMAGE	1	Structure Location	Structure Condtion Photo at Time of Survey
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057-014A-000-010A-100	057-014A-000-010A-100-PHO1A.jpg		Bourne Consulting Engineering	PLYMOUTH	August 2006	DIGITAL IMAGE	1	Structure Location	Structure Condtion Photo at Time of Survey
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057-014A-000-021A-200	057-014A-000-021A-200-PHO2A.jpg		Bourne Consulting Engineering	PLYMOUTH	August 2006	DIGITAL IMAGE	1	Structure Location	Structure Condtion Photo at Time of Survey
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057-017-000-161-100	057-017-000-161-100-PHO1A.jpg		Bourne Consulting Engineering	PLYMOUTH	August 2006	DIGITAL IMAGE	1	Structure Location	Structure Condtion Photo at Time of Survey
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057-020-000-182-200	057-020-000-182-200-PHO2B.jpg		Bourne Consulting Engineering	PLYMOUTH	August 2006	DIGITAL IMAGE	1	Structure Location	Structure Condtion Photo at Time of Survey

TOWN: PLYMOUTH
SOURCE: BCE - FIELD PHOTOGRAPHS
LOCATION: Bourne Consulting Engineering
DATE OF RESEARCH: AUGUST 2006

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057-023-000-026-200	057-023-000-026-200-PHO2B.jpg		Bourne Consullting Engineering	PLYMOUTH	August 2006	DIGITAL IMAGE	1	Structure Location	Structure Condtion Photo at Time of Survey
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TOWN: PLYMOUTH
SOURCE: BCE - FIELD PHOTOGRAPHS
LOCATION: Bourne Consulting Engineering
DATE OF RESEARCH: AUGUST 2006

057-048-000-197-100	057-048-000-197-100-PHO1A.jpg		Bourne Consullting Engineering	PLYMOUTH	August 2006	DIGITAL IMAGE	1	Structure Location	Structure Condtion Photo at Time of Survey
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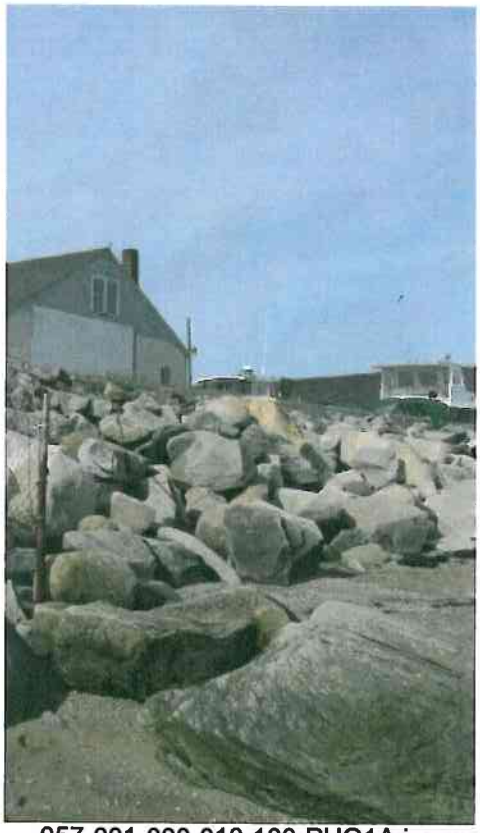
South Shore Coastal Infrastructure and Assessment



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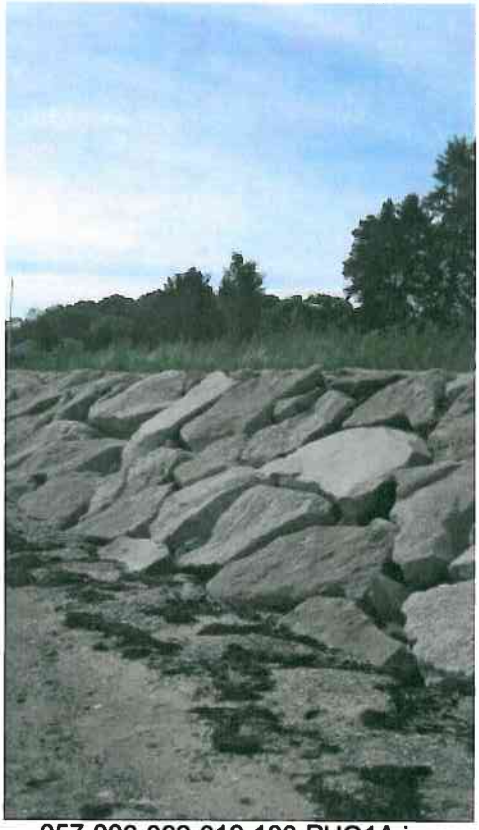

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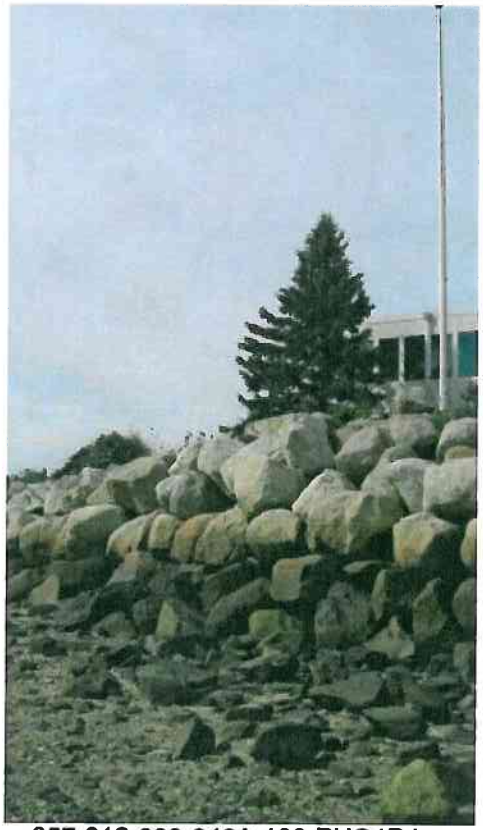

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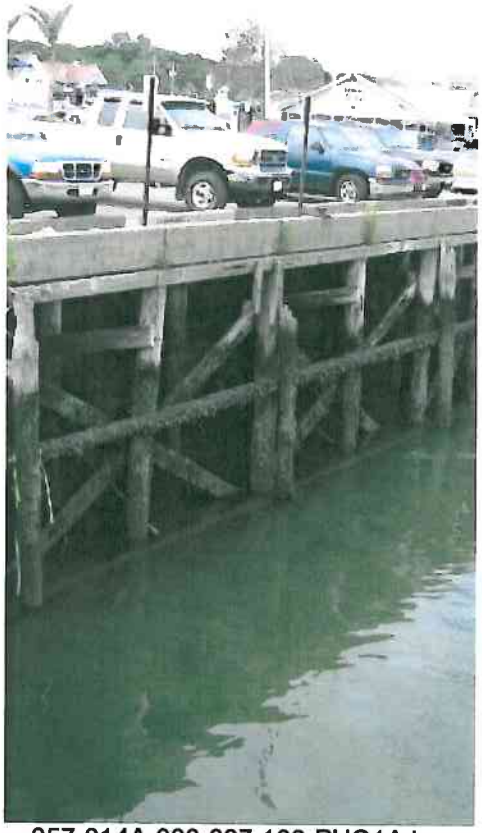

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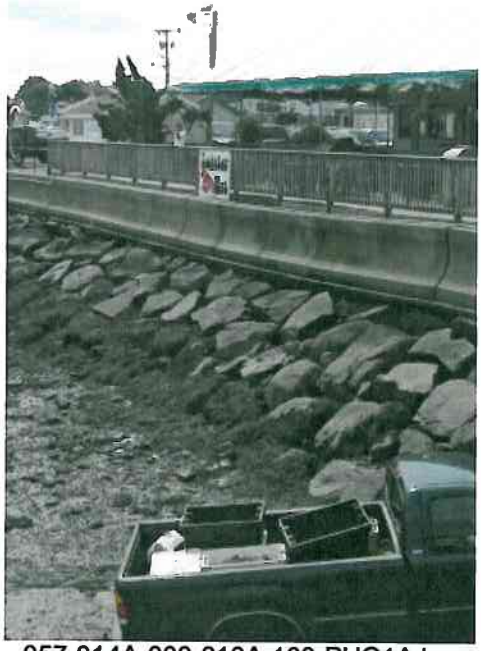

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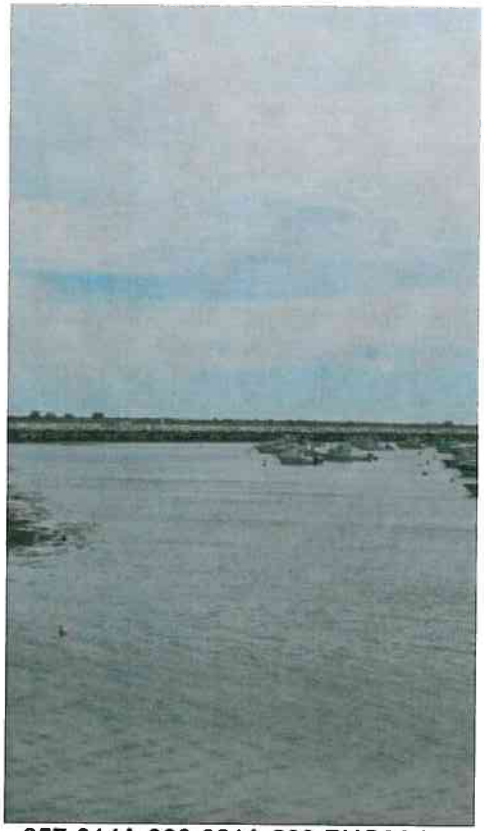

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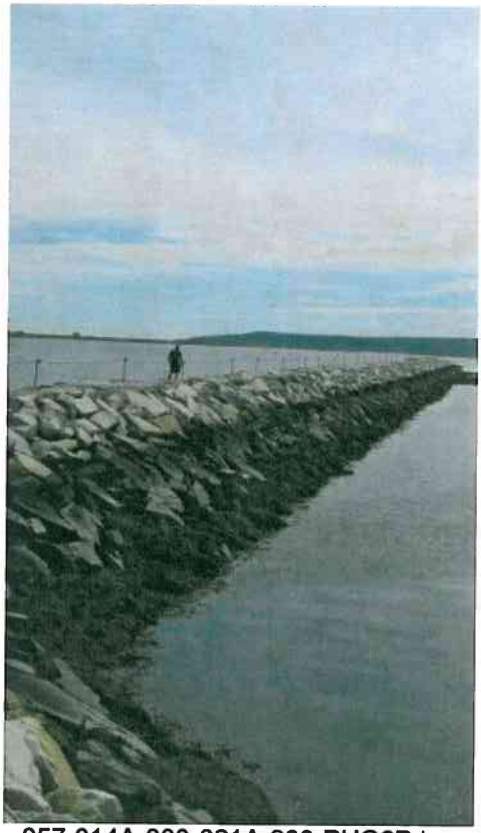

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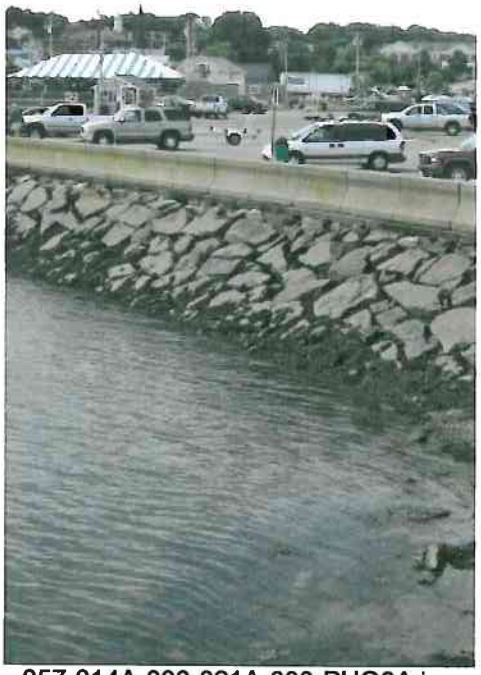

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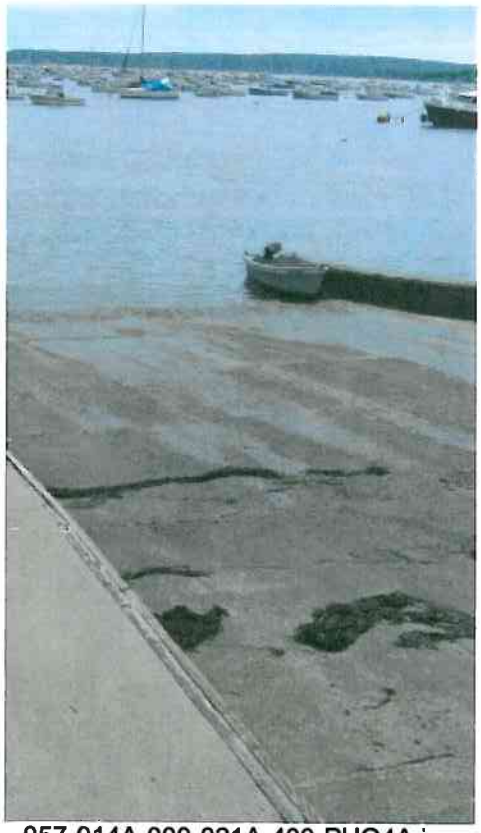

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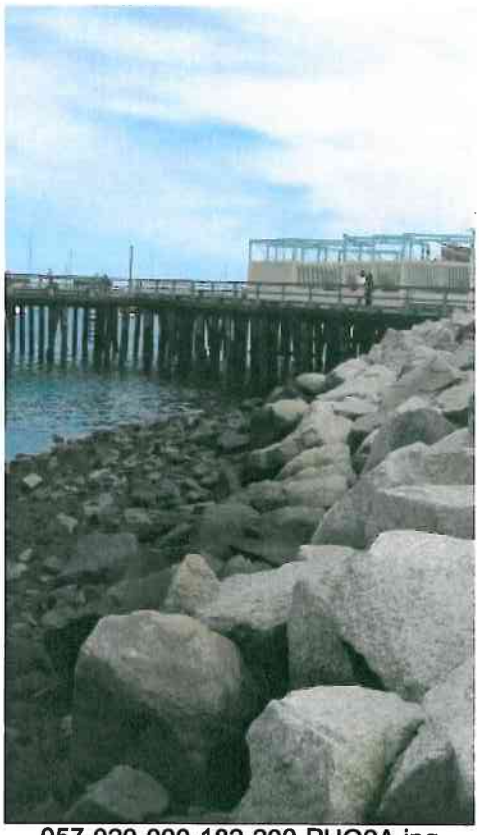

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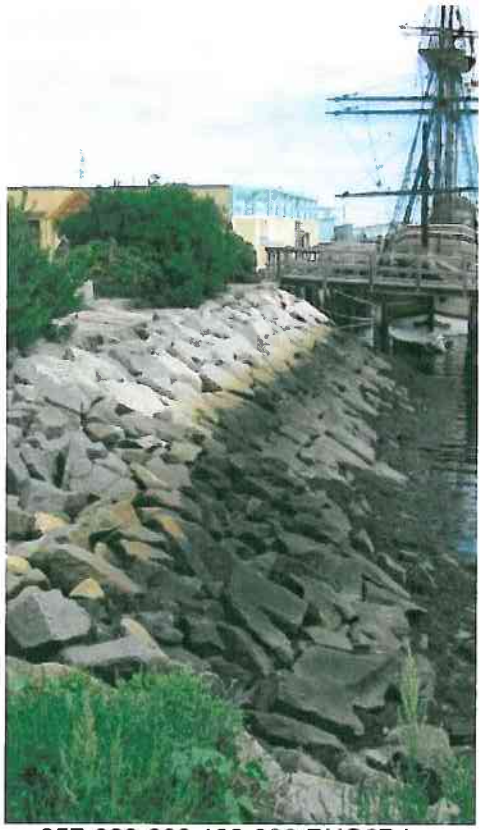

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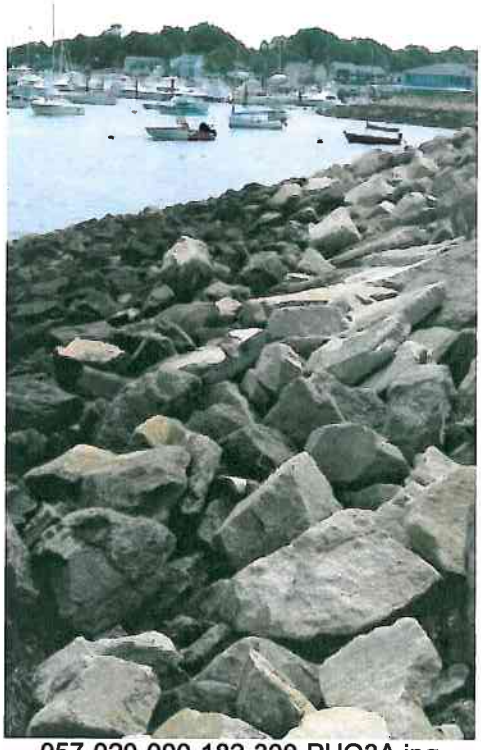

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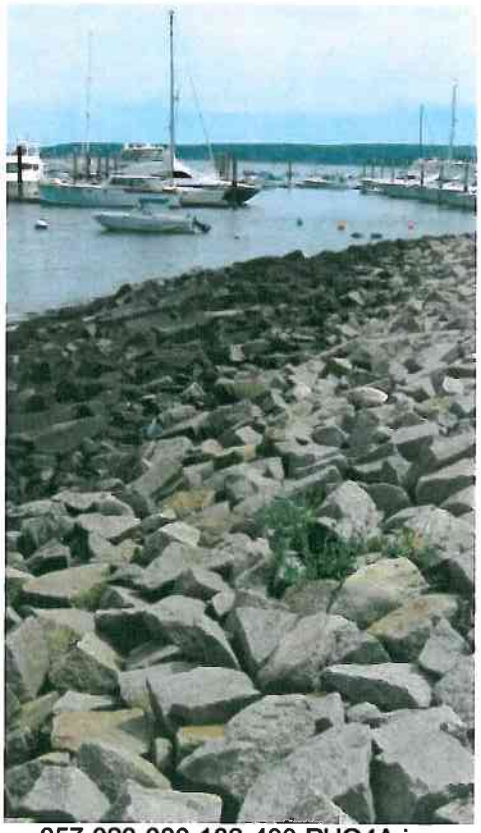

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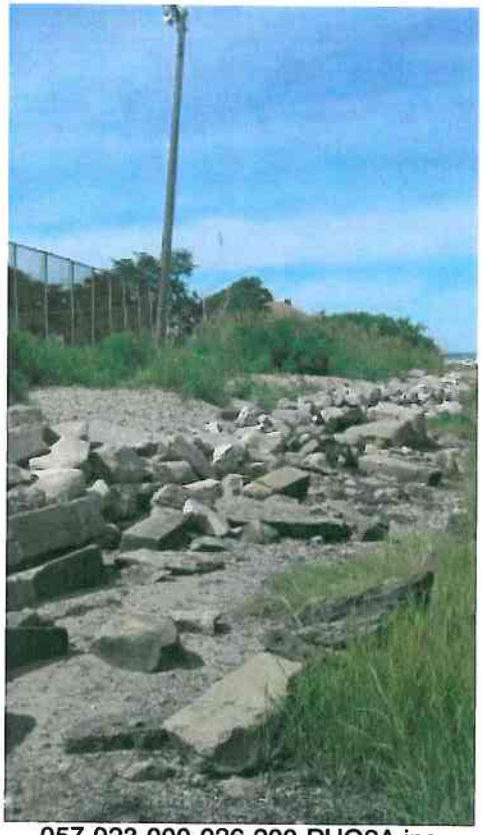

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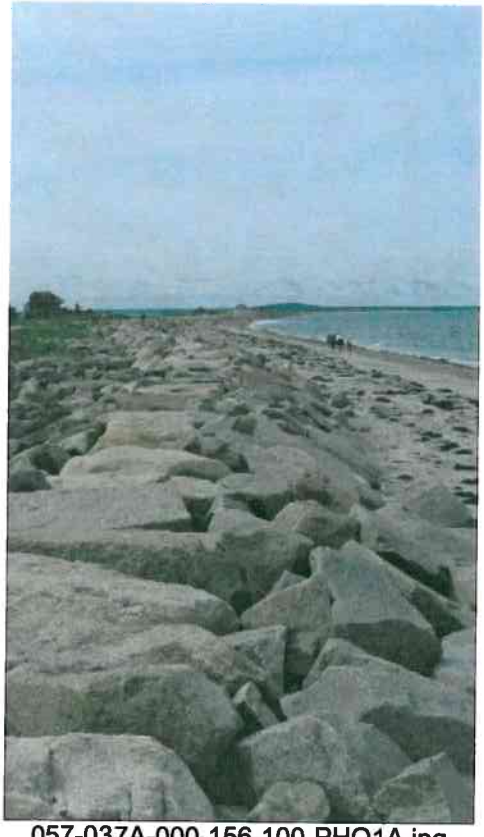

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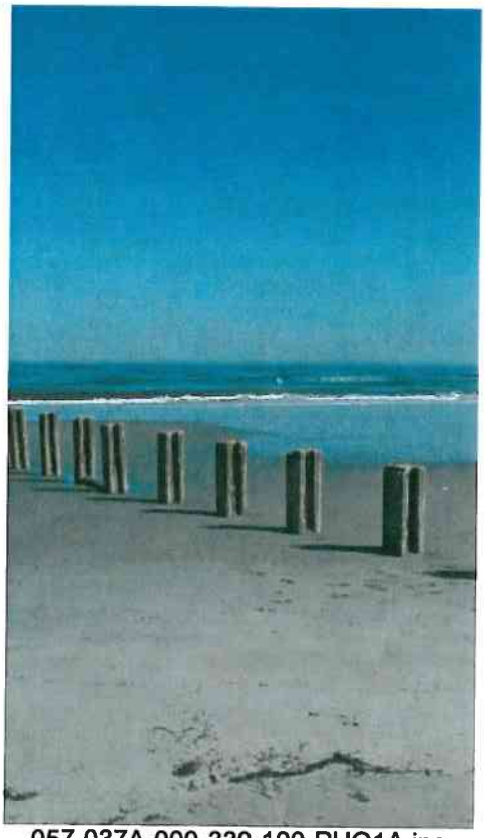

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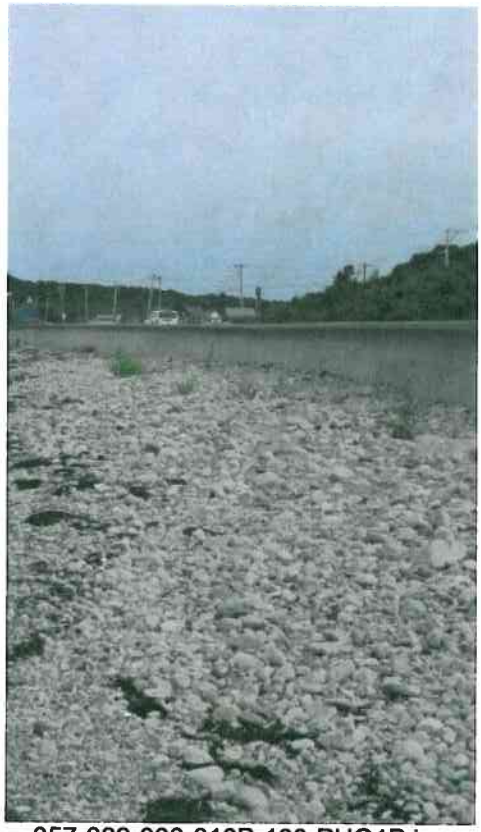

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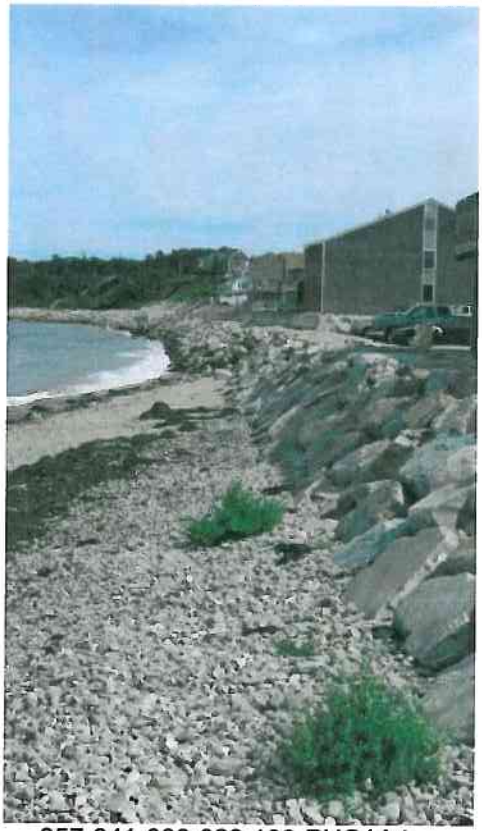

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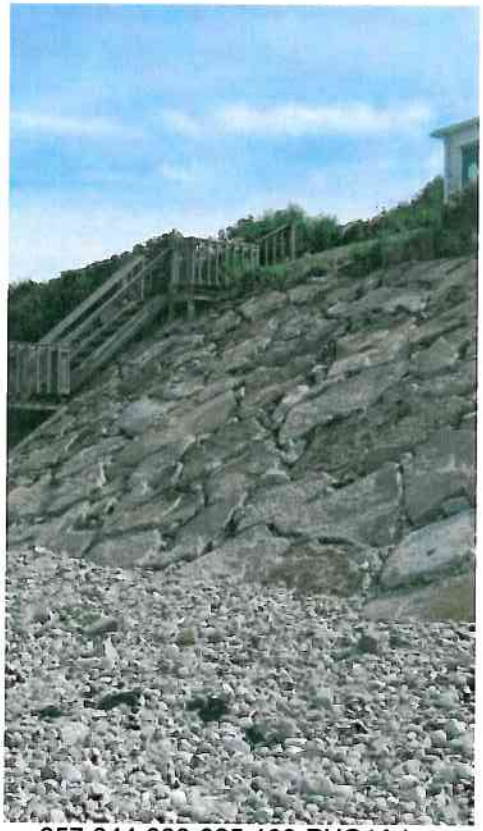

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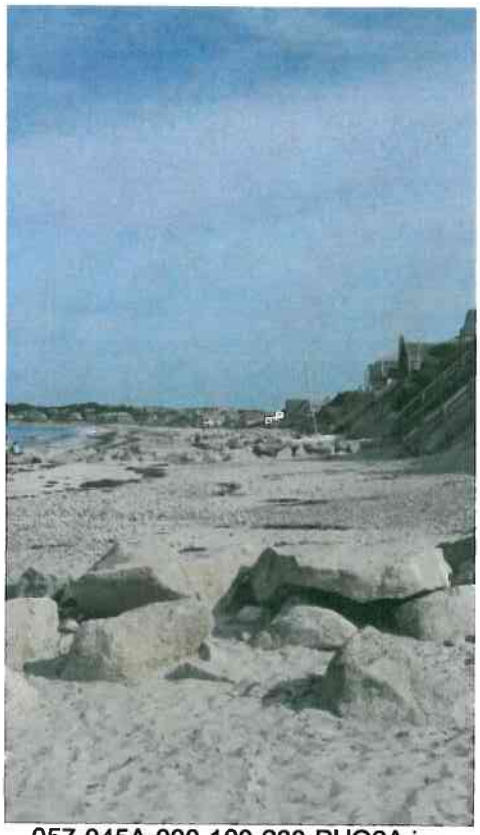

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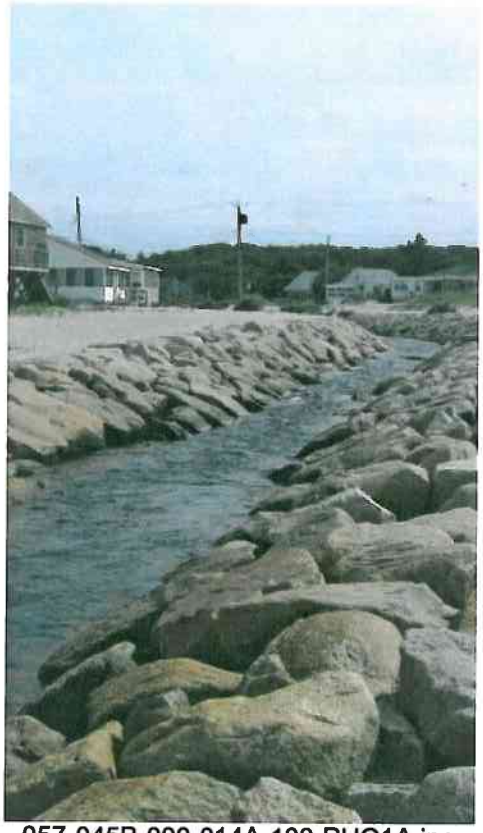

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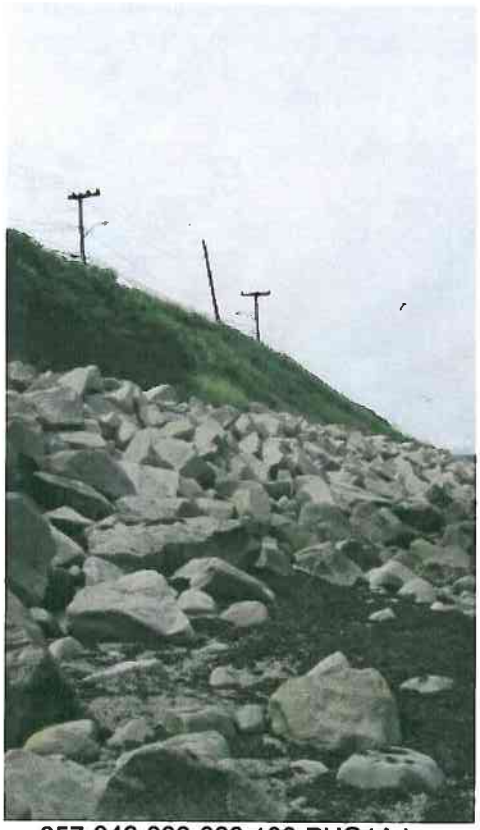

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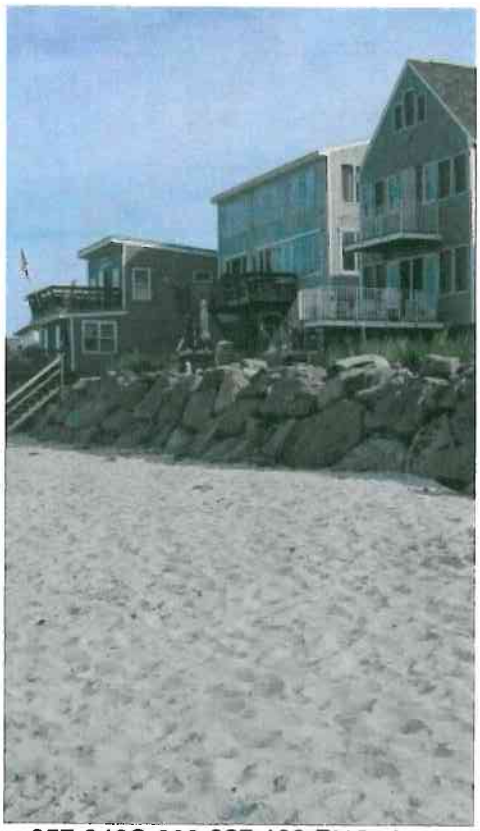

