8910

8910

Diag. Cht. No. 6450-2

FORM C&GS-504

U.S. DEPARTMENT OF COMMERCE
ENVIRONMENTAL SCIENCE SERVICES ADMINISTRATION
COAST AND GEODETIC SURVEY

DESCRIPTIVE REPORT

Type of Survey Hydrographic

Field No. BO-10-1-66 *Office No.* H-8910

LOCALITY

State Washington

General locality Admiralty Inlet

Locality Vicinity of Port Townsend

1966

CHIEF OF PARTY

J. G. Grunwell

LIBRARY & ARCHIVES

DATE June 22, 1970

USCOMM-DC 37022-P66

18440 - ✓
18400 - ✓

TO ACCOMPANY DESCRIPTIVE REPORT

FORM C&GS-537 (5-66)

U.S. DEPARTMENT OF COMMERCE
ENVIRONMENTAL SCIENCE SERVICES ADMINISTRATION
COAST AND GEODETIC SURVEY

REGISTER NO.

H-8910

HYDROGRAPHIC TITLE SHEET

INSTRUCTIONS - The Hydrographic Sheet should be accompanied by this form, filled in as completely as possible, when the sheet is forwarded to the Office.

FIELD NO.

BO-10-1-66

State WASHINGTON

General locality ~~PUGET SOUND~~ ADMIRALTY INLET

Locality VICINITY OF ~~ADMIRALTY INLET~~ PORT TOWNSEND

Scale 1:10,000 Date of survey 1966 6-16-66 9-26-66

Instructions dated 11 January 1966 Project No. ~~OPR-412~~

Vessel USC&GSS BOWIE (CSS-26)

Chief of party James G. Grunwell, LCDR, USESSA, CO, BOWIE

Surveyed by M.H. Fleming, LT, S.M. Hamilton, LTJG, M.N. Maki, ENS

Soundings taken by echo sounder, hand lead, pole Raytheon DE-723 Echo Sounding Fathometer

Graphic record scaled by Ship personnel

Graphic record checked by Ship personnel

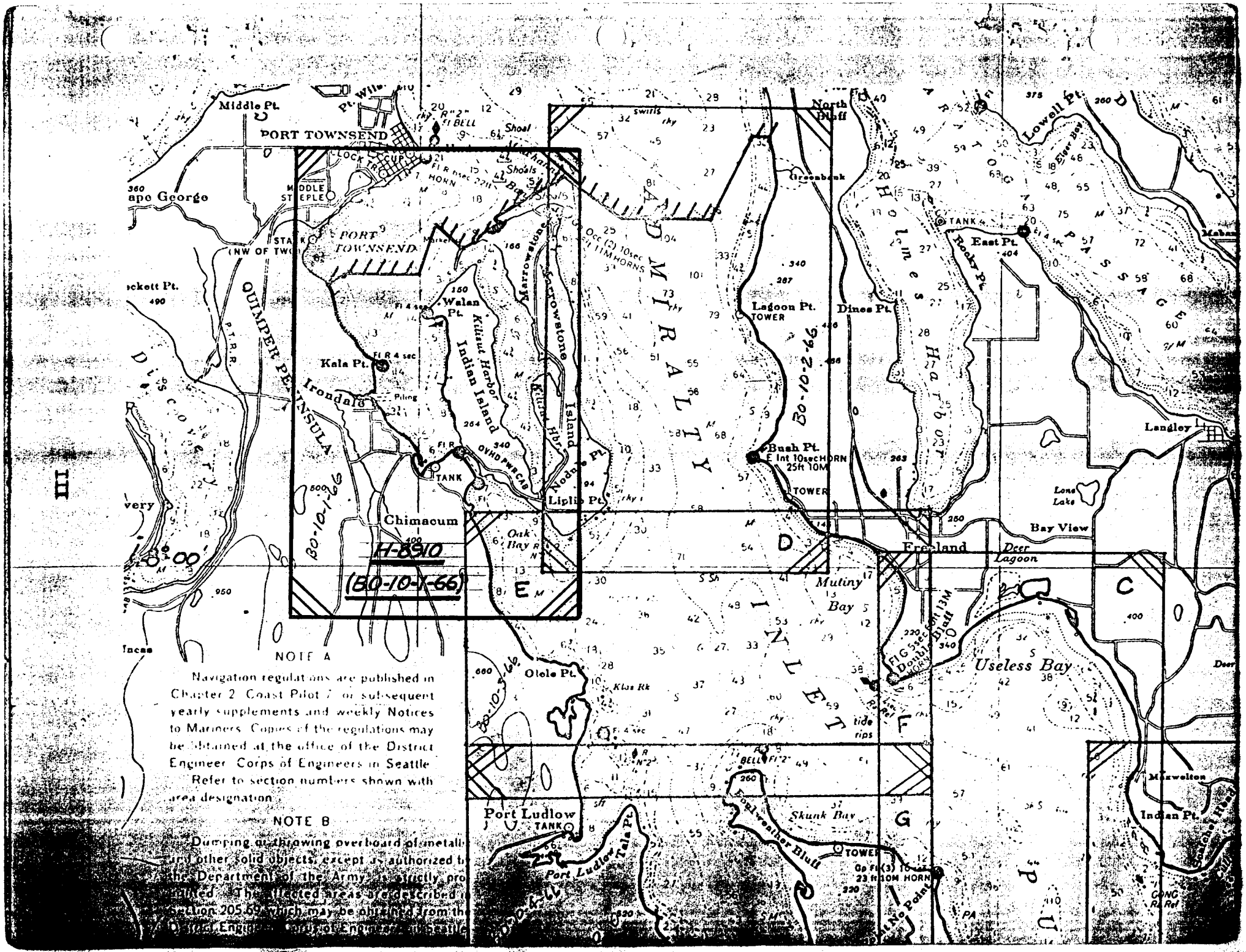
Protracted by M.N.MAKI, N.LESTENKOF ~~Automated plot by Pacific Marine Centers~~

Soundings penciled by N. LESTENKOF

Soundings in fathoms feet at MLW MLLW are true depths

REMARKS:

USCOMM-DC 37009-P66


PORT TOWNSEND
Middle Pt.
Cape George
Kala Pt.
Irondale
QUIMPER PENINSULA
Indian Island
Marrowstone Island
Kilisut Harbor
Walan Pt.
Chimacum
H-8910
(80-10-X-66)
80-10-1-66
80-10-2-66
NOTE A
Navigation regulations are published in Chapter 2 Coast Pilot 7 or subsequent yearly supplements and weekly Notices to Mariners. Copies of the regulations may be obtained at the office of the District Engineer Corps of Engineers in Seattle
Refer to section numbers shown with area designation.
NOTE B
Dumping or throwing overboard planetall
and other solid objects, except as authorized b
the Department of the Army is strictly pro
mined. The affected areas are described
Section 205.69 which may be obtained from th
District Engine
Admiralty Inlet
North Bluff
Greenbank
Lagoon Pt.
TOWER
Dines Pt.
Bush Pt.
Lone Lake
Bay View
Freeland
Deer Lagoon
Mutiny Bay
Useless Bay
Double Bluff
Olele Pt.
Port Ludlow
Port Ludlow Tala Pt.
Foulweather Bluff
Skunk Bay
Indian Pt.
Mawelton
Lowell Pt.
East Pt.
Rocky Pt.
Langley
Holmes Harbor
Discovery Bay
Oak Bay
tide rips

DESCRIPTIVE REPORT TO ACCOMPANY HYDROGRAPHIC SURVEY H-8910
(FIELD NUMBER BO-10-1-66)
SCALE - 1:10,000
1966
USC&GSS BOWIE (CSS-26)
JAMES G. GRUNWELL, LCDR, USESSA

A. PROJECT

Boat sheet H-8910 (BO-10-1-66) is sheet "E" of project instructions entitled OPR-412, PORT TOWNSEND, ADMIRALTY INLET AND VICINITY dated 11 January 1966. No supplemental instructions were issued affecting the project itself, other than those dated 15 June 1966.

B. AREA SURVEYED

The area covered by H-8910 (BO-10-1-66) includes the portion of Port Townsend Bay, Washington south of Latitude 48° ~~05~~ 02', all of Oak Bay, all of Kilisut Harbor and some area along the northern border of Marrowstone Island, Washington.

This sheet ~~makes junction with~~ overlaps portions of the following prior surveys:

H-~~6186~~ 6816	1:10,000	1942
H-6757	1:5,000	1942
H-6618	1:5,000	1940
H-6193	1:5,000	1937
H-1729	1:20,000	1885
H-3767	1:10,000	1915
H-1482A	1:10,000	1880

Corps of Engineers Survey File Number D-1-6-59 Bp-6864/, L-1519(65)

This sheet also junctions with contemporary surveys H-8911 (BO-10-2-66) and H-8912 (BO-10-3-66).

C. SOUNDING VESSEL

The area of BO-10-1-66 was done by USC&GSS BOWIE's Launch #95 and the shoreline work and verification was done by skiff. Blue day letters identify launch work and green day letters identify skiff work.

D. SOUNDING EQUIPMENT

The entire area of this sheet was sounded with one Raytheon DE-723 fathometer serial number 936 in water that never exceeded twenty fathoms. The echo sounding machine's operation was based on a speed of 800 fathoms per second. The machine worked perfectly throughout the survey. Echo sounding corrections

were determined from bar checks taken daily and from a Nansen bottle cast taken in the area (see "Abstract of Corrections to Echo Soundings" in appendix).

E. SMOOTH SHEET

The smooth sheet grid was projected by computer plotter at Pacific Marine Center as was the boat sheet (see copy of request sheet form in appendix).

F. CONTROL

The horizontal control for hydrography was obtained by the usual methods. These included use of triangulation stations in the area and photogrammetric and hydrographic means. After corrections were applied, all methods checked.

All hydrographic positions were determined from visual control by the three-point sextant fix. No electronic control was used.

The photogrammetric compilations used for transfer of signals included the following:

T-12056	(From 1960 Photography)
T-12057	"
T-12063	"
T-12064	"

G. SHORELINE

All shoreline was obtained from the photogrammetric compilations listed above under "Control". Sufficient soundings were taken near the shore to define most of the low-water line.

It should be noted that the logboom area offshore from station KED is constantly changing in size and shape.

H.. CROSSLINES

The percentage of crosslines was about 10% which was sufficient for the area. All crosslines checked very well.

I. JUNCTIONS

Junctions with all prior and contemporary surveys agreed (see paragraph "B", "Area Surveyed"). See Review par 5.

J. COMPARISON WITH PRIOR SURVEYS

There were no presurvey items on this sheet. Soundings on this survey agree well with all prior surveys. No differences could be found of any magnitude (see paragraph "B", "Area Surveyed" for list of prior surveys).

Bp-68641

The United States Corps of Engineers Survey of 22 October 1965, scale 1" = 200', File Number D-1-6-59, done in the waterway connecting Oak Bay and Port Townsend Bay, checked well with this survey's findings ~~(see copy in appendix)~~.

K. COMPARISON WITH THE CHART

The largest scale chart of the area surveyed is C&GS 6405, scale 1:20,000, 9th Edition, 9 October 1964. No significant changes were found in the project area in soundings or shoreline. See Review par. 7A

L. ADEQUACY OF SURVEY

The survey is complete insofar as soundings and shoreline are concerned. All lights and buoys have been either located correctly prior to the survey, or, in the case of Oak Bay Light, during the survey. Cable areas were not checked with sextant fixes but appear to be correct as shown on the latest C&GS charts. Also, the overhead power cable and bridge clearances at Port Townsend Canal were not checked; however, there will be no change from the present charted information.

