

FE399

NOAA FORM 76-35A

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SERVICE

DESCRIPTIVE REPORT

Type of Survey . Field Examination.....
Field No. . PHP-5-1-94.....
Registry No. . FE-399.....

LOCALITY

State . Washington.....
General Locality . San Juan Island.....
Sublocality . Friday Harbor.....

1994

CHIEF OF PARTY
LT Guy T. Noll.....

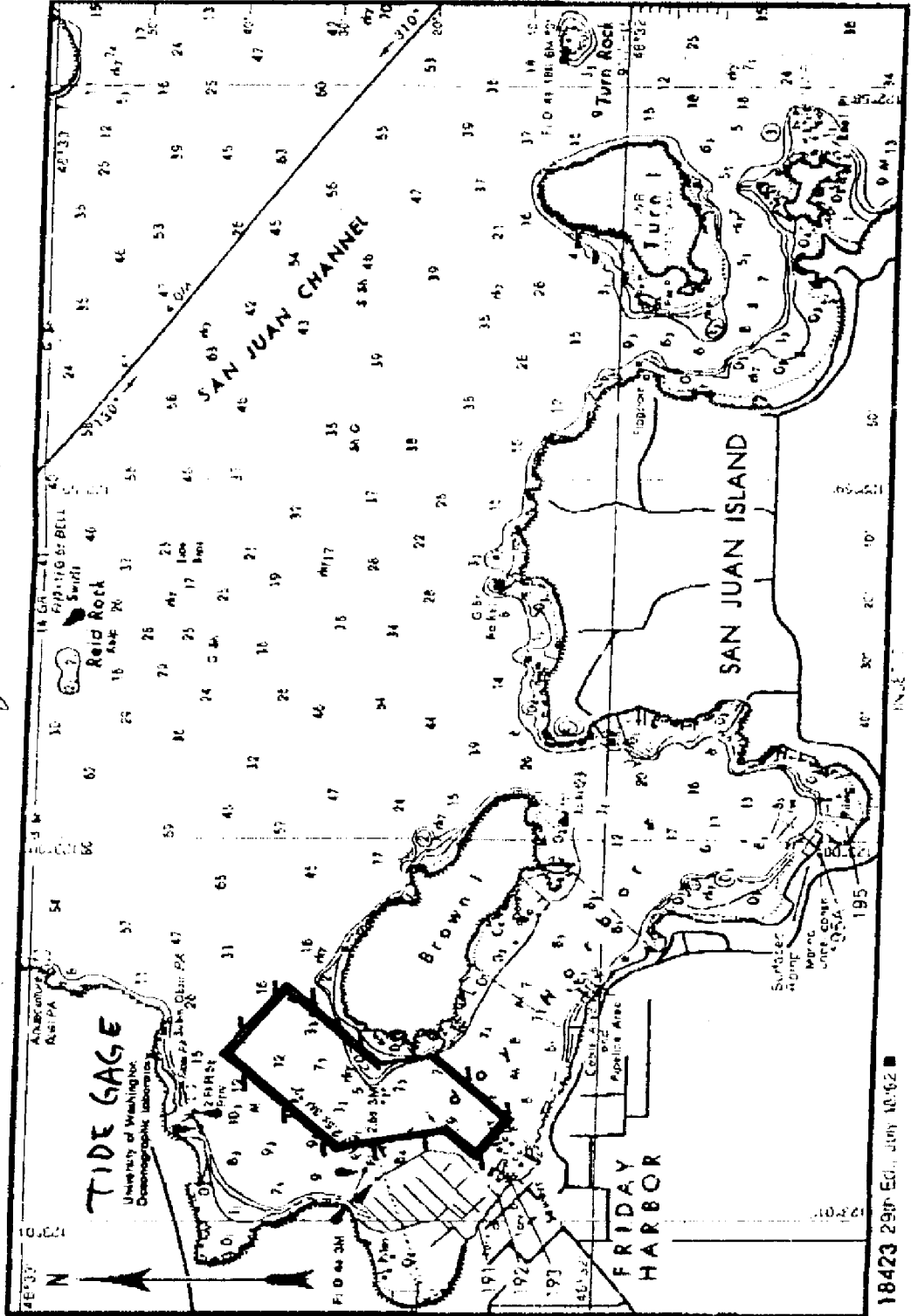
LIBRARY & ARCHIVES

DATE AUG 9 1995

S-N901-F
FRIDAY HARBOR, WASHINGTON
FIELD EXAMINATION
1:5,000-SCALE

PROJECT LIMITS SKETCH