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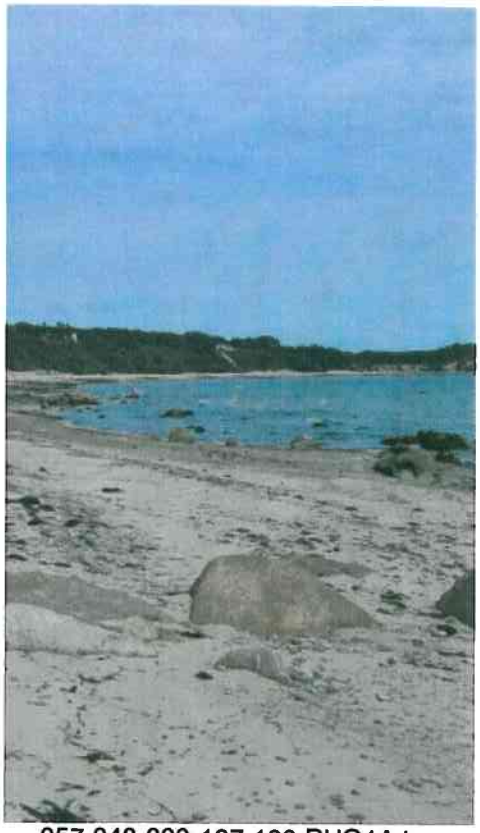

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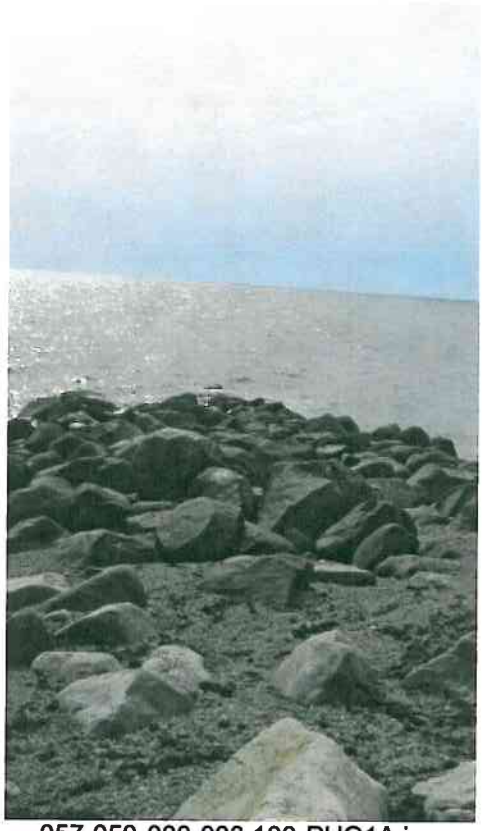

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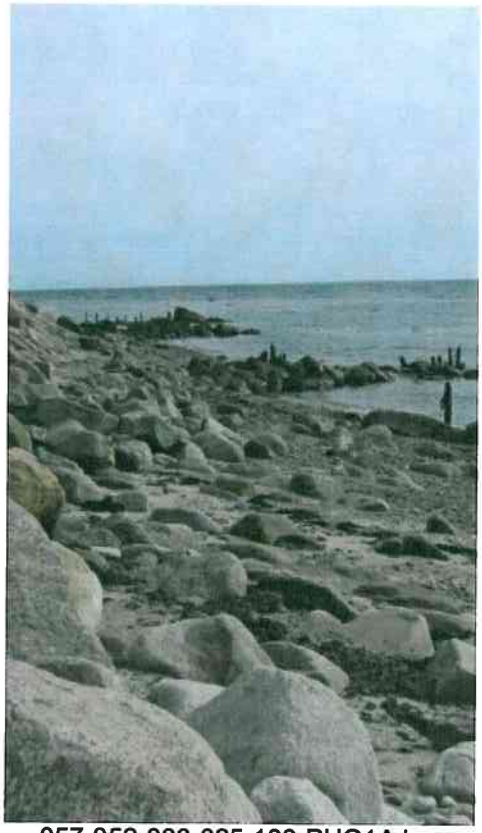

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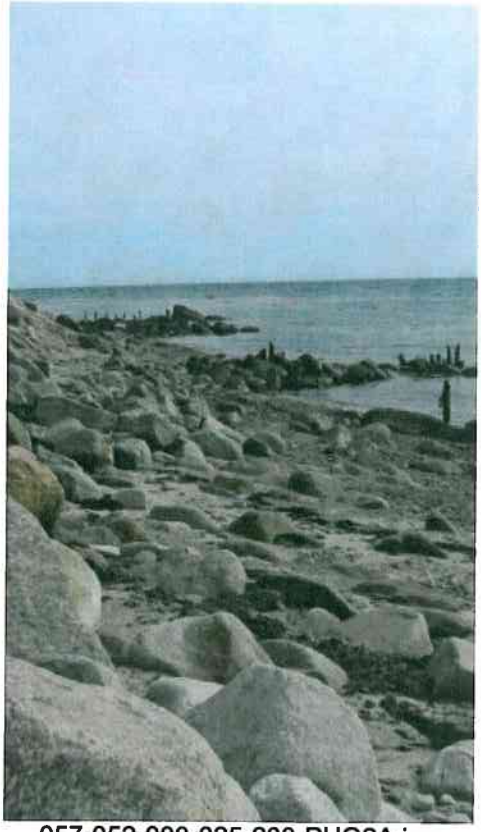

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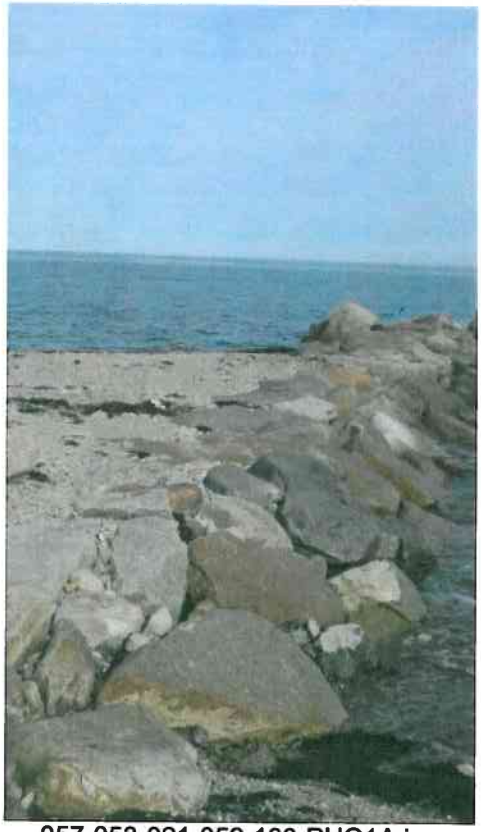

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Section V

Town of Plymouth

Structure Research

TOWN DOCUMENT LIST

MA DCR - DOCUMENT LIST

MA DEP – Chp 91 DOCUMENT LIST

- Copies of License Documents

USACE – PERMIT DOCUMENT LIST

- Copies of Permit Documents

TOWN: PLYMOUTH
SOURCE: TOWN OF PLYMOUTH
LOCATION: PLYMOUTH MA
DATE OF RESEARCH: AUGUST 2006

BCE Structure No	Document No	Contract/ Drawing Number	Entity	Municipality	Date	Title	Sheets	Location	Description
057-001-000-010-100	057-001-000-010-100-TWN1A	6159	MA DPW	PLYMOUTH	OCT 1956	Proposed Drainage, Headwall, Pipe and Tide Gate - Hedge Road	2	Hedge Road	MA DPW# 1686
057-001-006-062-100	057-001-006-062-100-TWN1A	6158	MA DPW	PLYMOUTH	APR 1967	Proposed Shore Protection, Stone Mound - Hedge Road	1	Hedge Road	MA DPW# 2574
057-007-000-042-100	057-007-000-042-100-TWN1A	6165	MA DPW	PLYMOUTH	SEP 1957	Proposed Shore Protection, Stone Mound - High Cliff	1	High Cliffs	MA DPW# 1814
057-014A-000-021A-200	057-014A-000-021A-200-TWN2A	6197	COE	PLYMOUTH	JUN 1955	Plymouth Harbor Breakwater	5		
057-017-000-161-100	057-017-000-161-100-TWN1A	6144	MA DPW	PLYMOUTH	JUL 1948	Proposed Bank Protection & Pavement, Water Street	1	Water Street	MA DPW# 1050
057-020-000-182-100	057-020-000-182-100-TWN1A	6169A	MA DPW	PLYMOUTH	MAY 1956	Proposed Shore Protection, Rip Rap, Conc Curb, Wall, & Grading at Pilgrams Memorial Park	1		
057-037A-000-339-100	057-037A-000-339-100-TWN1A	6198	COE	PLYMOUTH	APR 1970	Plymouth Harbor MA, Rehabilitation of Long Beach Breakwater	16		
057-039-000-010B-100	057-039-000-010B-100-TWN1A	6186	MA DPW	PLYMOUTH	MAY 1952	Proposed Shore Protection, Eel River	1	Eel River, Near Public Bath House	MA DPW# 1237
057-039-000-010B-100	057-039-000-010B-100-TWN1B	6166	MA DPW	PLYMOUTH	SEP 1957	Proposed Shore Protection, Concrete Seawall and Stone Apron - Long Beach	1	Long Beach	MA DPW# 1803
057-039-000-010B-100	057-039-000-010B-100-TWN1C	6162	MA DPW	PLYMOUTH	APR 1965	Proposed Shore Protection, Concrete Seawall and Stone Apron - Long Beach	1	Long Beach in front of Bath House	MA DPW# 2478
057-039-000-010B-100	057-039-000-010B-100-TWN1D	6163	MA DPW	PLYMOUTH	MAR 1968	Proposed Shore Protection, Stone Groin Construction, Warren Cove, North of Bath House	1	Warren Cove, North of Bath House	MA DPW# 2635
057-039-000-010B-100	057-039-000-010B-100-TWN1E	6166	COE	PLYMOUTH	DEC 1956	Plymouth Harbor, MASS, Repairs to Long Beach	1		MA DPW# 1608
057-039-000-010B-100	057-039-000-010B-100-TWN1F	6188	PLY DPW	PLYMOUTH	OCT 1978	Contract 2851, Reconstruction of Warrens Cove Revetment	2	Warrens Cove	
057-041-000-029-100	057-041-000-029-100-TWN1A	6163	MA DPW	PLYMOUTH	OCT 1956	Proposed Shore Protection, Stone Mound & Groin Construction - Warren Cove	1	Warren Cove	MA DPW# 1666
057-041-000-029-100	057-041-000-029-100-TWN1B	6175	MA DPW	PLYMOUTH	FEB 1960	Proposed Shore Protection, Stone Mound & Rip Rap Slope - Warren Cove	1	Warren Cove	MA DPW# 2096
057-041-000-029-100	057-041-000-029-100-TWN1C	6185	MA DPW	PLYMOUTH	MAR 1964	Proposed Shore Protection, Stone Mound Protection - Warren Cove	3	Warren Cove	MA DPW# 2333
057-046-000-003-100	057-046-000-003-100-TWN1A	6192	MA DPW	PLYMOUTH	AUG 1934	Proposed Shore Protection, Manomet Point	1	Stone Revetmenrt North Side of Manomet Point	MA DEP # 416
057-046-000-083-100	057-046-000-083-100-TWN1A	6148	MA DPW	PLYMOUTH	JAN 1954	Proposed Stone Jettles, White Horse Beach,	1		
057-048-000-197-100	057-048-000-197-100-TWN1A	6191	MA DPW	PLYMOUTH	JUN 1955	Proposed Shore Protection, Groin Construction, Manomet Bluffs - Southerly of Bradford Ave.	1	South of Contract #1475 -	MA DPW# 1513
057-048-000-197-100	057-048-000-197-100-TWN1B	6170	PLY DPW	PLYMOUTH	AUG 1979	Town of Plymouth Reconstuction of Shoreline Stonework & Groins, Lookout Point	1		
057-048-000-197-100	057-048-000-197-100-TWN1C	6144	PLY DPW	PLYMOUTH	MAY 1941	Shore protection Project, Manomet Point	1	North Side of Point	2 Jettles -MA DPW# 710
057-050-000-006-100	057-050-000-006-100-TWN1A	6143	MA DEQE	PLYMOUTH	JUL 1974	Proposed Shore Protection, Stone Mound Protection, Indian Hill	1	Indian Hill	MA DPW# 2796
057-050-000-006-100	057-050-000-006-100-TWN1B	6157	PLY DPW	PLYMOUTH	-	Reconstuction of Indian Head Revetment	4	South End of Seawall Drive	
057-052-000-025-100	057-052-000-025-100-TWN1A	6191	MA DPW	PLYMOUTH	DEC 1959	Proposed Shore Protection, Stone Mound - Ellisville, Vicinity of Black Pond	1	Ellisville, Vicinity of Black Pond	MA DPW# 2087
057-052-000-025-100	057-052-000-025-100-TWN1B	6184	MA DPW	PLYMOUTH	SEP 1964	Proposed Shore Protection, Stone Mound Protection - Ellisville	1	Ellisville	MA DPW# 2452
057-052-000-025-200	057-052-000-025-200-TWN2A	6172	MA DPW	PLYMOUTH	DEC 1953	Proposed Shore Protection, Groin Construction, Manomet Bluffs - Vicinity of Old Beach Road	3	Manomet Bluffs - Vicinity of Old Beach Road	MA DPW# 2006
057-053-021-019-200	057-053-021-019-200-TWN2B	6161	MA DPW	PLYMOUTH	AUG 1956	Proposed Shore Protection, Groin Construction, Massasoit Shores	1	Massasoit Shores	MA DPW# 1654
057-053-021-059-100	057-053-021-059-100-TWN1A	6167	MA DPW	PLYMOUTH	DEC 1939	Proposed Excavation & Stone Jetty, Ellisville Harbor	1	Ellisville Harbo	MA DPW# 639
057-053-021-059-100	057-053-021-059-100-TWN1B	6176	MA DPW	PLYMOUTH	APR 1960	Proposed Harbor Improvement and Shore Protection - Excavating Stone Jetty - Ellisville Harbor	1	Ellisville Harbor	MA DPW# 2105

TOWN: PLYMOUTH
SOURCE: MA-DCR - OFFICE OF WATERWAYS
LOCATION: MA-DCR - OFFICE OF WATERWAYS, HINGHAM, MA
DATE OF RESEARCH: AUGUST 2006

BCE Structure No	Document No	Contract/ Drawing Number	Entity	Municipality	Date	Title	Sheets	Location	Description
057-001-000-010-100	057-001-000-010-100-DCR1A	1686	MA DPW	PLYMOUTH	OCT 1956	Proposed Drainage, Headwall, Pipe and Tide Gate - Hedge Road	2	Hedge Road	
057-006-062-019-100	057-006-062-019-100-DCR1A	2574	MA DPW	PLYMOUTH	APR 1967	Proposed Shore Protection, Stone Mound - Hedge Road	1	Hedge Road	
057-007-000-042-100	057-007-000-042-100-DCR1A	1814	MA DPW	PLYMOUTH	SEP 1957	Proposed Shore Protection, Stone Mound - High Cliff	1	High Cliffs	
057-014A-000-007-100	057-014A-000-007-100-DCR1A	2725	MA DEQE	PLYMOUTH	FEB 1971	Proposed Harbor Improvements Repairs to Bulkhead - PLYMOUTH Harbor	5	PLYMOUTH Harbor	
057-014A-000-021A-300	057-014A-000-021A-300-DCR3A	2702	MA DEQE	PLYMOUTH	SEP 1970	Proposed Shore Protection, Concrete Seawall - North Westerly of T-Wharf	1	North Westerly of T-Wharf	
057-014A-000-021A-400	057-014A-000-021A-400-DCR4B	2702	MA DEQE	PLYMOUTH	SEP 1970	Proposed Shore Protection, Concrete Seawall - North Westerly of T-Wharf	1	North Westerly of T-Wharf	
057-014A-000-021A-500	057-014A-000-021A-500-DCR5A	2702	MA DEQE	PLYMOUTH	SEP 1970	Proposed Shore Protection, Concrete Seawall - North Westerly of T-Wharf	1	North Westerly of T-Wharf	
057-017-000-181-100	057-017-000-181-100-DCR1A	1050	MA DPW	PLYMOUTH	JUL 1948	Proposed Bank Protection & Pavement, Water Street	1	Water Street	
057-020-000-182-100	057-020-000-182-100-DCR1A	663	MA DPW	PLYMOUTH	Nov 1945	Concrete Retaining Wall, PLYMOUTH State Pier	1	PLYMOUTH State Pier	
057-039-000-010B-100	057-039-000-010B-100-DCR1A	656	MA DPW	PLYMOUTH	MAR 1940	Proposed Shore Protection, Warrens Cove	1	Warrens Cove - Hotel Pilgrim	
057-039-000-010B-100	057-039-000-010B-100-DCR1B	686	MA DPW	PLYMOUTH	SEP 1940	Proposed Shore Protection, Warrens Cove	1	Warrens Cove - Hotel Pilgrim	
057-039-000-010B-100	057-039-000-010B-100-DCR1C	946	MA DPW	PLYMOUTH	JUL 1946	Proposed Repairs to Sea Wall, Warren Cove	1	Warrens Cove	
057-039-000-010B-100	057-039-000-010B-100-DCR1D	1439	MA DPW	PLYMOUTH	OCT 1954	Proposed Shore Protection, Concrete Seawall, Warren Cove - Northerly of Bath House at Long Beach	1	Long Beach	
057-039-000-010B-100	057-039-000-010B-100-DCR1E	1661	MA DPW	PLYMOUTH	SEP 1956	Proposed Shore Protection, Concrete Seawall and Stone Apron - Long Beach	1	Long Beach	
057-039-000-010B-100	057-039-000-010B-100-DCR1F	1803	MA DPW	PLYMOUTH	SEP 1957	Proposed Shore Protection, Concrete Seawall and Stone Apron - Long Beach	1	Long Beach	
057-039-000-010B-100	057-039-000-010B-100-DCR1G	2033	MA DPW	PLYMOUTH	MAY 1959	Proposed Shore Protection, Concrete Seawall and Stone Apron - Long Beach	1	Long Beach - South of the Bath House	
057-039-000-010B-100	057-039-000-010B-100-DCR1H	2635	MA DPW	PLYMOUTH	MAR 1968	Proposed Shore Protection, Stone Groin Construction, Warren Cove, North of Bath House	1	Warren Cove, North of Bath House	
057-039-000-010B-100	057-039-000-010B-100-DCR1I	1237	MA DPW	PLYMOUTH	MAY 1952	Proposed Shore Protection, Eel River	1	Eel River, Near Public Bath House	
057-039-000-010B-100	057-039-000-010B-100-DCR1J	2478	MA DPW	PLYMOUTH	APR 1965	Proposed Shore Protection, Concrete Seawall and Stone Apron - Long Beach	1	Long Beach in front of Bath House	
057-041-000-029-100	057-041-000-029-100-DCR1A	946	MA DPW	PLYMOUTH	JUL 1946	Proposed Repairs to Sea Wall, Warren Cove	1	Warrens Cove	South of Eel River
057-041-000-029-100	057-041-000-029-100-DCR1B	341	MA DPW	PLYMOUTH	OCT 1932	Proposed Rip Rap Jettles & Repairs to Sea Wall, Warrens Cove, Plymouth	1	Warrens Cove	
057-041-000-029-100	057-041-000-029-100-DCR1C	656	MA DPW	PLYMOUTH	MAR 1940	Proposed Shore Protection, Warrens Cove	1	Warrens Cove - Hotel Pilgrim	
057-041-000-029-100	057-041-000-029-100-DCR1D	686	MA DPW	PLYMOUTH	SEP 1940	Proposed Shore Protection, Warrens Cove	1	Warrens Cove - Hotel Pilgrim	
057-041-000-029-100	057-041-000-029-100-DCR1E	1666	MA DPW	PLYMOUTH	OCT 1956	Proposed Shore Protection, Stone Mound & Groin Construction - Warren Cove	1	Warren Cove	
057-041-000-029-100	057-041-000-029-100-DCR1F	2096	MA DPW	PLYMOUTH	FEB 1960	Proposed Shore Protection, Stone Mound & Rip Rap Slope - Warren Cove	1	Warren Cove	
057-041-000-029-100	057-041-000-029-100-DCR1G	2333	MA DPW	PLYMOUTH	MAR 1964	Proposed Shore Protection, Stone Mound Protection - Warren Cove	3	Warren Cove	
057-044-000-025-100	057-044-000-025-100-DCR1A	2036	MA DPW	PLYMOUTH	JUN 1957	Proposed Shore Protection, Stone Revetment - Pricilla Beach	1	Pricilla Beach, Just north of stairs	

TOWN: PLYMOUTH
SOURCE: MA-DCR - OFFICE OF WATERWAYS
LOCATION: MA-DCR - OFFICE OF WATERWAYS, HINGHAM, MA
DATE OF RESEARCH: AUGUST 2006

057-045A-000-100-200	057-045A-000-100-200-DCR1A	1194	MA DPW	PLYMOUTH	JAN 1952	Proposed Stone Jetties, White Horse Beach	1	White Horse Beach	Seven Stone Jetties
057-045B-000-14A-100	057-045B-000-14A-100-DCR1A	2006	MA DPW	PLYMOUTH	DEC 1953	Proposed Shore Protection, South Mound Barlett Brook - White Horse Beach	3	White Horse Beach	
057-045B-000-14A-200	057-045B-000-14A-200-DCR1B	2006	MA DPW	PLYMOUTH	DEC 1953	Proposed Shore Protection, South Mound Barlett Brook - White Horse Beach	3	White Horse Beach	
057-046-000-003-100	057-046-000-003-100-DCR1A	1263	MA DPW	PLYMOUTH	AUG 1952	Proposed Shore Protection, Manomet	1	Manomet	Revetment
057-048-000-197-100	057-048-000-197-100-DCR1A	1475	MA DPW	PLYMOUTH	MAR 1955	Proposed Shore Protection, Groin Construction, Manomet Bluffs	1	Monomet Bluffs - South of Strand Ave.	Stone Jetties
057-048-000-197-100	057-048-000-197-100-DCR1B	1513	MA DPW	PLYMOUTH	JUN 1955	Proposed Shore Protection, Groin Construction, Manomet Bluffs - Southerly of Bradford Ave.	1	South of Contract #1475	
057-048-000-197-100	057-048-000-197-100-DCR1C	2006	MA DPW	PLYMOUTH	DEC 1953	Proposed Shore Protection, Groin Construction, Manomet Bluffs - Vicinity of Old Beach Road	3	Manomet Bluffs - Vicinity of Old Beach Road	
057-048-000-197-100	057-048-000-197-100-DCR1D	1654	MA DPW	PLYMOUTH	AUG 1956	Proposed Shore Protection, Groin Construction, Massasoit Shores	1	Massasoit Shores	
057-050-000-006-100	057-050-000-006-100-DCR1A	2796	MA DEQE	PLYMOUTH	JUL 1974	Proposed Shore Protection, Stone Mound Protection, Indian Hill	1	Indian Hill	
057-052-000-025-100	057-052-000-025-100-DCR1A	2087	MA DPW	PLYMOUTH	DEC 1959	Proposed Shore Protection, Stone Mound - Ellisville, Vicinity of Black Pond	1	Ellisville, Vicinity of Black Pond	
057-052-000-025-100	057-052-000-025-100-DCR1B	2452	MA DPW	PLYMOUTH	SEP 1964	Proposed Shore Protection, Stone Mound Protection - Ellisville	1	Ellisville	
057-052-000-025-200	057-052-000-025-200-DCR1C	2006	MA DPW	PLYMOUTH	DEC 1953	Proposed Shore Protection, Groin Construction, Manomet Bluffs - Vicinity of Old Beach Road	3	Manomet Bluffs - Vicinity of Old Beach Road	
057-053-021-019-100	057-053-021-019-100-DCR1A	1198	MA DPW	PLYMOUTH	DEC 1951	Proposed Stone Jetties, Look Out Point	2	Look Out Point	3 Jetties
057-053-021-059-100	057-053-021-059-100-DCR1A	639	MA DPW	PLYMOUTH	DEC 1939	Proposed Excavation & Stone Jetty, Ellisville Harbor	1	Ellisville Harbor	
057-053-021-059-100	057-053-021-059-100-DCR1B	2105	MA DPW	PLYMOUTH	APR 1960	Proposed Harbor Improvement and Shore Protection - Excavating Stone Jetty - Ellisville Harbor	1	Ellisville Harbor	

TOWN: PLYMOUTH
SOURCE: MA-DEP CHAPTER 91 LICENSE
LOCATION: MA-DEP MAIN OFFICE, BOSTON, MA
DATE OF RESEARCH: AUGUST 2006

BCE Structure No	Document No	Contract/ Drawing Number	Entity	Municipality	Date	Title	Sheets	Location	Description
057-014A-000-014-100	057-014A-000-014-100-LIC1A	2146	DEP CH.91	PLYMOUTH	NOV 15 1939	PLAN ACCOMPANYING PETITION OF THE TOWN OF PLYMOUTH TO REMOVE WOODEN BULKHEAD IN PLYMOUTH HARBOR - PLYMOUTH	1	ALONG EXISTING STONE WALL BETWEEN WATER STREET AND FISH WHARF	REMOVE TIMBER BULKHEAD
057-014A-000-01A-100	057-014A-000-01A-100-LIC1A	1005	DEP CH.91	PLYMOUTH	AUG 15 1983	LAN ACCOMPANYING PETITION OF THE TOWN OF PLYMOUTH TO REPAIR AND MAINTAIN EXISTING DRAINAGE OUTFALL AND CONSTRUCT AND MAINTAIN SUPPLEMENTAL OUTFALL IN PLYMOUTH HARBOR, TOWN OF PLYMOUTH, COUNTY OF PLYMOUTH	3	WATER STREET, JUST SOUTHEAST OF LATHROP STREET	DRAINAGE OUTFALL INTERACTION WITH STONE REVETMENT
057-014A-000-021-100	057-014A-000-021-100-LIC1A	1005	DEP CH.91	PLYMOUTH	AUG 15 1983	LAN ACCOMPANYING PETITION OF THE TOWN OF PLYMOUTH TO REPAIR AND MAINTAIN EXISTING DRAINAGE OUTFALL AND CONSTRUCT AND MAINTAIN SUPPLEMENTAL OUTFALL IN PLYMOUTH HARBOR, TOWN OF PLYMOUTH, COUNTY OF PLYMOUTH	3	WATER STREET, JUST SOUTHEAST OF LATHROP STREET	DRAINAGE OUTFALL INTERACTION WITH STONE REVETMENT
057-017-000-161-100	057-017-000-161-100-LIC1A	1722	DEP CH.91	PLYMOUTH	SEP 1935	PLAN ACCOMPANYING PETITION OF TOWN OF PLYMOUTH TO BUILD A STONE WALL AND FILL, WATER STREET, TOWN OF PLYMOUTH	1	WATER STREET BETWEEN SOUTH PARK AVE AND BREWSTER STREET	NEW SEAWALL
057-017-000-163-100	057-017-000-163-100-LIC1A	1722	DEP CH.91	PLYMOUTH	SEP 1935	PLAN ACCOMPANYING PETITION OF TOWN OF PLYMOUTH TO BUILD A STONE WALL AND FILL, WATER STREET, TOWN OF PLYMOUTH	1	WATER STREET BETWEEN SOUTH PARK AVE AND BREWSTER STREET	NEW SEAWALL
057-023-000-026-100	057-023-000-026-100-LIC1A	7004	DEP CH.91	PLYMOUTH	JAN 15 1998	PLANS ACCOMPANYING PETITION OF TOWN OF PLYMOUTH, DEPARTMENT OF PUBLIC WORKS, PARKS DIVISION, REHABILITATION OF STEPHEN'S FIELD SEAWALL AND APPURTENANT WORK, PLYMOUTH HARBOR, PLYMOUTH, MA	3	STEPHENS FIELD	REPAIR STEPHENS FIELD REVETMENT
057-041-000-029-100	057-041-000-029-100-LIC1A	2254	DEP CH.91	PLYMOUTH	JAN 30 1990	PLANS ACCOMPANYING PETITION OF MASSACHUSETTS DIVISION OF ENVIRONMENTAL MANAGEMENT, DIVISION OF WATERWAYS, REPAIR OF WARREN COVE REVETMENT AND APPURTENANT WORK	2	WARREN COVE	REPAIR WARREN COVE REVETMENT
057-046-000-003-100	057-046-000-003-100-LIC1A	8035	DEP CH.91	PLYMOUTH	JUNE 15 1999	PLANS ACCOMPANYING PETITION OF TOWN OF PLYMOUTH, MA FOR BOAT HOUSE LANE BOAT RAMP IMPROVEMENTS	3	BOAT HOUSE LANE	1ST SHEET MISSING
057-050-023-001-100	057-050-023-001-100-LIC1A	612	DEP CH.91	PLYMOUTH	NOV 28 1979	PLAN ACCOMPANYING PETITION OF TOWN OF PLYMOUTH TO CONSTRUCT AND MAINTAIN A STORM DRAIN OUTFALL FOR SHIP POND IN CAPE COD BAY, TOWN OF PLYMOUTH	1	TERMINUS OF SHORE DRIVE ADJACENT TO SHIP'S POND	CONSTRUCT AND MAINTAIN JETTY, GROIN, RIP-RAP
057-059-000-010B-100	057-059-000-010B-100-LIC1A	9216	DEP CH.91	PLYMOUTH	FEB 21 2002	PLAN ACCOMPANYING PETITION OF THE TOWN OF PLYMOUTH FOR CONSTRUCTION AND MAINTAINING A STONE REVETMENT AT 140 AND 150 WARREN AVENUE IN WARRENS COVE, PLYMOUTH BAY	7	140 AND 150 WARREN AVENUE	