M. AIDS TO NAVIGATION

This survey had no aids to navigation not already located on present charts.

The fifteen buoys in the entrance to Kilisut Harbor were checked and found to be in agreement with the latest edition of the Light List (1966) and the latest large scale chart (C&GS 6405)* These are the only floating aids on this sheet. * see Review, 7D

Walan Point Light, Kala Point Light, Oak Bay Light, and Port Townsend Canal Light are the four fixed aids to navigation on this survey. Kala Point Light and Oak Bay Light are located as intersection triangulation stations. Walan Point Light is located on photogrammetric compilation T-12057 and Port Townsend Canal Light is on T-12064. All check with the 1966 Light List with the exception of Oak Bay Light which has been rebuilt and was located during this survey by triangulation (see appendix for computations).

N. STATISTICS

Launch #95 had a total of 2523 visual fixes and 321.3 miles of hydro. The skiff had an additional 785 fixes, all detached positions for rocks and shoreline. The survey covered about eleven square miles of water surface. A total of eighty bottom samples were taken.

O. MISCELLANEOUS

No additional scientific or practical information resulted from this survey which has not been previously mentioned.

P. RECOMMENDATIONS

This survey is complete and needs no further investigation or survey. ✓

Q. REFERENCES TO REPORTS

No reports were submitted which are not part of the survey records. ✓

Walter W. Wolfe
ENS. USESSA

DIGITAL PLOTTING

Project No. OPR-412

Requested By J. G. GRUNWELL

Ship BOWIE

Plot No. BO-10-1166

Date Requested March 2, 1966

SHEET LIMITS

(NW SE) Distance from Grid to Plotter Origin 4499.62 — Meters

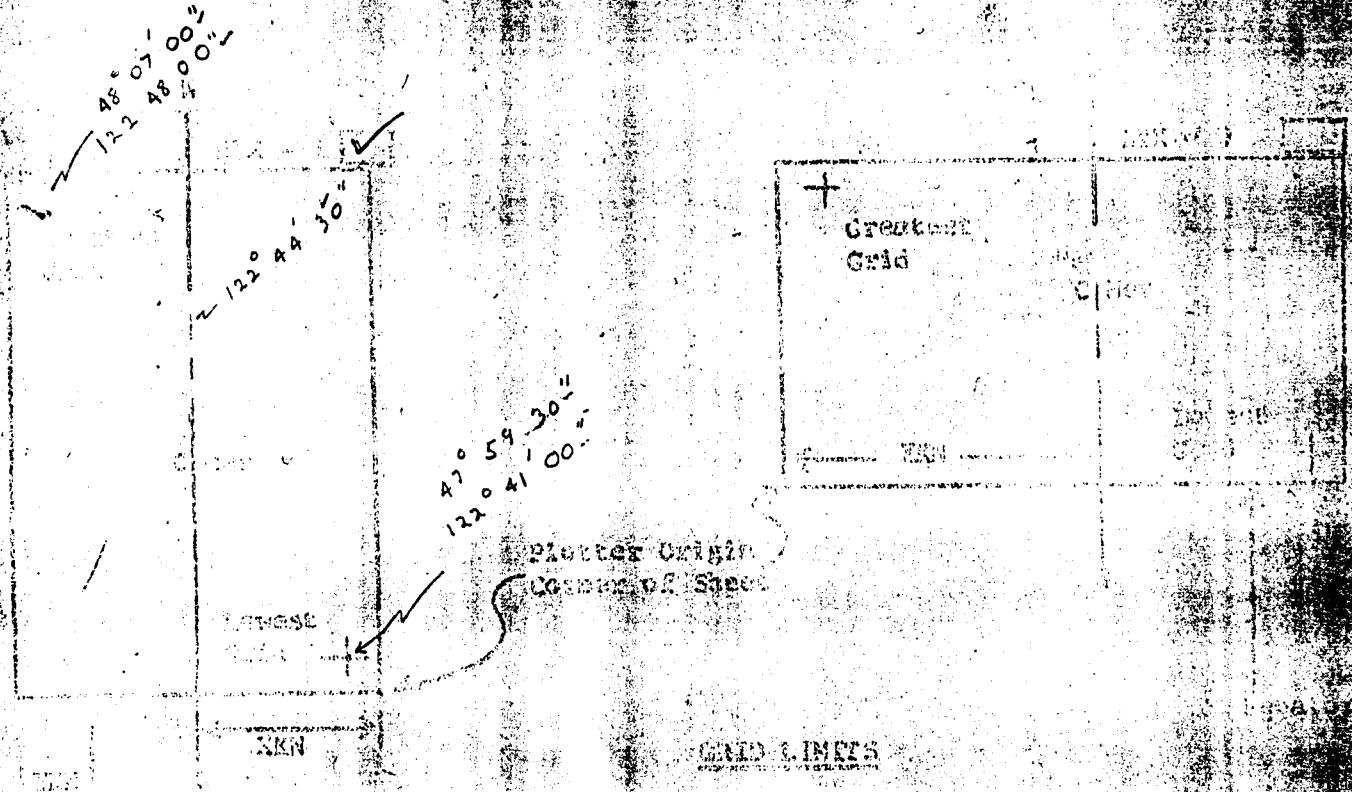
(W E) Distance from Plotter to Plotter Origin 5,316,587.108 Meters

Central Meridian 122 44 30 W

Plotting Scale 1:10,000

Direction of Sheet (Check One) 30° ✓ 60°

Orientation of Sheet (Check One)



GRID LINES

Greatest Latitude 48 ° 07 ' 00"

Lowest Latitude 47 ° 59 ' 30"

Difference 0 07 ' 30" — 30"

15

Greatest Longitude 122 ° 48 ' 00"

Lowest Longitude 122 ° 41 ' 00"

Difference 0 7 ' 00" — 30

Triangulation Stations on back

13

14

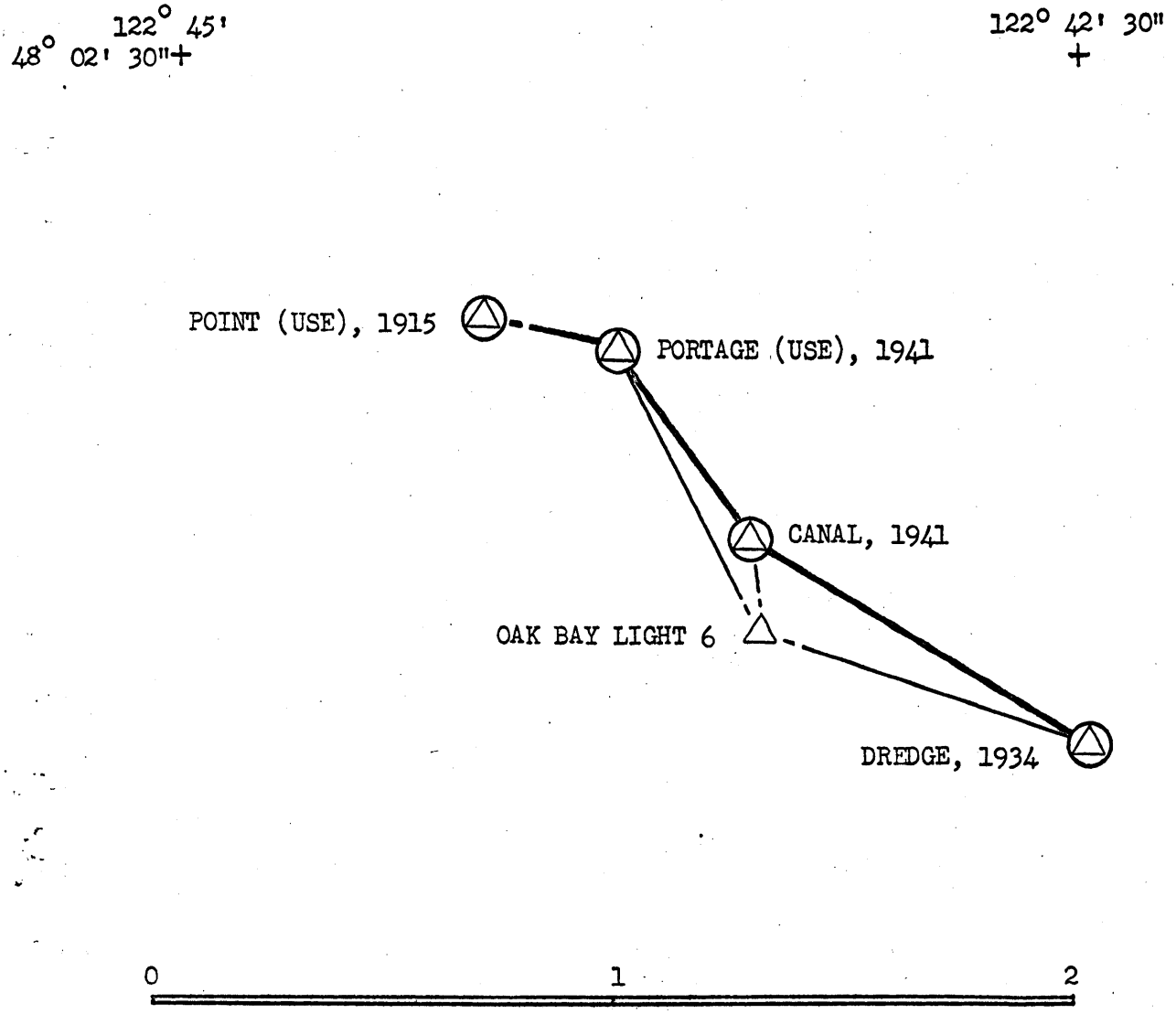
Comp: PSI

Triangulation Stations

Station	Latitude	Longitude
Point Hudson Light	48° 07' 02.557"	122° 44' 52.389"
Port Townsend, Courthouse steeple	48° 06' 44.141"	122° 45' 58.505"
Port Townsend, National Paper Products Co., Southeast Stack	48° 05' 35.606"	122° 47' 41.490"
~~Shoal~~	48° 03' 48.331"	122° 46' 37.136"
Kala Point Light	48° 03' 28.395"	122° 45' 56.507"
~~Hadlock~~, Methodist ~~Church~~, Steeple	48° 02' 03.68"	122° 45' 19.50"
~~Point (USE)~~	48° 02' 00.706"	122° 44' 09.129"
Cone	48° 02' 19.510"	122° 44' 05.476"
Depot	48° 03' 08.898"	122° 44' 29.302"
Walan Point	48° 04' 25.563"	122° 44' 41.694"
Indian (USE)	48° 04' 51.917"	122° 44' 12.306"
Skow 2	48° 05' 19.614"	122° 44' 02.5[illegible]
Rock	48° 04' 52.403"	122° 43' 32.592"
~~Indian~~	48° 02' 11.934"	122° 43' 24.350"
Dredge	48° 01' 12.307"	122° 42' 28.187"
Guppy	48° 03' 34.345"	122° 41' 56.225"
Navy Rear	48° 05' 02.257"	122° 42' 42.082"
~~Rid~~ (USE)	48° 06' 06.750"	122° 41' 28.953"
Rid 1942. (Hydro)	48° 05' 38.66"	122° 41' 28.94"
Crave	48° 04' 21.893"	122° 41' 03.495"
Robbins (USE)	48° 00' 32.673"	122° 41' 06.692"
~~Oak Bay Light~~	48° 01' 25.846"	122° 43' 24.614"

SMH

Coast & Geodetic Survey
Triangulation Sketch
Oak Bay Washington
Oct 1966
Project OPR-412
J.G. Grunwell Chief of Party



FORM 157 (3-61)

U.S. DEPARTMENT OF COMMERCE
COAST AND GEODETIC SURVEY

POSITION OF INTERSECTED STATION

(Planes Coordinates)

INTERSECTED STATION: Oak Bay Light 6, 1966

STATE: Washington

ZONE: North

NOTE: When α_1, α_2 or α_3 is less than 1° from 0° or 180°, interchange x and y throughout and use tangents in place of cotangents.