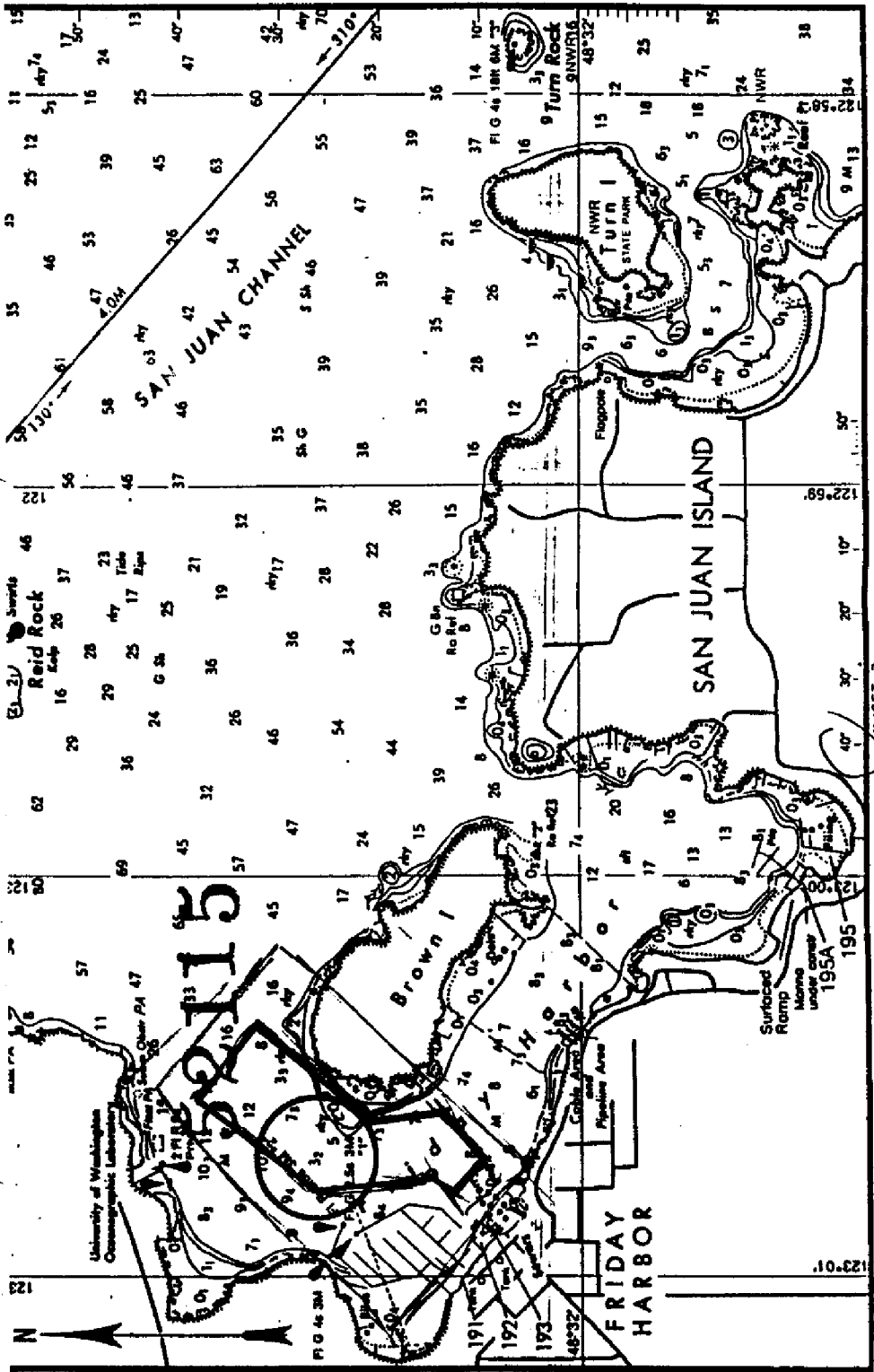
APPROVED: *[Signature]* DATE: 5/24/94



MERCATOR PROJECTION AT SCALE 1:20,000
 SOUNDINGS IN FATHOMS
 (FATHOMS AND FEET TO ELEVEN FATHOMS
 AT MEAN LOWER LOW WATER IN U.S. TERRITORY
 AT LOWEST NORMAL TIDES IN CANADIAN TERRITORY
 North American Datum of 1983
 World Geodetic System 1984)

NAUTICAL CHART 18423
 Including San Juan Islands
 BELLINGHAM TO EVERETT
 WASHINGTON





INSET 7

HYDROGRAPHIC TITLE SHEET

FE-399

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.