057-14A-000
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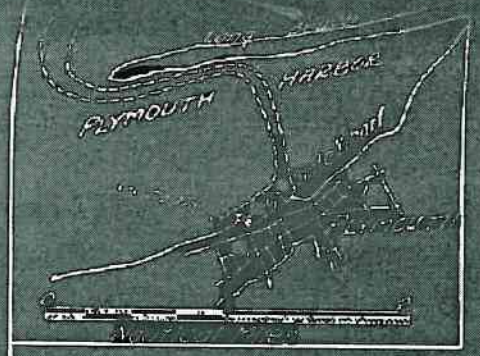
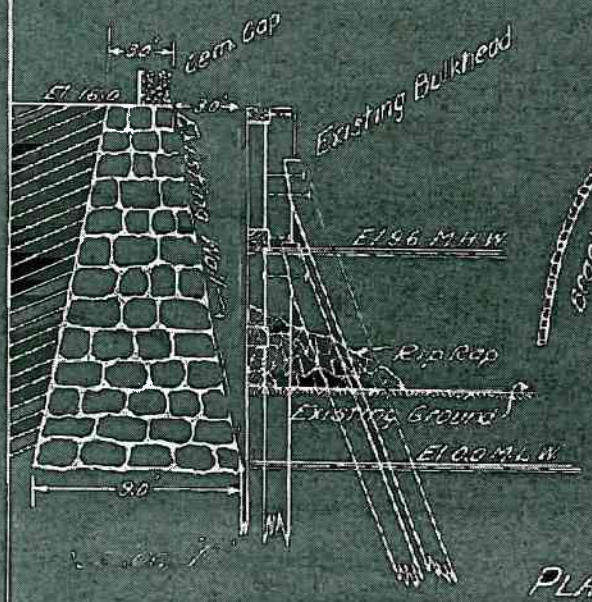
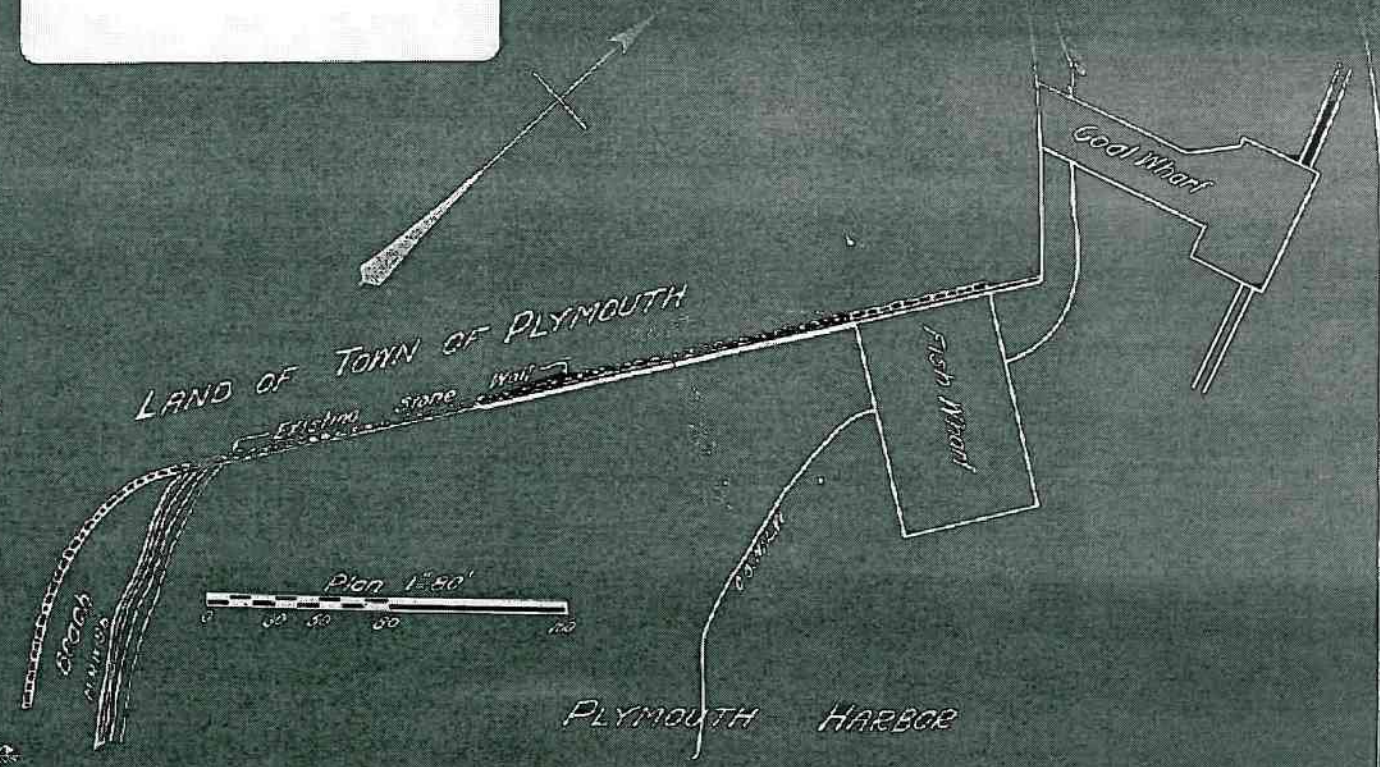






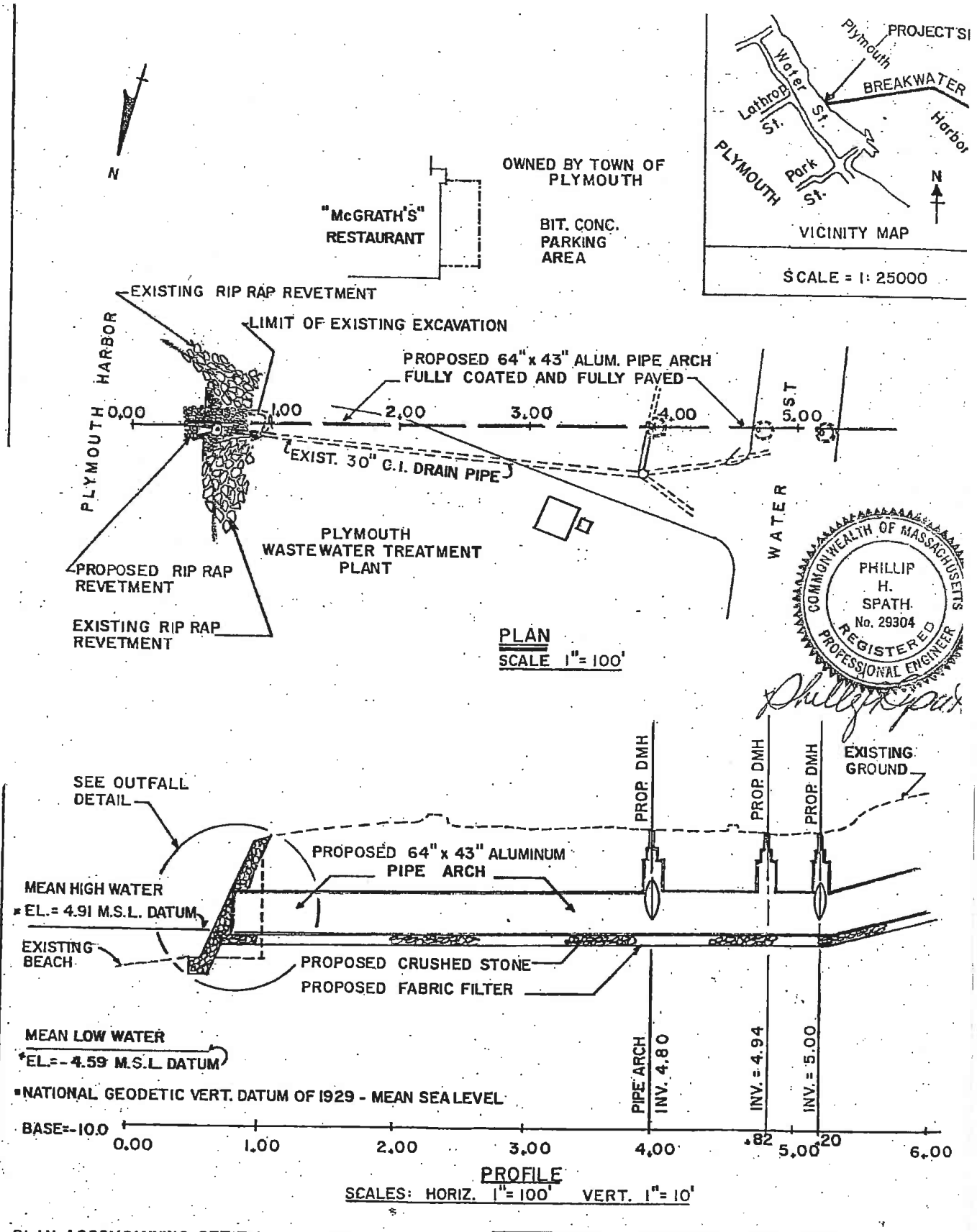
PLAN ACCOMPANYING PETITION OF
THE TOWN OF PLYMOUTH
TO REMOVE WOODEN BULKHEAD IN
PLYMOUTH HARBOR-PLYMOUTH
NOV 15, 1939
A.E. Blackmer Town Engineer

NO 2146
APPROVED BY DEPARTMENT OF PUBLIC WORKS
DECEMBER 13, 1939

COMMISSIONER OF PUBLIC WORKS

ASSOCIATE COMMISSIONERS

DIRECTOR - DIVISION OF WATERWAYS



057-14A-000-01A-100
057-14A-000-02A-100

PLAN ACCOMPANYING PETITION OF THE TOWN OF PLYMOUTH

TO REPAIR AND MAINTAIN EXISTING DRAINAGE OUTFALL AND CONSTRUCT AND MAINTAIN SUPPLEMENTAL OUTFALL IN PLYMOUTH HARBOR TOWN OF PLYMOUTH, COUNTY OF PLYMOUTH

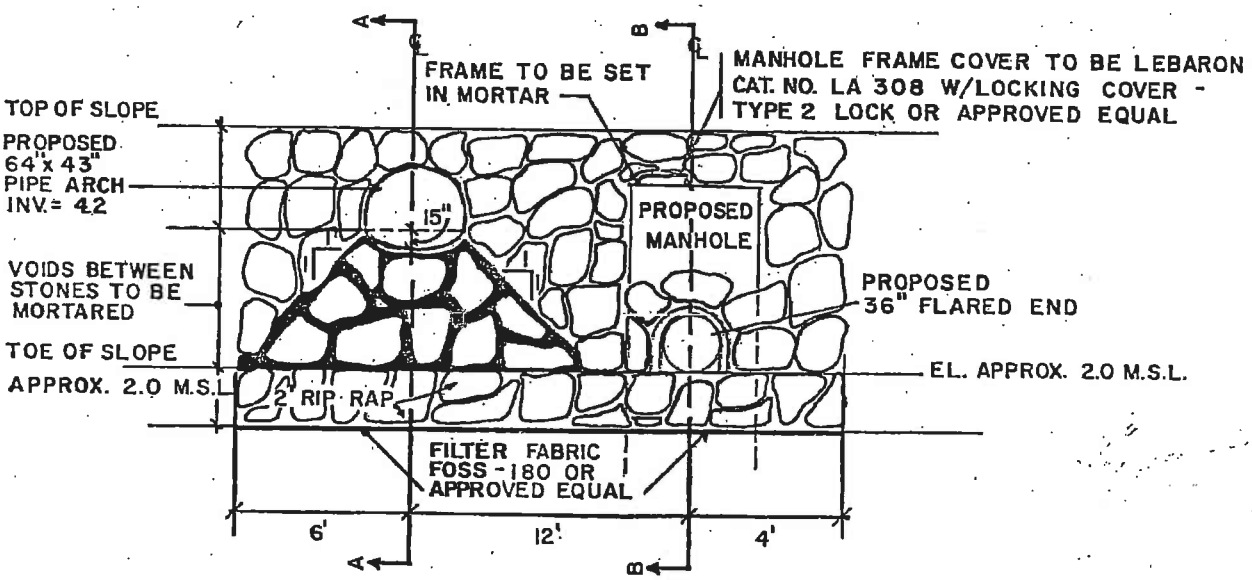
LICENSE PLAN NO. 1005

Approved by Department of Environmental Quality Engineering of Massachusetts AUGUST 15, 1983

COMMISSIONER

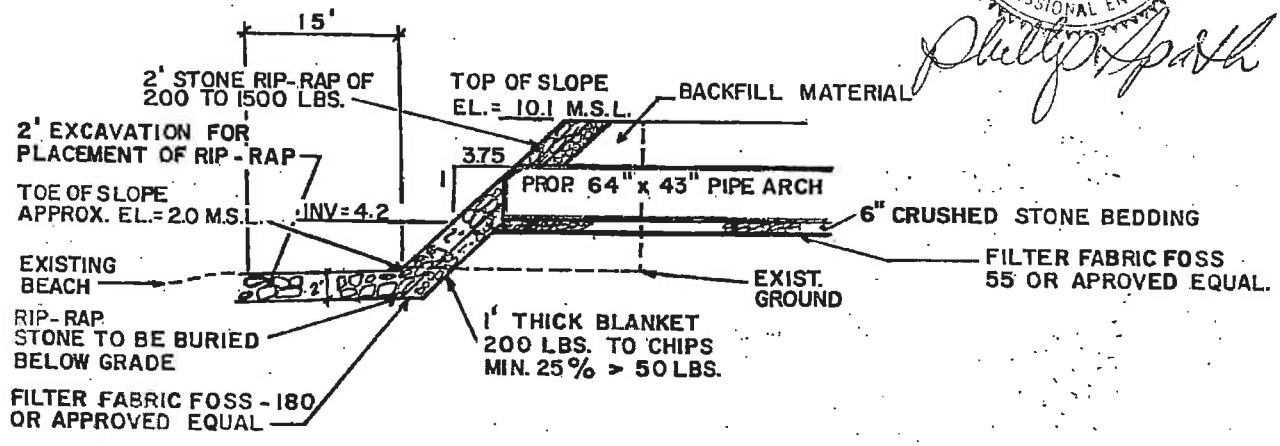
CHIEF ENGINEER

1 of 3



OUTFALL DETAIL

NOT TO SCALE



SECTION A-A

NOT TO SCALE

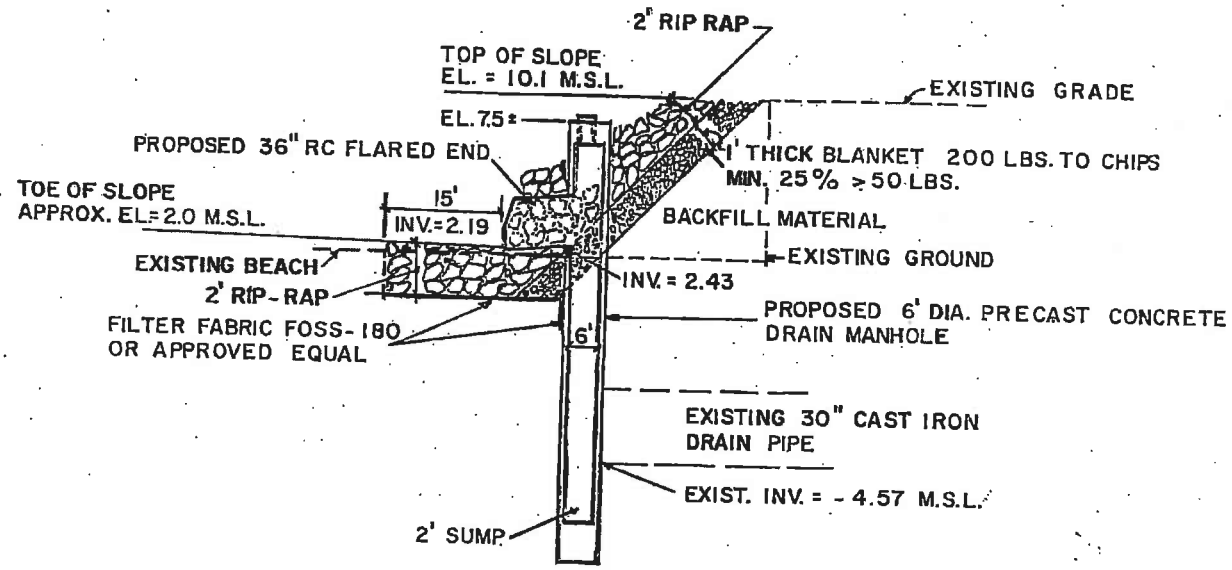
COMMONWEALTH OF MASSACHUSETTS
PHILLIP H. SPATH
No. 23304
REGISTERED PROFESSIONAL ENGINEER

LICENSE PLAN NO. 1005

Approved by Department of Environmental Quality Engineering
AUGUST 15, 1983

057-144-1A-100

83W-054



SECTION B-B

NOT TO SCALE

LICENSE PLAN NO. *1005*

Approved by Department of Environmental Quality Engineering

August 15, 1983

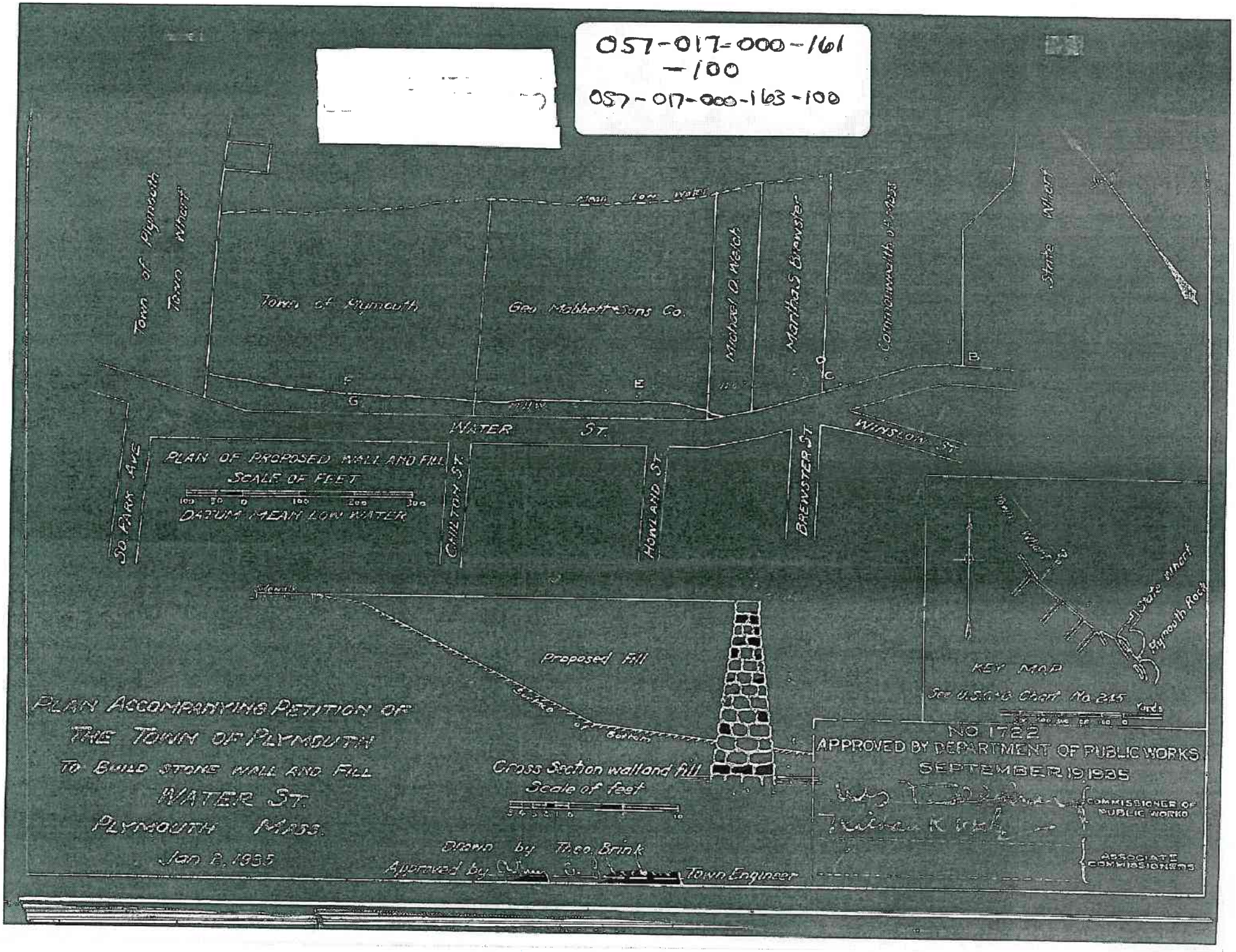
COMMONWEALTH OF MASSACHUSETTS
PHILLIP H. SPATH
No. 29304
REGISTERED PROFESSIONAL ENGINEER

Phillip H. Spath

83w-054

SHEET 3 OF 3

057-017-000-161
-100
057-017-000-163-100



057-23-26-100

057-023-000-026-100

NOTES:
1. THE ENTIRE PROJECT IS LOCATED WITHIN THE FLOOD PLAIN BOUNDARY.
2. M.L.W. EL. -4.92 CANNOT BE SHOWN WITHIN THE LIMITS OF THIS PLAN.
3. ALL ELEVATIONS ARE BASED ON U.S.G.S.

COMMONWEALTH OF MASSACHUSETTS
RICHARD S. JOHNSON
CIVIL
REGISTERED PROFESSIONAL ENGINEER

"PLANS ACCOMPANYING PETITION OF TOWN OF PLYMOUTH DEPARTMENT OF PUBLIC WORKS, PARKS DIVISION, REHABILITATION OF STEPHEN'S FIELD SEAWALL AND APPURTENANT WORK, PLYMOUTH HARBOR, PLYMOUTH, MA.

PREPARED BY: AMORY ENGINEERS, P.C. DUXBURY, MA

DATE: DECEMEBER 1994

LATEST REVISION: JULY 17, 1996 SHEET: 1 OF 3

LICENSE PLAN NO. 7004
Approved by Department of Environmental Protection of Massachusetts
Elizabeth A. Kaylakeras
JAN 15 1998

"PLANS ACCOMPANYING PETITION OF TOWN OF PLYMOUTH DEPARTMENT OF PUBLIC WORKS, PARKS DIVISION, REHABILITATION OF STEPHEN'S FIELD SEAWALL AND APPURTENANT WORK, PLYMOUTH HARBOR, PLYMOUTH, MA.

PREPARED BY: AMORY ENGINEERS, P.C. DUXBURY, MA

DATE: DECEMEBER 1994

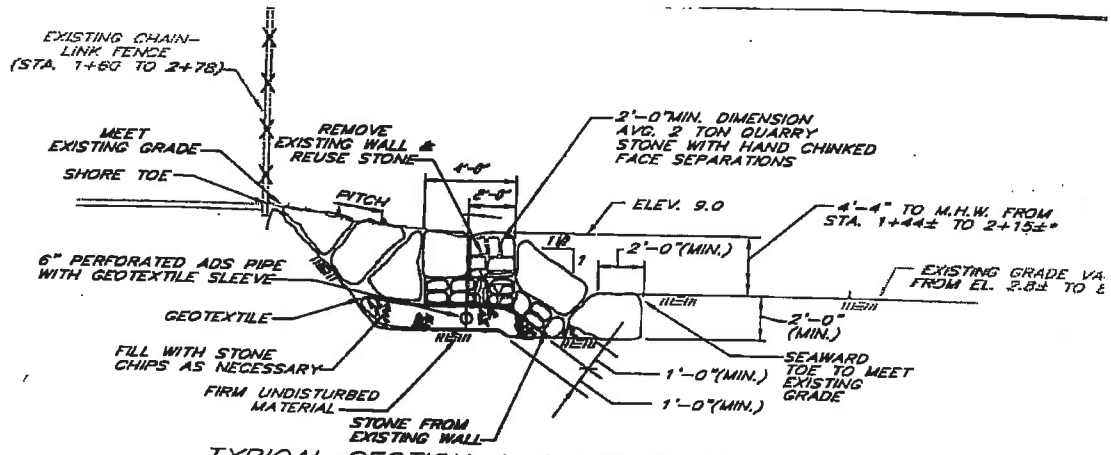
LATEST REVISION: JULY 17, 1996

SHEET 2 OF 3

LICENSE PLAN NO. 7004

Approved by Department of Environmental Protection

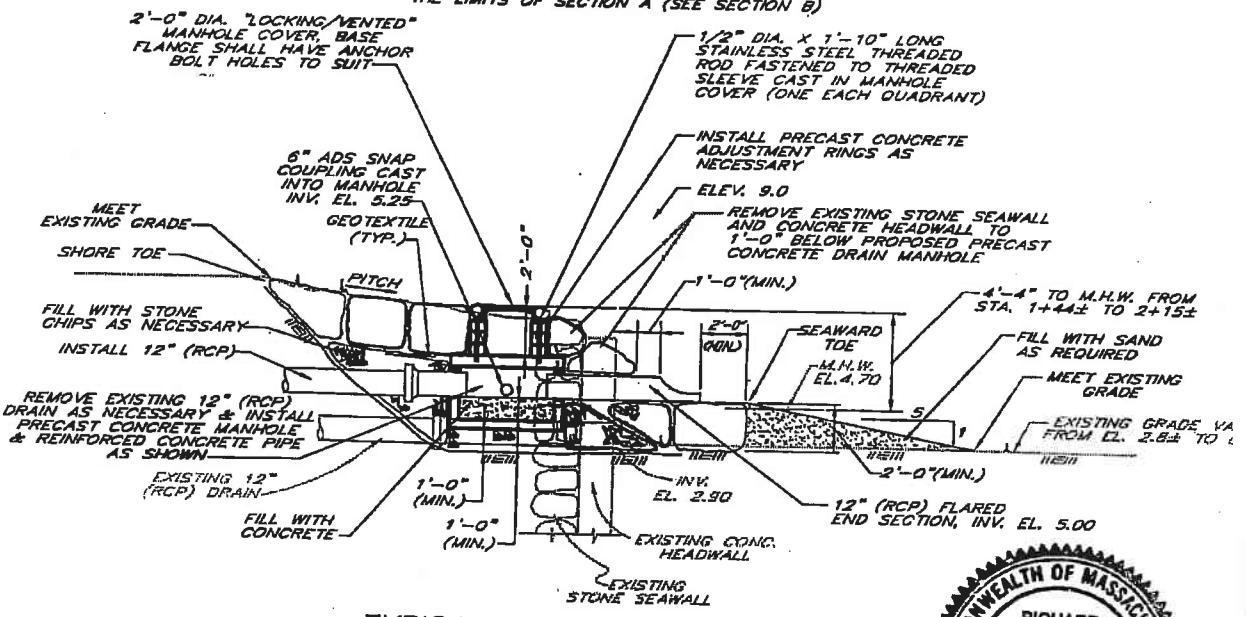
Date: JAN 15 1998



TYPICAL SECTION A-A STONE SEAWALL
STA. 1+25± TO STA. 3+05±

0 4 8
SCALE IN FEET

"1. M.H.W. EL. 4.70 CANNOT BE SHOWN WITHIN THE LIMITS OF SECTION A (SEE SECTION B)



TYPICAL SECTION B-B (SKEWED)
DRAINAGE OUTFALL STA. 1+48±

0 4 8
SCALE IN FEET

NOTE: SEE TYPICAL SECTION A (STONE SEAWALL) FOR DESCRIPTIONS & DIMENSIONS OF SEAWALL

NOTES:

1. ALL ELEVATIONS ARE BASED ON U.S.G.S. MEAN SEA LEVEL BENCH MARK "E43 1978".
2. M.L.W. EL -4.92 CANNOT BE SHOWN WITHIN THE LIMITS OF SECTIONS A AND B.

LIST OF ABUTTERS

LUCY M. HOLMES
140 SANDWICH STREET
PLYMOUTH, MA02360
LOT: 7B

JANE L. & JOHN D. SHAW
R 138 SANDWICH STREET
PLYMOUTH, MA 02360
LOT: 10B

CHRISTINE & GRETA MARINOS
27 FREMONT STREET
PLYMOUTH, MA 02360
LOT: 37A

ALICE PAINE/BEKEM BREWER
77 FOREST STREET
NEW BEDFORD, MA 02748
LOTS: 38C & 64

TOWN OF PLYMOUTH
11 LINCOLN STREET
PLYMOUTH, MA 02360
LOTS: 11A, 16B, 16C, 17C, & 24

CLAIRE BOVIN
26 FREMONT STREET
PLYMOUTH, MA 02360
LOT: 49

JOAN R. THOMAS
4319 GLADSDEN COURT
JACKSONVILLE, FL 32207
LOT: 23B

DORA I. & WILLIAM MELLO
27-1/2 FREMONT STREET
PLYMOUTH, MA 02360
LOT: 37B

DOLORES G. CAPPANNARI
8 N. MAIN STREET
ATTLEBORO, MA 02703
LOT: 38B

ADM LAND COMPANY
17 LEYDEN STREET
PLYMOUTH, MA 02360
LOT: 60A

COMMONWEALTH OF MASSACHUSETTS
RICHARD S. JOHNSON
CIVIL
No. 34202
REGISTERED PROFESSIONAL ENGINEER

"PLANS ACCOMPANYING PETITION OF TOWN OF PLYMOUTH DEPARTMENT OF PUBLIC WORKS, PARKS DIVISION, REHABILITATION OF STEPHEN'S FIELD SEAWALL AND APPURTENANT WORK, PLYMOUTH HARBOR, PLYMOUTH, MA.