From

			(1)	(2)	(3)
1 DREDGE, 1934	α_1 112° 05' 46"	Cot α_1(+)	0.405 9788	x_1 1,541,295.69	y_1 377,681.82
2 CANAL, 1941	α_2 3 17 24	Cot α_2(-)	17.395 9860	x_2 1,537,510.60	y_2 380,126.93
			(4)	(5)	(6)
			(8)		

Θ - 1-23-44 (dredge)

Θ - 1-24-26 (canal)

Cot α_1 − Cot α_2 = 17.801 9648

a=(1)×(2)+(3)=(+) 1,003,415.19

b=(4)×(5)+(6)=(−) 26,366,385.94

(7)=a−b= 27,369,801.13

X=(7)/(8) = 1,537,459.57

Y=X×(1)−(a)= 379,239.20

or X×(4)−(b), if value (4) is smaller than (1)

From *(Check Computation)*

			(1)	(2)	(3)
1 DREDGE, 1934	α_1 112° 05' 46"	Cot α_1(+)	0.405 9788	x_1 1,541,295.69	y_1 377,681.82
3 PORTAGE (incl) 1941	α_3 335 15 53	Cot α_3(+)	2.170 6345	x_3 1,536,035.93	y_3 382,329.63
			(4)	(5)	(6)
			(8)		

Θ - 1-24-43 (portage)

Cot α_1 − Cot α_3 = 1.764 6557

a=(1)×(2)+(3)=(+) 1,003,415.19

b=(4)×(5)+(6)=(+) 3,716,502.21

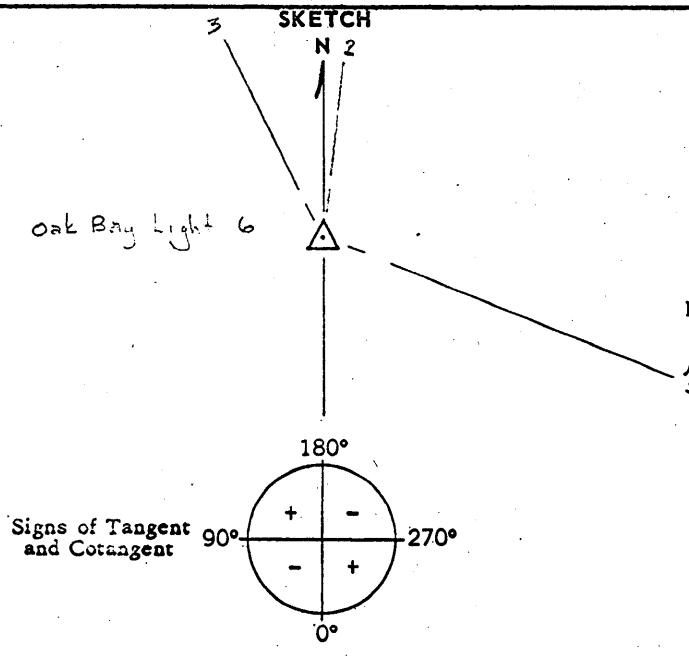
(7)=a−b = 2,713,087.02

X=(7)/(8) = 1,537,459.70

Y=X×(1)−(a)= 379,239.15

or X×(4)−(b), if value (4) is smaller than (1)

SKETCH



$E=\sqrt{\Delta x^2 + \Delta y^2}$ = 0.14

$X - x_1$ =(−) 3,836.12

$Y - y_1$ =(+) 1,557.38

Tan $\alpha = \frac{X-x_1}{Y-y_1}$ = 2.463 1882

α = 112° 05' 46"

180-00-00
− 67-54-14
112-05-46

Check Grid Az = 112° 05' 46" (1 to Int. Sta.)

$D = \frac{X - x_1 \text{ (or } Y - y_1)}{\text{Sin } \alpha \text{ (or Cos } \alpha)}$ = 4,140.2 (Use $Y-y_1$ and Cos α, if $Y-y_1$ is greater than $X-x_1$)

1 Side Check = $\frac{E}{D}$ = 1: 29,573

COMPUTED BY: R. B. Melby

CHECKED BY: L L Riggers

USCOMM-DC 25893-P61

U.S. DEPARTMENT OF COMMERCE
COAST AND GEODETIC SURVEY
FORM 742b
REV. APRIL 1953

GEODETIC POSITIONS FROM LAMBERT COORDINATES
(CALCULATING MACHINE COMPUTATION)

STATE—ZONE Washington - North $l=$ 0.74452 03390

Station Oak Bay Light 6, 1966

C	2,000,000.00	R_b	19,205,863.43
x	1,537,459.57	y	379,239.20
$x'=x-C$	- 462,540.43	R_b-y	18,826,624.23
$\tan\theta=x'\div(R_b-y)$	0.02456 84210	θ	5066.5813″
θ	1° 24′ 26.5813″	$\Delta\lambda=\theta\div l$	6805.1617″
$\cos\theta$	0.99969 83327	$\Delta\lambda$	- 1° 53′ 25.1617″
$R=(R_b-y)\div\cos\theta$	18,832,305.32	Central Meridian	120° 50′ 00.0000″
ϕ	48° 01′ 26.7463″	$\lambda=$C. M.$-\Delta\lambda$	122° 43′ 25.1617″

- Lue

Station

C		R_b	
x		y	
$x'=x-C$		R_b-y	
$\tan\theta=x'\div(R_b-y)$		θ	″
θ	° ′ ″	$\Delta\lambda=\theta\div l$	″
$\cos\theta$		$\Delta\lambda$	° ′ ″
$R=(R_b-y)\div\cos\theta$		Central Meridian	° ′ ″
ϕ	° ′ ″	$\lambda=$C. M.$-\Delta\lambda$	° ′ ″

Station

C		R_b	
x		y	
$x'=x-C$		R_b-y	
$\tan\theta=x'\div(R_b-y)$		θ	″
θ	° ′ ″	$\Delta\lambda=\theta\div l$	″
$\cos\theta$		$\Delta\lambda$	° ′ ″
$R=(R_b-y)\div\cos\theta$		Central Meridian	° ′ ″
ϕ	° ′ ″	$\lambda=$C. M.$-\Delta\lambda$	° ′ ″

Station

C		R_b	
x		y	
$x'=x-C$		R_b-y	
$\tan\theta=x'\div(R_b-y)$		θ	″
θ	° ′ ″	$\Delta\lambda=\theta\div l$	″
$\cos\theta$		$\Delta\lambda$	° ′ ″
$R=(R_b-y)\div\cos\theta$		Central Meridian	° ′ ″
ϕ	° ′ ″	$\lambda=$C. M.$-\Delta\lambda$	° ′ ″

FORM 28D
(2-61)

U.S. DEPARTMENT OF COMMERCE
COAST AND GEODETIC SURVEY

FIELD GEOGRAPHIC POSITIONS

LOCALITY Oak Bay to Port Townsend NORTH AMERICAN 1927 DATUM 3rd - ORDER TRIANGULATION. STATE Wash.

STATION	LATITUDE AND LONGITUDE	AZIMUTH	BACK AZIMUTH	TO STATION	DISTANCE METERS
	° ′ ″	° ′ ″	° ′ ″		
OAK BAY LIGHT, 1966 d.m.	48 01 26.746 122 43 25.162				

-23-

[1]No check on this position.

Abbreviations used: d.=described; m.=marked; n.=not; r.=recovered; l.=lost; p.=probably.
(Examples: n.d.=not described; p. l.=probably lost.)

USCOMM-DC 25267-P61

C&GS FORM 567
(11-61)

U.S. DEPARTMENT OF COMMERCE
COAST AND GEODETIC SURVEY

NONFLOATING AIDS OR LANDMARKS FOR CHARTS

TO BE CHARTED
~~TO BE EXAMINED~~
~~TO BE DELETED~~
} STRIKE OUT TWO

Seattle, Washington 7 October, 1966

I recommend that the following objects which have ~~been~~ been inspected from seaward to determine their value as landmarks be charted on ~~(additions from)~~ the charts indicated.

The positions given have been checked after listing by Robt. B. Melby

J.G. Grunwell LCDR USESSA
Chief of Party.

STATE: Washington

CHARTING NAME	DESCRIPTION	SIGNAL NAME	POSITION LATITUDE * ° ′	POSITION LATITUDE * ″ D.M. METERS	POSITION LONGITUDE * ° ′	POSITION LONGITUDE * ″ D.P. METERS	DATUM	METHOD OF LOCATION AND SURVEY No.	DATE OF LOCATION	HARBOR CHART	INSHORE CHART	OFFSHORE CHART	CHARTS AFFECTED
				26.746		25.162	N.A.	Triang-			x		6405
Oak Bay Light 6			48 01	826.1	122 43	521.4	1927	ulation	10/4/66		x		6450
											x		184-SC

This form shall be prepared in accordance with Hydrographic Manual, Publication 20.2, Sec. 1-55, 2-39, 6-36, 7-18 to 22 inclusive, and Fig. 79. Positions of charted landmarks and *nonfloating aids* to navigation, if redetermined, shall be reported on this form. Revisions shall show both the old and new positions. The data should be considered for the charts of the area and not by individual field survey sheets. Information under each column heading should be given.

USCOMM-DC 16234-P61

* TABULATE SECONDS AND METERS

FORM CD-121 (11-63) (FORMERLY A-10)

UNITED STATES GOVERNMENT

U.S. DEPARTMENT OF COMMERCE
COAST AND GEODETIC SURVEY

Memorandum ENVIRONMENTAL SCIENCE SERVICES ADMINISTRATION

TO : The Commanding Officer
USC&GSS BOWIE

DATE: January 20, 1967

In reply refer to:
C3311-9-CSSA

FROM : Chief, Datum Planes Section
Oceanography Division

SUBJECT: Tide data, Project OPR 412

In reply to your memorandum dated January 5, 1967, listed below is the proposed tide station zoning for the above project:

Sheet No.	Tide Station
BO 10-1-66 (Southward to Oak Bay)	Port Townsend
BO 10-1-66 (Oak Bay)	Bush Point
BO 10-2-66	Marrowstone Island or Bush Point. Tide at Bush Point is ½ hour later with no correction for range.
BO 10-3-66 (South to 48° Lat.)	Bush Point
BO 10-3-66 (South of 48° Lat.)	Hansville Zero time correction 0.95 Range Ratio

The hourly heights on hand from the respective gages should be used for obtaining tide reducers. Any missing tides that are necessary to process the hydrographic sheets may be requested from this Office.