PHP-5-1-94

State Washington

General locality San Juan Island

Locality Friday Harbor

Scale 1:5,000 Date of survey June 10 and 12, 1994

Instructions dated May 27, 1994 Project No. S-N901-PHP

Vessel Launch 0651, Launch 0652

Chief of party LT Guy Noll, NOAA

Surveyed by Pacific Hydrographic Party * (LT Noll, LT Fletcher, ST Adams, ET Wernicke)

Soundings taken by echo sounder, hand lead, pole DSF-6000N, Innerspace 448

Graphic record scaled by PHP Personnel

Graphic record checked by PHP Personnel

Verification: L.T. Deodato Automated plot by HP Design Jet 650C

~~Plot checked by~~

Evaluation by: B.A. Olmstead

~~Verification by~~

Soundings in ~~fathoms~~ feet at M.L.W MLLW and decimeters

REMARKS: All times are UTC. Revisions and marginal notes in black were
generated during office processing. All separates are filed with
the hydrographic data, as a result page numbering may be interrupted
or non-sequential. All depths listed in this report are referenced
to mean lower low water unless otherwise noted.

* Field processing: ST M.E. Bigelow

SC AUG 9 1995 JWA/SURF 8/14/95 SSV

Descriptive Report to Accompany Field Examination FE-399

Field Number PHP-5-1-94
Scale 1:5,000
1994

Pacific Hydrographic Party
Chief of Party: LT Guy T. Noll

A. PROJECT ✓

In accordance with project instructions S-N901-PHP dated May 27, 1994, a field examination in the vicinity of Friday Harbor, San Juan Islands, Washington was performed on June 10 and June 21, 1994.

Hydrography was accomplished in the vicinity of Awois Item 52115 (Latitude 48°32'27.000"N, Longitude 123°00'42.50"W, originally NAD 27, converted to NAD 83) where shoaling up to 8" per year was reported by pilots of the Washington State Ferry system (see correspondence following report.)

B. AREA SURVEYED - See Eval Rpt, Section B

The area surveyed for FE-399 extends from latitude 48:32:45 N, longitude 123:01:00 W, south to latitude 48°32'00":N, longitude 123°00'15"W. Field sheet 1 was skewed to 0° with sheet dimensions measuring 50cm by 50cm. Hydrographic limits for FE-399 are within those required by the Hydrographic Manual (Section 1.2.3, pp. 1-6).

Data acquisition occurred on June 10, 1994 (DN 161) and June 21, 1994 (DN 172) using Anacortes, Washington as the base of operations.

C. SOUNDING VESSELS ✓

NOAA Launch 1101 (EDP No. 0651), a 29-foot Jensen, and NOAA Launch 1102 (EDP No. 0652), a 21-foot SeaArk, were used for all hydrography. No changes to the standard vessel sounding configuration were necessary.

D. AUTOMATED DATA ACQUISITION AND PROCESSING - See Eval Rpt, Section D

The PC-DAS and the Hydrographic Data Acquisition and Processing System (HDAPS) software was used during this survey. Program names and versions are listed in the appendix.

The following non-HDAPS computer programs were used:

<u>Program Name</u>	<u>Version</u>	<u>Date</u>
VELOCITY	2.00	1992
NADCON	1.01	1989
INVERS3D	1.00	1991
MONITOR	2.00	1994
PC-DAS	5.01	1994
GEOID93	1.00	1993

E. SONAR EQUIPMENT ✓

Side scan sonar operations were aborted due to extremely turbid conditions caused by frequent ferry traffic in the immediate vicinity. The bottom tracking function of the tow fish would not "hold bottom", thus preventing the acquisition of usable sonar data.

F. SOUNDING EQUIPMENT ✓

An Innerspace Model 448 (IN-448) echosounder, serial number 263 was used on VN 0652. A DSF-6000N dual frequency echosounder, S/N B038N, was used aboard 0651. Soundings were recorded in meters with an assumed speed-of-sound through water of 1,500 meters per second.

Digitized soundings displayed on line were compared in the field with the analog trace to ensure reasonable agreement. No on-line calibration adjustments can be performed on the IN-448 or DSF-6000N.