PREPARED BY: AMORY ENGINEERS, P.C. DUXBURY, MA

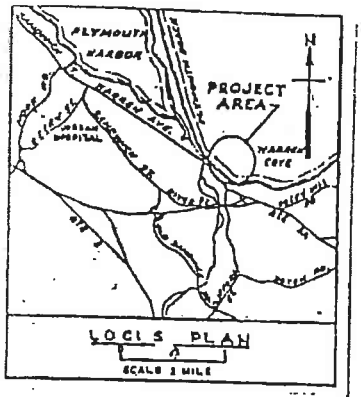
DATE: DECEMEBER 1994

LICENSE PLAN NO. 7004
Approved by Department of Environmental Protection
Date: JAN 15 1998

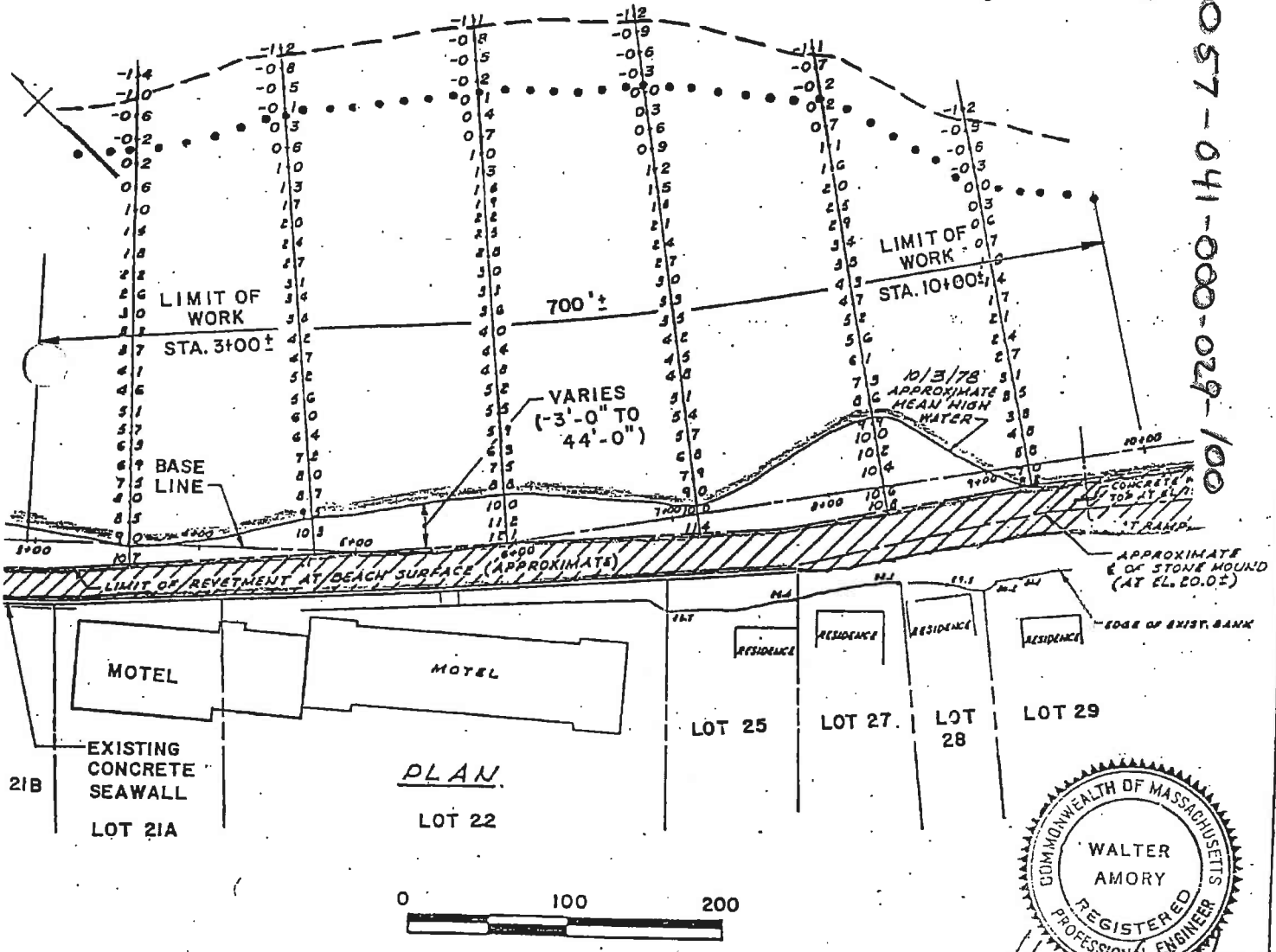
3083

LEGEND

- MEAN HIGH WATER SHORELINE
- MEAN LOW WATER SHORELINE
- EXTREME LOW WATER SHORELINE
- PROPERTY LINE
- EXISTING STONE REVETMENT



FROM: USGS Quad Sheets
(Manomet, MA, and Plymouth, MA)
Lat. 41°56'28"N
Long. 70°37'17"W

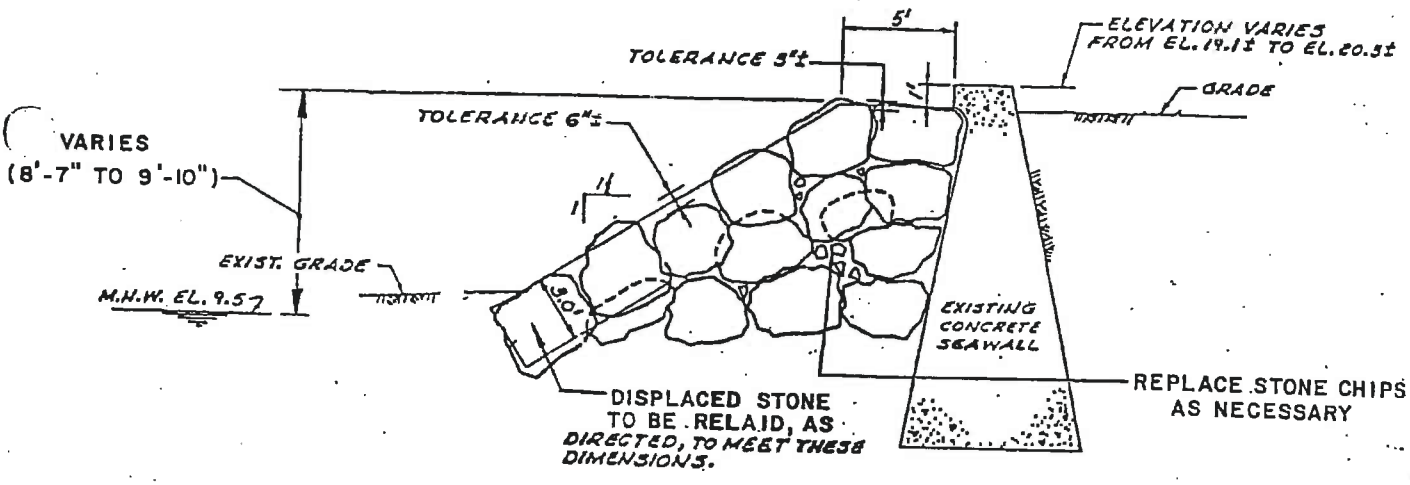


"PLANS ACCOMPANYING PETITION
OF MASSACHUSETTS DIVISION
OF ENVIRONMENTAL MANAGEMENT,
DIVISION OF WATERWAYS"
epair of Warren Cove Revetment and Appurtenant
ork
ymouth Bay
ymouth, MA
epared by Amory Engineers, P.C.
te: 6/12/80

COMMONWEALTH OF MASSACHUSETTS
WALTER AMORY
REGISTERED PROFESSIONAL ENGINEER

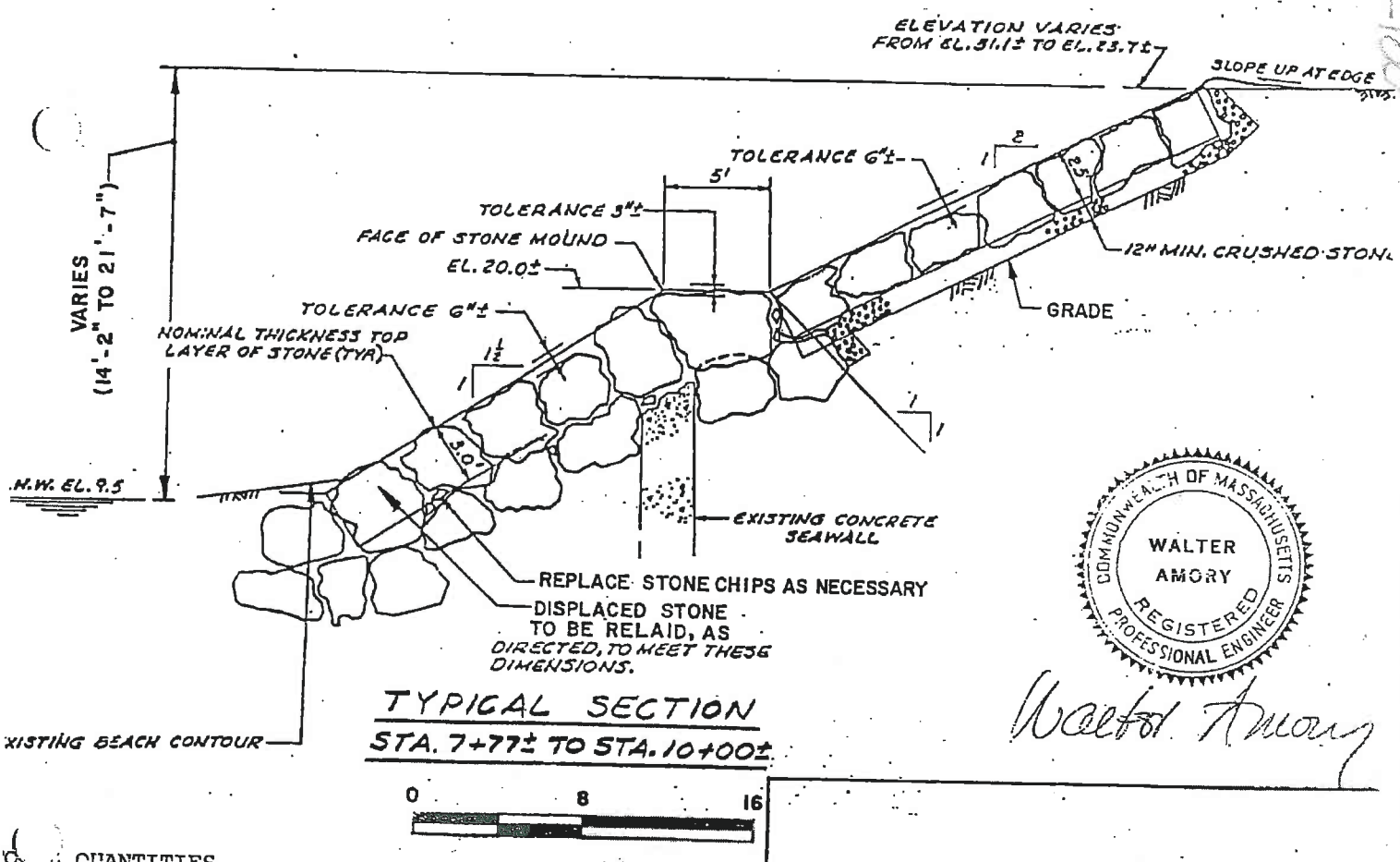
LICENSE PLAN NO. 2254
Approved by Department of Environmental Protection
of Massachusetts
COMMISSIONER
DIRECTOR
JAN 31 1980
SECTION CHIEF

057-041-000-029-100
100-000-000-140-750



TYPICAL SECTION
STA. 0+00± TO STA. 7+77±

0 8 16



TYPICAL SECTION
STA. 7+77± TO STA. 10+00±

0 8 16

COMMONWEALTH OF MASSACHUSETTS
WALTER AMORY
REGISTERED PROFESSIONAL ENGINEER

Walter Amory

QUANTITIES

tone chips 149 cu.yd.

repared by Amory Engineers, P.C.
ate: 6/12/89 Sheet 2 of 3

LICENSE PLAN NO. 2254

Approved by Department of Environmental Protection

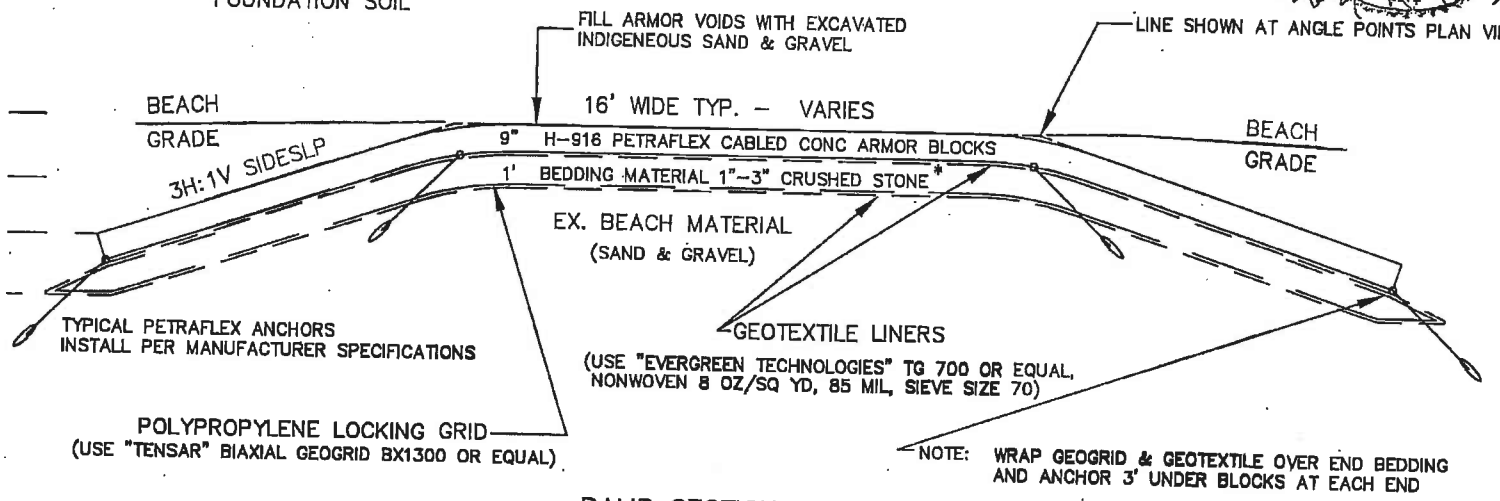
Date: JAN 30 1990

057-14-89-100

201-300-000-040-050

SECTION INSTALLATION LISTED TOP TO BOTTOM:

- ARTICULATED BLOCK
- GEOTEXTILE
- STONE
- GEOGRID
- GEOTEXTILE
- FOUNDATION SOIL



RAMP SECTION
SCALE: 1" = 5'

NOTE: CONCRETE MIX FOR MORTARING SHALL HAVE AN ULTIMATE COMPRESSIVE STRENGTH OF 3,000 PSI AT 28 DAYS. MAXIMUM AGGREGATE SIZE SHALL BE 3/4", AIR ENTRAINED TO AN AIR CONTENT OF 4%–5%.

MAINTAIN WAY LANDWARD OF STONE RAMP WITH CLEAN, BANK RUN GRAVEL.

ARTICULATED BLOCK, GEOGRID & GEOTEXTILE INSTALLATIONS PER MANUFACTURERS' SPECIFICATIONS.

* PREFERRED STONE GRADATION

SIZE	% FINER
3"	100
2&1/2"	50–100
2"	25–50
1&1/2"	10–20
1"	< 15

DRAWN BY	REVISION DATE
RP	6/24/98

SCALE: 1" = 5'
5 0 5
SCALE IN FEET

PLYMOUTH, MA
BOAT HOUSE LANE
BOAT RAMP IMPROVEMENTS

PROFILE

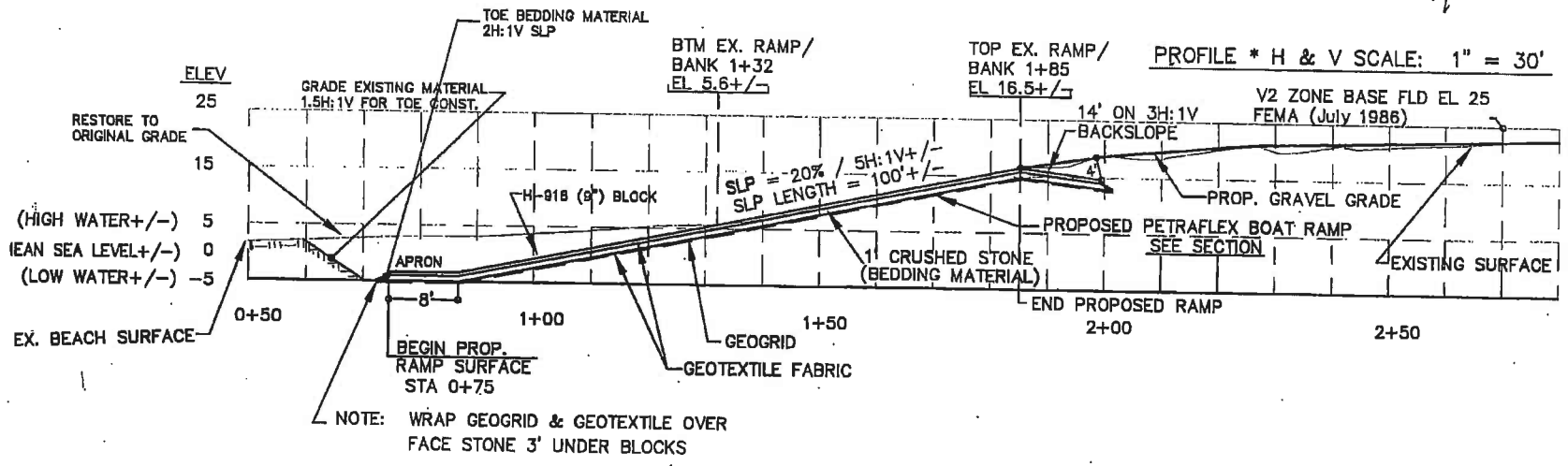
DWG No. 1187-1

LICENSE PLAN NO. 9035
Approved by Department of Environmental Protection
Date: JUN 15 1999

PLANS ACCOMPANYING PETITION OF
TOWN OF PLYMOUTH, MA
FOR BOAT HOUSE LANE
BOAT RAMP IMPROVEMENTS

SHEET 3 OF 3

057-046-000-003-100



NOTE: EXCAVATE APPROXIMATELY 200 CUBIC YARDS OF BEACH SAND FOR INSTALLATION.

DATUM IS USGS 1929 NGVD, MSL.
ADJUSTMENT TO MLW IS SHOWN FOR WATERWAYS.

COMMONWEALTH OF MASSACHUSETTS
KARL R. ANDERSON No. 24061 REGISTERED PROFESSIONAL ENGINEER
7-2-98

LICENSE PLAN NO. 8035
Approved by Department of Environmental Protection
Date: JUN 15 1999

PLANS ACCOMPANYING PETITION OF
TOWN OF PLYMOUTH, MA
FOR BOAT HOUSE LANE
BOAT RAMP IMPROVEMENTS

SHEET 3 OF 3

DRAWN BY	REVISION DATE
RP	6/24/98

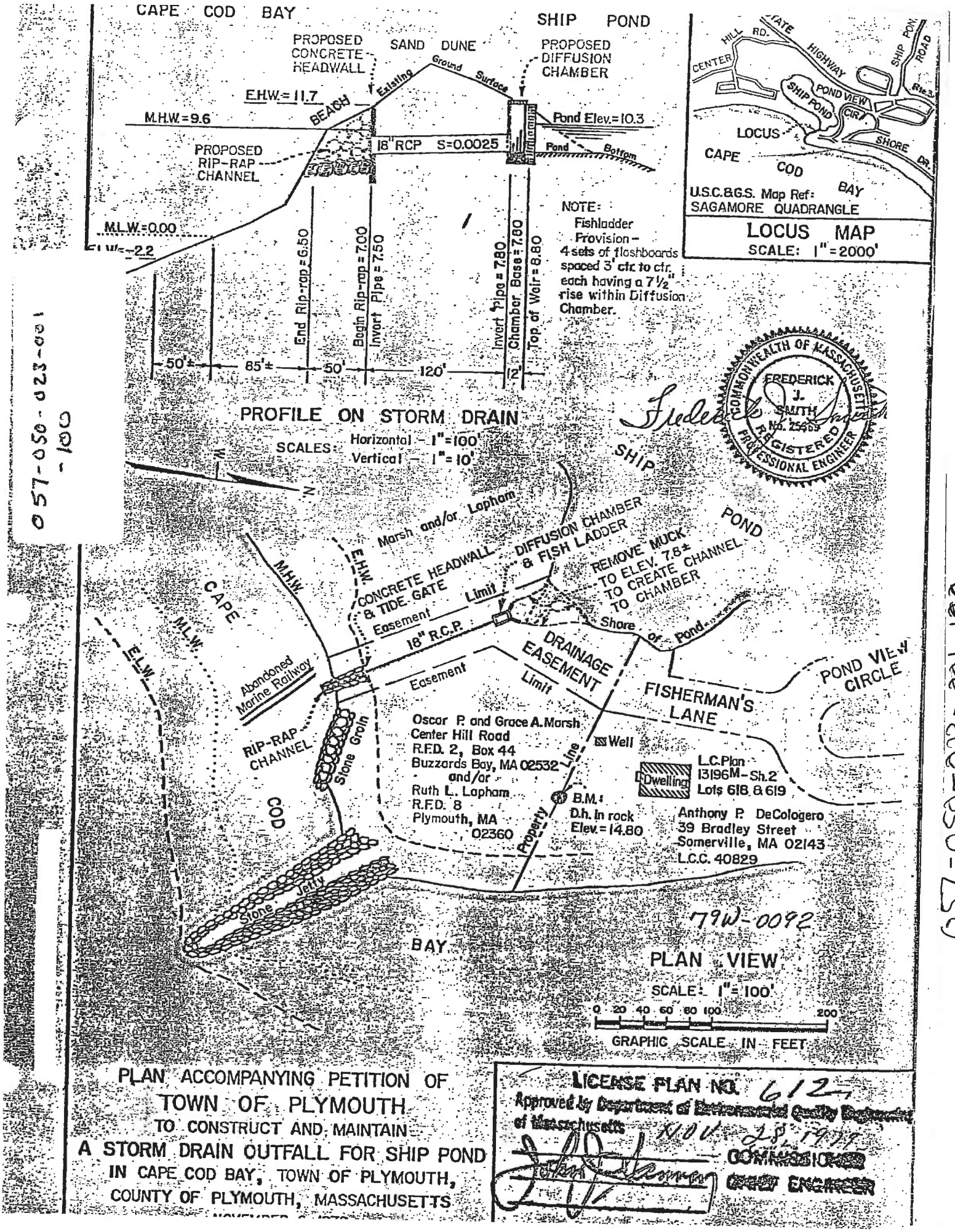
SCALE: 1" = 30'
30 0 30
SCALE IN FEET

PLYMOUTH, MA
BOAT HOUSE LANE
BOAT RAMP IMPROVEMENTS

PLAN VIEW

DWG No. 1187-1

057-46-0-3-100



057-050-023-001-100

057-050-023-001-100

PLAN ACCOMPANYING PETITION OF TOWN OF PLYMOUTH TO CONSTRUCT AND MAINTAIN A STORM DRAIN OUTFALL FOR SHIP POND IN CAPE COD BAY, TOWN OF PLYMOUTH, COUNTY OF PLYMOUTH, MASSACHUSETTS

NOVEMBER

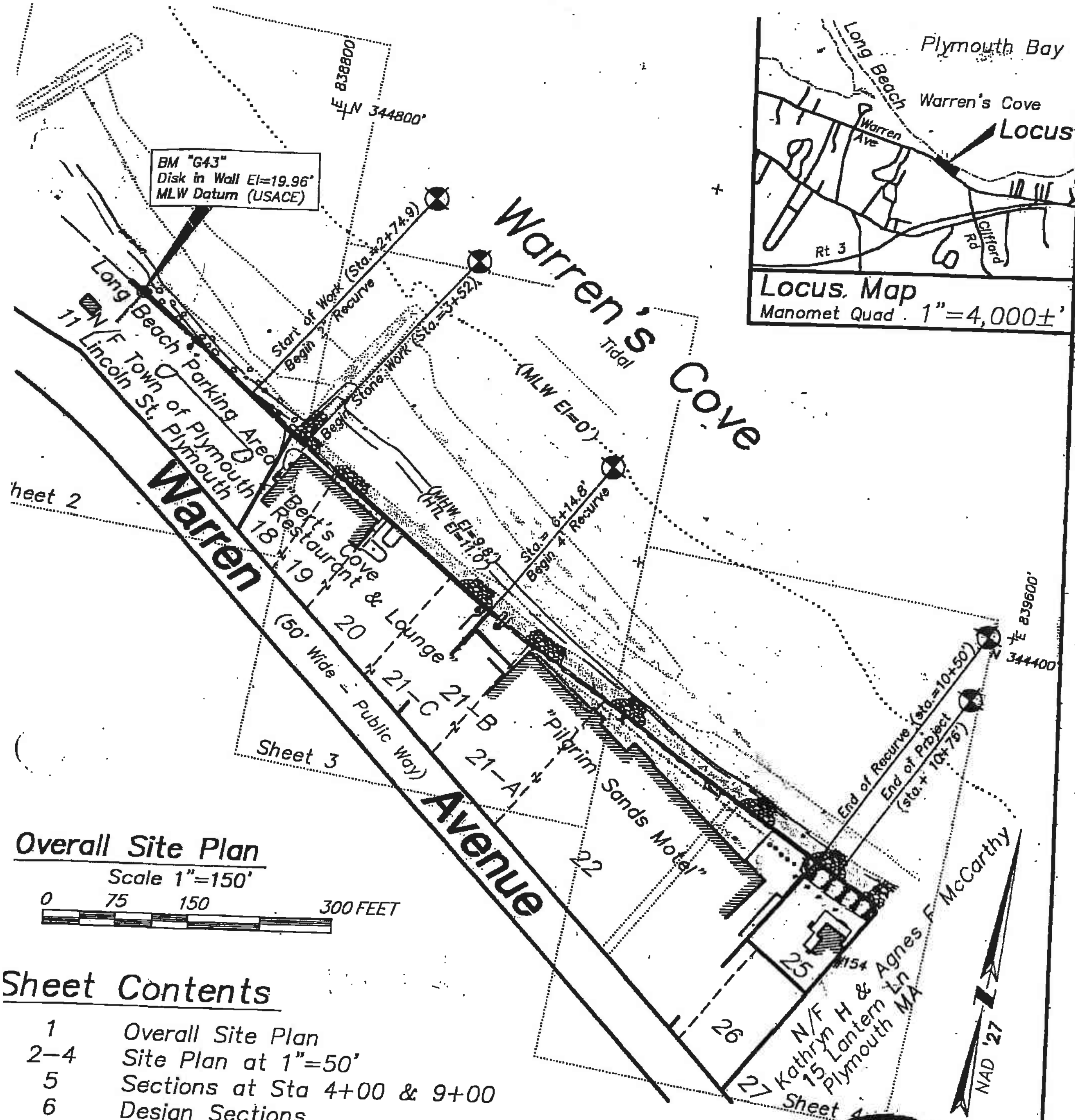
LICENSE PLAN NO. 612

Approved by Department of Environmental Quality Engineering of Massachusetts

NOV 25 1991

COMMISSIONER

CHIEF ENGINEER



Sheet Contents

1	Overall Site Plan
2–4	Site Plan at 1"=50'
5	Sections at Sta 4+00 & 9+00
6	Design Sections
7	Notes

PETER SULLIVAN NO. 29733 CIVIL REGISTERED PROFESSIONAL ENGINEER

Plan Accompanying Petition
of the
Town of Plymouth
for Construction & Maintaining
A Stone Revetment
at 140 & 150 Warren Avenue
in Warrens Cove, Plymouth Bay
September 19, 2001

Sullivan Engineering, Inc.
Osterville, Mass.

Sheet 1 of 7

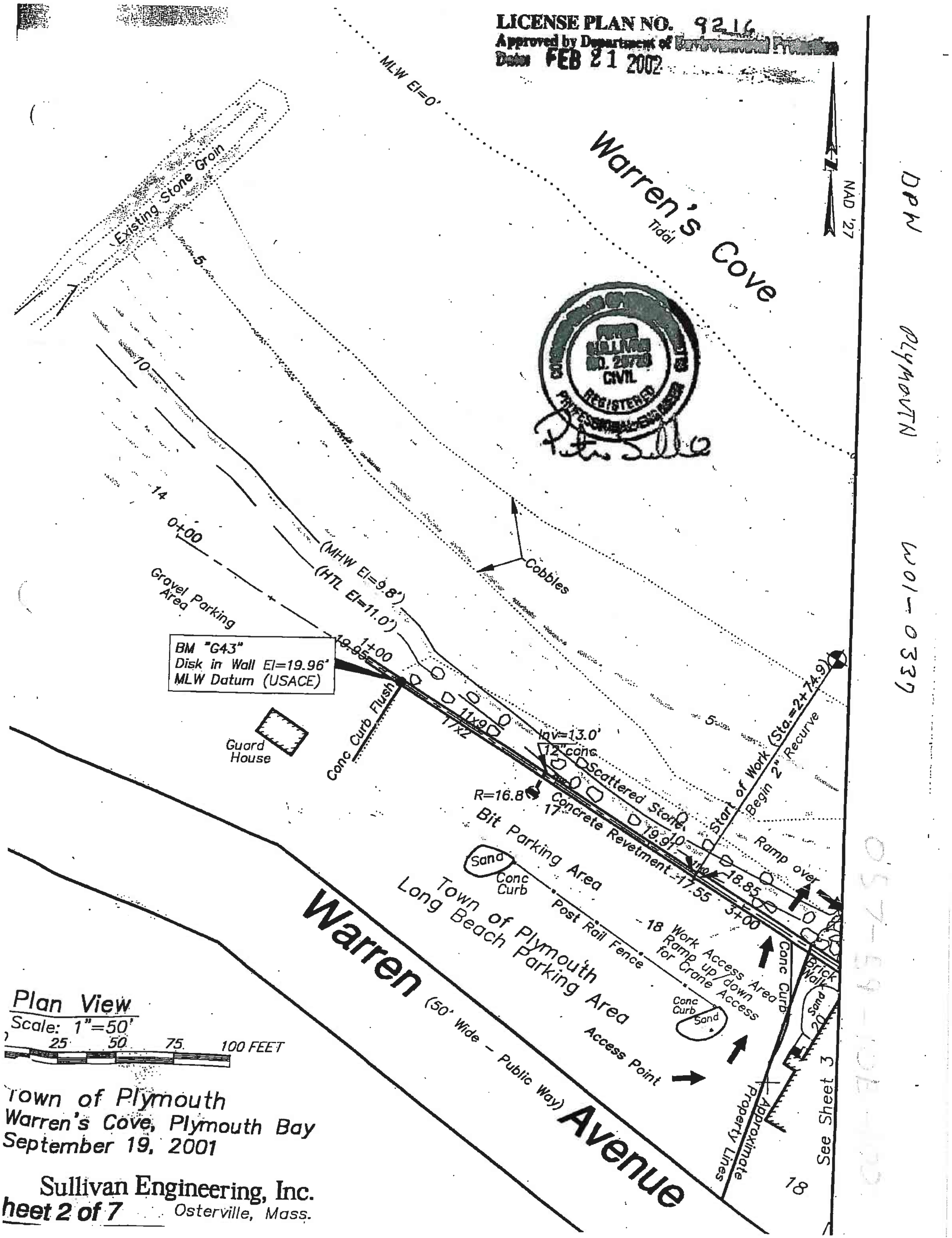
LICENSE PLAN NO. 9216
Approved by Department of Environmental Protection
of Massachusetts

[signature]

FEB 21 2002

DPW
Plymouth
057-059-000-10B-100
Vol 1-0337
057-059-000-10B-100

LICENSE PLAN NO. 9216
Approved by Department of Environmental Protection
Date FEB 21 2002



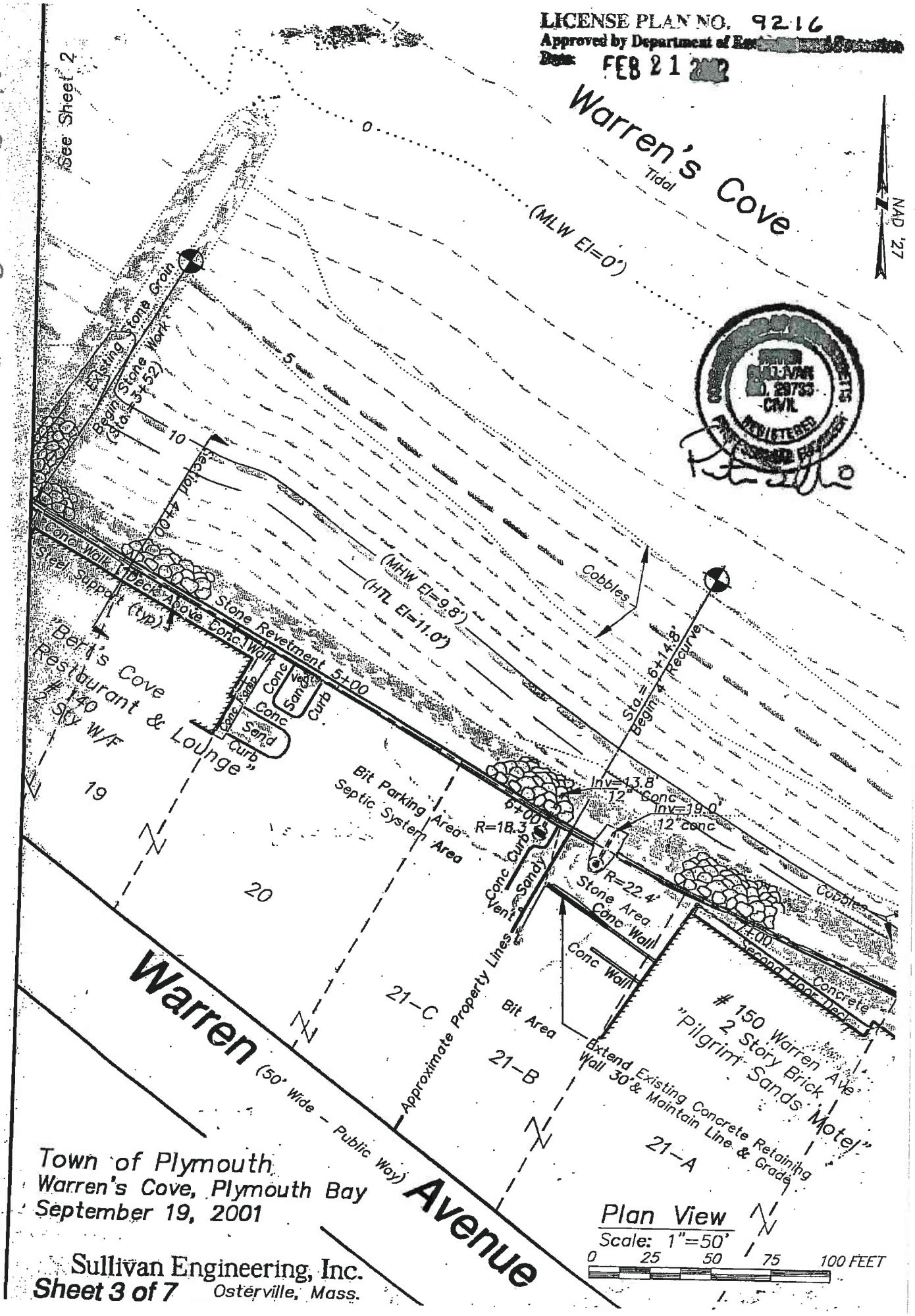
Town of Plymouth
Warren's Cove, Plymouth Bay
September 19, 2001

Sullivan Engineering, Inc.
Osterville, Mass.