For your convenience there are listed below the planes of reference on the tide staffs:

Location	MLLW on Staff
Port Townsend	2.2 feet
Marrowstone Island	3.2 "
Bush Point	1.7 " 3.7 " (Gage)
Hansville	4.8 "

L. C. Wharton

Oceanographic Station Field Data

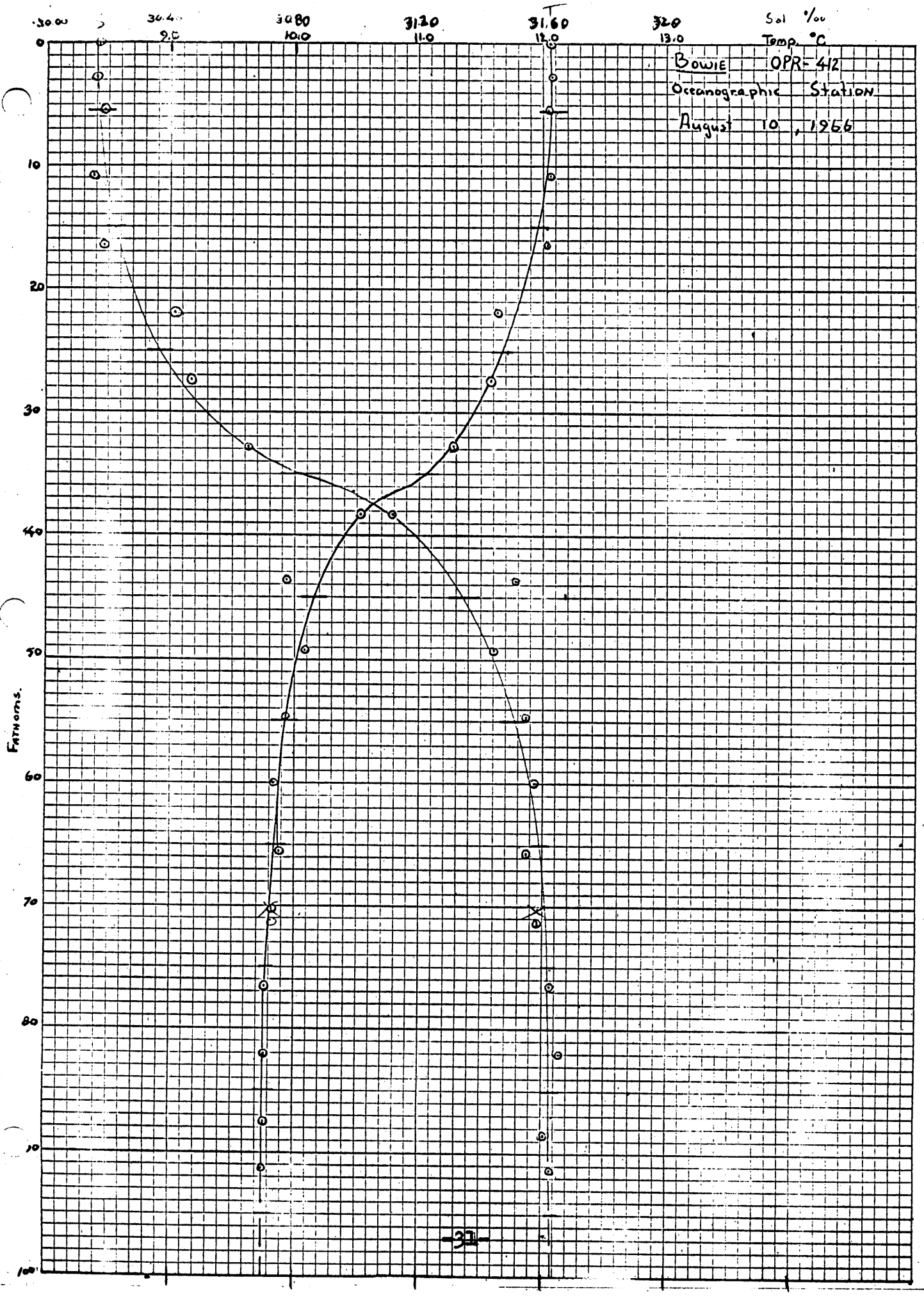
10 August 1966 This station was occupied in the deepest part part of Admiralty Inlet, between Marrowstone Point and Lagoon Point. All data, temperature salinity and depth was obtainéd by use of a STD instrument, operated by personel of the Pacific Oceanographic Laboritories.

Depth Meters	Depth Fathoms	Temp. °C	Salinity °/oo
0	0.0	12.06	30.16
5	2.74	12.07	30.15
10	5.46	12.04	30.18
20	10.9	12.06	30.15
30	16.4	12.03	30.18
40	21.9	11.63	30.42
50	27.3	11.58	30.47
60	32.8	11.29	30.65
70	38.2	10.52	31.12
80	43.7	9.94	31.51
90	49.1	10.09	31.44
100	54.7	9.94	31.54
110	60.0	9.82	31.57
120	65.6	9.89	31.54
130	71.1	9.82	31.58
140	76.6	9.77	31.63
150	82.0	9.76	31.65
160	87.5	9.76	31.61
167	91.3	9.75	31.63

mhf

On the next page, these values are plotted and temperature and salinity are interpolated for selected mid layer depths.

Layer (fms)	Mid Depth	Temp. °C	Salinity °/oo	Layer Velocity	Corr. Factor	Layer Corr.	Depth Corr.(fms)
1.3-10	5.6	12.05	30.16	1488.3	.01729	.1504	0.15
10-20	15	12.03	30.18	1488.7	.01757	.1757	0.33
20-30	25	11.72	30.39	1488.2	.01723	.1723	0.50
30-40	35	10.76	30.84	1485.4	.01531	.1531	0.65
40-50	45	10.22	31.39	1484.8	.01490	.1490	0.80
50-60	55	9.96	31.53	1484.1	.01442	.1442	0.94
60-70	65	9.83	31.59	1484.1	.01442	.1442	1.09
70-80	75	9.77	31.62	1484.2	.01448	.1448	1.23
80-90	85	9.75	31.63	1484.5	.01470	.1470	1.38
90-100	95	9.75	31.63	1484.9	.01497	.1497	1.53
100-110	105	9.75	31.64	1485.3	.01518	.1518	1.68
110-120	115	9.75	31.64	1485.5	.01538	.1538	1.84


30.00
30.40
30.80
31.20
31.60
32.0
‰ Sal
9.0
10.0
11.0
12.0
13.0
Temp. °C
BOWIE OPR-412
Oceanographic Station
August 10, 1966
0
10
20
30
40
50
60
70
80
90
100
Fathoms.
KEUFFEL & ESSER CO. MADE IN U.S.A.

(Let 1 inch equal 4 fathoms for deep water and 1 inch equal 0.4 fathom for shoal.)

0.0 0.4 0.8 1.2 1.6 2.0

CORRECTIONS IN FEET, FATHOMS

FORM C&GS-117 (4-62)

U.S. DEPARTMENT OF COMMERCE
COAST AND GEODETIC SURVEY

VELOCITY CORRECTIONS

Ship BOWIE

LCDR James G Grunwell Comdg.

These corrections are to be used

between 30 June 1966 and 31 August 1966

in the locality Admiralty Inlet

for hydrographic surveys Nos. H-8910 & H-8911

10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190

TRUE DEPTHS IN FATHOMS

(For deep water add a v to these figures

KEUFFEL & ESSER CO. MADE IN U.S.A. 20 X 20 TO THE INCH 7 X 10 INCHES 46 1240

(−) 0.2 (+) 0.2 (Let 1 inch equal 4 fathoms for deep water and 1 inch equal 0.4 fathom for shoal.)

0.2 0.4 0.6 0.8 1.0 1.2 1.4 1.6 1.8 2.0

CORRECTIONS IN ~~RED~~, FATHOMS

FORM C&GS-117 (4-62) U.S. DEPARTMENT OF COMMERCE COAST AND GEODETIC SURVEY

VELOCITY CORRECTIONS

Ship BOWIE

LCDR JAMES G. GRUNWELL Comdg.

These corrections are to be used between 6-30 19 66 and 7-31 19 66

in the locality ADMIRALTY INLET

WASHINGTON STATE

for hydrographic surveys Nos. H-8910 & H-8911

(For deep water add a b... these figures)

DEPTHS IN FATHOMS

FATHOMS ECHO SOUNDER	CORR.
0.0 - 2.5	+0.0
2.6 - 5.7	+0.1
5.8 - 10.5	+0.2
10.6 - 15.7	+0.3
15.8 - 21.3	+0.4
21.4 - 27.6	+0.5
27.7 - 37.8	+0.6
37.9 - 51.5	+0.8
51.6 - 64.8	+1.0
64.9 - 77.6	+1.2
77.7 - 90.7	+1.4
90.8 - 103.8	+1.6
103.9 - 116.2	+1.8
116.3 - 128.7	+2.0
128.8 - 141.2	+2.2

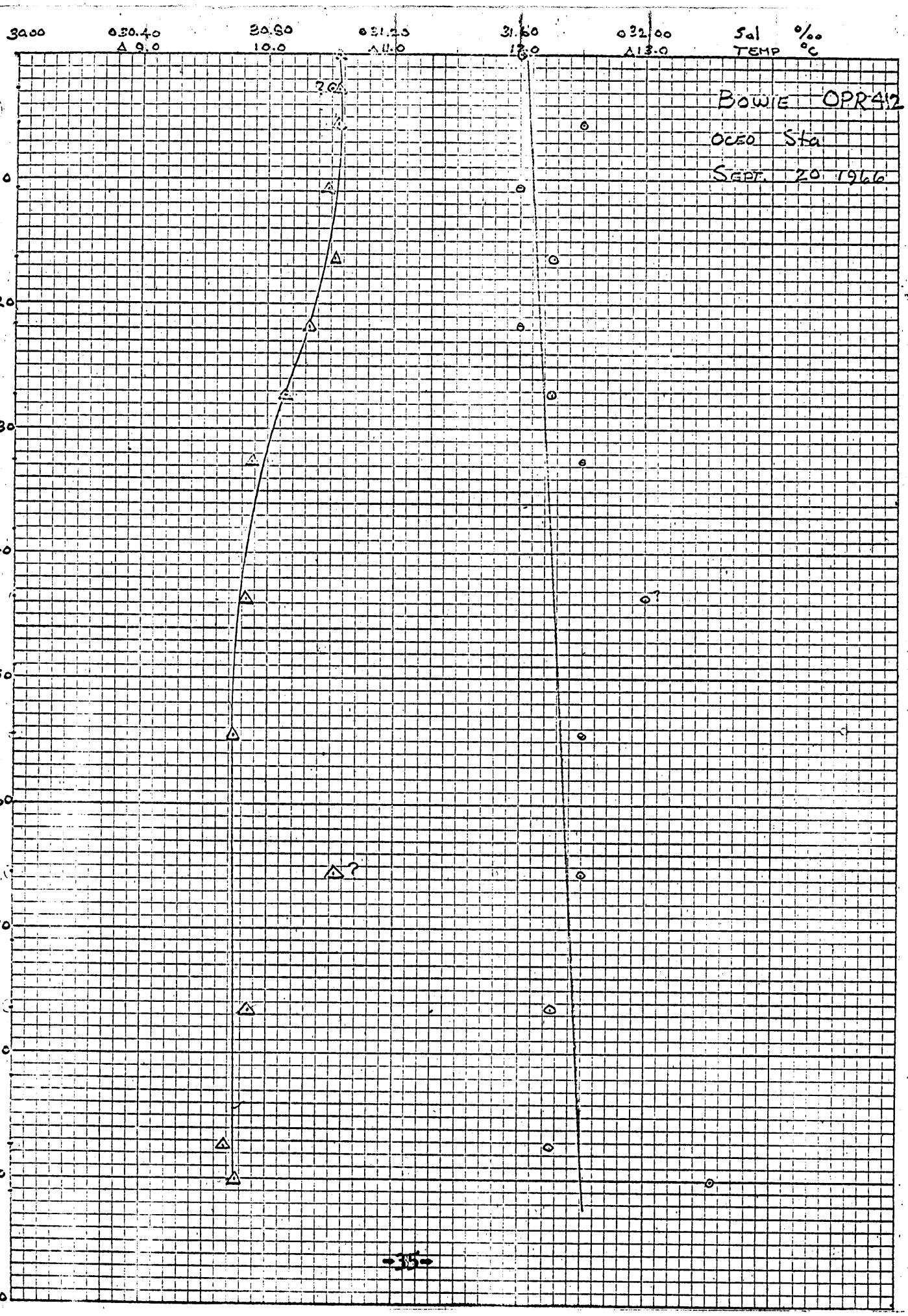
20 September 1966 This station was occupied between Lagoon point and Marrowstone Point, in Admiralty Inlet. The station was observed the standard way using Nansen bottles and reversing thermometers. Specific Gravity was measured with hydrometers.