A metric leadline was used for depth comparisons with the echosounder. PHP fabricated the leadline following Hydrographic Survey Guideline (HSG) 69. Each leadline is 1/4-inch steering tiller rope. Shrink tubing, secured with "Scotchkote", marks one-meter intervals from 1 to 30. With the line under six pounds of constant tension, markings were calibrated with a steel surveyor's tape. The throwing end is a standard six-pound lead weight shackled to a stainless steel thimble bent to the bitter end. Leadline calibration forms were included in Separate IV* (Sounding Equipment Calibration and Corrections) which was sent in the Descriptive Report for H-10534.

G. CORRECTIONS TO SOUNDINGS - See Eval Rpt, Section G

Velocity of Sound

Comparison between a leadline check in Friday Harbor and the Innerspace 448 indicated that no new sound velocity cast need be performed in Friday Harbor and that no correction need be applied

* Filed with the survey records

for the shoal depths acquired. Corrections from the Anacortes AML-based sound velocity cast were used for consistency.
Static Draft ✓

Static draft for VN 0652 was determined on 4/12/94. First, the depth of the transducer face from a reference mark on the hull was measured. Next, with the launch in the water (fuel tanks half full and two crewmen aboard) the depth from this reference mark to the launch's waterline was measured. Combining the two measurements, a static draft of 0.4 meters was calculated.

A static draft of 0.5 meters was determined for VN 0651 on 5/3/94, at the same location using a method similar to the one above.

Dynamic Draft ✓

Settlement and squat measurements for VN 0651 were conducted on 5/4/94 and for VN 0652 on 5/5/94. Field records were included in Separate IV* of the Descriptive Report for OPR-N264-PHP-10-2-94, H-10534, Guemes Channel.

Settlement and squat correctors are applied on line to all survey data via the PC-DAS Offset Tables*. Offset Table 1 corresponds to VN 0651; Offset Table 2 corresponds to VN 0652. Settlement and squat correctors are reapplied during field processing using the REAPPLY program in HDAPS.

Tide Correctors ✓

Predicted tide correctors from the existing Primary station at Friday Harbor, 944-9880, were applied to soundings in field processing. Final correctors will be applied from data collected by this station. *Approved Tide Note dated August 4, 1994 is attached.*

H. CONTROL STATIONS - See Eval Rpt, Section H

Horizontal Datum

The horizontal control datum for this project is North American Datum of 1983 (NAD 83). A copy of the HDAPS Control Station Table is included in Appendix III*(List of Horizontal Control Stations). A separate Horizontal Control Report OPR-N264, Guemes Channel, was submitted in April of 1994.

* Filed with the survey records

I. HYDROGRAPHIC POSITION CONTROL - See Eval Rpt, section I

Reference Position Control ✓

Differential GPS (DGPS) was used for position control throughout this survey. Control was achieved by differential GPS with Vancouver, B.C. , 320 Khz Beacon serving as the reference (corrector) station. The results of the MONITOR program performed for this station are in the records for project N264-PHP, surveys H-10534 and H-10535, Guemes Channel.

DGPS Performance Checks ✓

Per FPM, Section 3.4.4.1, DGPS performance checks were obtained during the survey using the site established at the Anacortes Cap Sante Marina for OPR-N264-PHP-94.

Positioning Equipment ✓

The unique numbers for all equipment serial numbers are annotated on the daily echograms*.

J. SHORELINE - See Eval Rpt, section J.

N/A. Shoreline shown on field sheets for orientation purposes only.

K. CROSSLINES ✓

Sounding lines which overlap, and data collected on separate days, indicate no systemic problem with positioning or sounding operations.

L. JUNCTIONS - See Eval Rpt, section K.

N/A

M. COMPARISON WITH PRIOR SURVEYS - See Eval Rpt, Section M

Comparisons were made with C&GS survey No. 8087, dated August-November 1953. Awois item 52115, a reported depth of 3 fathoms, 2 feet in 1953 was not observed in the reported position. Shoal removal operations were conducted in 1986 according to the Army Corps of Engineers. The least depth found by the Pacific Hydrographic Party during a hydrographic development of the area was 3 fathoms, 5 feet.

* Filed with the survey records.

N. ITEM INVESTIGATION REPORTS - See Eval Rpt, Section N

N/A. This Field Exam is an Item Investigation.

