GORDON'S WHARF STUDY
TAUNTON RIVER
SULLIVAN, MAINE

DRAFT

prepared for:

Town of Sullivan
1888 U.S. Highway 1
Sullivan, Maine 04664

prepared by:

Pine Tree Engineering, Inc.
53 Front Street
Bath, Maine 04530
(207)443-1508

January 2012
Project No. 11016

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Figure

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Note: The costs contained in this study may be updated utilizing the Engineering News Record Construction Cost Index. The ENR index at the time this study was completed was 9172.

January ___, 2012

Mr. Gary Edwards, Selectman
Town of Sullivan
1888 U.S. Highway 1
Sullivan, Maine 04664

Subject: **Gordon's Wharf Study** **#11016**
Taunton River
Sullivan, Maine

Dear Mr. Edwards:

Pine Tree Engineering is pleased to present the report on the Gordon's Wharf Study. The report has been completed in accordance with our contract dated October 6, 2011.

Thank you for retaining our firm to undertake this project. We would be pleased to assist you in the implementation of the wharf's future developments.

Very truly yours,

PINE TREE ENGINEERING, INC.

DRAFT

Stephen C. DeWick, P.E.
Project Manager

SCD/szd
Enclosure

c: Lawrence Johannesman, MDOT

SECTION 1
INTRODUCTION

The primary focus of this study has been to determine the structural integrity of the stone wharf and to identify improvements necessary to ensure its longevity. The wharf covers an area of 25,800 square feet (0.6 acre), and its location is shown on Figure 1. Figure 2 shows a property survey of the site by Horizon Surveying Company.

The secondary focus has been to determine the condition of Wharf Road and to improve its ability to handle vehicular traffic. The gravel road is 430 feet long with an average width of approximately 20 feet. Two watercourses cross under the road near the intersection with Hog Bay Road.

Other improvements to the site may include, but are not limited to:

1. A 4-foot wide by 40-foot long aluminum gangway and a 10-foot wide by 20-foot long seasonal float.

2. An ADA accessible entrance to the second story of the building.

3. An ADA compliant restroom in the building.

4. An elevated surface for the wharf to achieve flood protection.

5. A single lane boat launch consisting of a precast concrete ramp and seasonal groundout floats.

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FIGURE 1

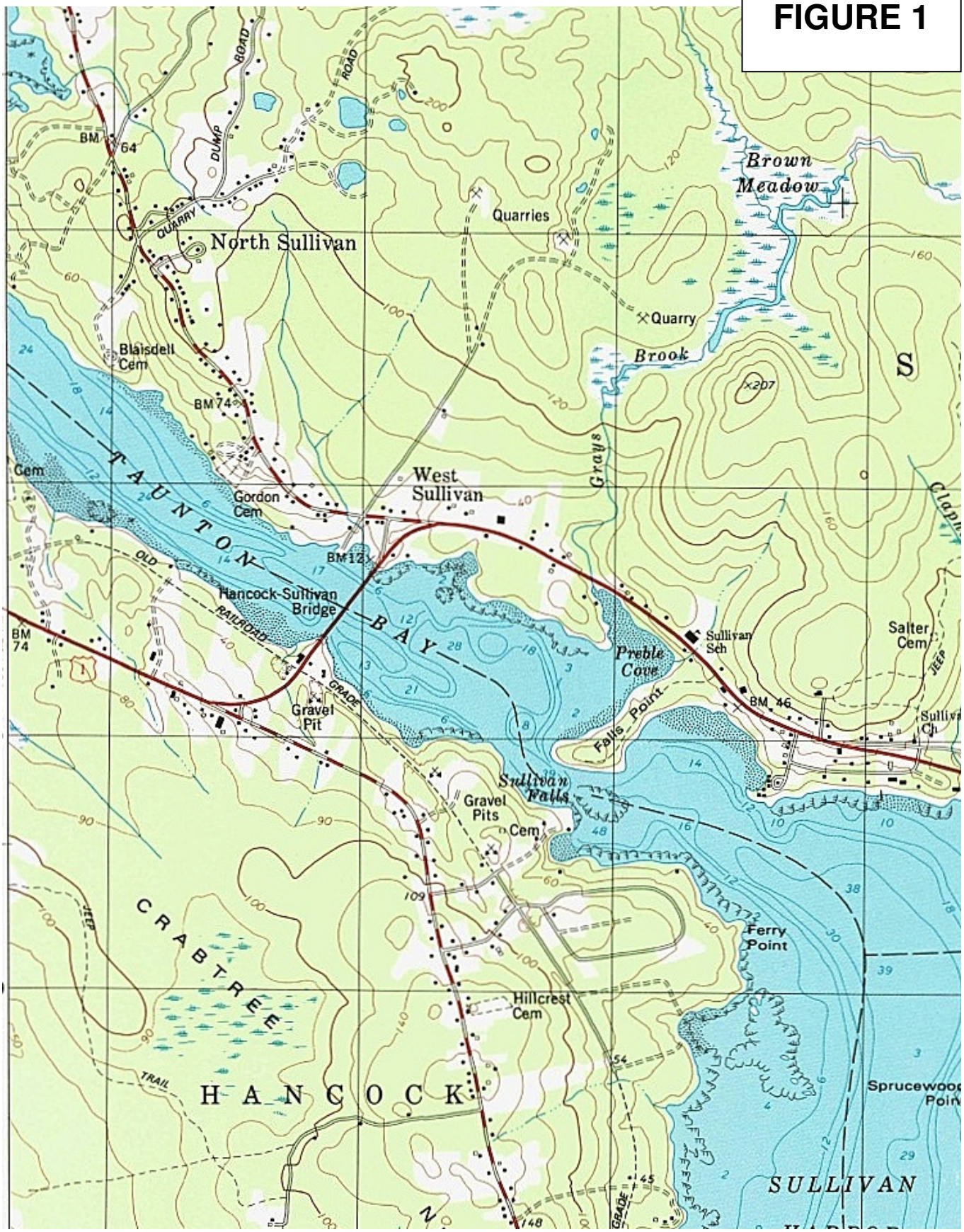
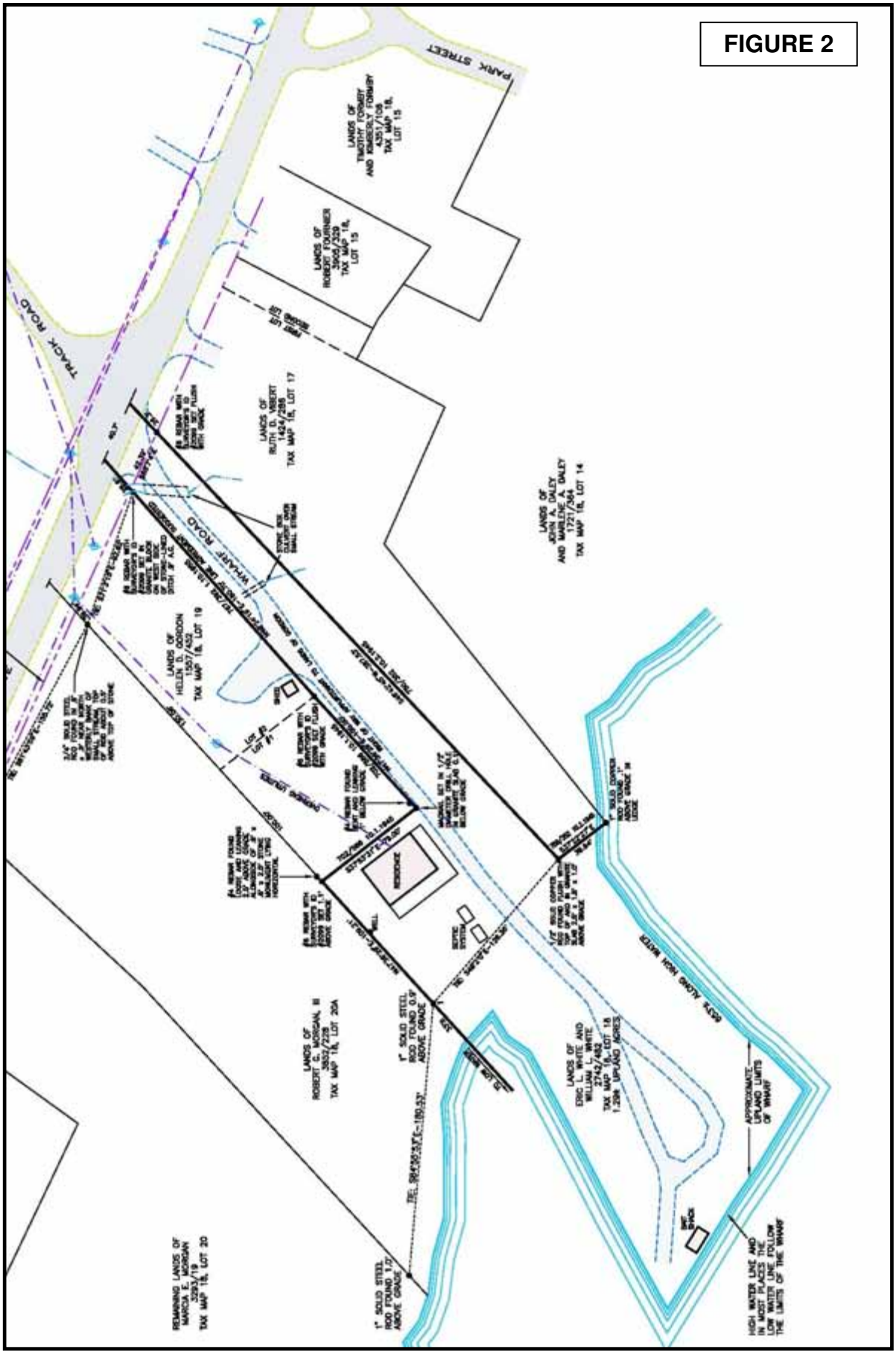