Bottle#	Depth meters	Temp. °C*	Specific Gravity	Salinity °/oo
T	0.0	10.56	1.0218	31.6
B	5.0	10.56	1.0212	30.8
T	10	10.56	1.0218	31.8
B	20	10.48	1.0218	31.6
T	30	10.52	1.0219	31.7
B	40	10.34	1.0218	31.6
T	50	10.15	1.0221	31.7
B	60	9.88	1.0220	31.8
T	80	9.83	1.0222	32.0
B	100	9.74	1.0220	31.8
B	120	10.54	1.0217	31.8
T	140	9.87	1.0221	31.7
T	160	9.79	1.0218	31.7
B	165	9.76	1.0220	32.2

*Temperatures are corrected to insitu

Values for velocity computations are absracted from the graph on the following page.

Layer Depth fms	Mid Depth	Temp °C	Salinity °/oo	Layer Velocity	Corr. Factor	Layer Corr.	Depth Corr. Fms
1.3-5	3.7	10.7	31.8	1485.6	.01545	.0572	0.06
5-10	7.5	10.6	31.8	1485.3	.01524	.0762	0.13
10-20	15	10.5	31.8	1485.2	.01518	.1518	0.28
20-30	25	10.3	31.8	1484.8	.01490	.1490	0.43
30-40	35	9.8	31.7	1483.6	.01408	.1408	0.58
40-50	45	9.7	31.7	1483.0	.01367	.1367	0.71
50-60	55	9.8	31.7	1483.8	.01421	.1421	0.85
60-70	65	9.8	31.7	1484.1	.01442	.1442	0.998
70-80	75	9.8	31.6	1484.4	.01463	.1463	1.14
80 -90	85	9.8	31.6	1484.7	.01483	.1463	1.29
90-100	95	9.6	31.5	1484.1	.01442	.1442	1.44
						mhf	


30.00
30.40
Δ 9.0
30.80
10.0
31.20
Δ 11.0
31.60
12.0
32.00
Δ 13.0
Sal ‰
TEMP °C
BOWIE OPR 412
OCEO Sta
SEPT. 20 1966
10
20
30
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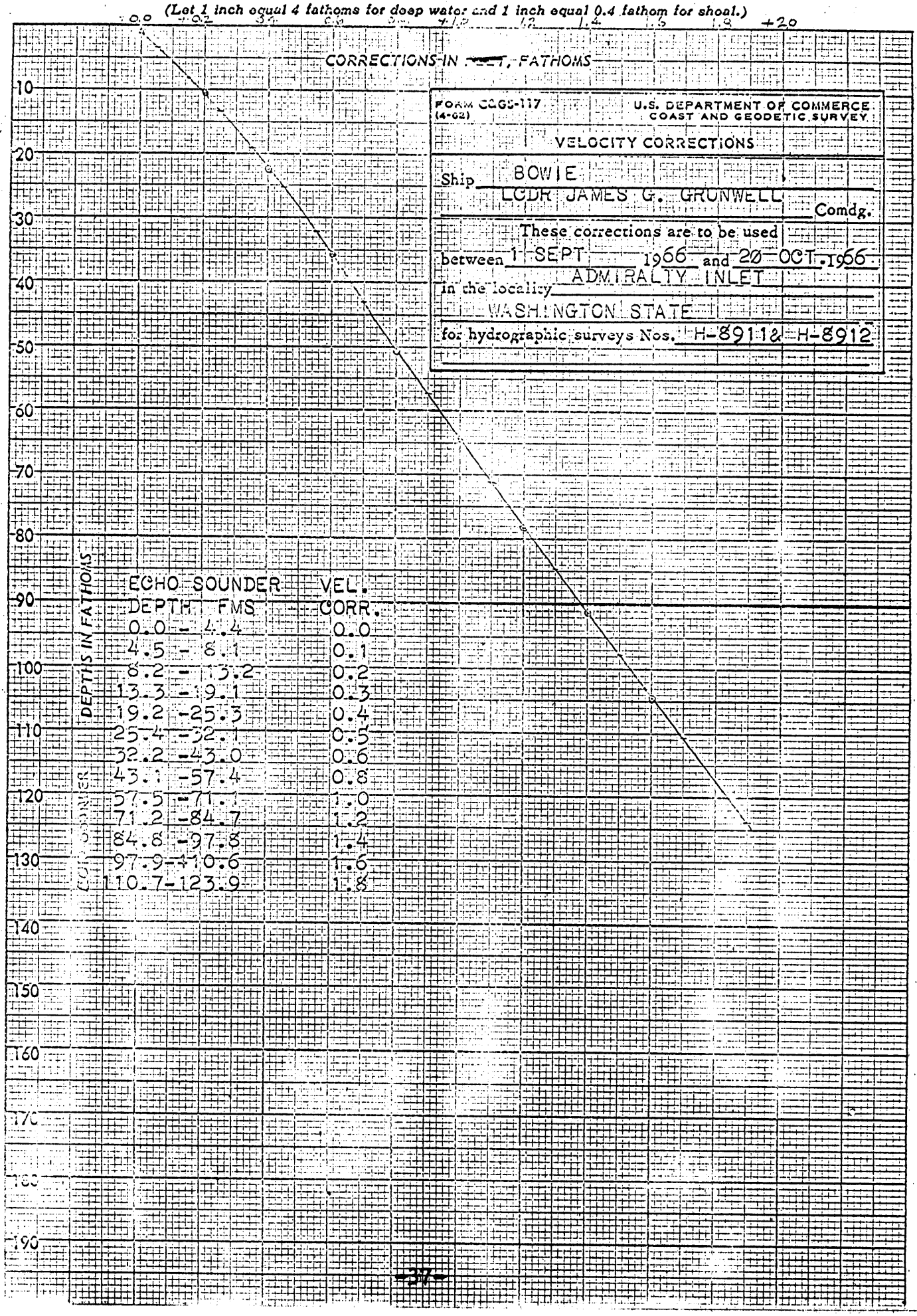
60
70
80
90
100
-35-

(Let 1 inch equal 4 fathoms for deep water and 1 inch equal 0.4 fathom for shoal.)



FORM C&GS-117 (4-62)

U.S. DEPARTMENT OF COMMERCE
COAST AND GEODETIC SURVEY

VELOCITY CORRECTIONS

Ship BOWIE

LCDR JAMES G. GRUNWELL Comdg.

These corrections are to be used between 1 SEPT 1966 and 20 OCT. 1966

in the locality ADMIRALTY INLET

WASHINGTON STATE

for hydrographic surveys Nos. H-8911 & H-8912

(For deep water add a 0 to these figures)

ECHO SOUNDER DEPTH FMS	VEL. CORR.
0.0 - 4.4	0.0
4.5 - 8.1	0.1
8.2 - 13.2	0.2
13.3 - 19.1	0.3
19.2 - 25.3	0.4
25.4 - 32.1	0.5
32.2 - 43.0	0.6
43.1 - 57.4	0.8
57.5 - 71.1	1.0
71.2 - 84.7	1.2
84.8 - 97.8	1.4
97.9 - 110.6	1.6
110.7 - 123.9	1.8

MOTOR LAUNCH #95

From an abstract of the season's bar checks, the sounding error was obtained. This error is the draft error, velocity error, and instrument error for the system. The trend of the error per test depth was used, not the daily values. Also, we used the deeper values, for if the bar is off to one side during the bar check, this will be displayed as a shoaler depth.

LIST OF STATIONS H-8910 (BO-10-1-66)

	ABE	T-12056
	AIM	T-12064
	ALA	WALAN POINT 1941
	AMP	T-12064
	ANT	T-12057
	ARN	T-12064
	ART	T-12064
	BAG	Volume 1, Page 5
	BIB	Volume 2, Page 3
	BIS	T-12064
	BON	T-12057
	BOY	Volume 6, Page 7
	BUT	T-12064
	CAB	Volume 1, Page 5
	CLU	CLUMP 1943
	COD	Volume 8, Page 3
	CON	CONE 1915
*	COP	T-12064
	COR	T-12064
	CRO	Volume 10, Page 68
	CRY	T-12057
	CUR	T-12064
*	DAW	T-12056
*	DIA	INDIAN (U.S.E.) 1920
	DIF	T-12057
	DOT	Volume 3, Pages 10, 14, 41, 62
	DRA	Volume 10, Page 68
	DUM	T-12063
	EAR	NAVY REAR 1941
	EAT	Volume 1, Page 5
	EGO	T-12064
	END	T-12064
	ENT	T-12064
	FAR	Volume 1, Page 5
	FED	T-12064
	FEN	T-12064
	FIG	T-12057
	GAD	Volume 2, Page 3
	GET	T-12064
	GUP	GUPPY 1941
	HAG	T-12063
	HED	Volume 10, Page 12
	HEX	T-12064
	HIM	T-12064
	HOD	T-12064
	HUD	POINT HUDSON LIGHT 1926
	ICE	T-12063
	IVY	T-12064
	JUG	Volume 2, Page 3

	KAL	KALA POINT LIGHT 1961
	KED	T-12063
	KEL	T-12057
	KID	Volume 8, Page 3
	KOW	SKOW 2 1941
	LAN	T-12057 (WALAN POINT LIGHT)
	LAX	T-12064
	LET	T-12063
	LOG	T-12064
	MAG	T-12063
	MAR	T-12057
*	MAX	T-12064
	MEL	Volume 6, Page 37
	MOW	T-12057
	MUM	T-12064
	NED	Volume 2, Page 3
	NOD	Volume 2, Page 4
	NON	Volume 8, Page 3
	NOR	T-12064
	OAK	OAK BAY LIGHT 1966
	OBI	T-12063
	OCK	ROCK 1941
	OLD	Volume 2, Page 4
	OWN	PORT TOWNSEND COURTHOUSE STEEPLE 1908
	PAD	T-12063
	PIE	T-12064
	PIL	T-12064
	POD	T-12064
	POI	POINT (U.S.E.) 1915
	POR	PORT TOWNSEND NATIONAL PAPER PRODUCTS COMPANY, S.E. STACK, 1937
	POT	DEPOT 1941
	RAM	T-12064
	RED	DREDGE 1941
	RIB	T-12064
	SAG	T-12064
	SHE	T-12064
*	SHO	SHOAL 1941
	SIG	T-12064
	SIS	T-12057
	SOL	T-12064
	SOW	T-12064
	STU	T-12064
	TAP	T-12064
	TEA	Volume 5, Page 50
	TIN	T-12064
	TRI	T-12064
	TUB	T-12064
	UNK	T-12064
	VAL	T-12064
	VET	Volume 8, Page 3
	VOL	T-12064
	WIT	Volume 8, Page 3

* These stations were not used for hydrographic control but may be used in references.