Sheet 2 of 7

057-59-108-100

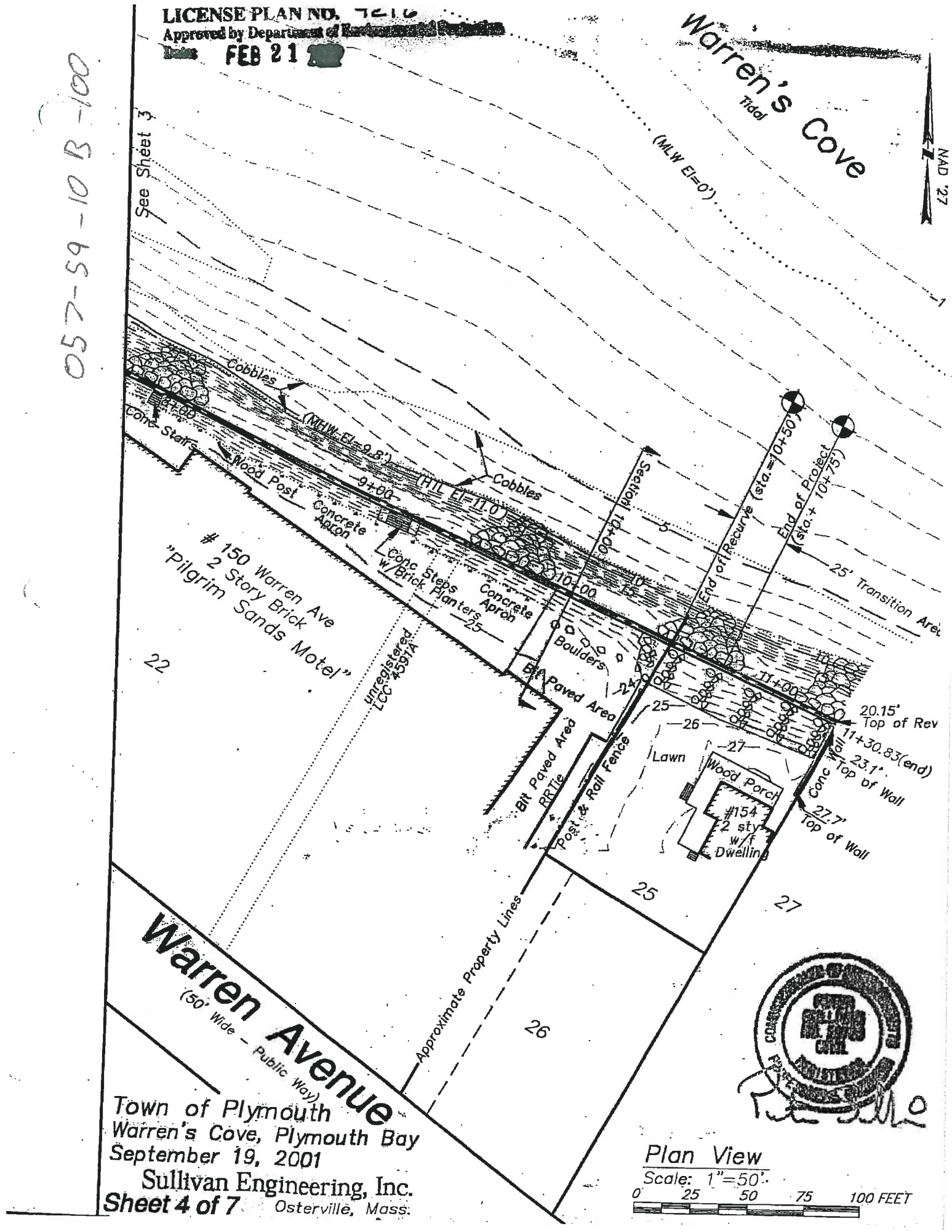
LICENSE PLAN NO. 9216
Approved by Department of Environmental Protection
Date: FEB 21 2002



Town of Plymouth
Warren's Cove, Plymouth Bay
September 19, 2001

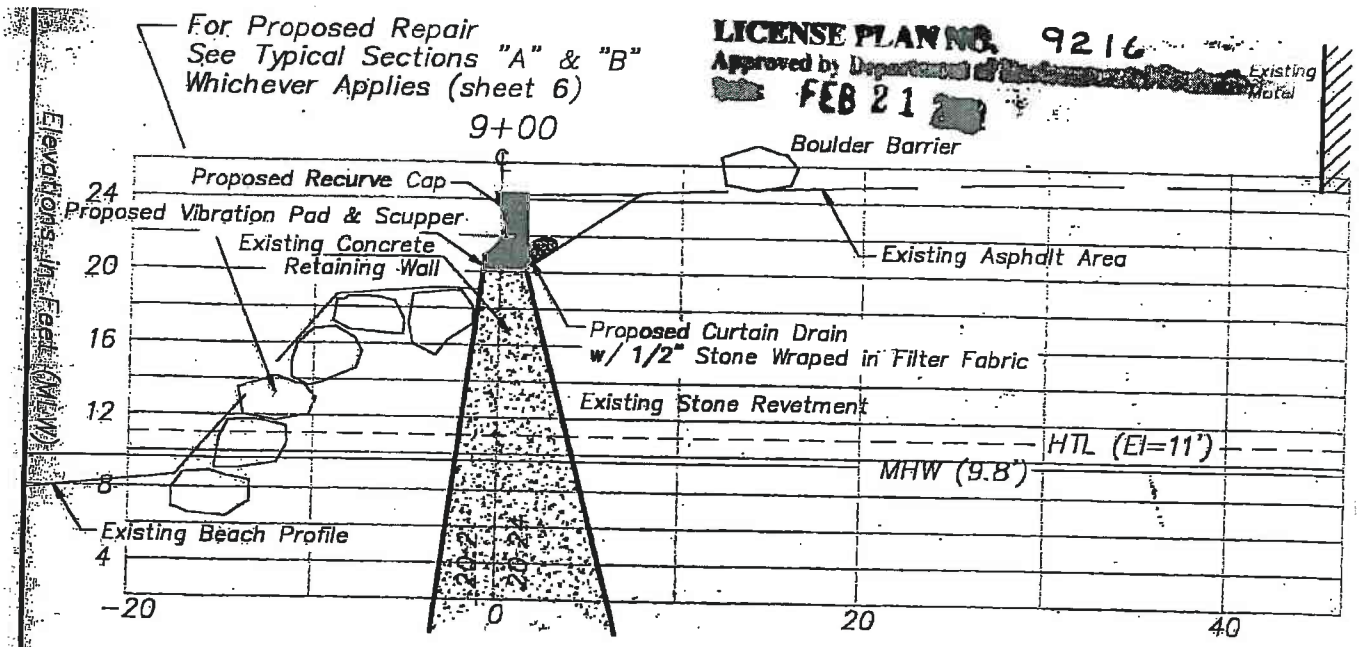
Sullivan Engineering, Inc.
Osterville, Mass.

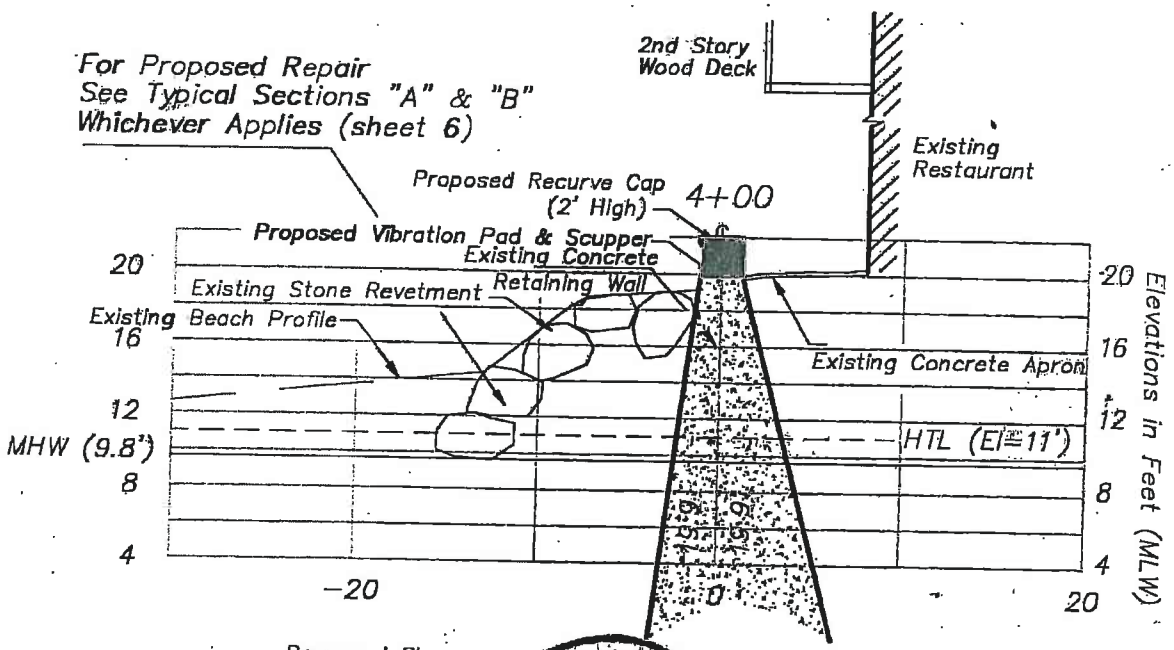
Sheet 3 of 7

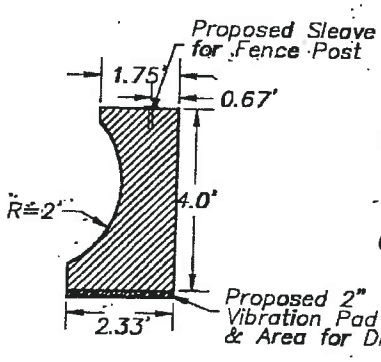

LICENSE PLAN NO. 7216
Approved by Department of Environmental Protection
Date FEB 21
057-59-10 B-100
Warren's Cove
Tidal
(MLW El=0')
NAD '27
See Sheet 3
Cobbles
(MLW El=9.8')
(HTL El=11.0')
Cobbles
Cone Stairs
Wood Post
Concrete Apron
Conc Steps w/Brick Planters
Concrete Apron
Boulders
Bit Paved Area
Bit Paved Area
RR Tie
Post & Rail Fence
Lawn
Wood Porch
#154
2 sty
w/f
Dwelling
Conc Wall
Top of Wall
Top of Wall
20.15' Top of Rev
11+30.83(end)
Centerline
End of Recurve (sta.=10+50')
End of Project (sta.= 10+75')
25' Transition Area
150 Warren Ave
2 Story Brick
"Pilgrim Sands Motel"
unregistered LCC 4591A
22
25
26
27
Approximate Property Lines
Warren Avenue
(50' Wide - Public Way)
Town of Plymouth
Warren's Cove, Plymouth Bay
September 19, 2001
Sullivan Engineering, Inc.
Sheet 4 of 7
Osterville, Mass.
Plan View
Scale: 1"=50'
0 25 50 75 100 FEET

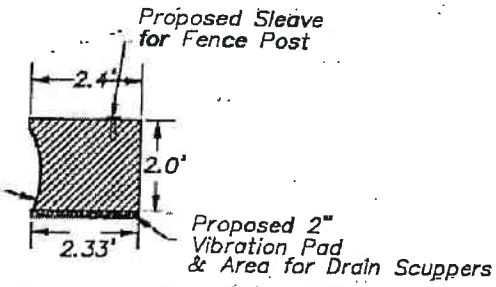
05 7-59-103-100

LICENSE PLAN NO. 9216
Approved by Department of
FEB 21









4' Recurve Wall Section
Typical (NTS)

2' Recurve Wall Section
Typical (NTS)

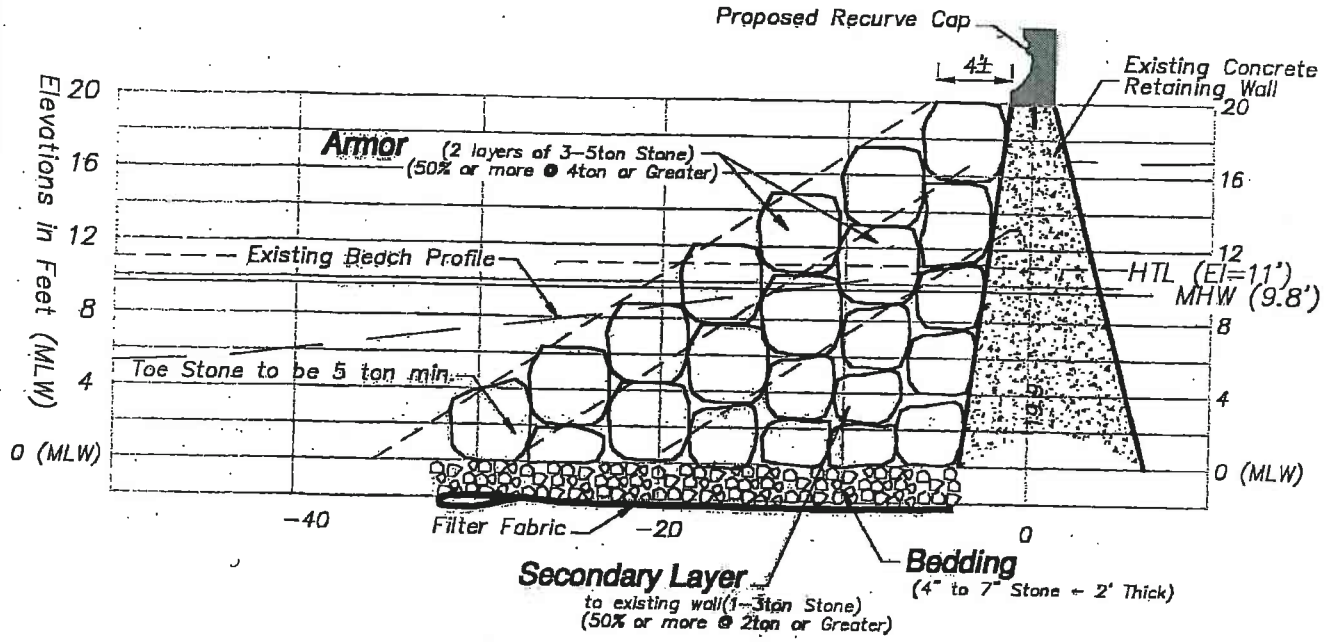
Town of Plymouth
Warren's Cove, Plymouth Bay
September 19, 2001

Profile View
Scale: 1"=10'
0 5 10 15 20 FEET

Sullivan Engineering, Inc.
Osterville, Mass.

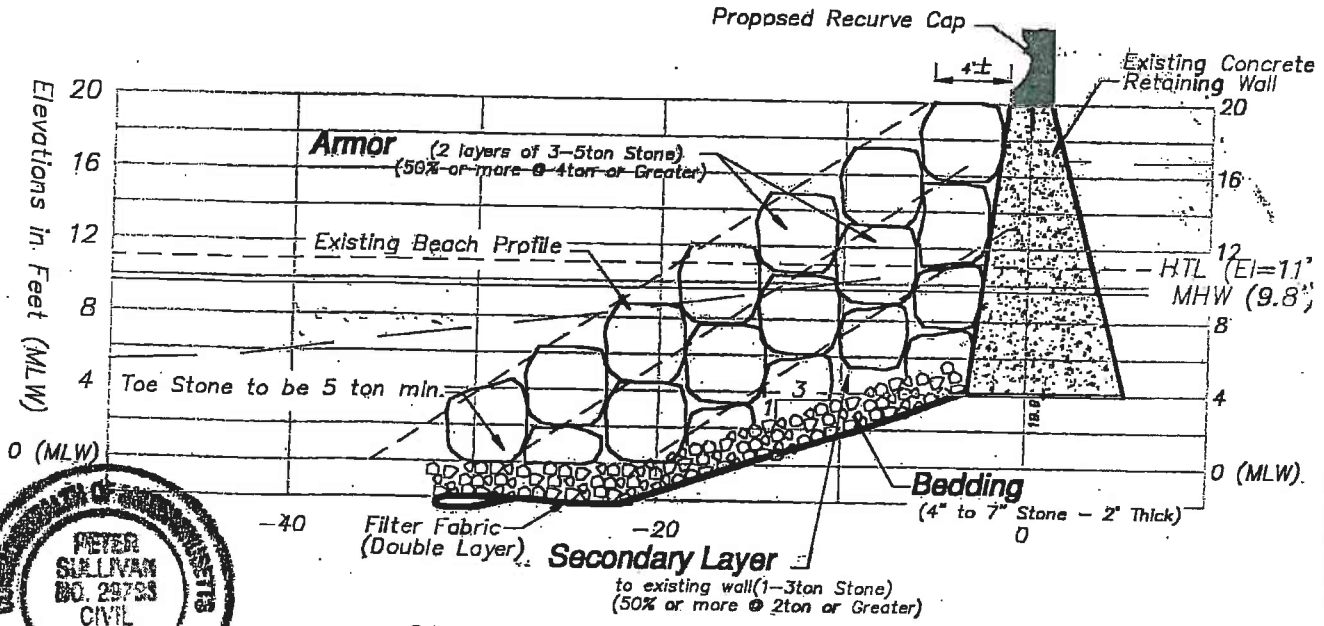
057-59-108-100

Approved by Department of Environmental Protection
Date: FEB 21



Typical Section A

For the Case were the bottom of the existing retaining wall is at elevation 0' MLW.



Typical Section B

For the Case were the bottom of the existing retaining wall is above elevation 0' MLW.

COMMONWEALTH OF MASSACHUSETTS
PETER SULLIVAN
NO. 29733
CIVIL
REGISTERED PROFESSIONAL ENGINEER

Town of Plymouth
Warren's Cove, Plymouth Bay
September 19, 2001
Sullivan Engineering, Inc.
Osterville, Mass.

Sheet 6 of 7

Profile View
Scale: 1"=10'
0 5 10 15 20 FEET

057-59-103-100

General Notes on Specification Requirements for Construction:

1. General.
Each stone will be placed by equipment suitable for lifting, manipulating, and placing stones of the size and shape specified.
Each stone shall be placed with its longest axis perpendicular to the armor slope.
Placing efforts shall insure that each stone is firmly set and supported by underlying materials and adjacent stones.
Loose stones shall be reset or replaced.
Elevation of the toe stone must be witnessed and confirmed.

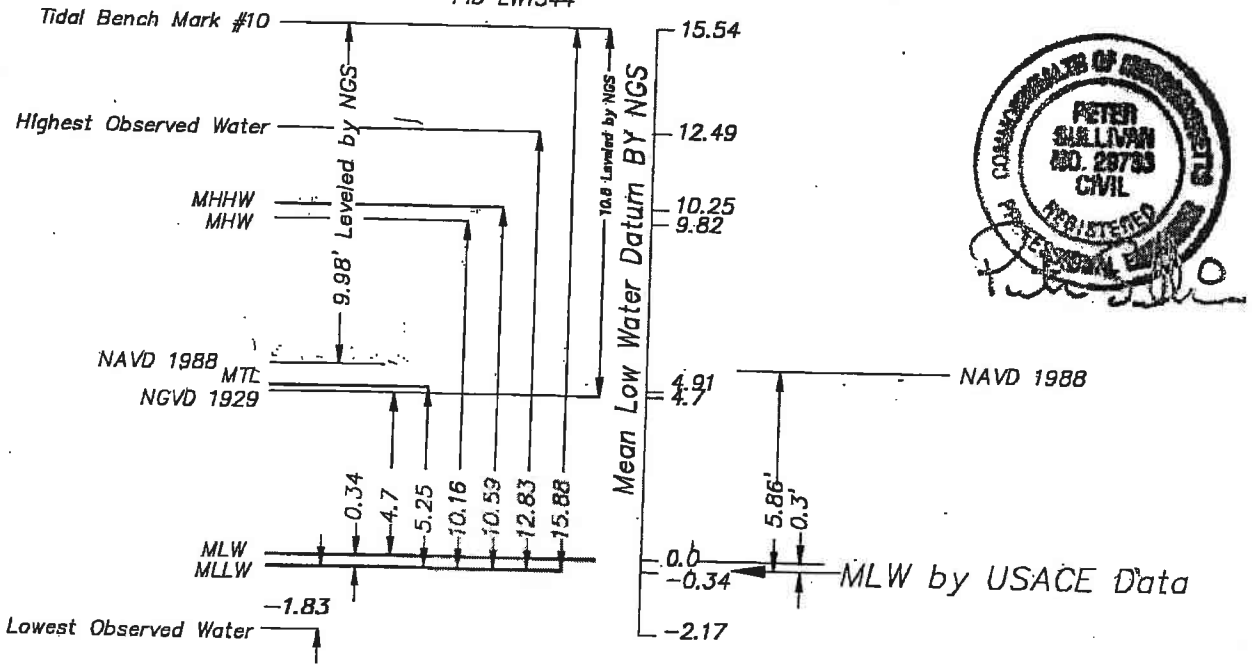
2. Armor Stone.
Armor stone should meet the following requirements:
Stones with their largest dimension greater than three times the least dimension should be rejected.
The stones should have high specific gravity and low absorption.
Materials should be able to withstand the design impact conditions.

3. Secondary Layer:
Stones with their largest dimension greater than three times the least dimension should not make up more than 10 % of the total.
All material should have adequate freezing and thawing resistance for the range of anticipated weather conditions.

4. Bedding Layer
Stone should be within the size range specified and the material should be well blended.
Stones with the largest dimension greater than three times the least dimension should not constitute more than 10% of the total.

5. Mapping
The topographic information shown was obtained by conventional survey methods on or between January 8, and February 15, 2001.
The datum used is Mean Low Water obtained from the USACE.
The property lines shown are from the Town of Plymouth Assessors' records and do not represen an actual survey on the ground.

Datum Relationship:



This relationship is based on the following:

Length of series	3 Months
Time period	June – August 1990
Tidal Epoch	1960–1978
Control Tide Station	Boston (844 3970)

Town of Plymouth
Warren's Cove, Plymouth Bay
September 19, 2001
Sullivan Engineering, Inc.
Osterville, Mass.

Sheet 7 of 7

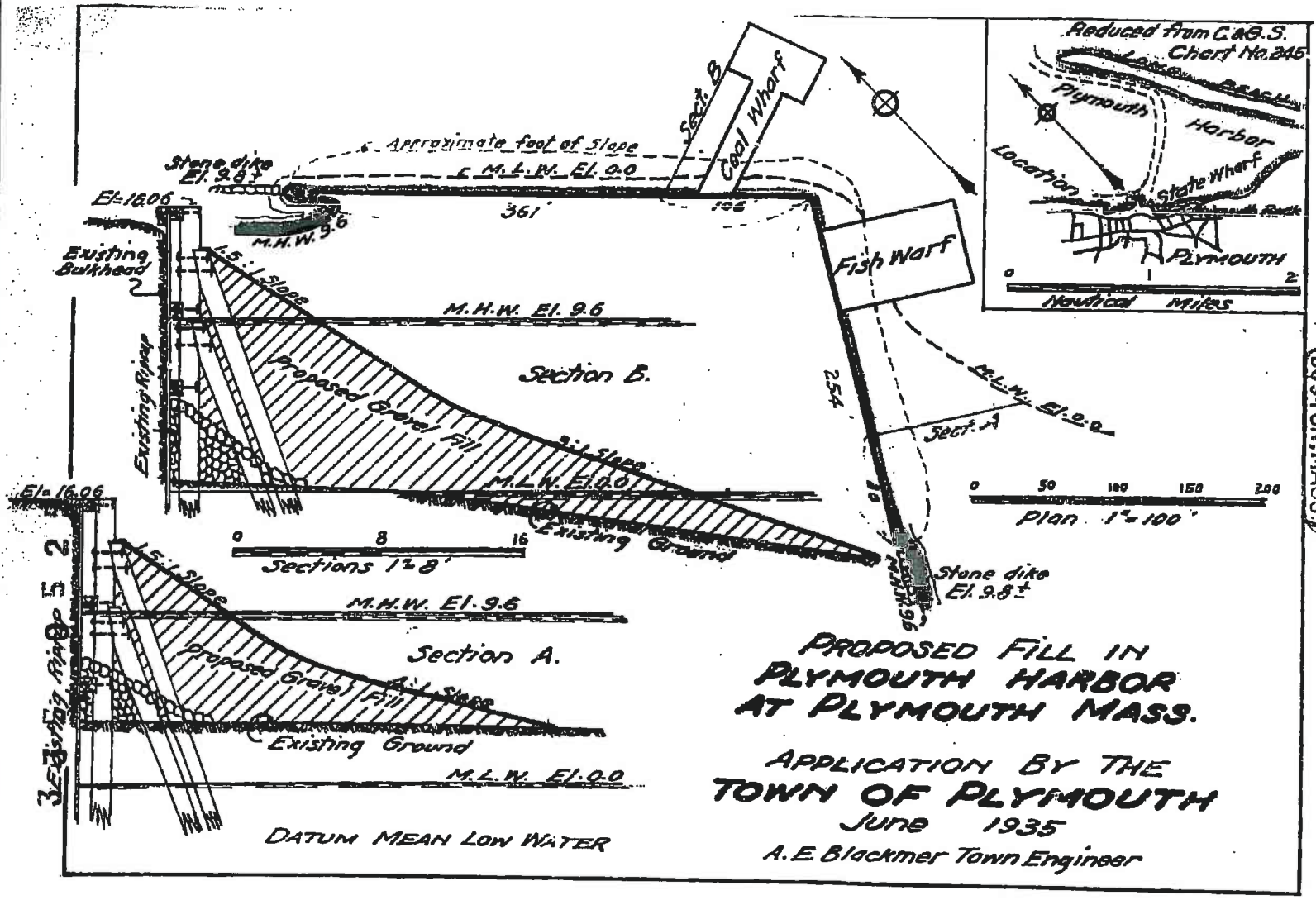
LICENSE PLAN NO. 9216
Approved by Department of Environmental Protection
Date: FEB 21

TOWN: PLYMOUTH
SOURCE: U.S. - ARMY CORPS OF ENGINEERS
LOCATION: U.S.A.C.E. - NEW ENGLAND DISTRICT, CONCORD, MA
DATE OF RESEARCH: AUGUST 2006

BCE Structure No	Document No	Contract/ Drawing Number	Entity	Municipality	Date	Title	Sheets	Location	Description
057-014A-000-007-100	057-014A-000-007-100-COE1A	Reel 335 Frame 0525	USACE	PLYMOUTH	JUN 1935	Proposed Fill in Plymouth Harbor	2	Town Pier and Western Shoreline	Timber Bulkhead and Gravel Fill
057-014A-000-007-100	057-014A-000-007-100-COE1B	NEDNP 59-112	MADPW	PLYMOUTH	FEB 1959	Proposed Town Wharf Construction, Plymouth Harbor	3	Town Pier Adjacent to T-Wharf	Includes Pile Cap, Rip Rap & Fill
057-014A-000-010A-100	057-014A-000-010A-100-COE1A	Reel 335 Frame 0525	USACE	PLYMOUTH	JUN 1935	Proposed Fill in Plymouth Harbor	2	Town Pier and Western Shoreline	Timber Bulkhead and Gravel Fill
057-014A-000-010A-100	057-014A-000-010A-100-COE1B	NEDNP 59-112	MADPW	PLYMOUTH	FEB 1959	Proposed Town Wharf Construction, Plymouth Harbor	3	Town Pier Adjacent to T-Wharf	Includes Pile Cap, Rip Rap & Fill
057-014A-000-014-100	057-014A-000-014-100-COE1A	Reel 335 Frame 0525	USACE	PLYMOUTH	JUN 1935	Proposed Fill in Plymouth Harbor	2	Town Pier and Western Shoreline	Timber Bulkhead and Gravel Fill
057-014A-000-014-100	057-014A-000-014-100-COE1B	NEINP 52-203	USACE	PLYMOUTH	SEP 1952	Proposed Fill and Bulkhead in Plymouth Harbor	2	Town Pier and Western Shoreline	Timber Bulkhead and Gravel Fill
057-014A-000-021A-300	057-014A-000-021A-300-COE3A	CENED-OR-R-22 19100109 MA-Plym-75-81	USACE	PLYMOUTH	OCT 1974	Proposed Public Access Facility, Boat Ramp and Parking Area	3	Boat Ramp at Town Pier	Includes Stone Mound at Shoreline
057-014A-000-021A-400	057-014A-000-021A-400-COE4A	CENED-OR-R-22 19100109 MA-Plym-75-81	USACE	PLYMOUTH	OCT 1974	Proposed Public Access Facility, Boat Ramp and Parking Area	3	Boat Ramp at Town Pier	Includes Stone Mound at Shoreline
057-014A-000-021A-500	057-014A-000-021A-500-COE5A	CENED-OR-R-22 19100109 MA-PLYM-75-81	USACE	PLYMOUTH	OCT 1974	Proposed Public Access Facility, Boat Ramp and Parking Area	3	Boat Ramp at Town Pier	Includes Stone Mound at Shoreline
057-017-000-161-100	057-017-000-161-100-COE1A	Reel 335 Frame 0525	USACE	PLYMOUTH	JUN 1935	Proposed Fill in Plymouth Harbor	2	Town Pier and Western Shoreline	Stone Seawall and Gravel Fill
057-017-000-163-100	057-017-000-163-100-COE1A	Reel 335 Frame 0525	USACE	PLYMOUTH	JUN 1935	Proposed Fill in Plymouth Harbor	2	Town Pier and Western Shoreline	Stone Seawall and Gravel Fill
057-020-000-042-100	057-020-000-042-100-COE1A	Reel 335 Frame 0525	USACE	PLYMOUTH	JUN 1935	Proposed Fill in Plymouth Harbor	2	Town Pier and Western Shoreline	Stone Seawall and Gravel Fill
057-020-000-182-100	057-020-000-182-100-COE1A	NEDNP 54-198Reel 335 Frame-0180	MADPW	PLYMOUTH	JUL 1954	Proposed Seawall Plymouth Harbor	3	Fill adjacent to State Pier	Bulkhead, Fill & Rip Rap
057-041-000-029-100	057-041-000-029-100-COE1A	NEDNP 56-287	MADPW	PLYMOUTH	OCT 1956	Proposed Stone Groin, Warren Cove	1	Off 3A, East of Eel River	
057-041-000-029-100	057-041-000-029-100-COE1B	CENAE-R-200102744	TOWN	PLYMOUTH	SEP 2001	Town of Plymouth for Construction and Maintaining Stone Revetment at 140 &150 Warren Ave	8	Warren Cove	
057-046-000-003-100	057-046-000-003-100-COE1A	Reel 335 Frame 623	MADPW	PLYMOUTH		Proposed Stone jetties in Cape Code Bay, Manomet Point	1	Northeast of the Intersection of Taylor Road and Manomet Drive	
057-053-021-019-100	057-053-021-019-100-COE1A	NEDNP 52-25	MADPW	PLYMOUTH	JAN 1952	Proposed Stone Jetties, Lookout Point	1	Lookout Point	
057-053-021-059-100	057-053-021-059-100-COE1A	NEDNP 60-265	MADPW	PLYMOUTH	JUN 160	Proposed Stone Jetty, Ellisville Harbor	1	Ellisville Harbor Entrance	
057-059-000-010B-100	057-059-000-10B-100-COE1A	NEDOD 69-133	MADPW	PLYMOUTH	APR 1969	Proposed Stone Groin, Plymouth Beach	1	Warren Cove	Extension of Grin Field
057-059-000-010B-100	057-059-000-10B-100-COE1B	CENAE-R-200102744	TOWN	PLYMOUTH	SEP 2001	Town of Plymouth for Construction and Maintaining Stone Revetment at 140 &150 Warren Ave	8	Warren Cove	
057-37A-000-156-100	057-37A-000-156-100-COE1A	NEDNP 53-188	USACE	PLYMOUTH	AUG 1953	Proposed Fill in Plymouth Harbor	1	Outshore End of Long Beach	Sand Fill From Hydraulic Dredging of Federal Channel

057-14A-000-10A-100
057-14A-000-007-100
057-14A-000-014-100

USACE
REEL 335
FRAME 0525



RECEIVED
JUL 15 1935
BOSTON, MASS.