O. COMPARISON WITH THE CHART - See Eval Rpt, Section O

Sounding comparisons

A field sheet was plotted in feet for comparisons with NOAA Charts 18434, 3rd edition, July 1991, and 18423 SC, 29th edition, September 1992, as well as a private survey conducted by David Evans and Associates, Inc. for the Washington State Ferries, August 1992. Comparison to NOAA chart no. 18421 was not made due to its small scale but it will be affected. The plots are forwarded with this Descriptive Report for use by PHS Personnel.

Various plots are included to facilitate comparison to previous surveys and charts:

- 1 - 1:5000 Boat sheet
- 1 - 1:5000 depth plot in feet
- 1 - 1:5000 depth plot in meters
- 1 - 1:480 depth plot in feet
(for comparison to D. Evans survey)
- 1 - 1:5000 track plot
- 1 - 1:1000 track plot
- 1 - 1:480 sounding transducer swath plot

P. ADEQUACY OF SURVEY - See Eval Rpt, Section P

This survey is complete and adequate to supersede prior surveyed least depths on the AWOIS shoal, and to update the depth contours in the immediate vicinity. Concur

Q. AIDS TO NAVIGATION

There are no Aids to Navigation within the survey limits of FE-399. See Section T. regarding the recommended establishment of an aid for safe passage near this shoal.

R. STATISTICS ✓

<u>Description</u>	<u>Quantities</u>
Total Positions	260
Total Detached Positions	0
Total Bottom Samples	0
Total Nautical Miles Hydrography	10.92
Square Nautical Miles Hydrography	N/A
Velocity Casts	0
Days of Production	2

S. MISCELLANEOUS ✓

Charting the entrance to Friday Harbor at a larger scale, even if such scale did not fulfill NOS guidelines for survey sounding density, may be useful to the mariner and should be accomplished as time and budget allow.

There were two data files which were inadvertently collected with an incorrect day number and time of sounding. Files # 15702 & # 15712 were both collected on DN 172 on launch 0652. Both files have been block edited by PHP personnel to the correct DN of 172.

T. RECOMMENDATIONS - See Eval Rpt, Section T

Least depths for the shoals in question were found to be in agreement with or deeper than those on existing NOAA charts and the D. Evans and Assoc. survey. In the interest of safety to ferries transiting this area the hydrographer strongly recommends that both the southeast end of AWOIS 52115 and the shoal off the western edge of Brown Island be appropriately marked to provide safe passage. A hazardous navigation situation could exist for ferry traffic if a deep-draft (20+ feet) ferry had to maneuver through this area on a negative tide. Washington State Ferry pilots are often "forced" to transit this area during the peak summer season due to the high volume of recreational boats and floatplanes which use Friday Harbor.

U. REFERRAL TO REPORTS ✓

Ancillary reports containing data pertaining to this Field Examination are forwarded with the Descriptive Report for survey H-10534, Guemes Channel, Puget Sound, Washington. Background information, including the survey request documentation, is included in Appendix VI. The following additional items are included with this Descriptive Report:

- 1 - Fathogram: DN 161, VN 0652, Innerspace 448
- 2 - Fathograms: DN 172, VN 0651, DSF-6000N
- 1 - Fathogram: DN 172, VN 0652, Innerspace 448
- 1 - Predicted tides for DN 161 through DN 185

Submitted for approval,



Edmund O. Wernicke
Engineering Technician

Approved and forwarded,



Guy T. Noll
Lieutenant, NOAA
Chief of Party



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
Coast and Geodetic Survey
Silver Spring, Maryland 20910

MAY 4 1994

Captain David M. Alger, Jr
Washington State Department
of Transportation
Washington State Ferries
Colman Dock/Pier 52
Seattle, Washington 98104-1487

Dear Captain Alger:

Thank you for contacting Lieutenant Guy Noll, NOAA, Chief, Pacific Hydrographic Party (PHP), in regard to your request to have PHP conduct a survey of Friday Harbor, San Juan Islands, Washington. I concur with you that there is a navigation safety issue involved when the State Ferries traverse this shoal and narrow restricting area in Friday Harbor.

I will assign PHP to accomplish this survey while they are conducting the Guemes Channel, Washington, project. The actual dates of the survey will be left to the discretion of the chief of party.

My point of contact for survey plans and schedules is Lieutenant John W. Humphrey, NOAA, Chief, Operations Section, 301-713-2702. Please feel free to call him if you have any questions.