APPROVAL SHEET

This survey, with associated records, is approved through 28 November 1966.

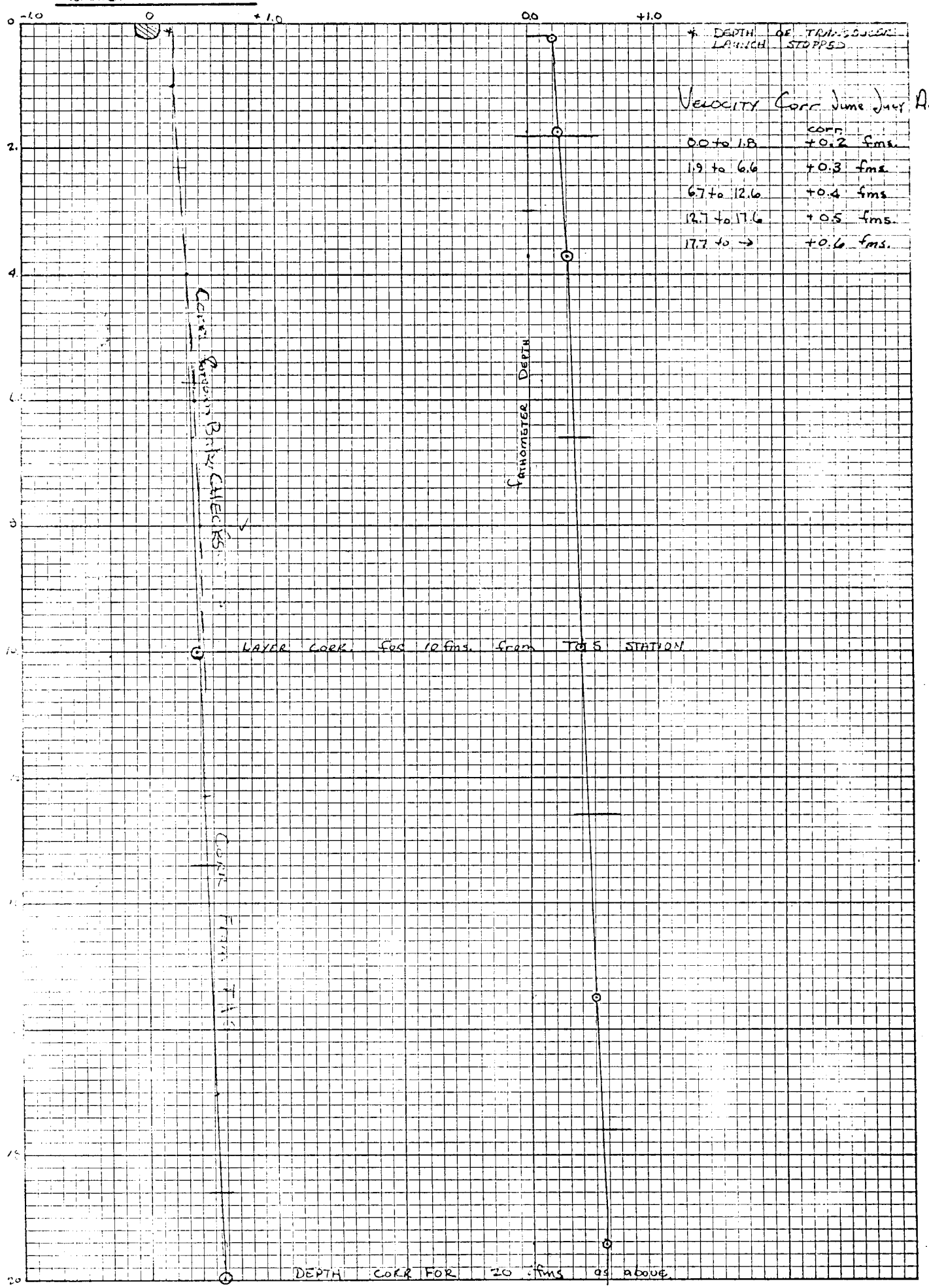
The survey is considered complete and adequate; no additional field work is indicated as of this date.

Personal supervision of the survey work was very close, and the boat sheet and sounding records were examined by me daily.

James G. Grunwell
LCDR, USESSA

BAR CHECK AVERGE DIFFS.

LAUNCH P.D-10-1-66



H-8910

Tide Note

Port Townsend tides were used for reduction of soundings in Port Townsend south of Latitude 48°06.30 through Port Townsend Canal.

Bush Point tides were used for the reduction of soundings in Oak Bay.

Mystery Bay tides were used for comparisons with Friday Harbor tides. Adjusted Friday Harbor tides were used for reduction of soundings in Kilisut Harbor.

The Port Townsend Tide station was located at the Union Oil Dock, Port Townsend, Washington at Latitude 48°06.95N and Longitude 122°44.97W. The gauge was a Porter-Fisher digital punch portable type, with a wooden well attached to the oil dock. The staff was made of plastic scales attached to the well. The 2.2 foot mark corresponded to MLLW. Hourly heights were furnished by the Washington office. This station was in operation throughout the times that hydrography was being accomplished on this survey (H-8910). The time meridian used was 120°W (PST).

Added in approx. position during review

The Bush Point Tide station was located on a small pier NE of Bush Point Light, Whidbey Island, Washington at Latitude 48°02.02N and Longitude 122°36.14W. The gauge was pressure recording type, 3.7 feet on the marigram corresponded to MLLW. The staff was made of plastic scales and was attached to a pile and the 1.7 foot staff mark corresponded to MLLW. Hourly heights were furnished by the Washington office. A range ratio of 1.1% and time retardation of 20 minutes was applied to obtain the tide reducers for the soundings in Oak Bay. The Bush Point tide station was in operation throughout the times that hydrography was being accomplished on this survey (H-8910). The time meridian used was 120°W (PST).

not within sheet limits

The Mystery Bay Tide station was located on Marrowstone Island on a small dock about Latitude 48°03.5 and Longitude 122°41.6. This station was established in July of 1967 for the express purpose of making simultaneous comparisons with the Seattle and Friday Harbor tides.

Added in approx. position during review

The geographical structure of Kilisut Harbor greatly affects the tides, a fact which did not become apparent until processing was well underway. The field work was originally done on Port Townsend tide, which proved unsatisfactory. The tide reducers finally used for the smooth sheet reduction of soundings are based on Friday Harbor tides adjusted for height and time. See attached memorandum C3312-254-MCFOE, dated 12/7/67. See attached comparison of reference planes and times of tides. Acceptable crossings of the sounding lines in Kilisut Harbor have been achieved by using the following Mystery Bay correctors as applied to Friday Harbor tides.

HHW -22 Min.	+0.5 feet
LHW -17 Min.	+0.5 feet
HLW -25 Min.	0.0 feet
LLW +08 min.	0.0 feet

Time Meridians used are 120°W (PST).

Chief Processing Division 31 July, 1967

C.O. Hodgson

Tide Observation at Mystery Bay, Washington under OPR 412

Tide Observation data at Mystery Bay, Washington, under Phase OPR 412 are submitted herewith and are considered complete.

On 29 June, 1967, a bubbler tide gage was installed at the county dock in Norland, Washington. Three new benchmarks were established with no recovery or leveling accomplished to any existing marks. The closest precise bench mark was 1.5 miles away. Because of this distance factor, it was felt that time would not allow the leveling to be accomplished.

Upon inspection of the gage on 7 July, it was found that the regulator had been smashed by vandals. The gage was repaired and 18 days of good data was obtained. On 24 July, the gage was discontinued and levels run. The staff was found to have settled .008 foot.

The following data is submitted:

1. Marigram (Bubbler) 29 June - 24 July, 1967
2. Reports tide station with copies
2. Form 258 Leveling Record Tide Stations
2. Pages Time of HW and LW for Mystery Bay tide observations

Walter F. Forster II
C.O., Hodgson

Form CD-121A (8-63) (Pres. by A.O. 206-10) UNITED STATES GOVERNMENT

Memorandum

U.S. DEPARTMENT OF COMMERCE
COAST AND GEODETIC SURVEY
ENVIRONMENTAL SCIENCE SERVICES ADMINISTRATION

TO : Chief, Processing Division, CFS3
Pacific Marine Center
1801 Fairview Avenue, East
Seattle, Washington 98102

DATE: August 15, 1967

In reply refer to:
C3311-115-MCFOE

FROM : Chief, Datum Planes Section
Oceanography Division

SUBJECT: Tide Reducers, OPR-412, Puget Sound

Reference is made to your memorandum dated August 8, 1967, regarding the above subject.

The results of the tide observations obtained at Bush Point and Hansville gives a difference in the time of the tide of about ~~½~~ ¼ hour and a range difference of 1.2 feet.

It is suggested that the following revised zoning be used for your sheet junctions. The other proposed zoning outlined in our memorandum dated January 20, 1967, remains in effect.

Vicinity of Oak Bay (Junction of Sheets 8910, 8911, and 8912) use Bush Point tides with -0 20 minutes in time and 1.1 range ratio. Junction of Sheets 8911 and 8912 outside of Oak Bay use Bush Point tides with -0 10 minutes in time and 1.1 range ratio.

L C Wharton

L. C. Wharton

FORM CD-121 (11-63) (PRES. BY A.O. 206-10)

UNITED STATES GOVERNMENT

Memorandum

U.S. DEPARTMENT OF COMMERCE
ENVIRONMENTAL SCIENCE SERVICES ADMINISTRATION
COAST AND GEODETIC SURVEY

TO : Director, Pacific Marine Center
Coast and Geodetic Survey

DATE: December 7, 1967

In reply refer to:
C3312-254-MCFOE

FROM : Chief, Tides Section
Oceanography Division

SUBJECT: Mystery Bay, Washington, marigram
Your reference: CFS3 4060/03.3

The tide record has been compared with simultaneous observations at Seattle and Friday Harbor. The diurnal tidal pattern at Mystery Bay agrees very well with that of Friday Harbor. The comparison with Seattle tides brought out a variance lasting several days whenever the moon is over the equator. Computed mean differences for Mystery Bay, based on Seattle tides, are therefore not really good. The enclosed table shows the results of our computation. Planes for Mystery Bay were derived from comparison with Friday Harbor tides and reduced to mean values. All heights refer to lower low water. At Mystery Bay MLLW is 1.93 feet above the staff zero or 9.93 feet above the marigram zero.

Martha A. Winn

Martha A. Winn

Enclosure

2 1

2 [illegible]

3 [illegible]

COAST AND GEODETIC SURVEY
December 7, 1967

Comparison of Reference Planes and Times of Tide

	Mystery Bay ft.	Friday Harbor ft.	Ht. Corr. ft.	Time Corr. min.	Seattle ft.	Ht. Corr. ft.	Time Corr. min.
HHW	8.2	7.7	0.5	-22	11.3	-3.1	-20
MHW	7.5	7.0	0.5	-22	10.4	-2.9	
LHW	6.8	6.3	0.5	-17	9.5	-2.7	-41
MTL	5.0	4.8	0.2		6.6	-1.6	
HLW	5.0	5.0	0.0	-25	5.6	-0.6	-65
MLW	2.5	2.5	0.0	-8	2.8	-0.3	
LLW	0.0	0.0	0.0	+8	0.0	0.0	-5

FORM C&GS-712
(3-9-64)

U.S. DEPARTMENT OF COMMERCE
COAST AND GEODETIC SURVEY

TIDE NOTE FOR HYDROGRAPHIC SHEET

April 21, 1969

[redacted] Pacific Marine Center

Plane of reference approved in
13 volumes of sounding records for

HYDROGRAPHIC SHEET 8910

Locality: Port Townsend, Washington

Chief of Party: J. C. Grunwell, (1966

Plane of reference is mean lower low water

Tide Station Used (Form C&GS-681):

Port Townsend, Washington
Bush Point, Washington

Height of Mean High Water above Plane of Reference is as follows:

Port Townsend	7.9 feet
Bush Point	8.2 "

Remarks

J. M. Symons
Chief, Tides and Currents Branch

USCOMM-DC 6680-P64

H-8910

Smooth Plotter's Note

Shorelines on the smooth sheet were obtained from the manuscripts as listed in Paragraph F of the field party's report. These manuscripts are based on photography of September 1960. Minor details of docks and piers were updated from photographs taken August 15, 1965.