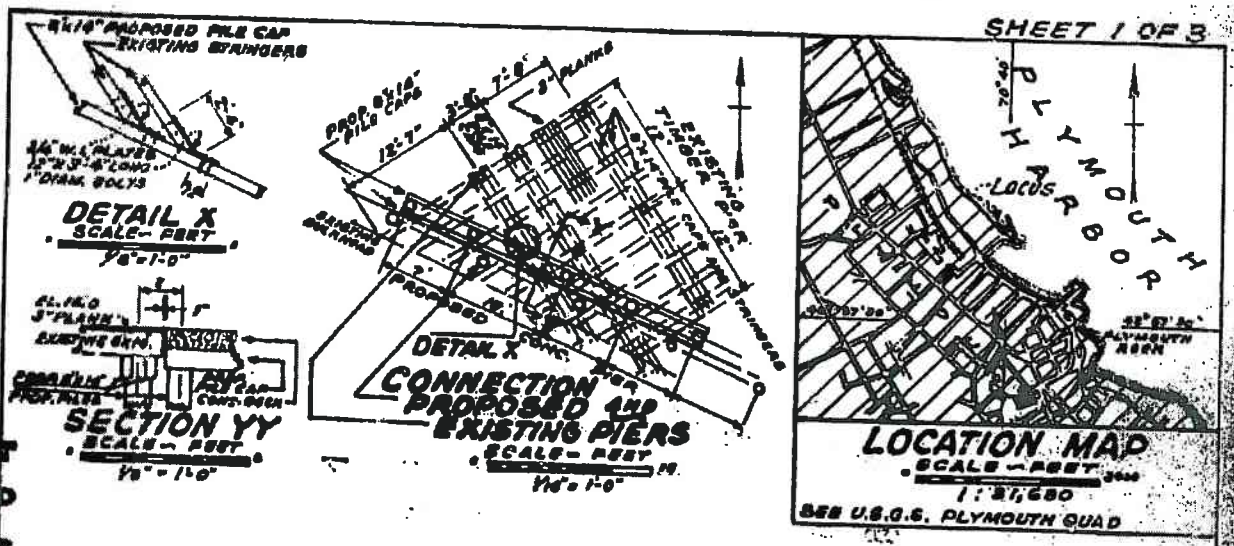
057-14A-000-10A-100

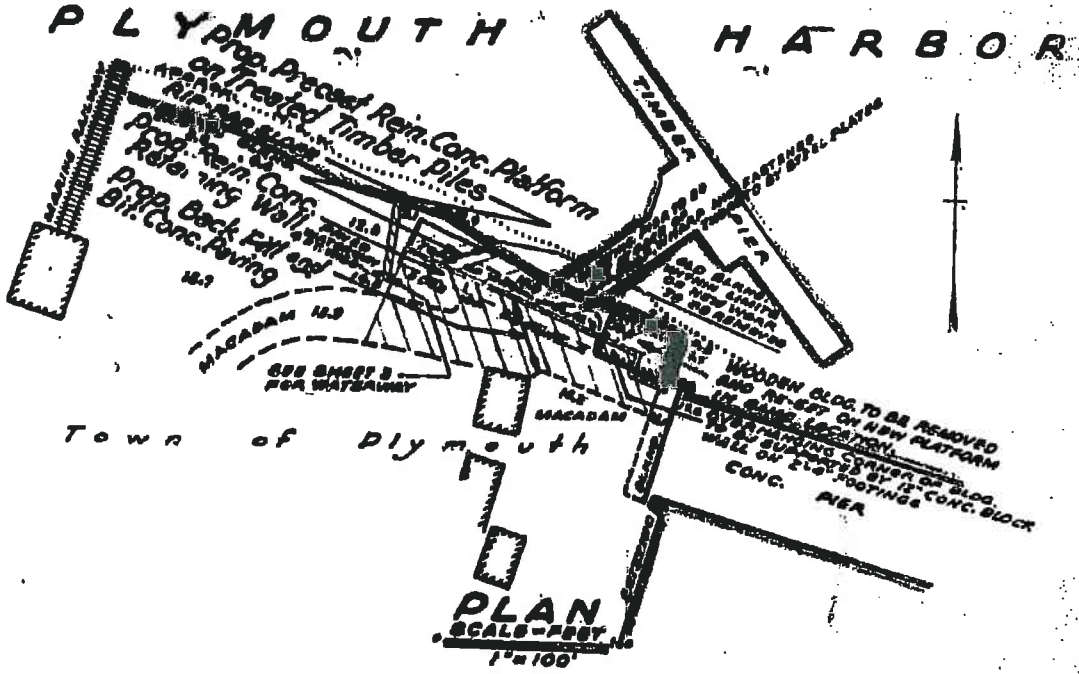
057-14A-000-007-100 & 6.

USACE

NEDNP-59-112

SHEET 1 OF 3





NOTE

ELEVATIONS ARE IN FEET AND TENTHS AND REFER TO PLANE OF MEAN LOW WATER.

HARDWARE TO BE RUST RESISTANT AND TIMBERS WEATHER PROOFED. CONSTRUCTION METHODS TO BE IN ACCORDANCE WITH CURRENT STANDARD PRACTICE.

LOCATION OF WORK TO BE DONE SHOWN IN RED.

PROPOSED
TOWN WHARF CONSTRUCTION
PLYMOUTH HARBOR
PLYMOUTH — MASS.
APPLICATION BY
DEPARTMENT OF PUBLIC WORKS OF MASSACHUSETTS
DIVISION OF WATERWAYS
FEBRUARY 1959

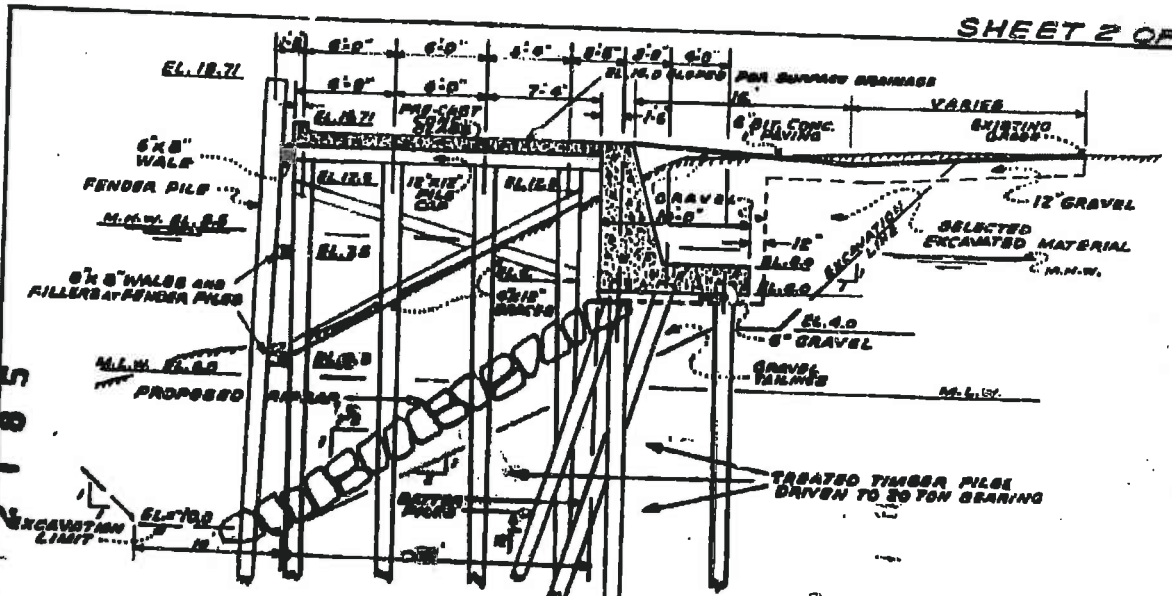
Robert B. MacKinnon
CHIEF WATERWAYS ENGINEER

ACC.03974-A

10512-104

0831.167

SHEET 2 OF 3



TYPICAL CROSS SECTION

SCALE OF FEET

PLAN PRE-CAST SLABS AND WALL

SCALE OF FEET

PILE LAYOUT

SCALE OF FEET

NOTE

ELEVATIONS ARE IN FEET AND TENTHS AND REFER TO PLANE OF MEAN LOW WATER.

HARDWARE TO BE RUST RESISTANT AND TIMBERS WEATHER PROOFED. CONSTRUCTION METHODS TO BE IN ACCORDANCE WITH CURRENT STANDARD PRACTICE.

PROPOSED
TOWN WHARF CONSTRUCTION
PLYMOUTH HARBOR
PLYMOUTH — MASS.
APPLICATION BY
DEPARTMENT OF PUBLIC WORKS OF MASSACHUSETTS
DIVISION OF WATERWAYS
FEBRUARY 1959

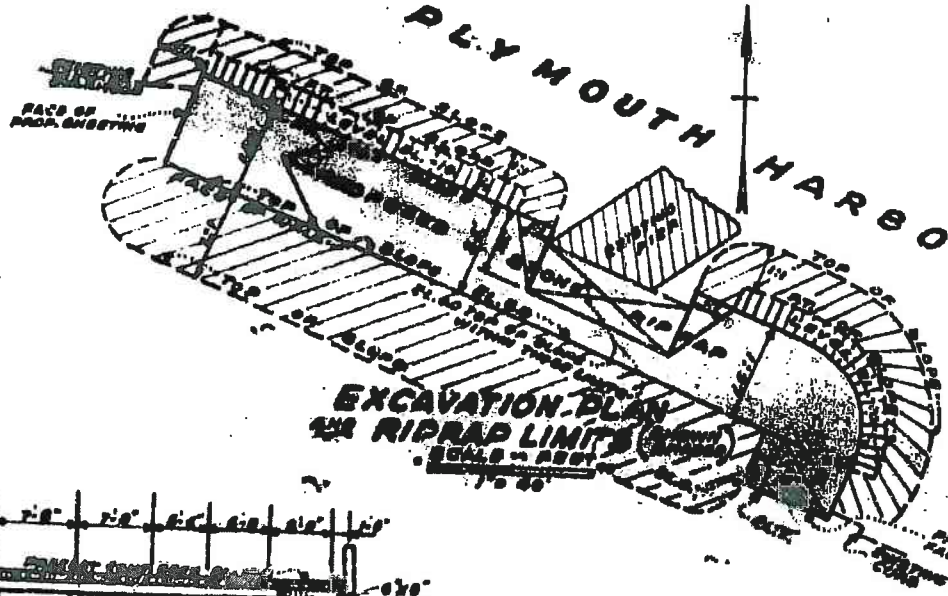
Robert B. MacKenney
CHIEF WATERWAYS ENGINEER

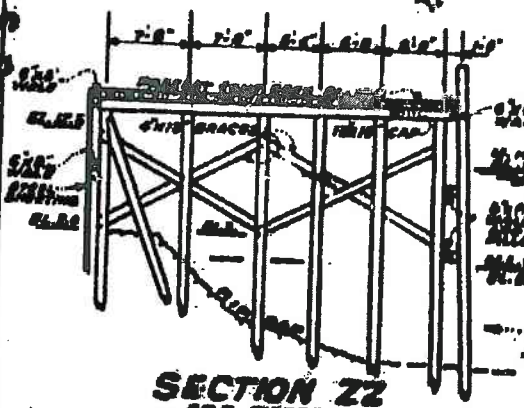
ACC. 03974-B

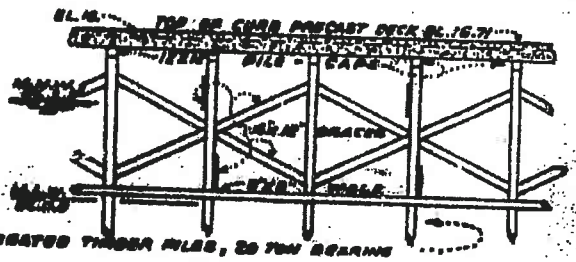
105 2185

0 1 1 6 8

SHEET 3 OF 3







TYPICAL PAVED WATERWAY
NO SCALE

NOTE

ELEVATIONS IN FEET AND TENTHS REFER TO PLANE OF MEAN LOW WATER.
HARDWARE TO BE RUST RESISTANT AND TIMBERS WEATHER PROOFED. CONSTRUCTION METHODS TO BE IN ACCORDANCE WITH CURRENT STANDARD PRACTICE.

PROPOSED
TOWN WHARF CONSTRUCTION
PLYMOUTH HARBOR
PLYMOUTH — MASS.
APPLICATION BY
DEPARTMENT OF PUBLIC WORKS OF MASSACHUSETTS
DIVISION OF WATERWAYS
FEBRUARY 1959

Robert B. MacKenzie
CHIEF WATERWAYS ENGINEER

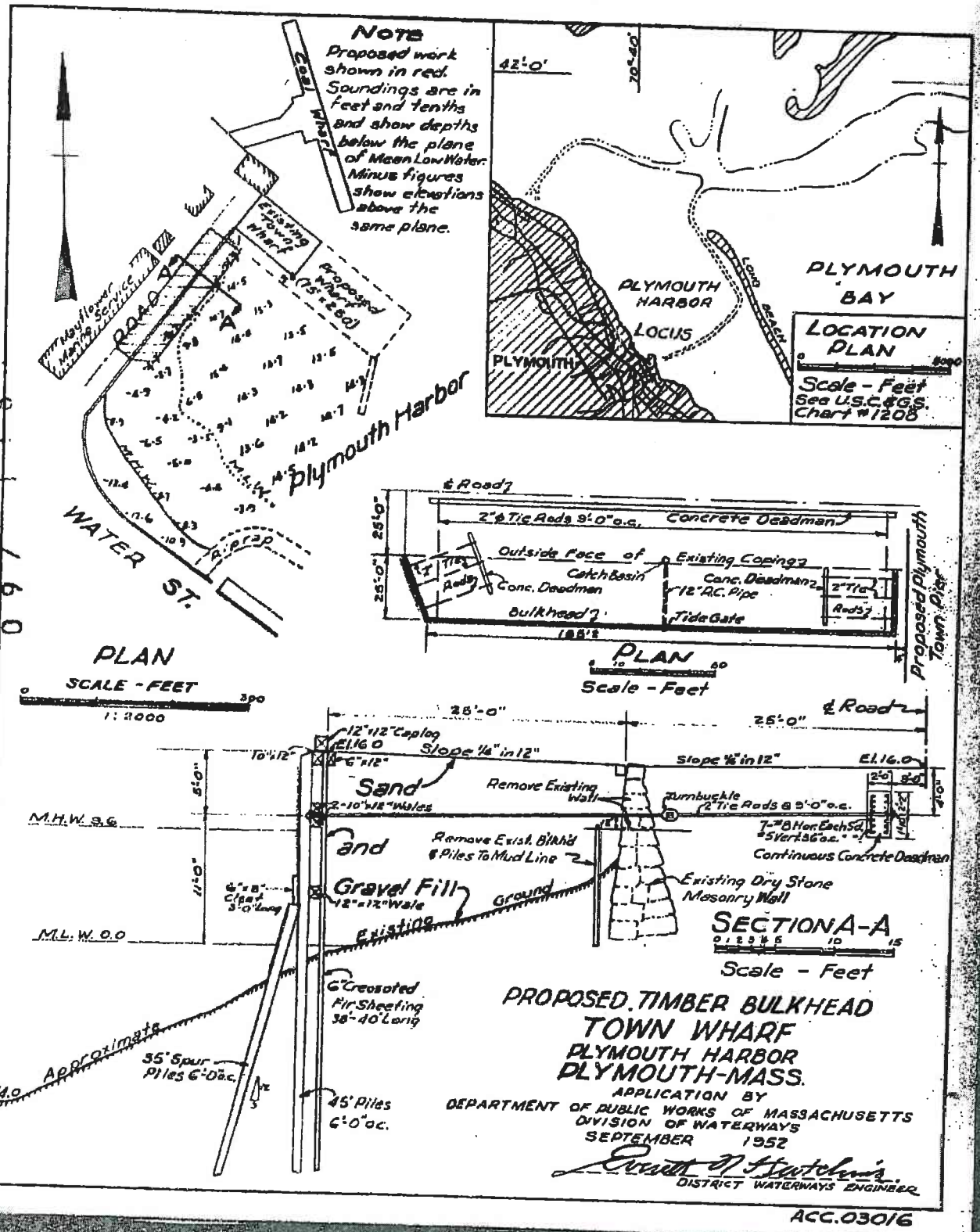
ACC.03974-C

1 5 2 1 8 6

057-14A-000-14
-100

48

USACE
NEINP 52-203



PROPOSED TIMBER BULKHEAD
TOWN WHARF
PLYMOUTH HARBOR
PLYMOUTH-MASS.

APPLICATION BY
DEPARTMENT OF PUBLIC WORKS OF MASSACHUSETTS
DIVISION OF WATERWAYS
SEPTEMBER 1952

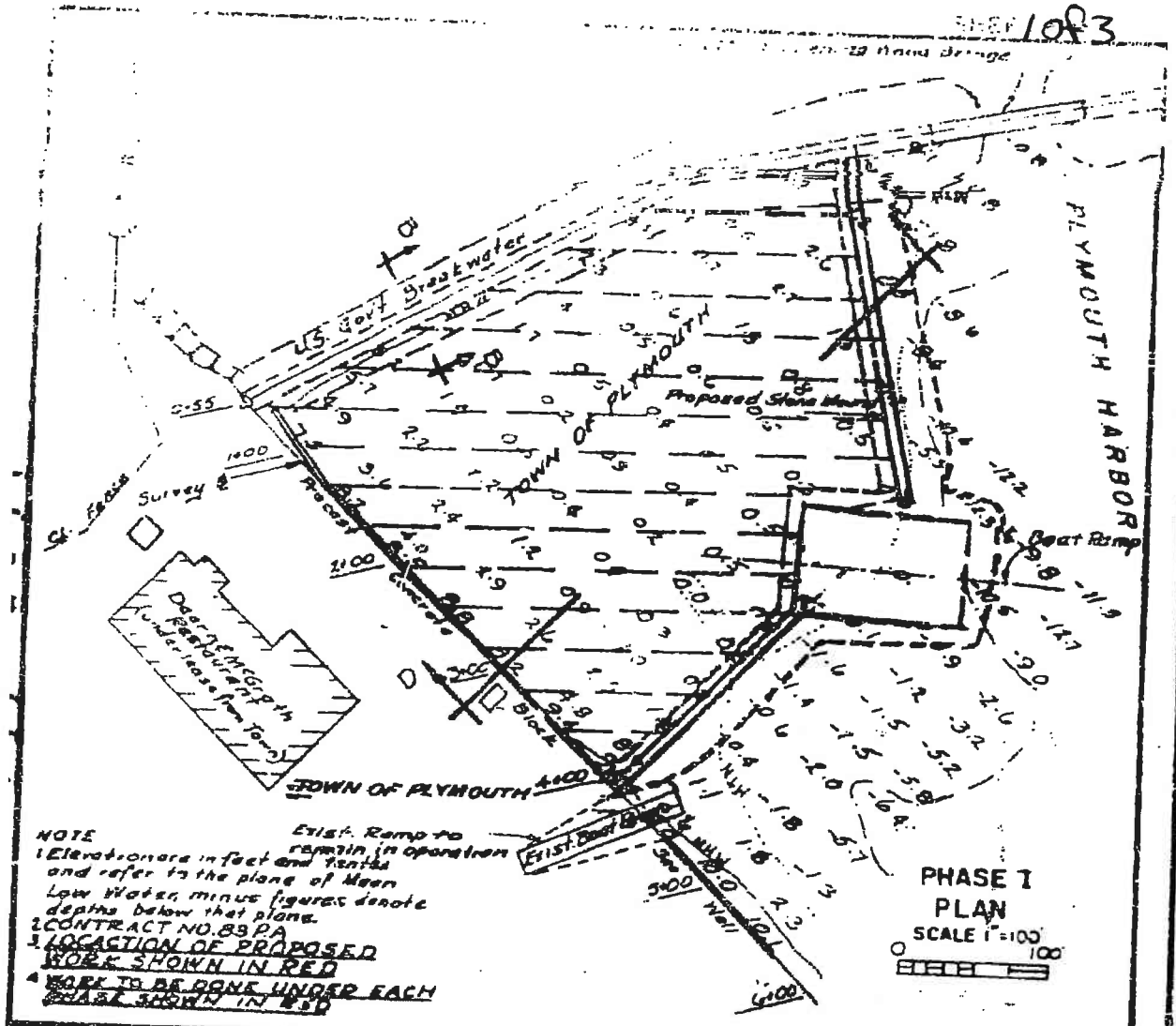
Ernest D. Stutchins
DISTRICT WATERWAYS ENGINEER

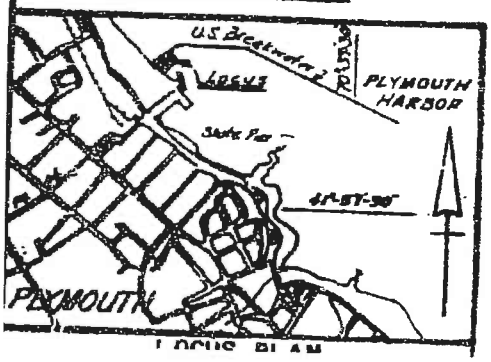
ACC.03016

057-14A-000-21A-300
057-14A-000-21A-400
057-14A-000-21A-500
057-017-000-161-100
057-017-000-163-100

USACE
CENED-OA-R-
22-1991001109

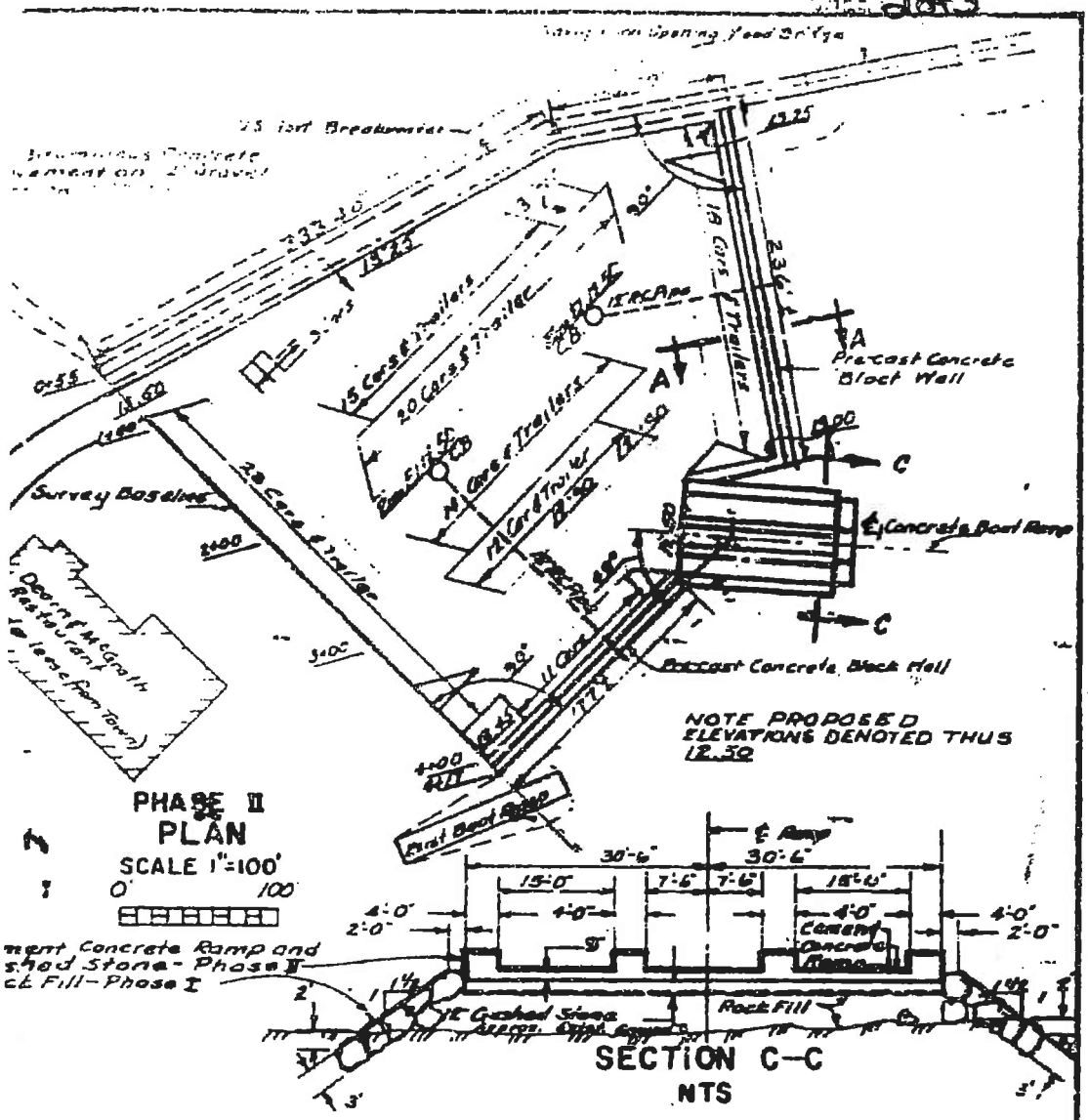
SHEET 1 of 3

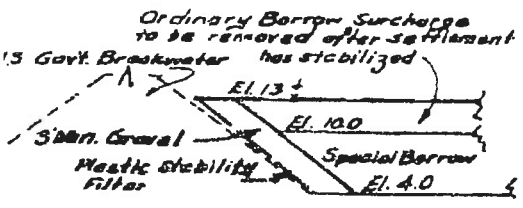




PROPOSED PUBLIC ACCESS FACILITY
BOAT RAMP AND PARKING AREA
PLYMOUTH HARBOR
PLYMOUTH MASSACHUSETTS
APPLICATION BY
DEPARTMENT OF PUBLIC WORKS OF MASS.
DIVISION OF WATERWAYS
OCTOBER 1974