BM 64
DUMP ROAD
QUARRY ROAD
North Sullivan
Quarries
Brown Meadow
Quarry
Brook
Blaisdell Cem
BM 74
Gordon Cem
West Sullivan
Grays
TAUNTON BAY
OLD RAILROAD
Hancock-Sullivan Bridge
BM 12
Gravel Pit
GRADE
Preble Cove
Falls Point
Sullivan Sch
Salter Cem
JEEP
BM 46
Sullivan Falls
Gravel Pits
Cem
Ferry Point
CRABTREE
TRAIL
Hillcrest Cem
HANCOCK
SULLIVAN

FIGURE 2


PARK STREET
TRACK ROAD
WHARF ROAD
LANDS OF
TIMOTHY C. FOURNIER
AND HEATHER LY FORNIER
4351/105
TAX MAP 18,
LOT 15
LANDS OF
ROBERT FOURNIER
3906/329
TAX MAP 18,
LOT 15
LANDS OF
RUTH D. VIBERT
1424/286
TAX MAP 18, LOT 17
LANDS OF
JOHN A. DALEY
AND MARLENE A. DALEY
1721/364
TAX MAP 18, LOT 14
LANDS OF
HELEN D. GORDON
1357/433
TAX MAP 18, LOT 19
LANDS OF
ROBERT C. MORGAN, III
3933/228
TAX MAP 18, LOT 20A
REMAINING LANDS OF
MARCIA E. MORGAN
3933/19
TAX MAP 18, LOT 20
LANDS OF
ERIC LAN WHITE AND
WILLIAM WHITE
2742/452
TAX MAP 18- LOT 18
1.20± UPLAND ACRES
APPROXIMATE
UPLAND LIMITS
OF WHARF
HIGH WATER LINE AND
IN MOST PLACES THE
LOW WATER LINE FOLLOW
THE LIMITS OF THE WHARF
BOATS ALONG HIGH WATER
STONE RUN
SMALL STREAM
GRAVEL
BRUSH
HEDGE
WELL
SEPTIC
SYSTEM
LOT 18
LOT 19

SECTION 2
SUMMARY AND RECOMMENDATIONS

Summary

Subsurface explorations by Maine Test Borings of Herman, Maine indicate the wharf is in structurally sound condition.

A topographic survey by the Natural Resources Conservation Service (NRCS) was completed in July 2011. The survey datum is assumed using a magnetic survey nail set in a granite slab at the southeast corner of the house. The results of the NRCS survey, included in the Existing Conditions plan (Figure 3), indicates that the top of the wharf, for the most part, is elevation 91.7 feet, using the assumed local datum mentioned above. This is close to the Maine Department of Environmental Protection (MDEP) Highest Annual Tide (HAT) elevation of 90.3 feet, and below the Federal Emergency Management Agency (FEMA) 100-year flood elevation of 94.5 feet.

The condition of the Wharf Road has not recently been improved. Temporary repairs to the stone culverts have been made with wooden members.

Recommendations

Based upon the findings of this study, the following recommendations are provided below:

1. The entire river side and southern walls should be excavated and backfilled with 6" - 8" stone to eliminate erosion and "washout." Seventy-five feet of the northern wall nearest the northwestern corner should also be excavated and backfilled with 6" - 8" stone.

2. Granite blocks should be added, as needed, to achieve an elevation of 91.7 feet or more around the perimeter of the wharf.

3. A riprap slope should be extended 15 feet in both directions around the northwest corner of the wharf to protect the toe of the wall.

4. The Wharf Road surface should be graded after being grubbed of all deleterious materials such as sod, clay, debris, and roots.

5. The two stone culverts should be repaired with new granite slabs.

6. The Wharf Road should receive an application of MDOT Type D gravel for a full width of 22 feet.

7. A two-lane road surface should be constructed with 3 inches of reclaimed pavement for a travel width of 16 feet.

8. The center line of the travel lanes should coincide with the center of the road right-of-way.

9. A development plan and implementation schedule should be prepared for future improvements.

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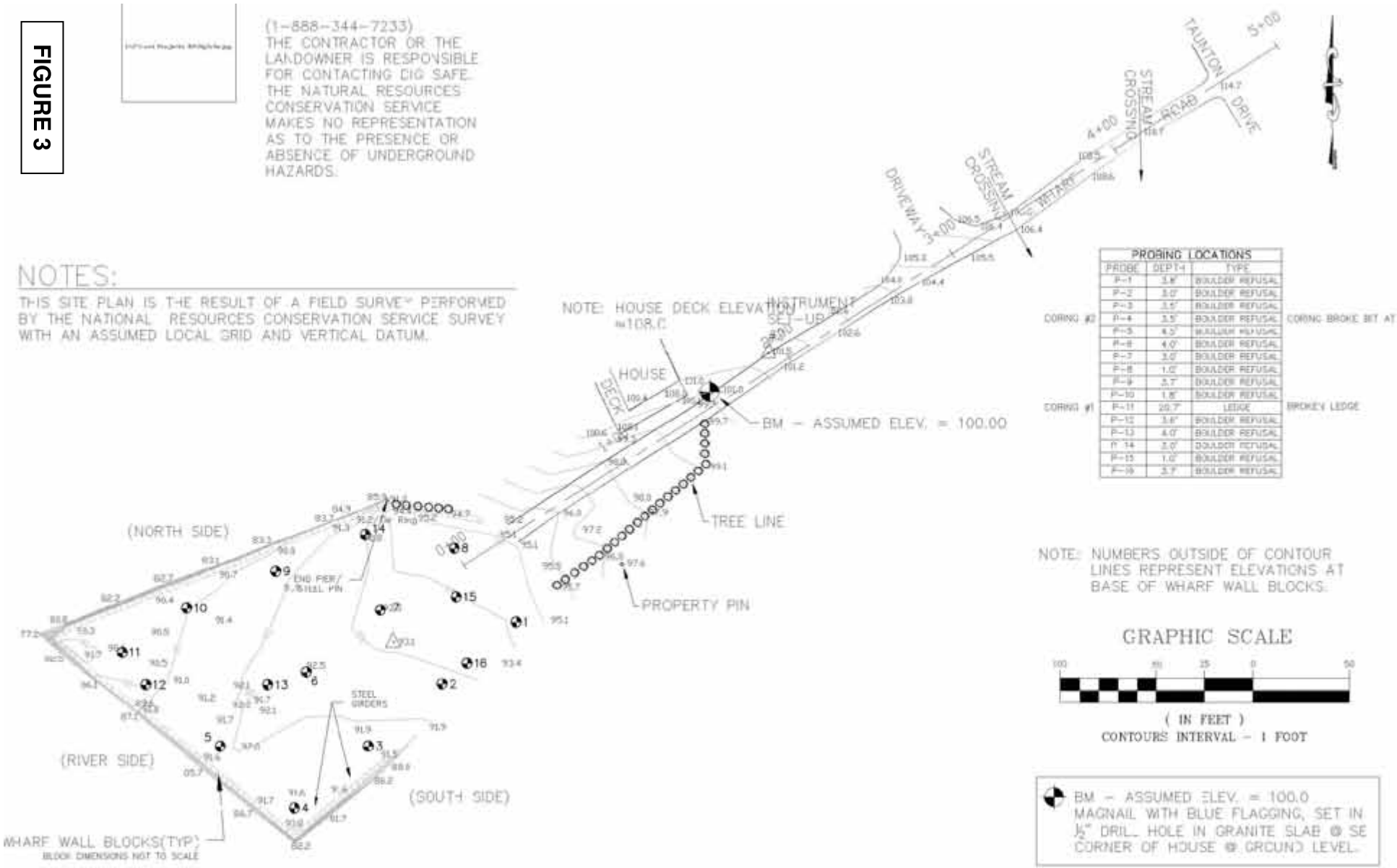
FIGURE 3



EXISTING CONDITIONS PLAN

SCALE: 1" = 50'

SECTION 3
CONDITION OF STONE WHARF

Two investigations were undertaken at Gordon's Wharf. They are described below.