The 15 buoys in the entrance channel of Kilisut Harbor are listed in the 1970 edition, Coast Guard Light List, Vol. III. The placement of these buoys have been compared with that shown on Chart 6405, 11th Edition, December 30, 1968.

Respectfully Submitted,

N. Lestenkof

N. Lestenkof

FORM 197
(3-16-55)

GEOGRAPHIC NAMES

Survey No. H-8910

Name on Survey	A On Chart No.	B On previous survey No.	C On U. S. quadrangle Maps	D From local information	E On local Maps	F P. O. Guide or Map	G Rand McNally Atlas	H U. S. Light List	K	
Admiralty Inlet		-								1
Chimacum Creek		-								2
Crane Point		-								3
Hadlock		-								4
Indian Island			-							5
Irondale		-								6
Kala Point			-							7
Kilisut Harbor			-							8
Kinney Point			-							9
Marrowstone Island			-							10
Mid Channel Bank										11
Mystery Bay			-							12
Nordland			-							13
Oak Bay		-								14
Port Townsend										15
Port Townsend (city)										16
Port Townsend Canal			✓							17
Quimper Peninsula			-							18
Scow Bay			-							19
Walan Point			-							20
Bishops Point - g.p.			-							21
Glen Cove - g.p.			-							22
Midchannel Bank g.p.										23
										24
										25
										26
										27

PREPARED BY

Frank W. Pickett

CARTOGRAPHIC TECHNICIAN

APPROVED BY

A. Joseph Wright

CHIEF GEOGRAPHER

FORM C&GS-946
(REV. 11-65)
(PRESC. BY
HYDROGRAPHIC
MANUAL 20-2,
6-94, 7-13)

U.S. DEPARTMENT OF COMMERCE
ENVIRONMENTAL SCIENCE SERVICES ADMINISTRATION
COAST AND GEODETIC SURVEY
NAUTICAL CHART DIVISION

HYDROGRAPHIC SURVEY STATISTICS

HYDROGRAPHIC SURVEY NO. 8910

RECORDS ACCOMPANYING SURVEY: To be completed when survey is registered.

RECORD DESCRIPTION	AMOUNT	RECORD DESCRIPTION	AMOUNT
SMOOTH SHEET	1	BOAT SHEETS	1
DESCRIPTIVE REPORT	1	OVERLAYS	0

DESCRIPTION	DEPTH RECORDS	HORIZ. CONT. RECORDS	PRINTOUTS	TAPE ROLLS	PUNCHED CARDS	ABSTRACTS/ SOURCE DOCUMENTS
ENVELOPES						
CAHIERS	1					
VOLUMES	13					
BOXES						

T-SHEET PRINTS *(List)* T-12056; T-12057; T-12063; and T-12064

SPECIAL REPORTS *(List)*

OFFICE PROCESSING ACTIVITIES

The following statistics will be submitted with the cartographer's report on the survey

PROCESSING ACTIVITY	AMOUNTS				
	PRE-VERIFICATION	VERIFICATION	REVIEW	TOTALS	
POSITIONS ON SHEET				3364	
POSITIONS CHECKED		1501	200		D.R.E.
POSITIONS REVISED		109	0		
DEPTH SOUNDINGS REVISED		70	3		4
DEPTH SOUNDINGS ERRONEOUSLY SPACED		148	0		
SIGNALS ERRONEOUSLY PLOTTED OR TRANSFERRED		1	0		
	TIME (MANHOURS)				
TOPOGRAPHIC DETAILS		28	15		
JUNCTIONS		23	50		60
VERIFICATION OF SOUNDINGS FROM GRAPHIC RECORDS		357	10		4
SPECIAL ADJUSTMENTS		—			
ALL OTHER WORK		272	133		44
TOTALS		680	208		108

		BEGINNING DATE	ENDING DATE
PRE-VERIFICATION BY		FEB-1,1969	
VERIFICATION BY	Vincent F. Flor	FEB. 12, 1969	ENDING DATE
REVIEW BY	Lysle R. Everhart	DEC 12, 1970	JAN 17, 1971

D.R. Engle Rev. 108 Insp. 19 hrs. Aug 6, '71

Sep

USCOMM-DC 36271-P65

OFFICE OF MARINE SURVEYS AND MAPS

MARINE CHART DIVISION

HYDROGRAPHIC SURVEY REVIEW

REGISTRY NO. H-8910 FIELD NO. BO-10-1-66

Washington, Admiralty Inlet, Vicinity of Port Townsend

SURVEYED: June 16, 1966 to Sept. 26, 1966

SCALE: 1:10,000 PROJECT NO.: OPR-412

SOUNDINGS: Raytheon DE-723 Depth Recorder CONTROL: Sextant fixes on shore signals

Chief of Party	J. G. Grunwell
Surveyed by	M. H. Fleming
	S. M. Hamilton
	M. N. Maki
Protracted by	M. N. Maki
	N. Lestenkof
Soundings Plotted by	N. Lestenkof
Verified and Inked by	V. F. Flor PMC
Reviewed by	L. R. Everhart
	Date: January 27, 1971
Inspected by	D. R. Engle

1. Description of Area

The survey covers the southeastern part of Port Townsend, the northern part of Oak Bay, the Port Townsend Canal connecting the two bays, and all of Kilisut Harbor. In the area of Port Townsend and Oak Bay the bottom slopes sharply from the shoreline to depths of 10 fathoms and then levels off to form a nearly flat bottom of 12 to 15 fathom depths. In Kilisut Harbor the bottom is generally irregular with several shoals and depressions. The entrance channel to Kilisut Harbor is winding and narrow. Soft green mud is the predominant bottom characteristic throughout the survey area.

2. Control and Shoreline

The source of control is given in the Descriptive Report.

The shoreline originates with final reviewed Manuscripts T-12056, T-12057, T-12063, and T-12064 of 1960-62.

The pier from T-12056 in lat. 48°04.7', long. 122°47.15'was inked on the boatsheet as being in ruins though no specific fixes on it or notes were recorded in the volumes. It is shown on the smooth sheet as being in ruins.

3. Hydrography

Depths at crossings are in good agreement.

The usual depths curves are adequately delineated.

The development of the bottom configuration and the determination of least depths are considered adequate.

4. Condition of Survey

The field plotting, sounding records, and the Descriptive Report are adequate and conform to the requirements of the Hydrographic Manual, except for the following:

A. Stamps and notes at the beginning and ending of day were not always complete.

B. Position data were not completely recorded in accordance with section 5-96 of the Hydrographic Manual. Occassionally, the signal names were omitted from the first fix of a page, or "same" was entered when different signals had been used to locate the hydrographic position.

C. Numerous dolphins, piles and ruins charted at the time of the present survey were not investigated by the field party and could not be disposed of during office review. (See par. 6 and 7B)

D. The green and blue inks used by the verifier were of poor quality and required extensive retouching during review.

5. Junctions

Adequate junctions were effected with contemporary surveys H-8911 (1966) on the northeast; H-8912 (1966) on the southeast; and with prior surveys H-6618 (1940) and H-6757 (1942), on the north. A partial butt junction was made with H-6193 (1937) on the northwest where shoaling of 1 to 3 feet has occurred just outside Glen Cove since the 1937 survey.

The dolphin charted in lat. 48°05.20', long. 122°47.77' from H-6193 and the outer half of the row of dolphins charted in approx. lat. 48°05.80', long. 122°43.6' from H-6757 apparently were not visible above the water surface and were not investigated during the present survey. Because submerged remains may exist, they were carried forward to the present survey as submerged piles.

In the junction with H-6816 (1942-43) a holiday exists in the eastern portion of the junctional area. A few soundings in approx. lat. 48° 06.65', long. 122°41.70' were carried forward from prior survey H-1729 (1885-86) to partially fill the holiday.

6. Comparison with Prior Surveys

A. H-333 (1852) 1:214,240
H-405 (1853) 1:200,000

These are small scale reconnaissance surveys and are not adequate for comparison.

B. H-1482a (1880) 1:10,000 This prior survey covers the area of Kilisut Harbor and Oak Bay. The soundings on the prior survey are generally in good agreement with those on the present survey except in the deeper areas where some shoaling of as much as ½ fathom has occurred. The present survey is more comprehensive and portrays the bottom in much greater detail. No description was found for the shape charted in lat. 48°01.1', long. 122°43.55' from H-1482a. As the area was crossed on the present survey at low tide and as no observations were recorded regarding this feature, it is considered nonexistent.

C. H-434 (1854) 1:10,000
H-1729 (1885-86) 1:20,000
H-T-2072 (1891) 1:4,800

These prior surveys cover the area of Port Townsend Bay, except for the Port Townsend Canal which was not in existence at the time of the prior surveys. There are no significant conflicts between the two surveys. A zero sounding representing a low water spot near the entrance to Kilisut Harbor has been carried forward to implement present depths.

D. H-3767 (1915) 1:10,000 This prior survey covers the approaches to the canal connecting Port Townsend Bay with Oak Bay. The Port Townsend Canal has altered the natural configuration of the area since the original survey. A detached shoal has built up at the west entrance of the Canal.

The present survey, with the addition of the zero sounding mentioned above, is adequate to supersede the above prior surveys in the common area.

E. H-8707 W.D. (1962) 1:10,000 No conflicts exist between the present survey depths and the effective wire drag depths.

F. T-6885a (1941) 1:10,000

Several piles and dolphins charted from this prior planetable survey were not investigated on the present survey. Apparently these structures were not visible above the water surface at the time of the survey. However, submerged remains may exist, and these items were carried forward as submerged piles to the present survey pending future investigation:

(1) A group of piles in lat. 48°02.10', long. 122°45.07'
(2) Two piles in approx. lat. 48°02.26', long. 122°45.25'
(3) Five piles between lat. 48°01.94', long. 122°44.94' and lat. 48°01.73', long. 122°44.88'
(4) Four dolphins in lat. 48°02.83', long. 122°44.29'
(5) The piling in lat. 48°03.28', long. 122°44.40' and in lat. 48°03.45', long. 122°44.40'
(6) The dolphin in lat. 48°02.07', long. 144°44.04', formerly a navigational light structure.

7. Comparison with Chart 6405 (12th Ed. Jan. 9, 1971)

A. Hydrography

The charted hydrography originates with the previously discussed surveys supplemented by the partial application of hydrography from the boat sheet and unverified smooth sheet of the present survey. Attention is called to the following:

(1) The low-water shoal charted in lat. 48°00.45', long. 122° 41.45' from H-1482 (1880) is discredited by the present survey and junctional survey H-8912 (1966). It should be removed from the chart.

(2) The 1½-fathom sounding charted in lat. 48°05.73', long. 122° 43.59' from the boat sheet of the present survey is in error because of incorrect interpretation of the fathogram trace. The correct depth is 2¼ fathoms.