Sincerely,

Dean R. Seidel
Captain, NOAA
Chief, Hydrographic Surveys Branch

bcc: N/CG2 - T. Richards
N/CG245 - D. Hennick
PHP - G. Noll



Figure 8.8

SURVEY/CHARTING REQUEST DOCUMENTATION

TO: N/CG2
FROM: LT GUY T. NOLL, chief; Pacific Hydrographic Party
N/CG2453
SUBJECT: Request for Survey or Chart

Today I was visited by:

Name: Captain David M. Alger, Jr.
Title: Master
Representing: Washington State Ferries (WADOT)
Phone Number: (206) 464-7800 Home 293-7364
Address: WADOT, Marine Division (Street or Number)
Colman Dock/ Pier 52 city
Seattle, WA 98104-1487 Zip Code

This person requested that NOAA perform a survey or produce a chart of the following area(s):

Friday Harbor, vicinity of entrance buoy

This person believes that a survey or chart of this area(s) are necessary because:

Shoaling 8" per year; has performed T&C leadline/fatho. survey ~~indication~~ which indicates present ferry route is shoaling to a "dangerous" extent.

The above request is an accurate and valid documentation of a survey chart request received by:

Captain David M. Alger, Jr.
Master

Na LT. GUY T. NOLL
Si Chief of Party
De Pacific Hydrographic Party



Pacific Hydrographic Party, N/CG2453
P.O.B. 188
Anacortes, WA 98221-0188
Phone: (206) 293-1379 FAX: (206) 293-0635

Washington State Department of Transportation
Marine Division
Washington State Ferries
Colman Dock/Pier 52
Seattle, WA 98104-1487
(206) 464-7800 / SCAN 579-7800

293-7364
Home

206-273-1379

U. S. Department
of Transportation

United States
Coast Guard



Commanding Officer
U.S. Coast Guard
Marine Safety Office
Puget Sound

1519 Alaskan Way S Bldg 1
Seattle, WA 98134-1192

Phone: (206) 286-5540

16600

JUL 30 1992

Captain David M. Alger, Jr.
c/o Washington State Ferries
Ship Harbor Ferry Dock
Anacortes, WA 98221

Dear Captain Alger:

Thank you for your letter of July 23, 1992, concerning your request for a new bottom survey of Friday Harbor.

I have referred your letter to the Thirteenth Coast Guard District Aids to Navigation Branch for action. That office will forward your request for a bottom survey to the U. S. Army Corps of Engineers and also will consider your suggestion that a buoyed channel be provided.

I appreciate your interest and efforts and those of your fellow masters in enhancing safety of navigation and protection of the marine environment.

Sincerely,

A handwritten signature in cursive script, appearing to read "Roger D. Mowery".

ROGER D. MOWERY
Captain, U. S. Coast Guard
Captain of the Port, Puget Sound, WA

WSF OPERATIONS DEPARTMENT
MEMORANDUM

DATE: August 14, 1992
FROM: David Black, Assistant Port Captain *D Black*
TO: Anacortes Masters and Mates
RE: Hydrographic Survey In Friday Harbor

Starting on Wednesday August 19th David Evans and Associates will initiate a underwater survey of the approach to Friday Harbor in the vicinity of Brown Island and the blasted rock. This survey will be conducted from a thirty foot survey vessel utilizing the latest state of the art equipment and when finalized should provide all of you with a clear image of the terrain in that area. The survey will be completed by Saturday August 22nd with the "hard copy" being available on or about the first week of September.

The Contractor will additionally place a bench mark for an eventual staff guage on the dock at Friday Harbor for accurate tidal information. The contractor did indicate that he would attempt to locate a staff guage for installation at this time.

L:

note: survey vessel in Fri. Har. on 8/21 and 8/20, Survey to be complete 8/22.



Capt. David M. Alger Jr.
 MASTER M/V EVERGREEN STATE
 WASHINGTON STATE FERRIET

INCLUDE
 MAIL
 STOPS



Subject FILE #

letter of 30 July, 1992
 MOWERY / ALGER
 FRIDAY HARBOR, WA. DEPTHS

PLEASE REPLY BY: NO REPLY REQUIRED

CAPT. ROGER D. MOWERY
 USCG
 CAPTAIN OF THE PORT, PUGET SOUND, WA.

Dear Captain Mowery,

Thank you for your letter of 30 July in response to my concern of controlling depths in Friday Harbor, WA.

With the new drafts of some of WSF's redesigned vessels I believe ~~with~~ water depths are now, more than ever, a major concern.

Thank you for your efforts to resolve this issue.