Subsurface Explorations

On November 2, 2011, Maine Test Borings conducted subsurface explorations with a truck mounted drill rig. Probings with a 4" diameter solid stem auger were performed at 14 locations. Corings with a 4" casing and a 2" diameter core barrel were performed at two locations.

The exploration logs are contained in Appendix C. The probings revealed good sound condition with no remnants of wooden cribs or unstable debris. The corings indicate sound fill materials with stones ranging in size up to 12 inches (±).

Investigation of Wharf

On November 21, 2011, Pine Tree Engineering visited the wharf at low tide. The purpose of the investigation was to determine the condition of the granite block walls and to locate any deficiencies in the structure. The condition observed is included below.

- South Side - The southern side of the wharf consists of a stone retaining wall starting at the southwestern corner of the wharf extending in a northeasterly direction for approximately 75 feet. The stones are approximately 3 to 5 feet in length by 3 feet in width and 2 feet in thickness. Steel "H"-piles are used to reinforce a portion of the retaining wall. A riprap slope then extends another 100 or more feet in the same Direction.

  Extensive voids were present between the stones of the retaining wall, which suggest instability in the top three courses. The voids, which were approximately 6-12 inches along the face of the wall extended up to 4 feet into the wall. Holes and other evidence of erosion (or wash out) were noted behind the wall. Two steel "H"-piles are used to reinforce the wall. It appeared that these piles were insufficiently embedded. Though the riprap slope extending from the end of the wall toward Taunton Drive was in good condition, there are small holes and other areas of erosional subsidence behind it in the grassy area above.

- River Side - The western side of the wharf consists of a stone retaining wall starting at the southwestern corner of the wharf extending in a northwesterly direction for approximately 170 feet to the northwestern corner of the wharf. These stones are also approximately 3 to 5 feet in length by 3 feet in width and 2 feet in thickness.

  The majority of this wall is in better condition than the southern wall. Voids between stones extend deeper in the wall near the southern and northern ends of this wall. Holes and other evidence of erosion (or wash out) were noted behind the wall toward the south. The top course is lower toward the northern end of this wall. A riprap slope was also noted around the northern corner of the wharf. Voids near the northwestern corner extended up to 7 feet into the wall. Granular soils are easily washed away from large stone retaining walls along rivers. Some granular materials were noted behind the western wall in various places.

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- North Side - The northern side of the wharf consists of a stone retaining wall starting at the northwestern corner of the wharf extending in a northeasterly direction for approximately 195 feet. These stones are also approximately 3 to 5 feet in length by 3 feet in width and 2 feet in thickness. Some washable material (gravel) was noted in the voids behind the wall.

In general, the stones along the northern wall were in good order compared to the southern and western walls. The voids were less prominent in width and depth with little to no granular (washable) soils. The northwestern corner of the wharf is showing greater evidence of erosion than the remainder of the northern wall.

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SECTION 4
GORDON'S WHARF IMPROVEMENTS

The majority of the granite block walls at Gordon's Wharf are stable and intact. There are several locations, specifically the south wall near the southwest corner and the west wall near the northwest corner, where the blocks have shifted, indicating an instability. They need to be reset.

The northwest corner of the wharf is the farthest point into the river, making it susceptible to the strongest currents. This area of the wharf is also at a lower elevation, making it susceptible to overtopping and erosion. The top course of blocks along the western side of the wharf should be extended to the northwest corner of the wharf and along the northern wall. The entire river side and southern walls, along with 75 feet of the northern wall, should be excavated and backfilled with 6" - 8" stone to eliminate erosion and "washout." A riprap slope should be extended around the northwest corner to protect the toe of the wall, ending 15 feet from the corner in both directions.

The Maine Department of Transportation (MDOT) recommends that piers and wharves have a deck elevation 15 to 16 feet above mean lower low water, or 1.4 feet above the Highest Annual Tide. That elevation for Gordon's Wharf should be 91.7 feet, based upon the assumed local datum used by NRCS.

Proposed improvements are shown in Figure 4 at the end of this section.

The activities and their costs are tabulated below:

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TABLE 1
Stone Wharf Improvements
Construction Cost Estimate

	Item	Unit Cost	Quantities	Cost
South Side				
1.	Reset and chink top three courses	$100 ea.	54 blocks	$5,400
2.	6" - 8" Stone	$40/c.y.	150 c.y.	6,000
3.	Geotextiles	$4/s.f.	800 s.f.	4,000
4.	Grading	$10/c.y.	50 c.y.	500
5.	Loam, seed, fertilize & mulch	$3/s.y.	150 s.y.	450
6.	Erosion control	$3/l.f.	200 l.f.	600
			Subtotal South Side:	**$16,950**
River Side				
7.	Reset and chink top two courses	$100 ea.	90 blocks	$9,000
8.	New Granite Blocks	$450 ea.	20 blocks	9,000
9.	6" - 8" stone backfill	$40/c.y.	300 c.y.	12,000
10.	Geotextiles	$4/s.f.	2,000 s.f.	8,000
11.	Type D gravel	$20/c.y.	250 c.y.	5,000
12.	Riprap	$60/c.y.	90 c.y.	5,400
13.	Loam, seed, fertilize & mulch	$3/s.y.	300 s.y.	900
14.	Erosion control	$3/l.f.	200 l.f.	600
			Subtotal Front Side:	**$49,900**
North Side				
15.	Reset Stones	$100 ea.	20 blocks	$2,000
16.	New Granite Blocks	$450 ea.	16 blocks	7,200
17.	Excavation	$15/c.y.	200 c.y.	3,000
18.	6" - 8" stone backfill	$40/c.y.	150 c.y.	6,000
19.	Geotextiles	$4/s.f.	800 s.f.	3,200
20.	Riprap	$60/c.y.	100 c.y.	6,000
21.	Loam, seed, fertilize & mulch	$3/s.y.	200 s.y.	600
22.	Erosion control	$3/l.f.	300 l.f.	900
			Subtotal North Side:	**$28,900**
			Subtotal Three Sides:	**$95,750**
			Contingency 10%:	9,600
			Permits:	1,200
			Engineering:	8,000
			Total:	**$114,550**