SHEET 2 of 3



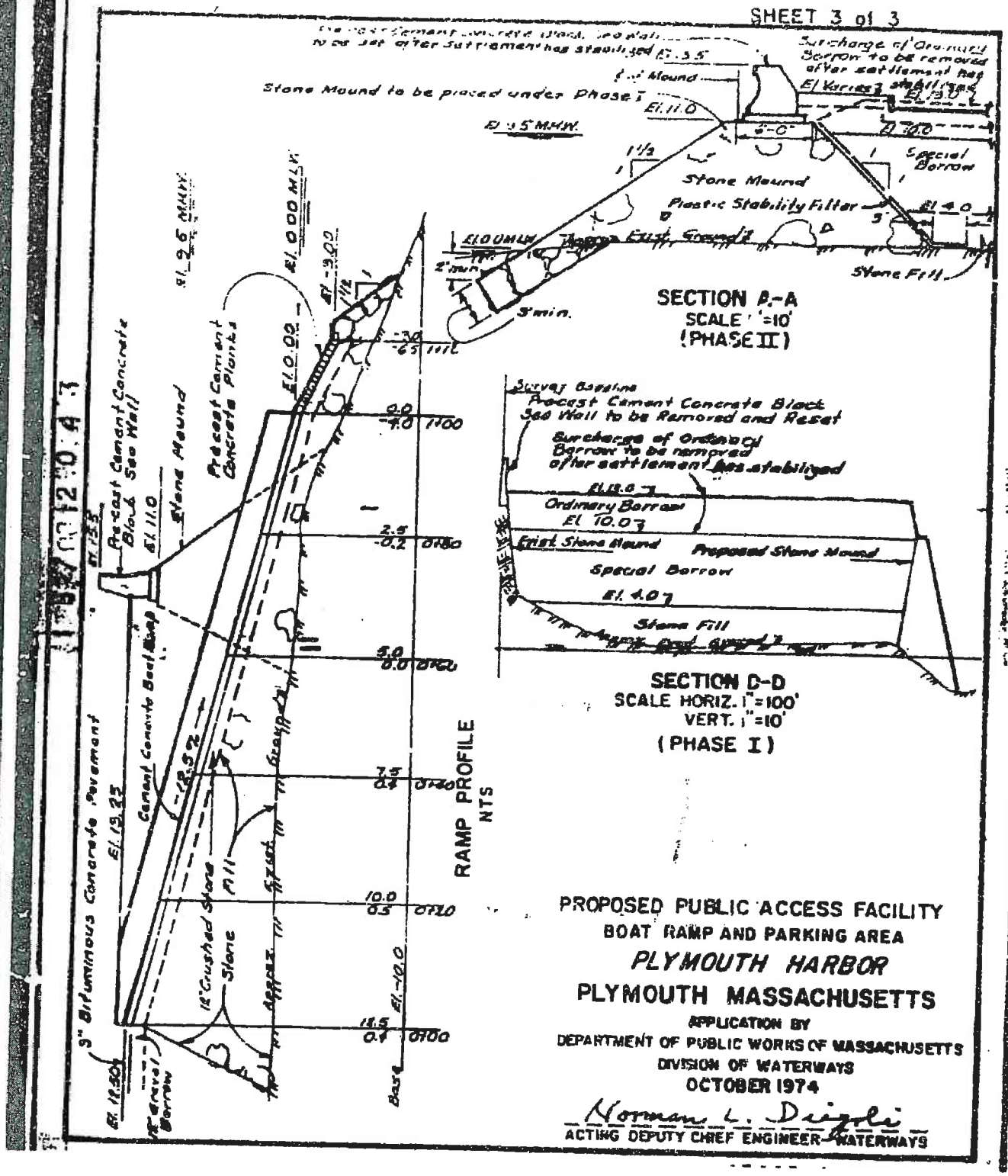


PROPOSED PUBLIC ACCESS FACILITY
BOAT RAMP AND PARKING AREA
PLYMOUTH HARBOR
PLYMOUTH MASSACHUSETTS

APPLICATION BY

DEPARTMENT OF PUBLIC WORKS OF MASSACHUSETTS

SHEET 3 of 3



PROPOSED PUBLIC ACCESS FACILITY
BOAT RAMP AND PARKING AREA

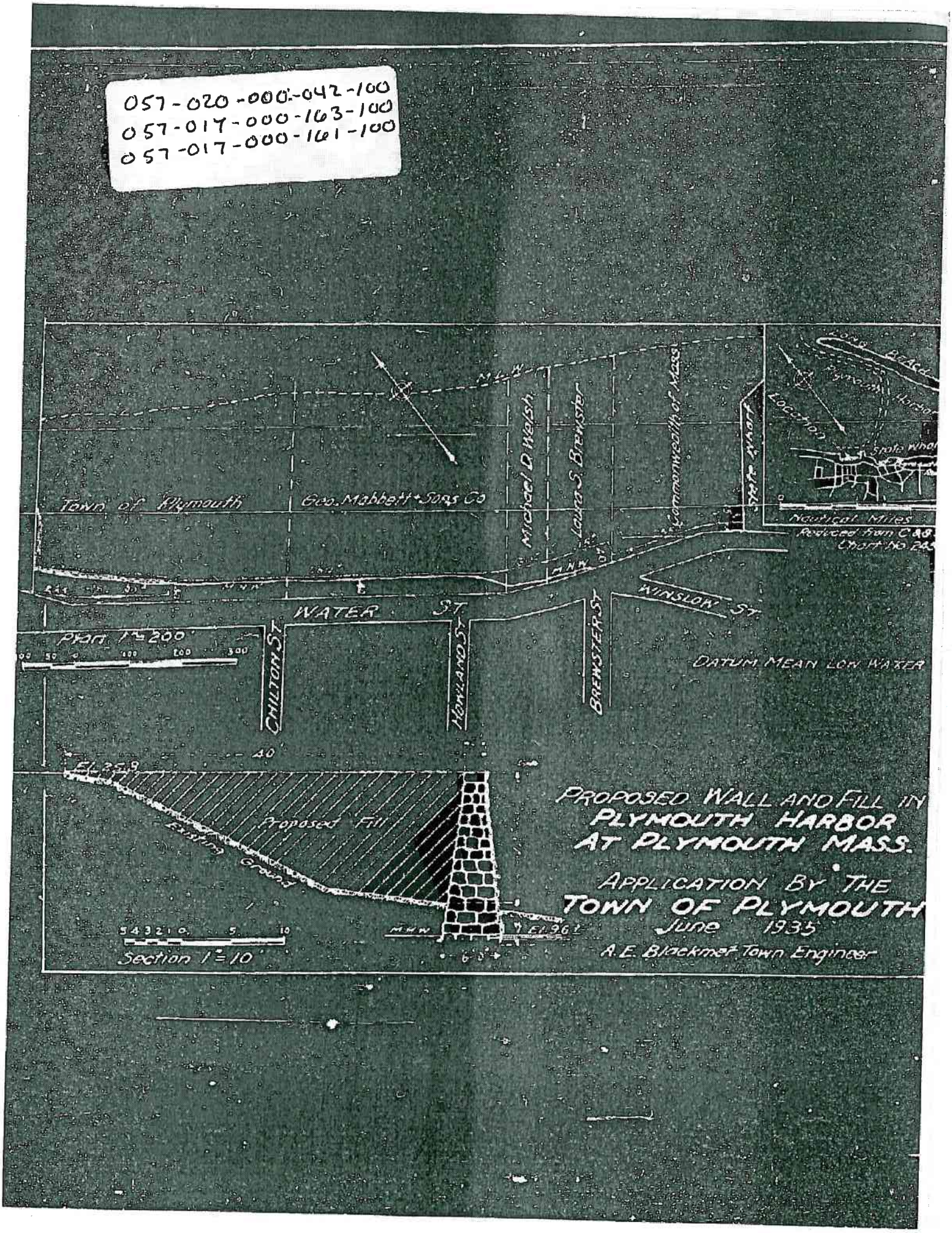
PLYMOUTH HARBOR

PLYMOUTH MASSACHUSETTS

APPLICATION BY
DEPARTMENT OF PUBLIC WORKS OF MASSACHUSETTS
DIVISION OF WATERWAYS
OCTOBER 1974

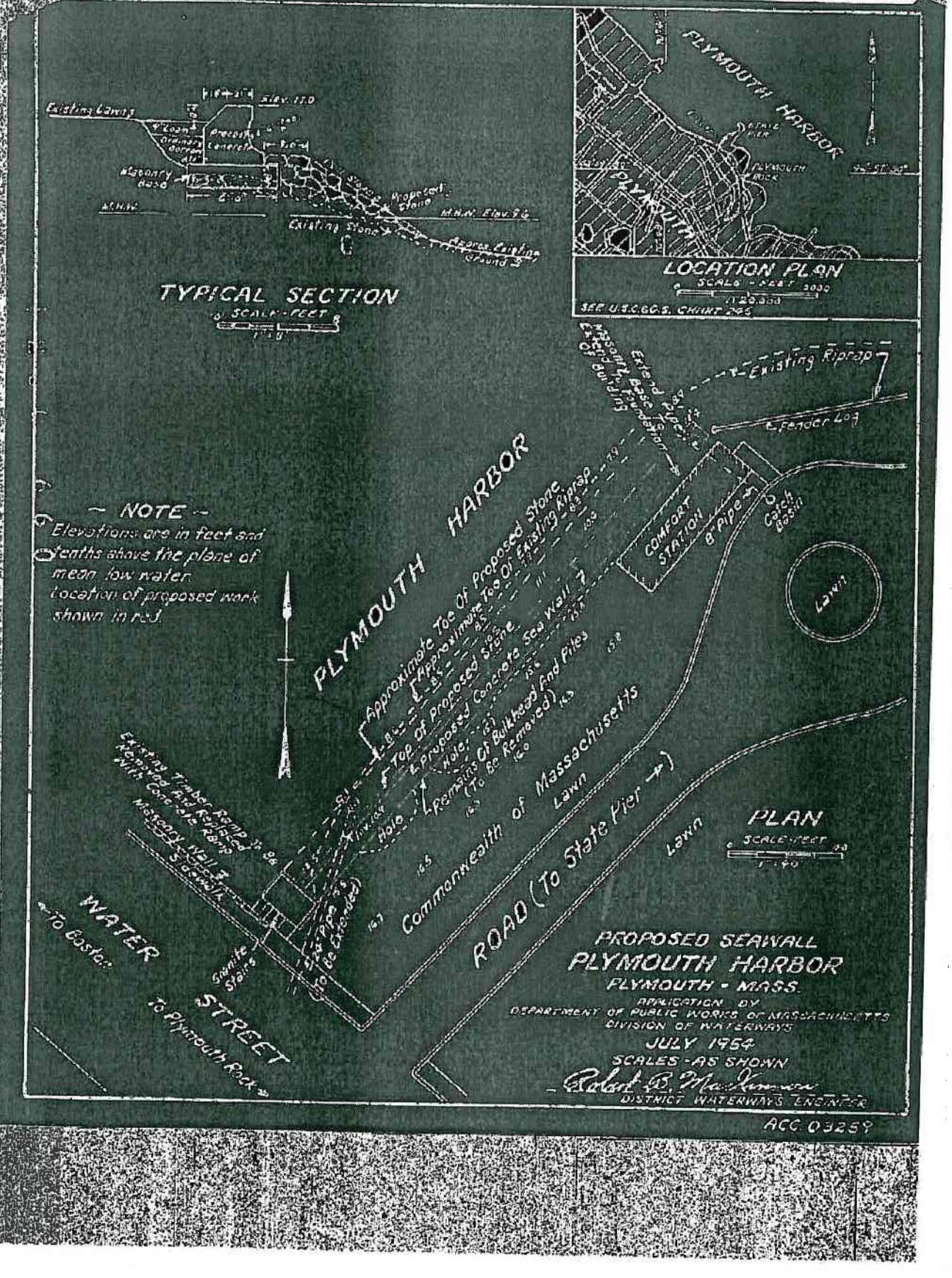
Norman L. Dingli
ACTING DEPUTY CHIEF ENGINEER-WATERWAYS

057-020-000-042-100
057-017-000-163-100
057-017-000-161-100



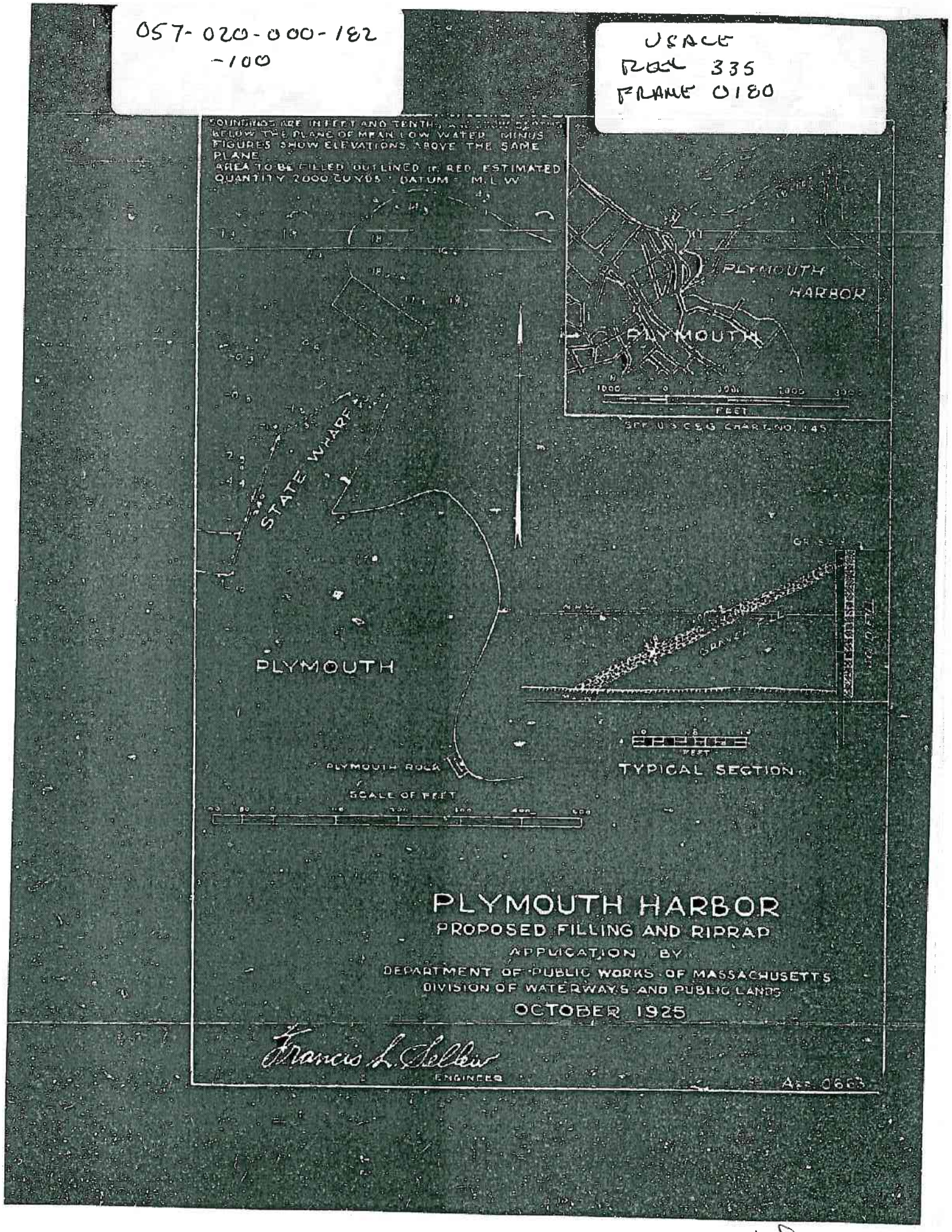
057-020-000-182
-100

USACE
NEDNP 54-198



057-020-000-182
-100

USACE
ROLL 335
FRAME 0180



PLYMOUTH HARBOR

PROPOSED FILLING AND RIPRAP

APPLICATION BY

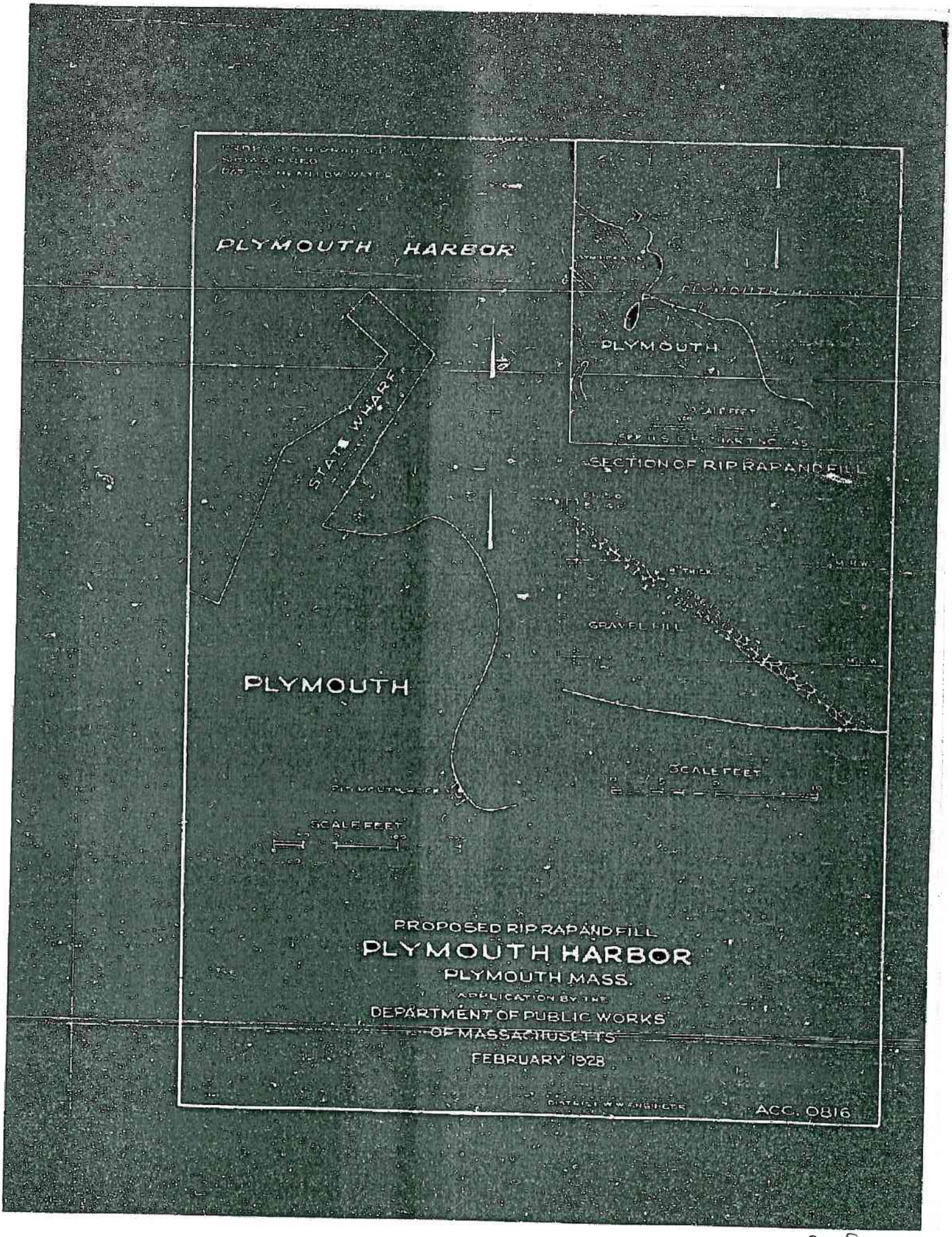
DEPARTMENT OF PUBLIC WORKS OF MASSACHUSETTS
DIVISION OF WATERWAYS AND PUBLIC LANDS

OCTOBER 1925

Francis L. Fellow
ENGINEER

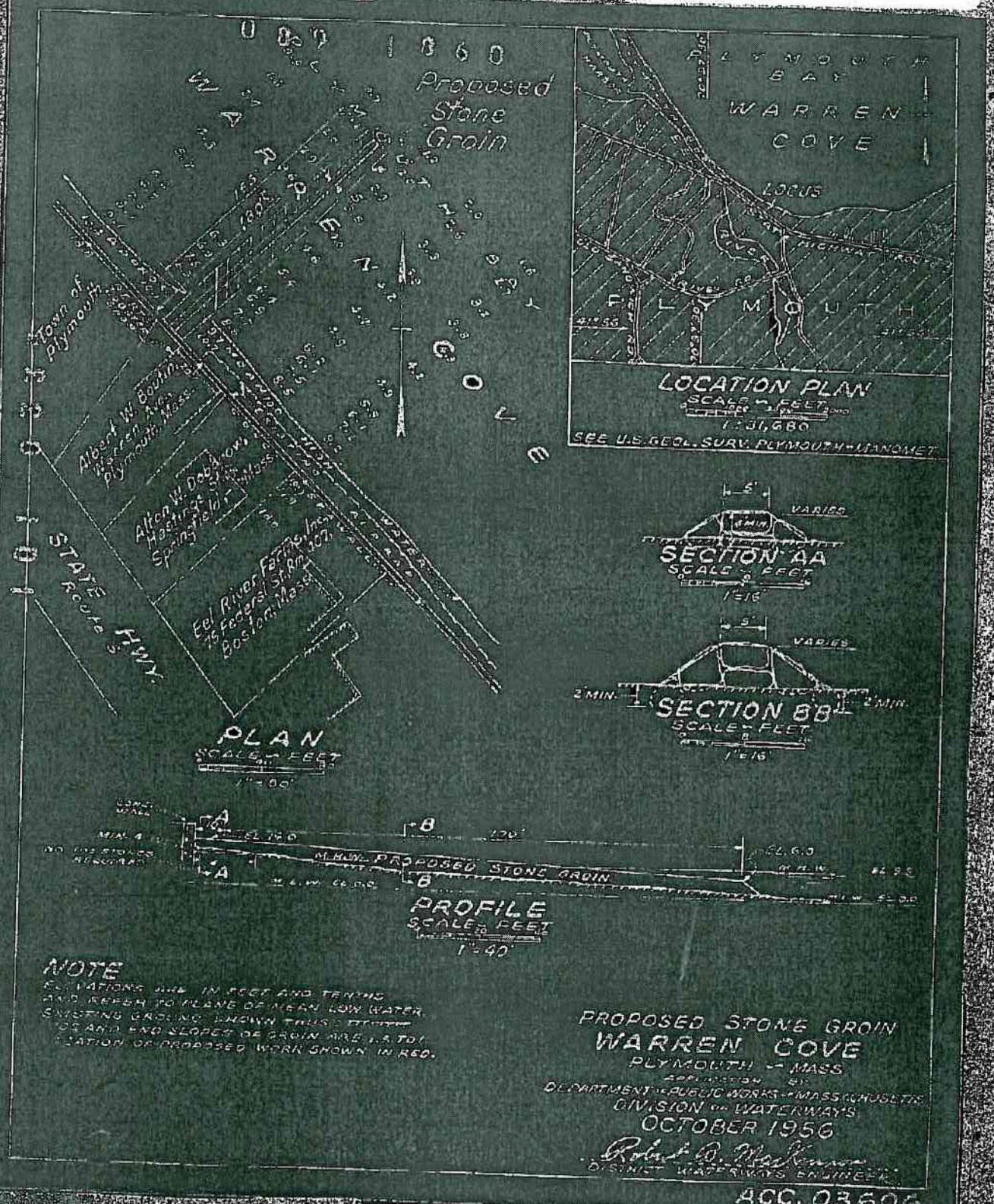
Apr. 0663

1072


PLYMOUTH HARBOR
STATE WHARF
PLYMOUTH
SCALE FEET
SECTION OF RIP RAP AND FILL
GRAVEL FILL
PLYMOUTH
SCALE FEET
SCALE FEET
PROPOSED RIP RAP AND FILL
PLYMOUTH HARBOR
PLYMOUTH MASS.
APPLICATION BY THE
DEPARTMENT OF PUBLIC WORKS
OF MASSACHUSETTS
FEBRUARY 1928
ACC. 0816

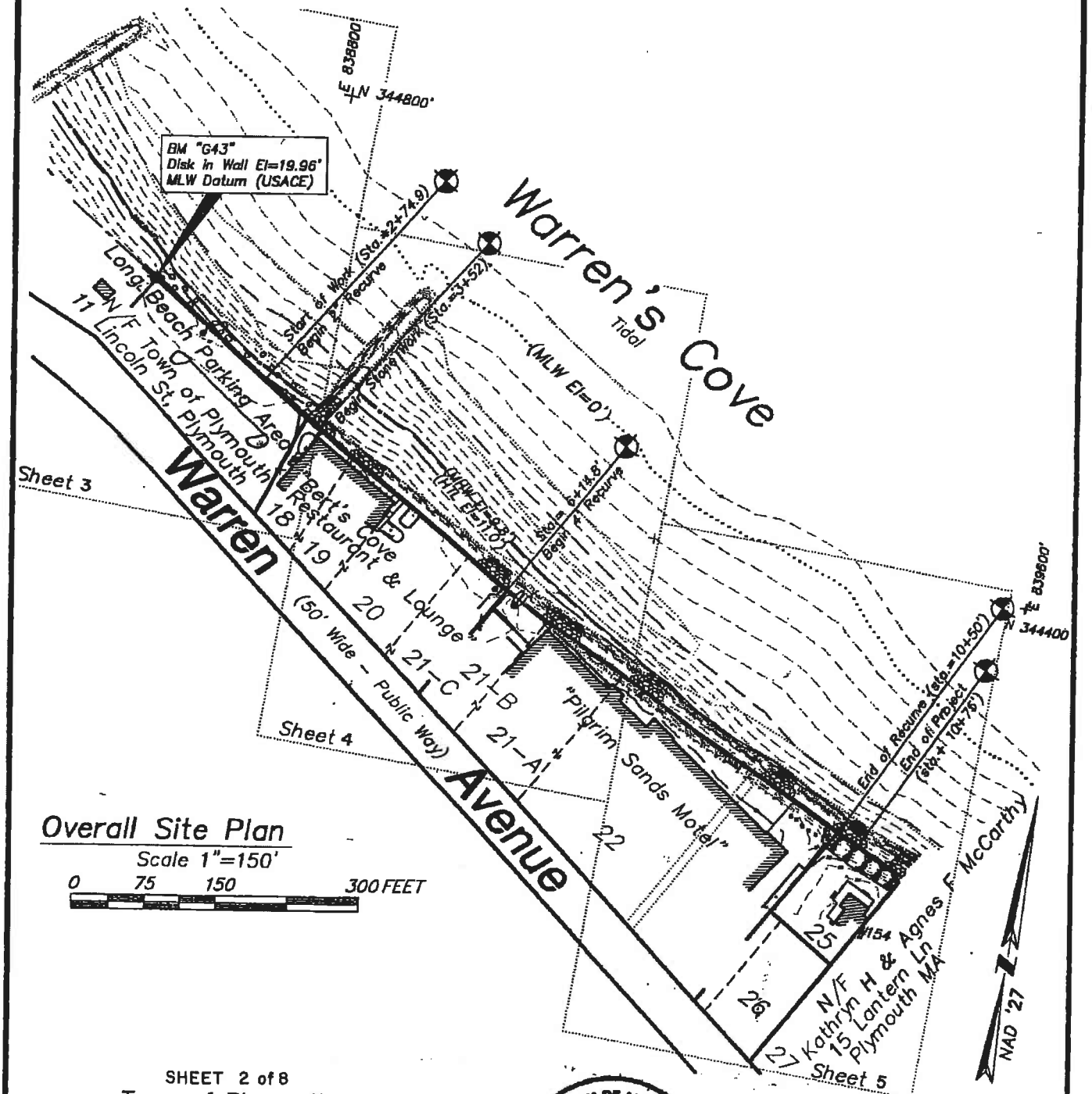
057-041-000-29-100

USACE
NEDNP 56-287



057-059-000-103-100
057-041-000-029-100

USACE
CENAE-R-2001-02744



Overall Site Plan

Scale 1"=150'

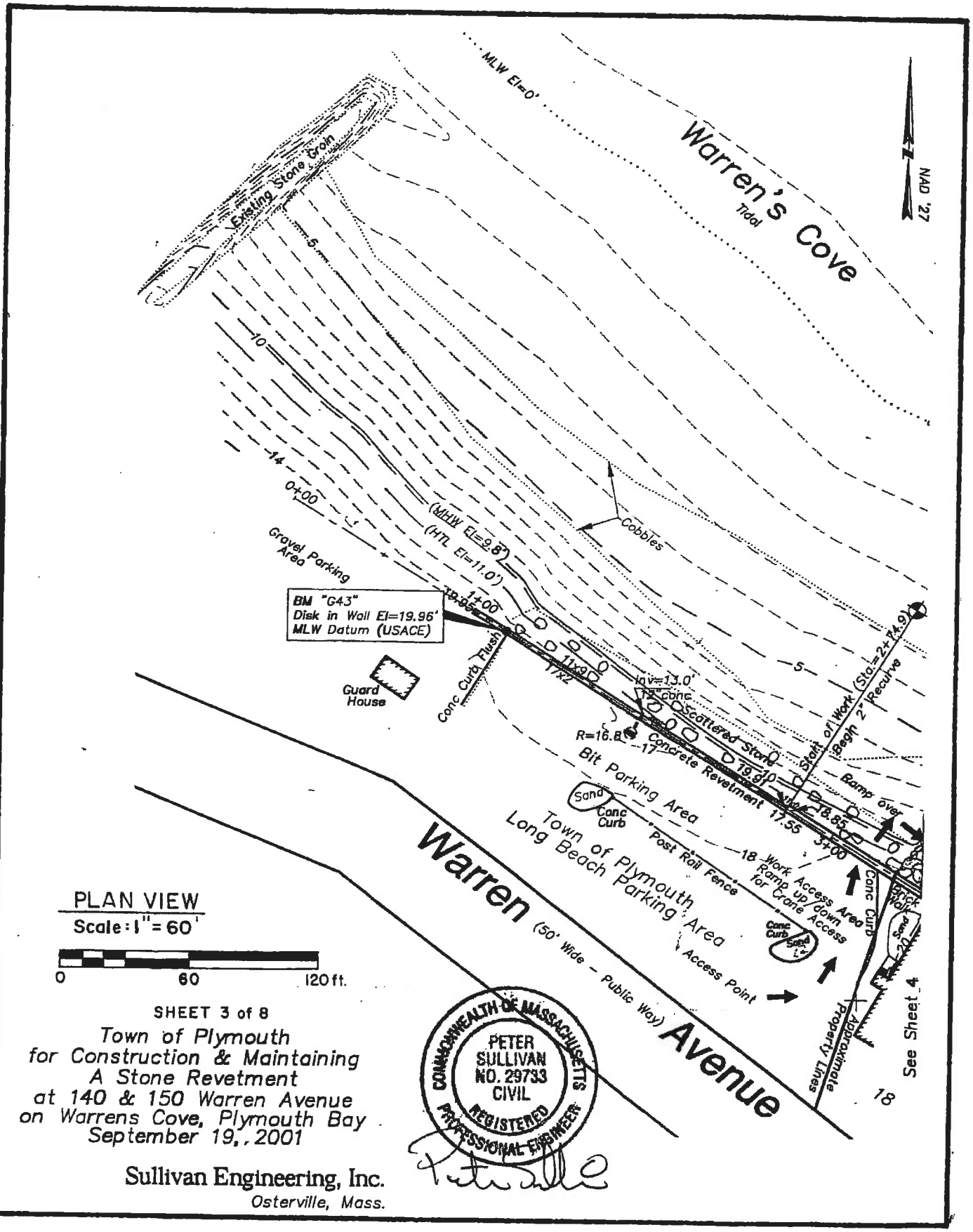
0 75 150 300 FEET

SHEET 2 of 8

Town of Plymouth
for Construction & Maintaining
A Stone Revetment
at 140 & 150 Warren Avenue
on Warrens Cove, Plymouth Bay
September 19, 2001

COMMONWEALTH OF MASSACHUSETTS
PETER SULLIVAN
NO. 29733
CIVIL
REGISTERED PROFESSIONAL ENGINEER

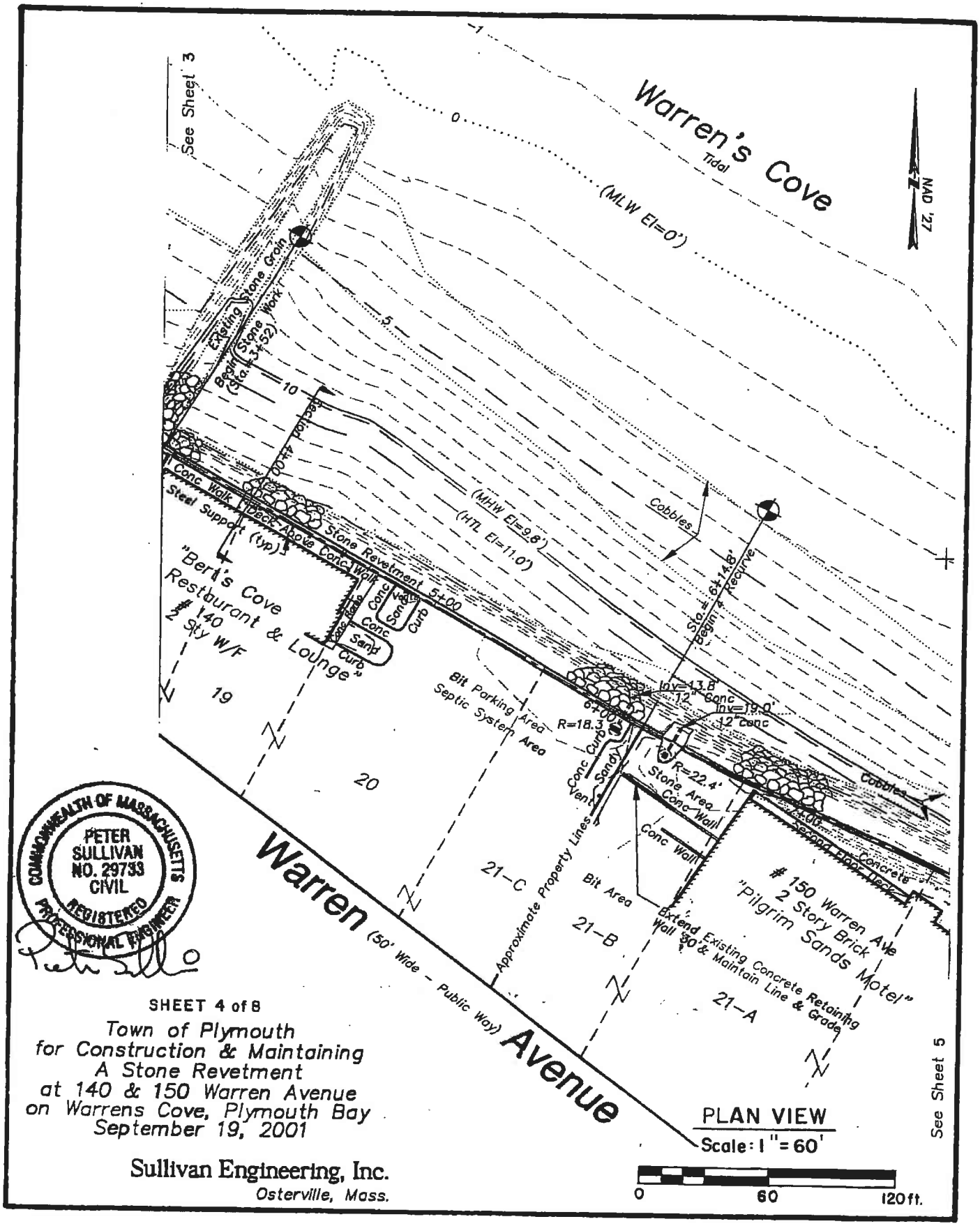
Sullivan Engineering, Inc.
Osterville, Mass.