Respectfully,

SIGNATURE: *D. M. Alger Jr.* PHONE NO. 206-293-7364 DATE 8/20/92

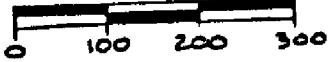
SIGNATURE PHONE NO. DATE

FORM SF 1

ORIGINATOR: SEND WHITE AND YELLOW COPIES TO RECIPIENT RECIPIENT: RETURN YELLOW COPY IF A REPLY IS NECESSARY

ORIGINATOR'S FOLLOW-UP COPY

SCALE: 1" = 200'



ELEV. DATUM: M.L.L.W. = 0'

USCGS TRIANGULATION STATION "BERRY"



DISPOSAL AREA - 2500 CY.

EXCAVATION AREA
2500 ± CU. YDS.

BLOY
(LOCATION 2-29-84)

BREAKWATER 'A'

US ARMY CORPS OF ENGRS.
BREAKWATERS

PORT OF FRIDAY HARBOR
MARINA

BREAKWATER 'B'

FRIDAY HARBOR



EXPANDED PLAN VIEW

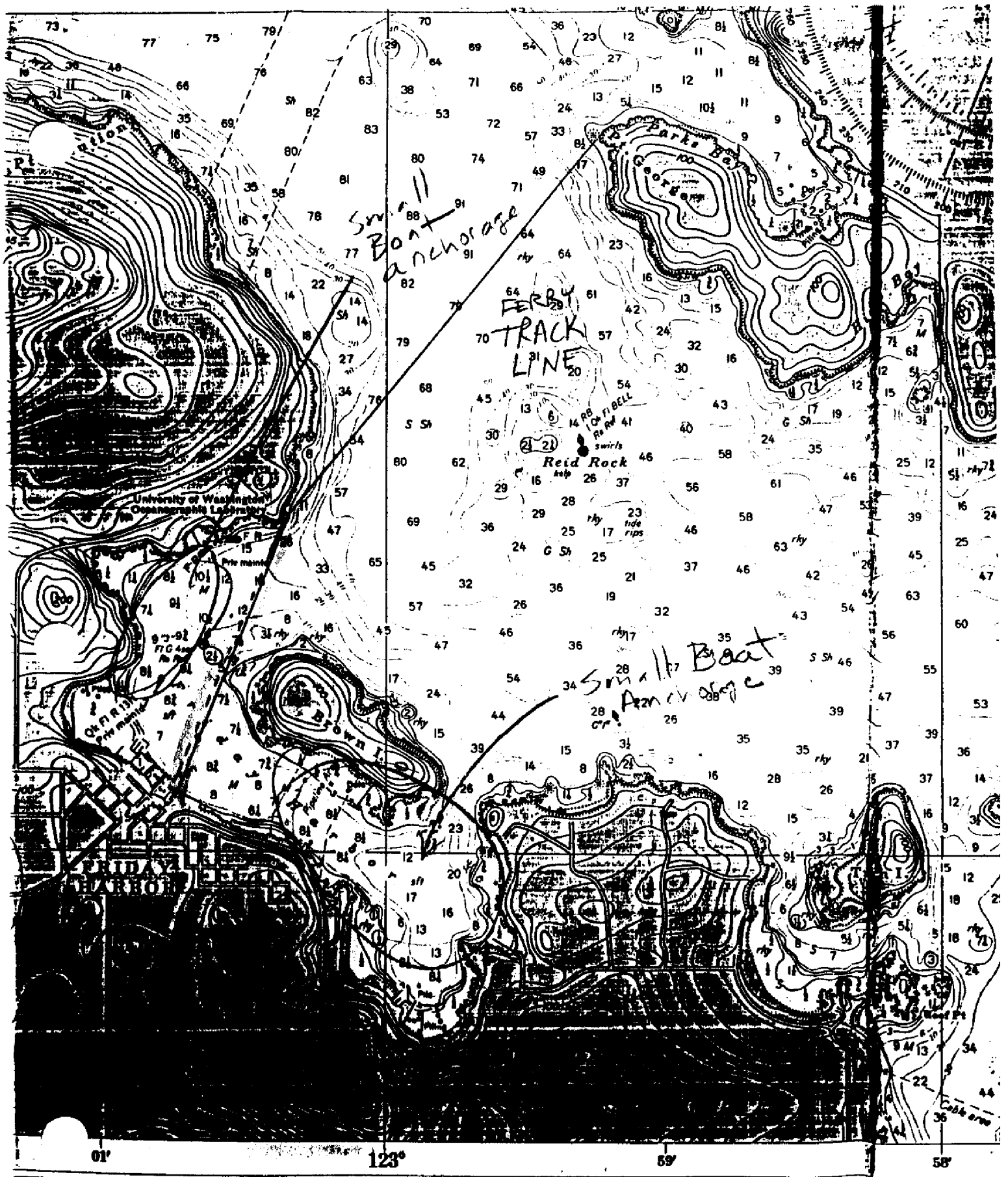
PORT OF
FRIDAY HARBOR

SHOAL REMOVAL

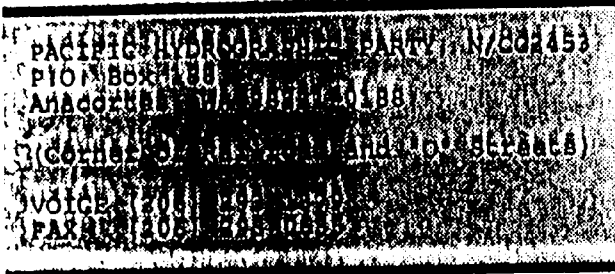
FRIDAY HARBOR, WA

NOTE: NORTH IS GR.D NORTH PER WA. STATE PLANE CO-ORD. SYS.

SHEET 2 OF 3 DATE 9-12-86



DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SERVICE
COAST AND GEODETIC SURVEY



FACIMILE COVER SHEET

DATE: 20 APR 94

ORIGINATOR: LT NOLL

ADDRESSEE: M. FRIESE

TELEPHONE: 301 713 2702

FAX #: _____

NUMBER OF PAGES : 9 (INCLUDING THIS PAGE)

REMARKS:

Mr. Alger recently re-surveyed with a calibrated Fathometer on a 38' Grand Banks @ 100' spacing and found increased shoaling - estimates 3" per year. 20-foot draft ferry traffic is confined to the "trench" between the shoal and the buoy "3". Also, we ^(CMAA) should get a copy of the David Evans Survey.

Captain David M. Alger, Jr.
Master



Washington State Department of Transportation
Marine Division
Washington State Ferries