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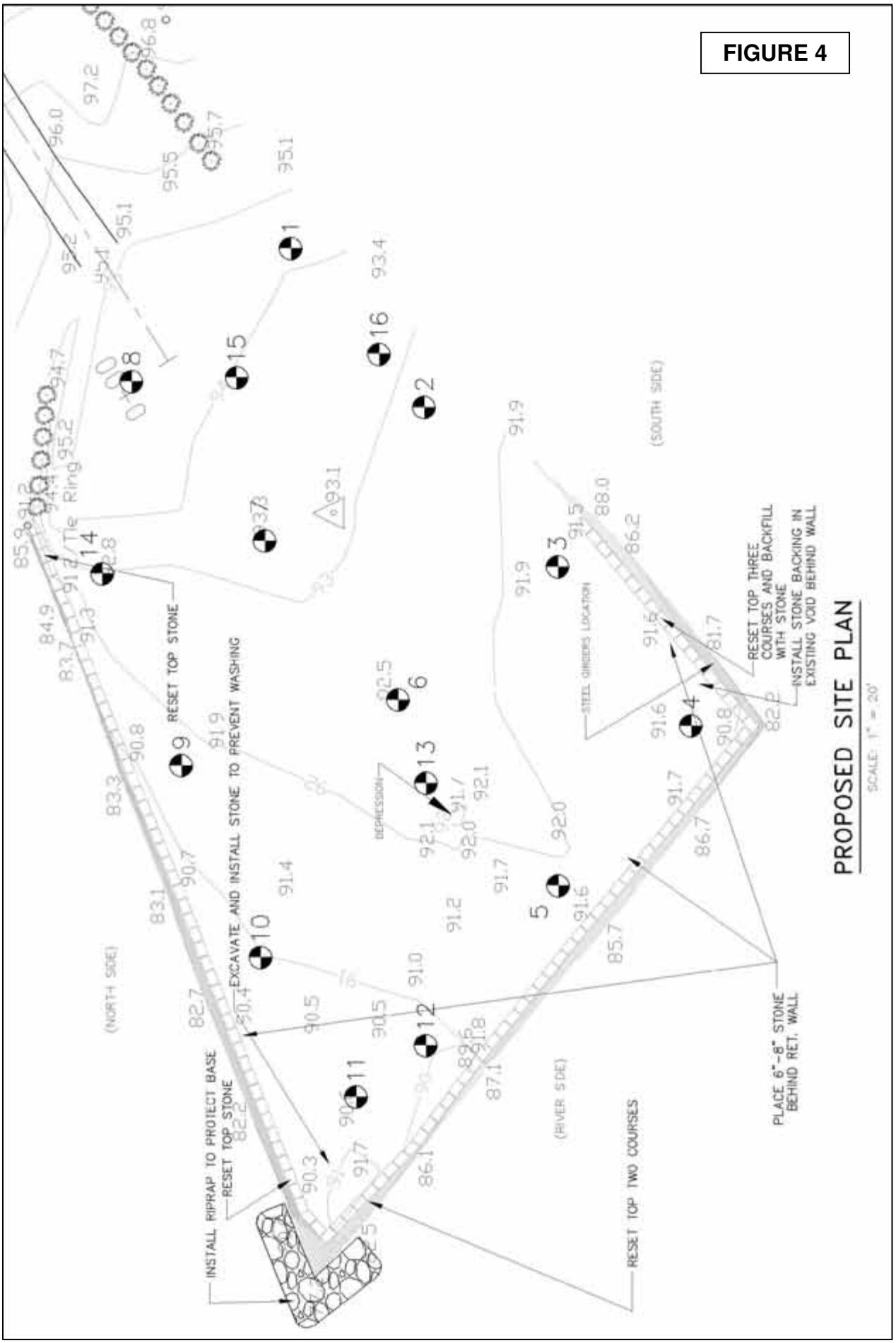
FIGURE 4


PROPOSED SITE PLAN
SCALE: 1" = 20'
RESET TOP STONE
EXCAVATE AND INSTALL STONE TO PREVENT WASHING
INSTALL RIPRAP TO PROTECT BASE
RESET TOP STONE
RESET TOP TWO COURSES
PLACE 6"-8" STONE BEHIND RET. WALL
RESET TOP THREE COURSES AND BACKFILL WITH STONE
INSTALL STONE BACKING IN EXISTING VOID BEHIND WALL
STEEL GIRDERS LOCATION
DEPRESSION
(NORTH SIDE)
(SOUTH SIDE)
(RIVER SIDE)
Tie Ring

SECTION 5
WHARF ROAD

The existing Wharf Road is gravel and little more than a single lane driveway. It is 450 feet in length. To serve the improved wharf, it should be widened to accommodate two-way traffic. Currently the road is on the northwestern edge of the right-of-way, which is 40 feet wide.

Bushes and small trees need to be cut and removed. The two stone culverts need additional slabs added to them. The road needs to be graded, unsuitable materials removed, and new materials placed on top.

Currently, the bushes are acting as a "natural" guardrail. When they are gone, the two streams will be exposed. Four short guardrails are recommended (two per stream crossing). The length of each should be 30 feet.

Figure 5 shows a typical cross section of the proposed road, while Figure 6 shows the road profile.

The activities and their costs are tabulated below:

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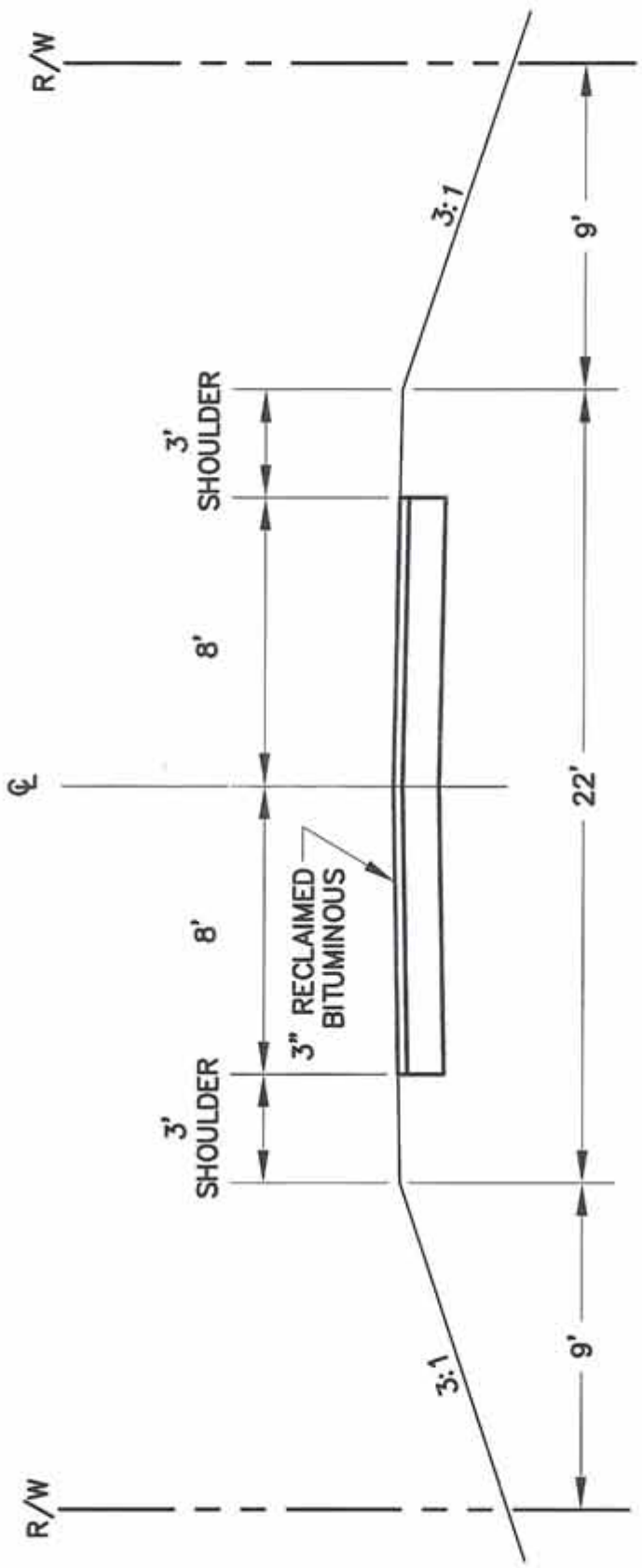
TABLE 2
Wharf Road Improvements
Construction Cost Estimate

Item	Unit Cost	Quantities	Cost
1. Bush cutting/removal	$2/l.f.	1,200 l.f.	$2,400
2. Common excavation	$10/c.y.	300 c.y.	3,000
3. Grading	$2/s.y.	800 s.y.	1,600
4. Type D gravel	$20/c.y.	300 c.y.	6,000
5. 3" reclaim	$30/c.y.	100 c.y.	3,000
6. Erosion control	$3/l.f.	1,200 l.f.	3,600
7. Guard rails (wooden)	$50/l.f.	120 l.f.	6,000
8. Granite slab @ culverts	$500 ea.	2	1,000
		Subtotal:	**$26,600**
		Contingency 10%:	2,700
		Permits:	400
		Engineering:	4,000
		Total:	**$33,700**

FIGURE 5



WHARF ROAD
PROPOSED CROSS SECTION

SCALE: 1"=5'