SHEET 3 of 8

Town of Plymouth
for Construction & Maintaining
A Stone Revetment
at 140 & 150 Warren Avenue
on Warrens Cove, Plymouth Bay
September 19,, 2001

Sullivan Engineering, Inc.
Osterville, Mass.

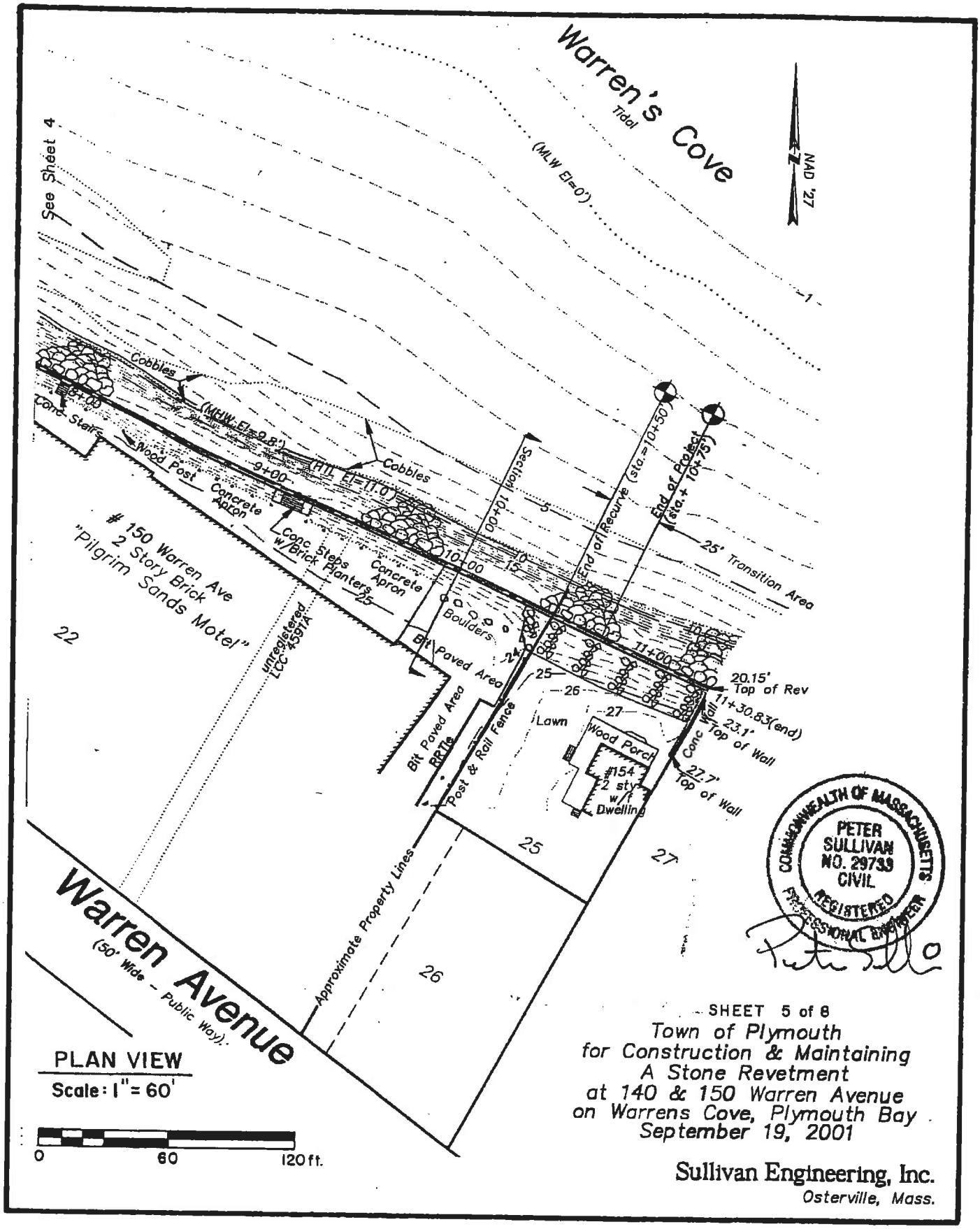


COMMONWEALTH OF MASSACHUSETTS
PETER SULLIVAN
NO. 29733
CIVIL
REGISTERED PROFESSIONAL ENGINEER

SHEET 4 of 8

Town of Plymouth
for Construction & Maintaining
A Stone Revetment
at 140 & 150 Warren Avenue
on Warrens Cove, Plymouth Bay
September 19, 2001

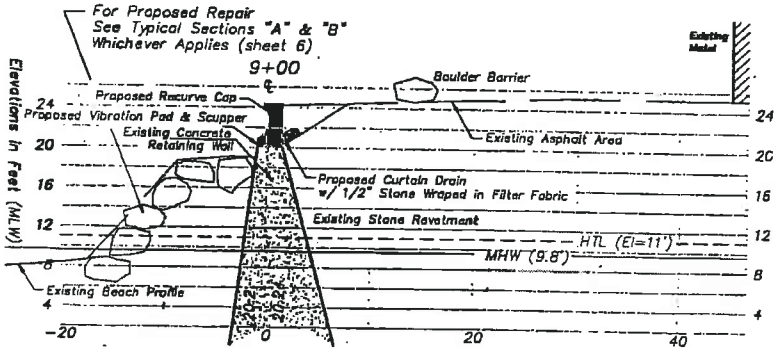
Sullivan Engineering, Inc.
Osterville, Mass.

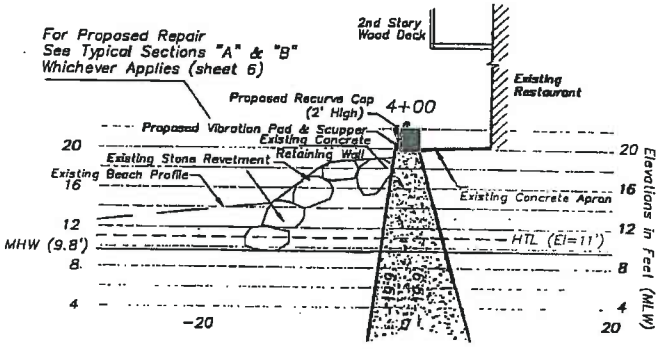


SHEET 5 of 8

Town of Plymouth
for Construction & Maintaining
A Stone Revetment
at 140 & 150 Warren Avenue
on Warrens Cove, Plymouth Bay
September 19, 2001

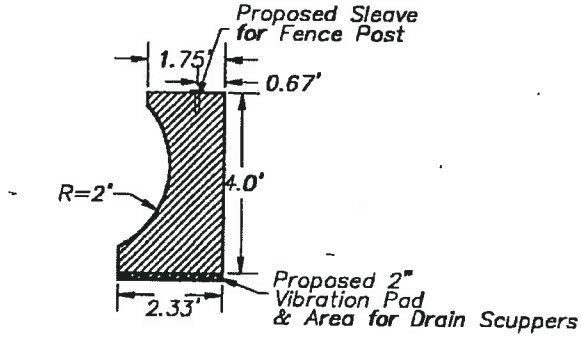
Sullivan Engineering, Inc.
Osterville, Mass.





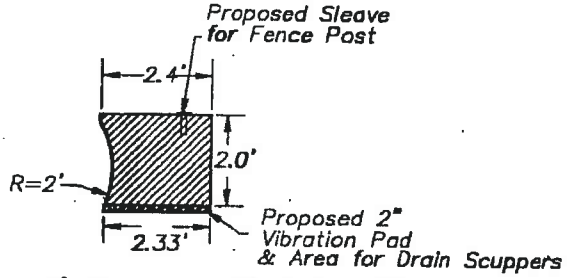
PROFILE VIEW

Scale: 1" = 20'



4' Recurve Wall Section

Typical (NTS)



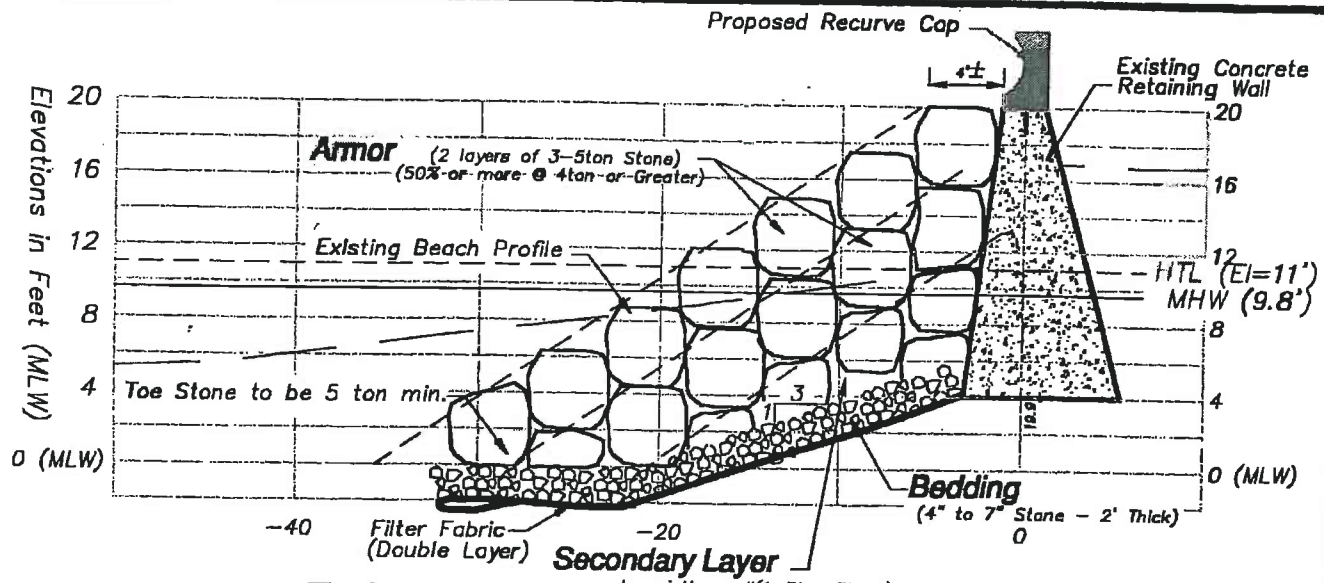
2' Recurve Wall Section

Typical (NTS)

SHEET 6 of 8

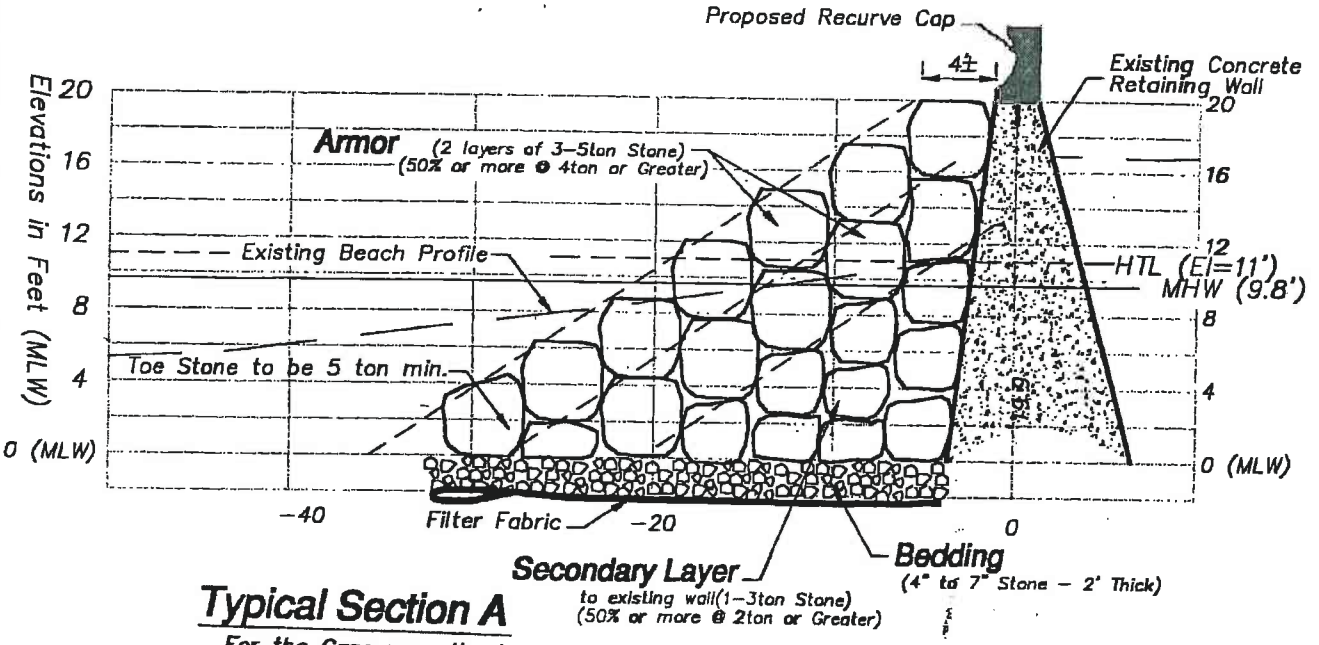
Town of Plymouth
for Construction & Maintaining
A Stone Revetment
at 140 & 150 Warren Avenue
on Warrens Cove, Plymouth Bay
September 19, 2001

Sullivan Engineering, Inc.
Osterville, Mass.



Typical Section B

For the Case were the bottom of the existing retaining wall is above elevation 0' MLW.



Typical Section A

For the Case were the bottom of the existing retaining wall is at elevation 0' MLW.

PROFILE VIEW

Scale : 1" = 10'

0 5 10 15 20 FEET

COMMONWEALTH OF MASSACHUSETTS
PETER SULLIVAN
NO. 29733
CIVIL
REGISTERED PROFESSIONAL ENGINEER

SHEET 7 of 8

Town of Plymouth
for Construction & Maintaining
A Stone Revetment
at 140 & 150 Warren Avenue
on Warrens Cove, Plymouth Bay
September 19, 2001

Sullivan Engineering, Inc.
Osterville, Mass.

General Notes on Specification Requirements for Construction:

1. General.
Each stone will be placed by equipment suitable for lifting, manipulating, and placing stones of the size and shape specified.
Each stone shall be placed with its longest axis perpendicular to the armor slope.
Placing efforts shall insure that each stone is firmly set and supported by underlying materials and adjacent stones.
Loose stones shall be reset or replaced.
Elevation of the toe stone must be witnessed and confirmed.

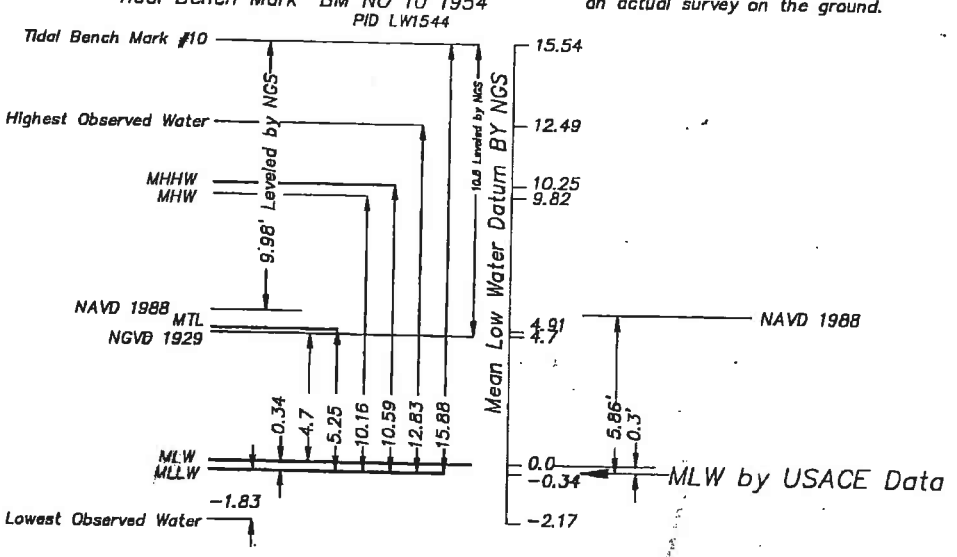
2. Armor Stone.
Armor stone should meet the following requirements:
Stones with their largest dimension greater than three times the least dimension should be rejected.
The stones should have high specific gravity and low absorption.
Materials should be able to withstand the design impact conditions.

3. Secondary Layer:
Stones with their largest dimension greater than three times the least dimension should not make up more than 10 % of the total.
All material should have adequate freezing and thawing resistance for the range of anticipated weather conditions.

4. Bedding Layer
Stone should be within the size range specified and the material should be well blended.
Stones with the largest dimension greater than three times the least dimension should not constitute more than 10% of the total.

5. Mapping
The topographic information shown was obtained by conventional survey methods on or between January 8, and February 15, 2001.
The datum used is Mean Low Water obtained from the USACE.
The property lines shown are from the Town of Plymouth Assessors' records and do not represent an actual survey on the ground.

Datum Relationship:

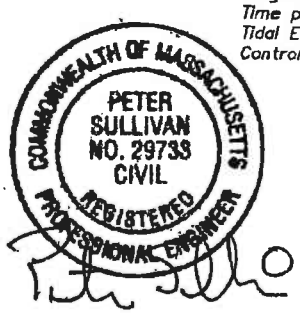


This relationship is based on the following:

Length of series	3 Months
Time period	June – August 1990
Tidal Epoch	1960–1978
Control Tide Station	Boston (844 3970)

SHEET 8 of 8

Town of Plymouth
for Construction & Maintaining
A Stone Revetment
at 140 & 150 Warren Avenue
on Warrens Cove, Plymouth Bay
September 19, 2001



Sullivan Engineering, Inc.
Osterville, Mass.

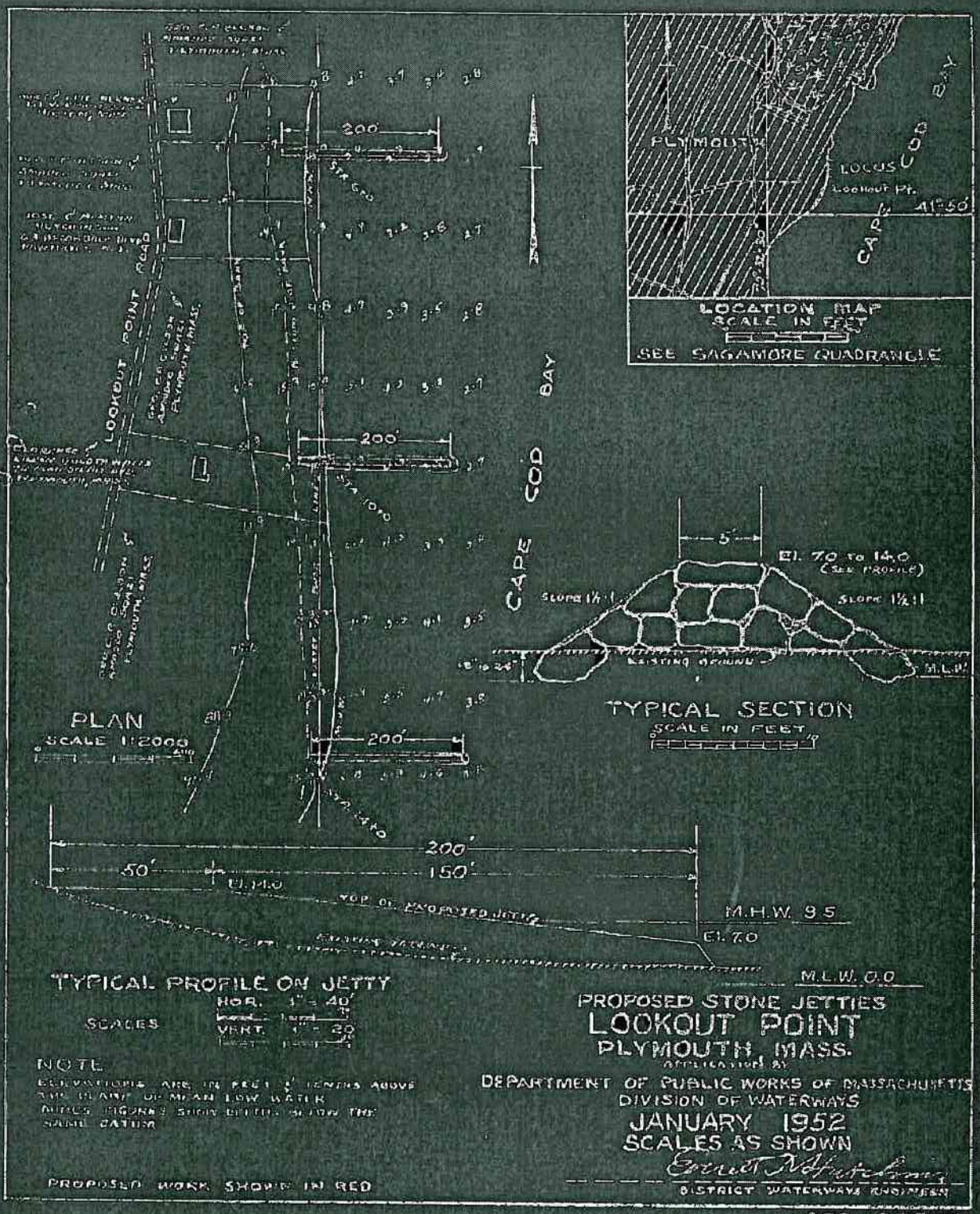
057-046-000-003
-100

USACE
RRL 335
FRAME 623

057-053-021-019
-100

USACE
NCDNP 52-25

093.01 179



057-053-021-055
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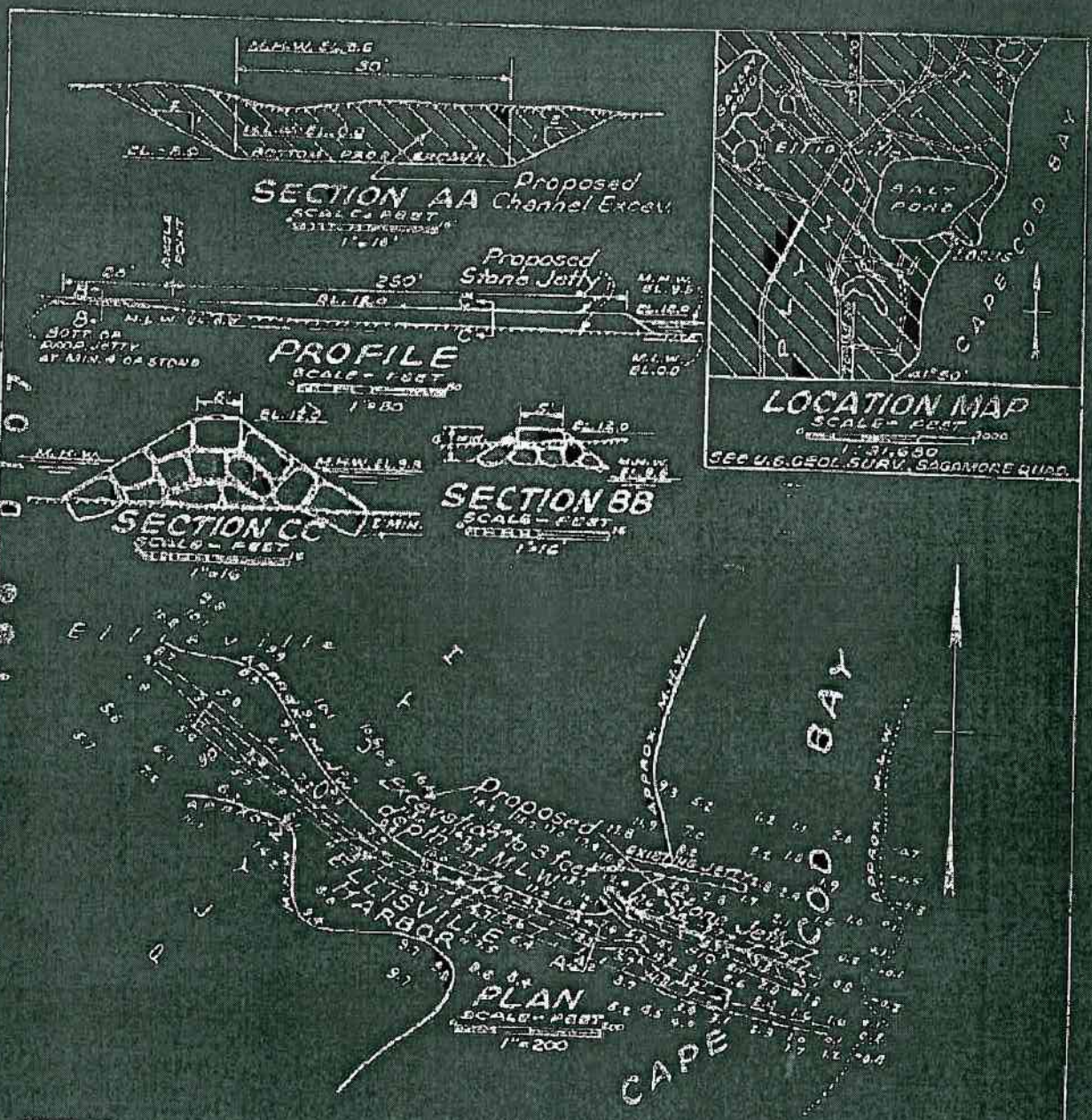
USACE
NEDNP 60-265



NOTE
ELEVATIONS ARE IN FEET AND TENTHS AND SHOW HEIGHTS ABOVE PLANE OF MEAN LOW WATER. MINUS FIGURES SHOW DEPTHS BELOW THE SAME PLANE. APPROX. EXISTING GROUND THUS ?????? SIDE AND END SLOPES FOR JETTY 1:1 TO 1:2. PROPERTY OWNERS NAMES UNKNOWN. EXCAVATED MATERIAL, APPROX. 18,200 C.Y. TO BE DEPOSITED ON BEACH ABOVE M.H.W. AND TO THE NO. EAST OF PROPOSED JETTY. LOCATION OF PROPOSED WORK IS SHOWN IN RED.

PROPOSED
EXCAVATION AND STONE JETTY
ELLISVILLE HARBOR
PLYMOUTH — MASS.
APPLICATION BY
DEPARTMENT of PUBLIC WORKS of MASSACHUSETTS
DIVISION of WATERWAYS
JUNE - 1960

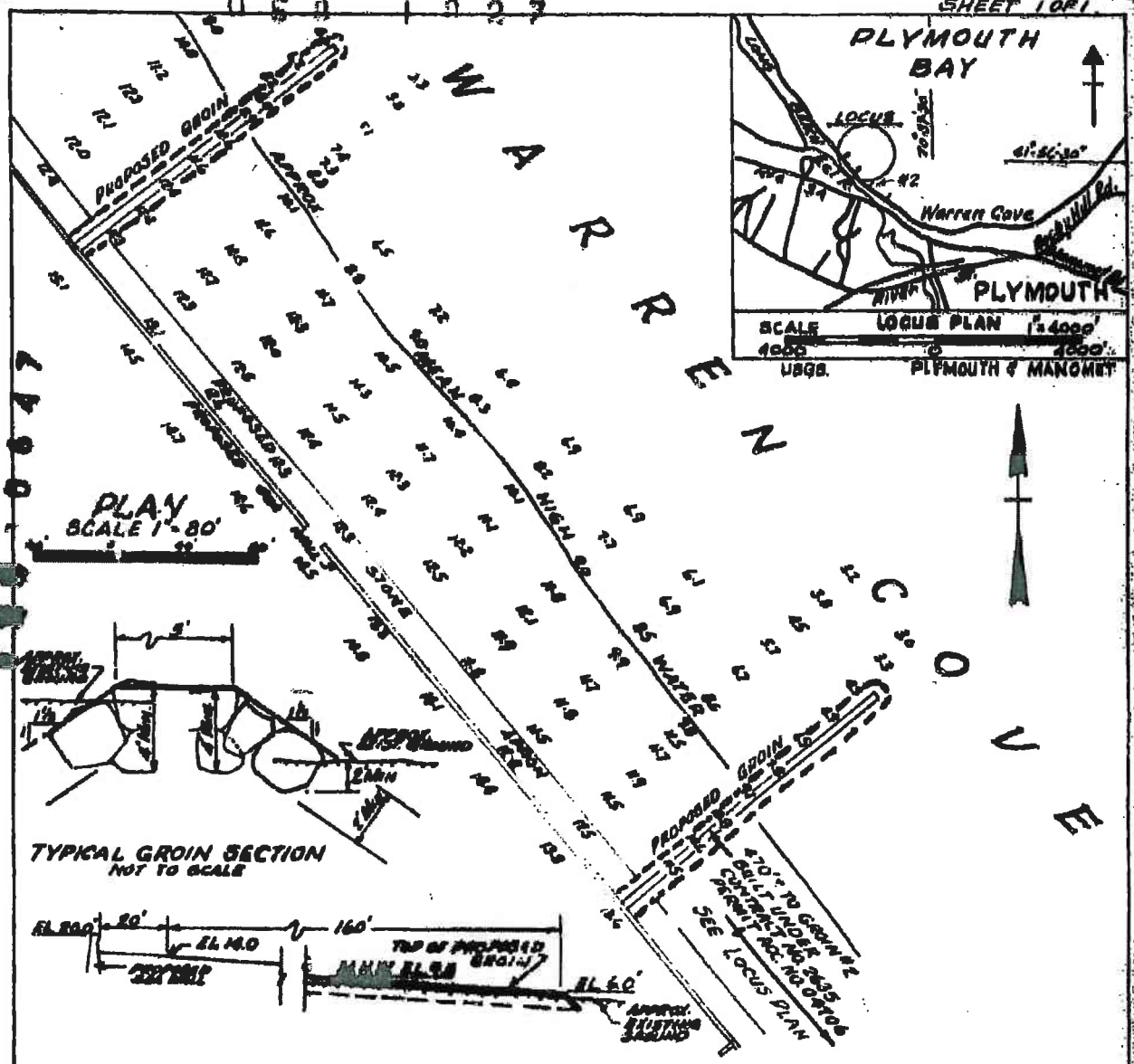
Robert B. MacKinnon
Chief Waterways Engineer

ACC. 04120

057-059-000-10B
-100

USACE
NEDOD 69-133

SHEET 1 OF 1



NOTES

Elevations are in feet and tenths and refer to the plane of mean low water.
Side and end slopes of Groins are 1½ to 1

PROPOSED STONE GROINS
PLYMOUTH BEACH
PLYMOUTH MASS.
APPLICATION BY
DEPARTMENT OF PUBLIC WORKS OF MASSACHUSETTS
DIVISION OF WATERWAYS
APRIL 1969

057-37A-006-156
-100

USACE
NEDNP 53-188

093 0499