The present survey is adequate to supersede the charted hydrography within the common area.

B. Topography

The following items, charted from the sources indicated, were not investigated on the present survey and should be retained on the chart:

(1) The log booms in lat. 48°05.00', long. 122°47.50' from chart

Letter 713 (1944). These booms were charted from a proposed construction plan. It could not be determined whether construction was actually completed as planned, or if the structure is permanent or may be moved periodically.

(2) The following items from air photographs of 1959 and 1960.

a. A pile in lat. 48°04.15', long. 122°46.96'
b. The ruins in lat. 48°02.28', long. 122°45.25'
c. A pier-in-ruins in lat. 48°00.08', long. 122°43.18'
d. The ramp in lat. 48°03.01', long. 122°44.47'

(3) The following items from air photographs of 1965:

a. The piling in lat. 48°03.05', long. 122°46.00'
b. The piling in lat. 48°02.55', long. 122°45.84'
c. Two wharves in ruins in lat. 48°02.00', long. 122°45.04'
d. The pier-in-ruins in lat. 48°01.95', long. 122°45.05'
e. Two piers in lat. 48°03.25', long. 122°41.35'
f. Shoreline revisions on the east side of Port Townsend Canal and in Oak Bay near the southern entrance to the canal. (See Blueprint 98390)

(4) The piers-in-ruins in lat. 48°05.74', long. 122°43.43' and in lat. 48°06.15', long. 122°42.06' from Chart Letter 435 (1957) were not investigated and are not considered disproved.

(5) The pier-in-ruins in lat. 48°02.62', long. 122°45.80' from T-4224 (1926). The present survey shows the inshore end of ruins of the pier. The offshore area was not investigated for submerged remains.

C. Controlling Depths

The charted controlling depths are based on Corps of Engineers data subsequent to the date of the present survey and supersede the present survey information.

D. Aids to Navigation

Aids to navigation on the present survey are in agreement with the chart except as follows:

(1) Port Townsend Canal buoy 7 charted in lat. 48°01.42', long. 122°43.32' was established in accordance with Local Notice to Mariners 48 (1970) subsequent to the date of the present survey.

(2) Kilisut Harbor buoy 6 located on the present survey in lat. 48°05.32', long. 122°43.87' was moved about 100 meters to the north

according to Notice to Mariners 40 (1967) subsequent to the date of the present survey.

(3) Kilisut Harbor buoy 19 located on the present survey in lat. 48°05.05', long. 122°43.30' is charted about 180 meters south southwest of its survey position.

(4) Kilisut Harbor buoy 24 located on the present survey in lat. 48°04.17', long. 122°42.62' is charted about 300 meters north northwest of its survey position.

(5) The mooring buoy charted in lat. 48°03.57', long. 122°44.70' was established in accordance with Notice to Mariners 48 (1970) subsequent to the date of the present survey.

(6) The mooring buoy charted in lat. 48°04.55', long. 122°44.80' from Notice to Mariners 17, 1946 was not located on the survey.

All aids to navigation as presently charted adequately mark the features intended.

8. Compliance with Instructions

The survey adequately complies with the Project Instructions except that a holiday was left in the junction with H-6816 (1942-43) in approx. lat. 48°06.6', long. 122°41.8'.

9. Additional Field Work

This survey is considered to be a good basic survey and no additional hydrography is recommended.

Examined & Approved:

John C. Boyer
Chief,
Marine Chart Division

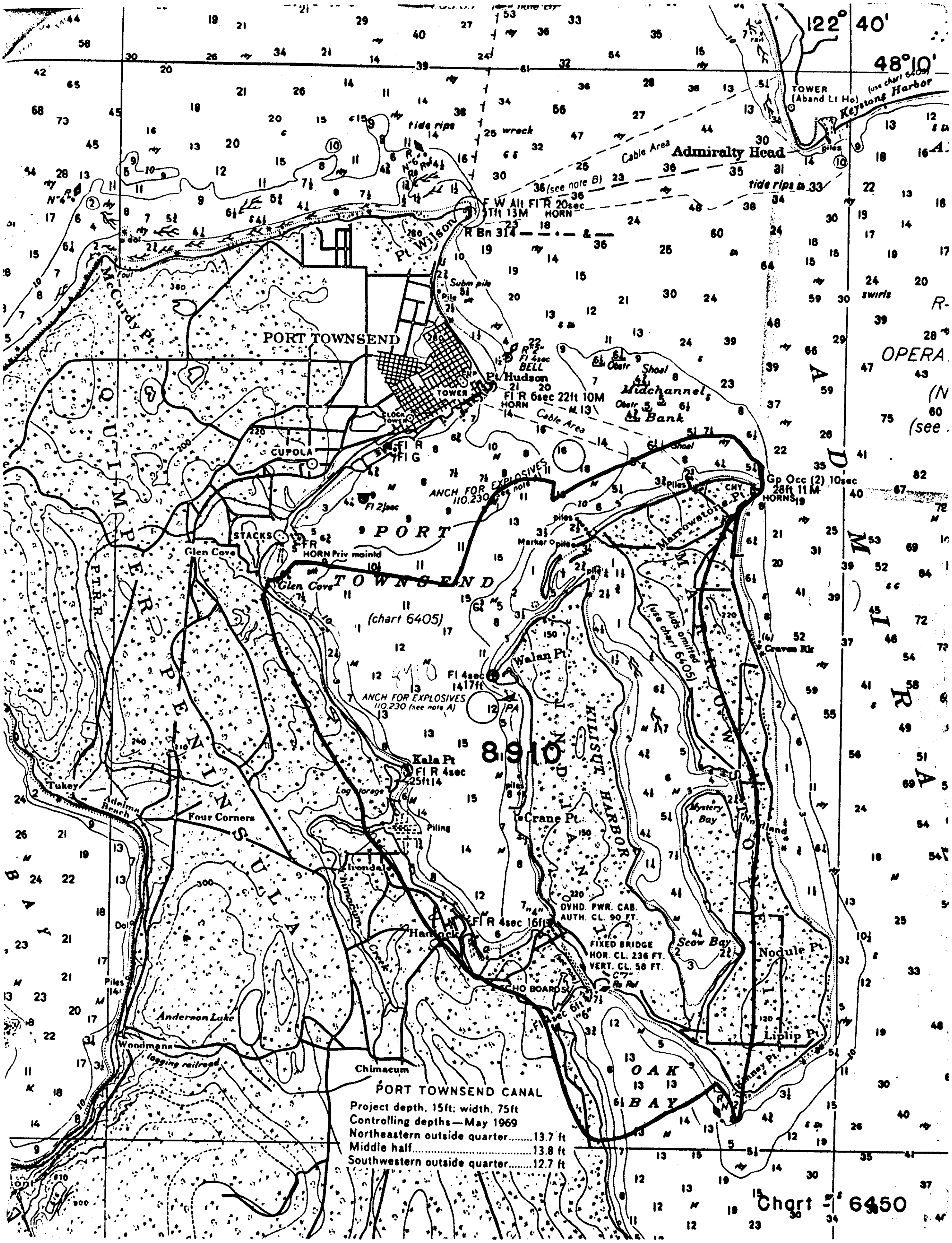
Robert C. Munson
Associate Director
Office of Marine Surveys and Maps

Information for Future Pre-Survey Reviews

The numerous delphins, piles and ruins discussed in paragraphs 5, 6 and 7B(1) through (6) of this review should be investigated to finally prove or disprove their existence.

Resurvey Cycle

Position Index - lat. 480, long. 1225
Bottom Change Index - 3
Use Index - 6
Resurvey Cycle - 25



122° 40'
48°10'
Admiralty Head
Keystone Harbor
TOWER (Aband Lt Ho)
Pt Wilson
PORT TOWNSEND
Pt Hudson
McCurdy Pt
CUPOLA
STACKS
Glen Cove
PORT TOWNSEND
(chart 6405)
ANCH FOR EXPLOSIVES 110.230 (see note A)
Midchannel Bank
Marrowstone Pt
Walan Pt
Kala Pt
Crane Pt
KILISUT HARBOR
Mystery Bay
Nordland
Craven Rk
Scow Bay
Nodule Pt
Liplip Pt
OAK BAY
QUIMPER PENINSULA
INDIAN ISLAND
MARROWSTONE ISLAND
ADMIRALTY
Four Corners
Tukey
Adelma Beach
Irondale
Hadlock
Chimacum
Chimacum Creek
Anderson Lake
Woodmans
OVHD. PWR. CAB. AUTH. CL. 90 FT.
FIXED BRIDGE HOR. CL. 236 FT. VERT. CL. 56 FT.
ECHO BOARDS
PORT TOWNSEND CANAL
Project depth, 15ft; width, 75ft
Controlling depths—May 1969
Northeastern outside quarter........13.7 ft
Middle half........13.8 ft
Southwestern outside quarter........12.7 ft
8910
Chart 6450

(3-25-63) NAUTICAL CHART DIVISION

RECORD OF APPLICATION TO CHARTS

FILE WITH DESCRIPTIVE REPORT OF SURVEY NO. H-8910

INSTRUCTIONS

A basic hydrographic or topographic survey supersedes all information of like nature on the uncorrected chart.
1. Letter all information.
2. In "Remarks" column cross out words that do not apply.
3. Give reasons for deviations, if any, from recommendations made under "Comparison with Charts" in the Review.

CHART	DATE	CARTOGRAPHER	REMARKS
6405	10-30-70	W. Wanless	~~Full~~ Part ~~Before~~ After Verification Review Inspection Signed Via
			Drawing No. Applied ~~Examined~~ for critical corrections
184-SC	12-4-70	J. Bailey	~~Full~~ Part ~~Before~~ After Verification Review Inspection Signed Via
			Drawing No. 11 Examined for critical corr. NO CORR. Appl. thru Dwg. 6405 # 17
6300	8-4-71	Jeffrey Stuart	~~Full~~ Part ~~Before~~ After Verification Review Inspection Signed Via
			Drawing No. No corr to hydro at this time.
6401	5-17-72	Jeffrey Stuart	~~Full~~ Part ~~Before~~ After Verification Review Inspection Signed Via
			Drawing No. No Corr.
6300	1-16-74	W. CHANDLER	Full ~~Part~~ ~~Before~~ After Verification Review Inspection Signed Via
18400			Drawing No. NO CORR
6405	10/19/77	P. Shumaker RCS	Full ~~Part~~ ~~Before~~ After Verification Review Inspection Signed Via
18464			Drawing No. 21
184 SC "D"	10/25/77	P. Shumaker RCS	Full ~~Part~~ ~~Before~~ After Verification Review Inspection Signed Via
18423			Drawing No.
18441	6-15-79	Gregory B. Norris	Full ~~Part Before~~ After Verification Review Inspection Signed Via
(6450)			Drawing No. 48
18440	6-25-79	Gregory B. Norris	Full ~~Part Before~~ After Verification Review Inspection Signed Via
(6401)		RCS-6-27-79	Drawing No. 31
18400	11-29-79	R A Lillis RCS-12-19-79	Full ~~Part Before~~ After Verification Review Inspection Signed Via
			Drawing No. 44
18477	10/4/82	J.A. Graham ron	Fully applied hydro to new Chart N-1 (18477) after final inspection
18471	4/8/83	J A Graham	Full after inspection Dwg 1
18473	4/15/83	J A Graham	Full after inspection Dwg 1

FORM C&GS-8352 SUPERSEDES ALL EDITIONS OF FORM C&GS-975. USCOMM-DC 8558-P63