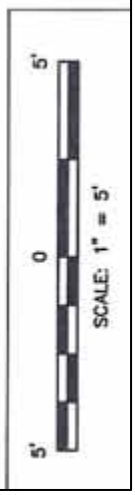
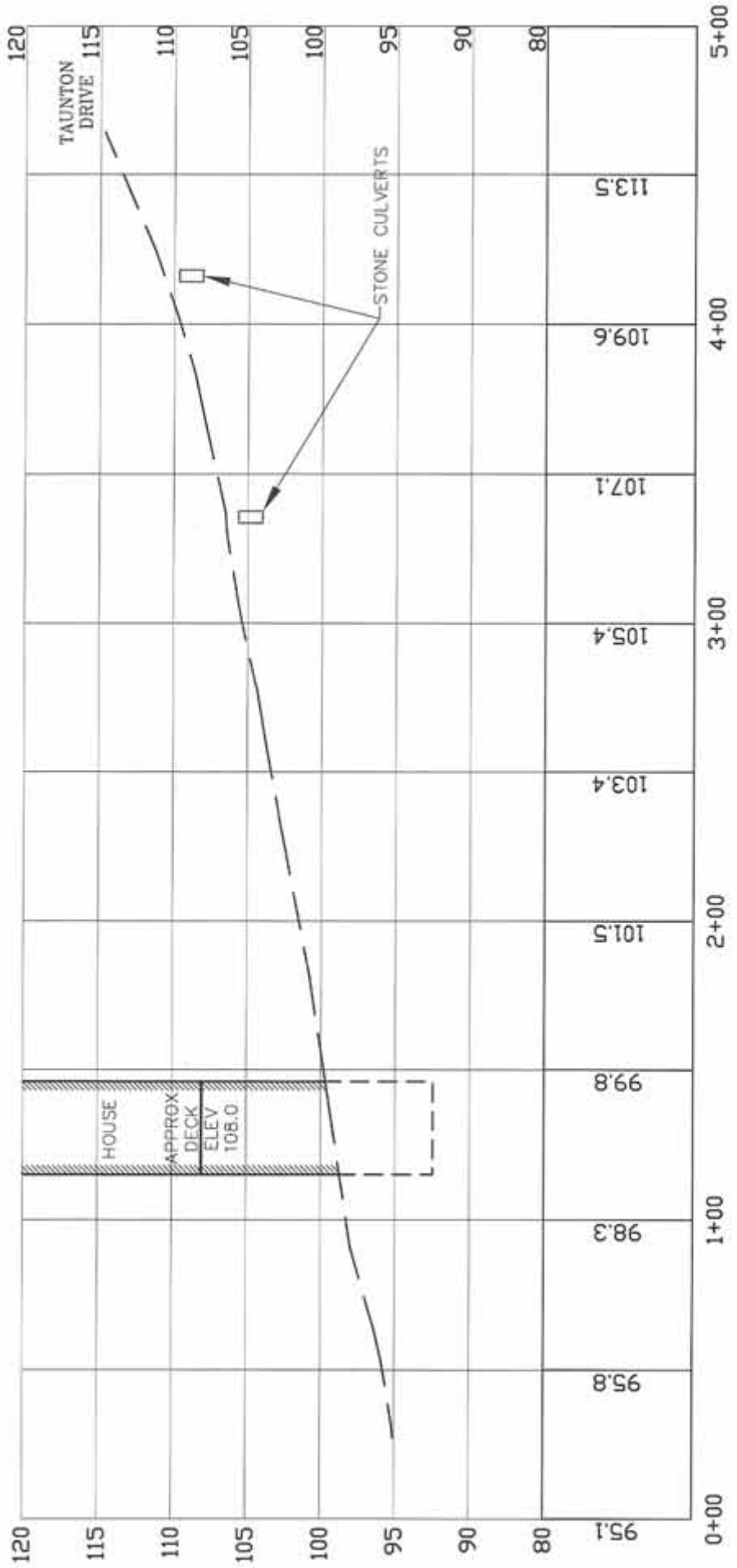


FIGURE 6



WHARF ROAD
EXISTING PROFILE

SCALE: 1"=50' HORIZONTALLY, 1"=10' VERTICALLY

SECTION 6
OTHER IMPROVEMENTS

Other improvements planned to the Gordon's Wharf project are:

Item	Description	Budget
1.	ADA ramp to building	$ 6,500
2.	ADA restroom in building	8,500
3.	Aluminum gangway and float	7,500
4.	Single lane launch ramp	35,000
5.	Groundout floats (6' x 6' style)	6,000
6.	Improved site conditions	20,000

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SECTION 7
PERMITS

Some of the planned activities will require local, state, and federal permits. The activities and permits are listed below:

	DEP PBR	ACOE	Planning Board	Flood Plain
Soil disturbance at wharf	✓	-	✓	✓
Activity adjacent to natural resource	✓	-	✓	✓
Gangway and float	✓	✓	✓	✓
ADA ramp to building	-	-	✓	-
Driveway atWharf Road	-	-	✓	-
Launch ramp	✓	✓	✓	✓

Nearly all of the above permits will require descriptions of the proposed work, relative to tide elevations. For that purpose, the local benchmark at the building at assumed elevation 100.00 feet will need to be physically tied to the NOAA tide datum and/or to U.S.G.S. datum at mean sea level NGVD29.

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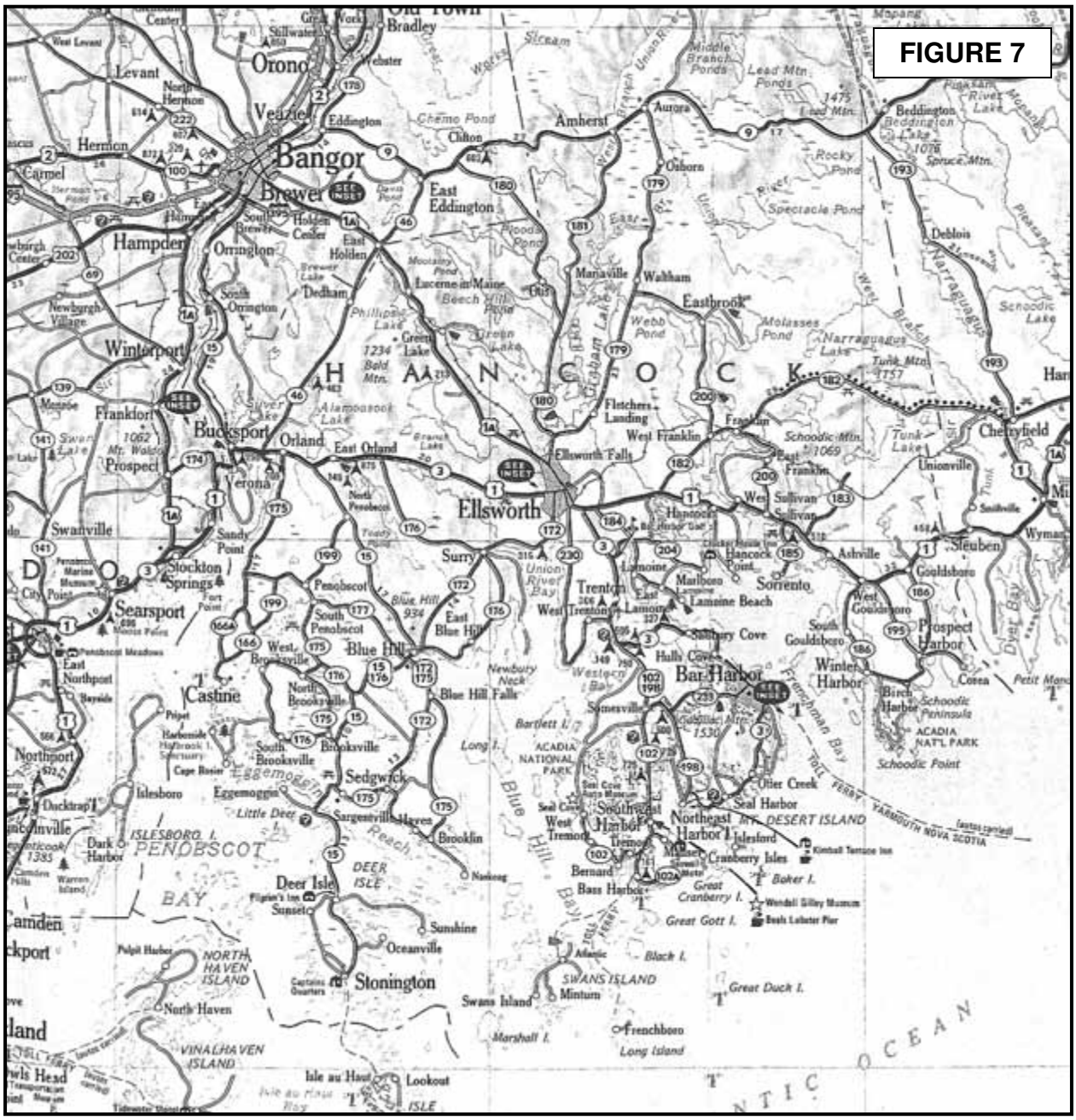
The critical mark relating to State and Federal permits is the Highest Annual Tide (HAT). Maine's Department of Environmental Protection publishes Maine Coast Levels each year. The 2012 levels for the Downeast region are in Appendix D of the report. Bart Harbor is the nearest station to the Taunton River and Sullivan Bay. Figure 7 shows Bar Harbor and West Sullivan. The tidal falls between Sullivan and Hancock delays the time at which stages occur. For the purpose of this study, it has been assumed that tidal elevations at Gordon's Wharf are the same as those for Bar Harbor.

Tidal data provided by MDOT from the Hancock Sullivan Bridge plans indicate mean low water is -5.5 feet, mean high water is +5.5 feet, and annual spring tide is +6.8 feet.

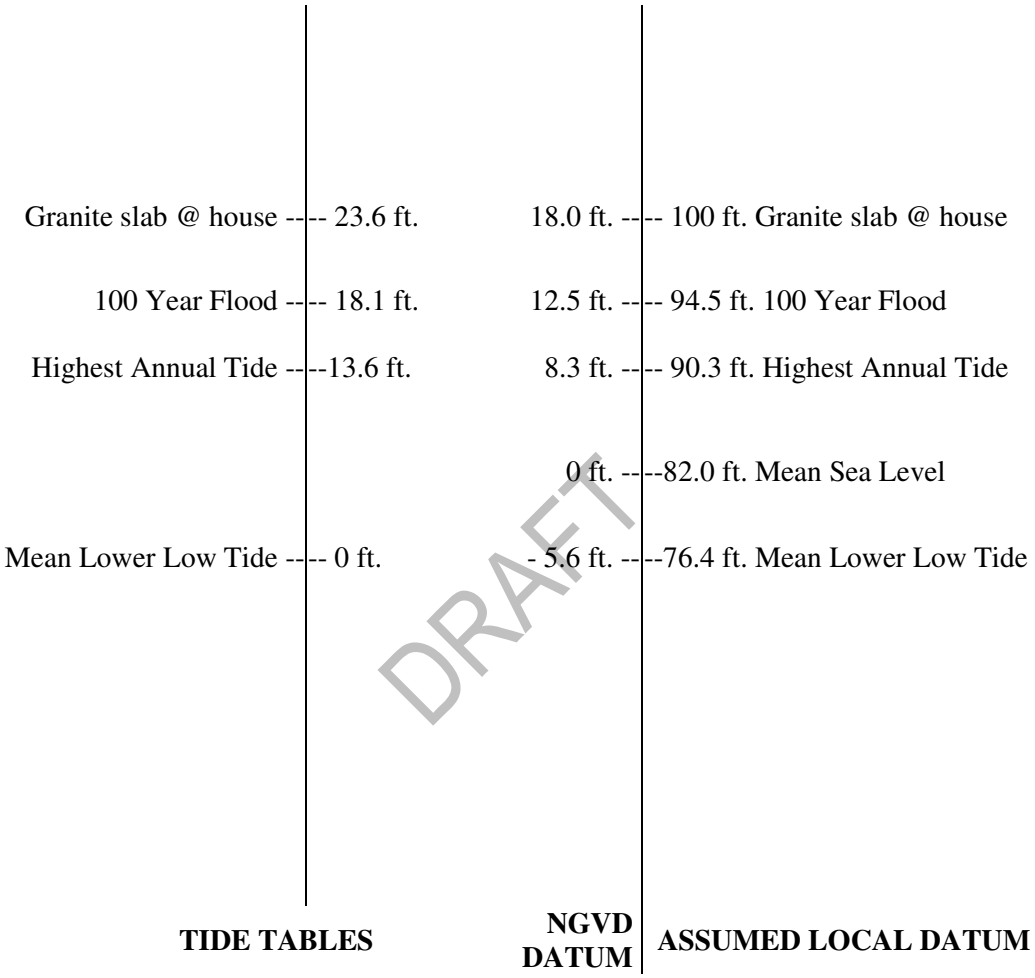
Figure 8 shows the relationship of the datums.



Bar Harbor Station and West Sullivan

FIGURE 8

Important Elevations for Indicated Datums



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Appendix A
Photographs - Present Condition

Photo by Stephen DeWick, September 2011

Photo by Stephen DeWick, September 2011

Photo by Stephen DeWick, September 2011

Photo by Lawrence Johannesman, September 2011

Photo by Lawrence Johannesman, September 2011

Photo by Lawrence Johannesman, September 2011

Appendix B
Photographs - Historical

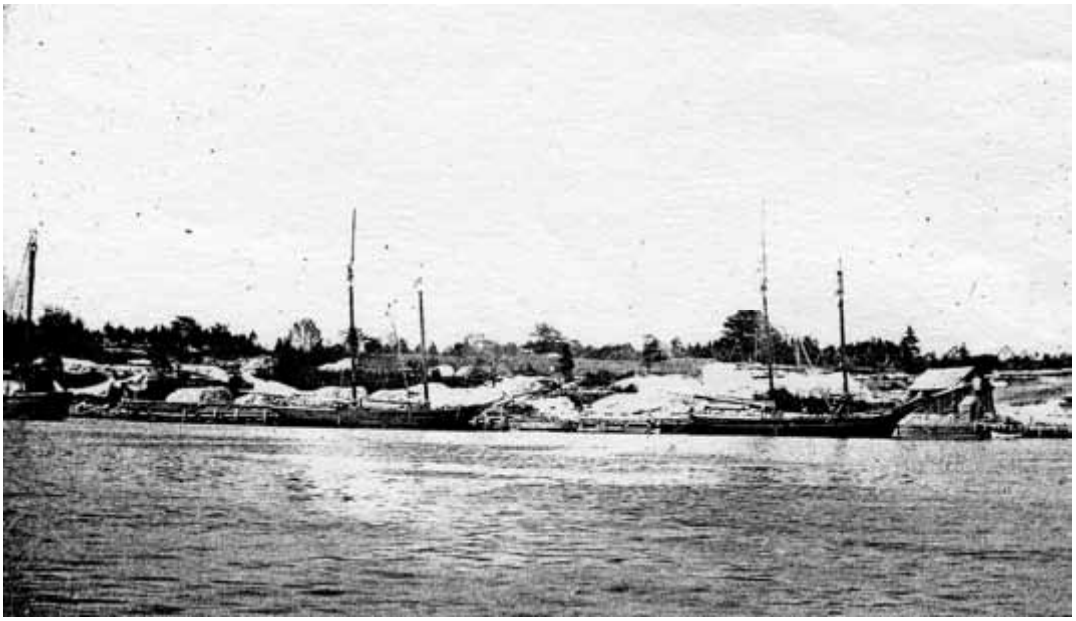


Photo 101

Photo 102

Photo 103

Photo 104

Photo 105

Photo 106

Photo 107

Photo 108

Photo 109

Photo 110

Photo 111

Photo 112

Photo 113

Photo 114

Photo 115

Photo 201

Photo 202

Photo 203

Photo 204

Photo 205

Photo 206

Photo 207

Photo 208

Photo 209

Photo 210

Photo 211

Photo 212

Photo 213

Photo 214

Photo 215

Photo 216

Photo 217

Photo 218

Photo 219

Photo 301

Photo 302

Photo 303

Photo 304

Photo 305

Photo 306

Photo 307

Photo 308

Photo 309

Photo 310

Photo 311

Photo 312

Photo 313

Photo 314

Photo 315

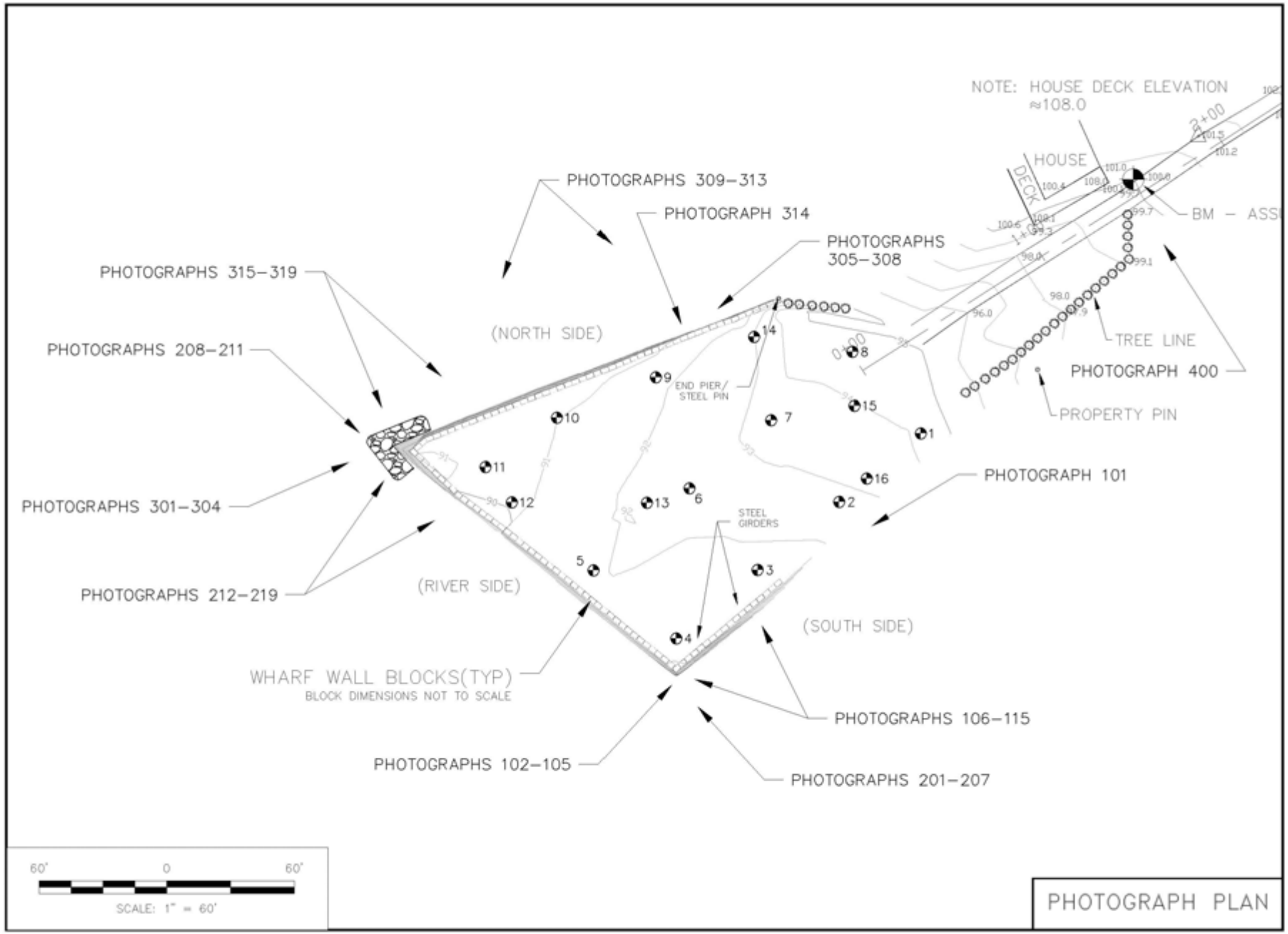
Photo 316

Photo 317

Photo 318

Photo 319

Photo 400


NOTE: HOUSE DECK ELEVATION ≈108.0
PHOTOGRAPHS 309–313
PHOTOGRAPH 314
PHOTOGRAPHS 305–308
PHOTOGRAPHS 315–319
PHOTOGRAPHS 208–211
(NORTH SIDE)
HOUSE
DECK
BM – ASS
TREE LINE
PHOTOGRAPH 400
PROPERTY PIN
END PIER/ STEEL PIN
PHOTOGRAPH 101
PHOTOGRAPHS 301–304
PHOTOGRAPHS 212–219
(RIVER SIDE)
STEEL GIRDERS
(SOUTH SIDE)
WHARF WALL BLOCKS(TYP)
BLOCK DIMENSIONS NOT TO SCALE
PHOTOGRAPHS 106–115
PHOTOGRAPHS 102–105
PHOTOGRAPHS 201–207
60' 0 60'
SCALE: 1" = 60'
PHOTOGRAPH PLAN

Subsurface Investigation
Gordon's Wharf
Sullivan, Maine
November 2, 2011

Maine Test Borings
Hermon, Maine 04401

Number	Depth to Refusal	Remarks
P-1	3.8'	Boulder refusal
P-2	3.0'	Boulder refusal
P-3	3.5'	Boulder refusal
P-4 Coring #2	3.5'	Boulder refusal, coring broke bit at 7.2'
P-5	4.5'	Boulder refusal
P-6	4.0'	Boulder refusal
P-7	3.0'	Boulder refusal
P-8	1.0'	Boulder refusal
P-9	3.7'	Boulder refusal
P-10	1.8'	Boulder refusal
P-11 Coring #1	20.7'	Broken at ledge
P-12	3.6'	Boulder refusal
P-13	4.0'	Boulder refusal
P-14	3.0'	Boulder refusal
P-15	1.0'	Boulder refusal
P-16	3.7'	Boulder refusal

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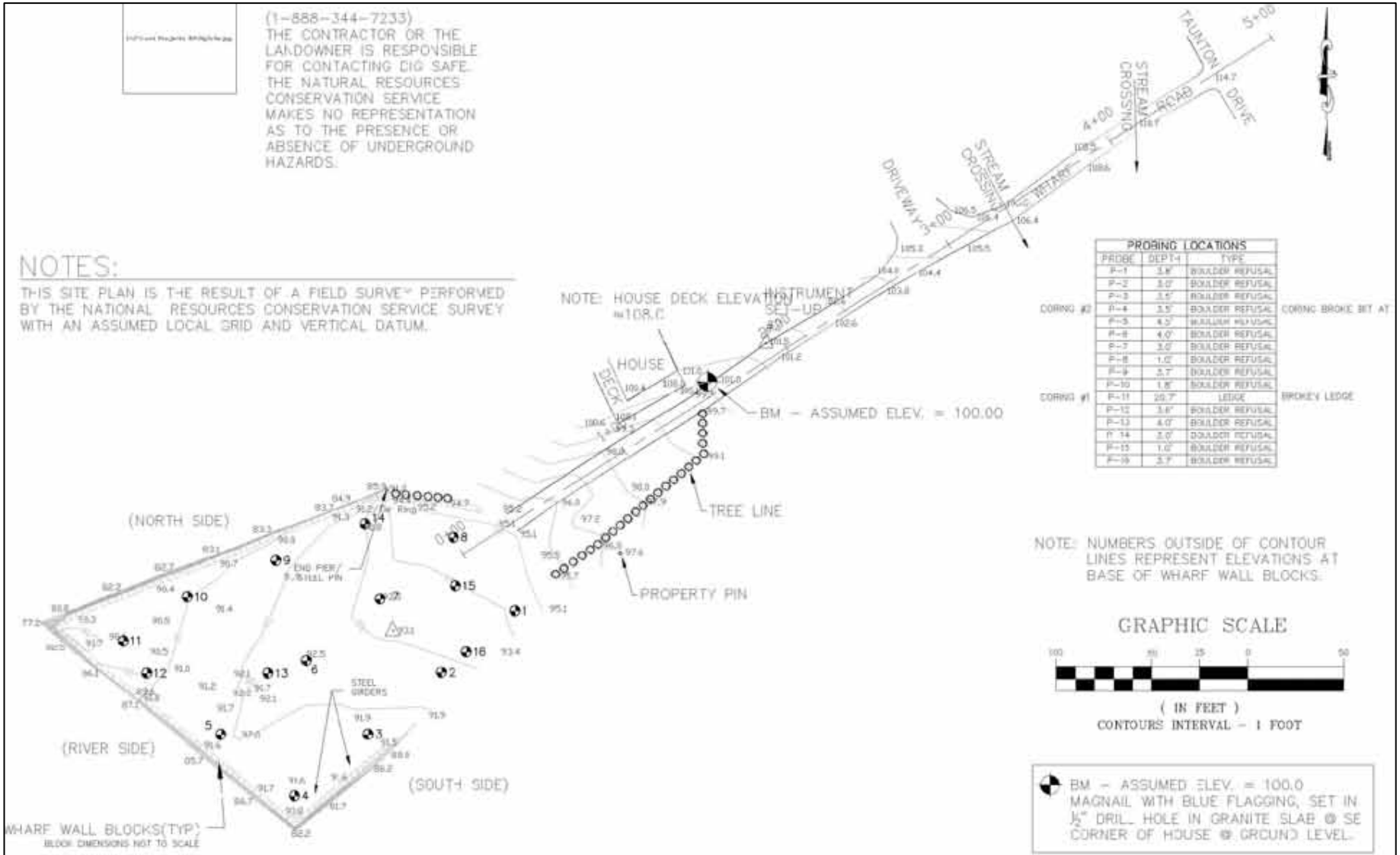
Note: See attached plan for location of probings.

(1-888-344-7233)
THE CONTRACTOR OR THE LANDOWNER IS RESPONSIBLE FOR CONTACTING DIG SAFE. THE NATURAL RESOURCES CONSERVATION SERVICE MAKES NO REPRESENTATION AS TO THE PRESENCE OR ABSENCE OF UNDERGROUND HAZARDS.

NOTES:

THIS SITE PLAN IS THE RESULT OF A FIELD SURVEY PERFORMED BY THE NATIONAL RESOURCES CONSERVATION SERVICE SURVEY WITH AN ASSUMED LOCAL GRID AND VERTICAL DATUM.



PROBING LOCATIONS			
PROBE	DEPTH	TYPE	
P-1	3.8'	BOULDER REFUSAL	
P-2	3.0'	BOULDER REFUSAL	
P-3	3.5'	BOULDER REFUSAL	
CORING #2 P-4	3.5'	BOULDER REFUSAL	CORING BROKE SET AT
P-5	4.5'	BOULDER REFUSAL	
P-6	4.0'	BOULDER REFUSAL	
P-7	3.0'	BOULDER REFUSAL	
P-8	1.0'	BOULDER REFUSAL	
P-9	3.7'	BOULDER REFUSAL	
P-10	1.8'	BOULDER REFUSAL	
CORING #1 P-11	20.7'	LEDGE	BROKE'N LEDGE
P-12	3.6'	BOULDER REFUSAL	
P-13	4.0'	BOULDER REFUSAL	
P-14	3.0'	BOULDER REFUSAL	
P-15	1.0'	BOULDER REFUSAL	
P-16	3.7'	BOULDER REFUSAL	

NOTE: NUMBERS OUTSIDE OF CONTOUR LINES REPRESENT ELEVATIONS AT BASE OF WHARF WALL BLOCKS.

GRAPHIC SCALE

100 50 25 0 50

(IN FEET)

CONTOURS INTERVAL - 1 FOOT

BM - ASSUMED ELEV. = 100.0
MAGNAIL WITH BLUE FLAGGING, SET IN ½" DRIL. HOLE IN GRANITE SLAB @ SE CORNER OF HOUSE @ GROUND LEVEL.

EXISTING CONDITIONS PLAN

SCALE: 1" = 50'

MAINE TEST BORINGS HERMON, ME 04401	CLIENT Pine Tree Engineering 53 Front St. Bath, ME	SHEET 1 OF 1 HOLE NO. B-1
DRILLER Bradford Enos	PROJECT NAME Sullivan Pier	LINE & STATION
MTB JOB NUMBER 11-152	LOCATION Sullivan, ME	OFFSET

GROUNDWATER OBSERVATONS		CASING	SAMPLER	CORE BARREL	Start Date	Finish Date
	TYPE	HW		NQ2	11/11/2011	11/11/2011
	SIZE I.D.	4"		2"		
	HAMMER WT.	300#			SURFACE ELEV:	
	HAMMER FALL	16"				

CASING BLOWS PER FOOT	SAMPLE NO.	O.D.	PEN.	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	18-24	Vane Reading	DEPTH	STRATUM DESCRIPTION
Spun												
HW												
Casing												
"												
"												
"												
"												
"												Granite Blocks, Voids & Fill
"												
"												
"												
"												
"												
"											14.0	
"												
Spun												
NW												
Casing												Brown Silty Sand,
"												w/Gravel & Cobbles
"											19.5	
												Rock
	1R	3"	4.3'	3.4'	24.3	79%					24.3	
												Bottom of Boring @ 24.3'

SAMPLES		SOIL CLASSIFIED BY:		REMARKS: No spoon samples taken
D = SPLIT SPOON	R = ROCK CORE	XX	DRILLER-VISUALLY	Spun HW casing from ground surface to 15.0'
C = 2" SHELBY TUBE	V = VANE TEST		SOIL TECHNICIAN-VISUALLY	Spun NW casing from 15.0' to 20.0'
S = 3" SHELBY TUBE			LABORATORY TESTS	Cored rock from 20.0' to 24.3'
U = 3 1/2" SHELBY TUBE				HOLE NO. B-1

Maine DEP
Highest Annual Tide (HAT) Levels for Year 2011
Maine Coast from Eastport to Portsmouth, NH

Location	2011HAT (Tide Table- ft.)	HAT (NGVD29) (elev. feet)	HAT (NAVD88) (elev. feet)	Ref. Station
Primary Control Stations				
Portsmouth (Seavey Is.)	10.6	6.7	6.0	
Portland	11.9	7.4	6.6	
Bar Harbor	13.6	8.3	7.6	
Eastport	22.7	13.4	12.8	
Secondary Stations				
EASTPORT	22.0	12.7	12.1	Eastport
Cobscook Bay				
Garnet Point, Pennamquan R.	23.6	13.9	13.3	Eastport
Coffins Point	21.3	12.6	12.0	Eastport
Birch Islands	21.3	12.6	12.0	Eastport
Cutler, Little River	16.8	10.0	9.4	Eastport
Cutler, Naval Radio Station	15.9	9.4	8.8	Eastport
Stone Island, Machias Bay	15.4	9.2	8.6	Eastport
Machiasport, Machias River	15.7	9.4	8.7	Eastport
Shoppee Point, Englishman Bay	15.0	9.1	8.5	Eastport
Steele Harbor Island	15.1	9.3	8.6	Portland
Millbridge, Narraguagus River	14.6	9.0	8.3	Portland
Green Island, Petit Manan Bar	13.8	8.5	7.8	Portland
Prospect Harbor	13.7	8.4	7.6	Portland
Winter Harbor, Frenchman Bay	12.9	7.9	7.2	Bar Harbor
Mount Desert Island				
BAR HARBOR	13.6	8.3	7.6	Bar Harbor
Southwest Harbor	13.1	7.9	7.2	Bar Harbor
Bass Harbor	12.6	7.6	6.9	Bar Harbor
Blue Hill Bay		0.0		
Blue Hill Harbor	12.9	7.9	7.2	Bar Harbor
Mackerel Cove	12.8	7.8	7.1	Bar Harbor
Ellsworth	13.6	8.3	7.6	Bar Harbor
Burnt Coat Harbor, Swans Island	12.1	7.4	6.7	Bar Harbor
Penobscot Bay				
Eggemoggin Reach				
Center Harbor	12.9	7.9	7.2	Bar Harbor
Little Deer Isle	12.8	7.8	7.1	Bar Harbor
Isle Au Haut	11.8	7.2	6.5	Bar Harbor
Stonington, Deer Isle	12.4	7.6	6.9	Bar Harbor
Matinicus Harbor, Wheaton Island	11.6	7.2	6.4	Bar Harbor
Vinalhaven, Vinalhaven Island	11.8	7.2	6.5	Bar Harbor
North Haven	12.4	7.5	6.8	Bar Harbor
Pulpit Harbor, North Haven Island	12.6	7.7	7.0	Bar Harbor
Castine	12.9	7.9	7.2	Bar Harbor
Penobscot River				
Gross Point, Eastern Channel	13.5	8.3	7.6	Bar Harbor
Bucksport	13.7	8.3	7.6	Bar Harbor
Winterport	15.1	9.3	8.6	Bar Harbor
Sandy Point	13.5	8.3	7.6	Bar Harbor
Bangor	17.0	10.4	9.7	Bar Harbor
Belfast	13.2	8.1	7.4	Bar Harbor
Rockland	12.6	7.8	7.1	Bar Harbor
MAINE, outer coast				

SECTION 1

Introduction

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SECTION 2

Summary and Recommendations

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SECTION 3

Condition of Stone Wharf

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SECTION 4

Gordon's Wharf Improvements

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SECTION 5

Wharf Road

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SECTION 6

Other Improvements

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SECTION 7

Permits

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APPENDIX A

Photographs

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APPENDIX B

Historical Photographs

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APPENDIX C

Inspection Photographs and Plan

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APPENDIX D

Exploration Logs

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APPENDIX E

Highest Annual Tide Table

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