Colman Dock/Pier 82
Seattle, WA 98104-1487
(206) 464-7800 / BCAN 576-7800

293-7364
Home



ORIGINAL

262570

532

From

Capt. David M. Alger Jr.
MASTER EVERGREEN STATE / WSF
c/o Washington State Ferries
Ship Harbor Ferry Dock
Anacortes, Wa. 98221

INCLUDE
MAIL
STOPS



To

Capt. Roger D. Mowery
Captain of the Port USCG
13th Coast Guard District
1519 Alaskan Way South
Seattle

Subject

FILE #

Need for new bottom
Survey - FRIDAY HARBOR

PLEASE
REPLY BY

NO REPLY
REQUIRED

FOLO

Message

Capt. Mowery,

On July 8th, 1992 WSF Masters, Captains Steve Brickley, Larry Brewster, and I, aided by retired WSF Capt. J.R. Conic sounded the bottom of the entrance to Friday Harbor, WA. Measurements were made by leadline and fathometer. The results speak for themselves. Enclosed are copies of those results, both corrected to 0.0 tide, and uncorrected (sounded at +4.2 feet / Port Townsend Tides).

I, we, hereby request a bottom survey be made and those results be made available. A buoyed channel would be restrictive but would provide safe entry and exit from Friday Harbor with regard to the new draft of the M.V. Elwha of close to 20 feet loaded. At a minus tide there is "little" room for error.

Thanks for your consideration.

FOLO

cc/ Capt. Brickley
Capt. Brewster
Capt. Ward

SIGNATURE

PHONE NO.

DATE

D.M. Alger Jr.

206-293-7364

7/23/92

FORM SF. 1

ORIGINATOR:

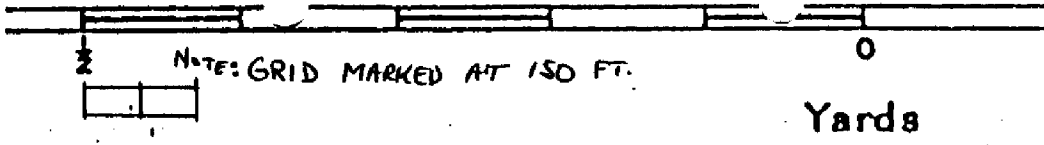
SEND WHITE AND YELLOW COPIES TO RECIPIENT

RECIPIENT:

RETURN YELLOW COPY IF A REPLY IS NECESSARY

ORIGINATOR'S FOLLOW-UP COPY

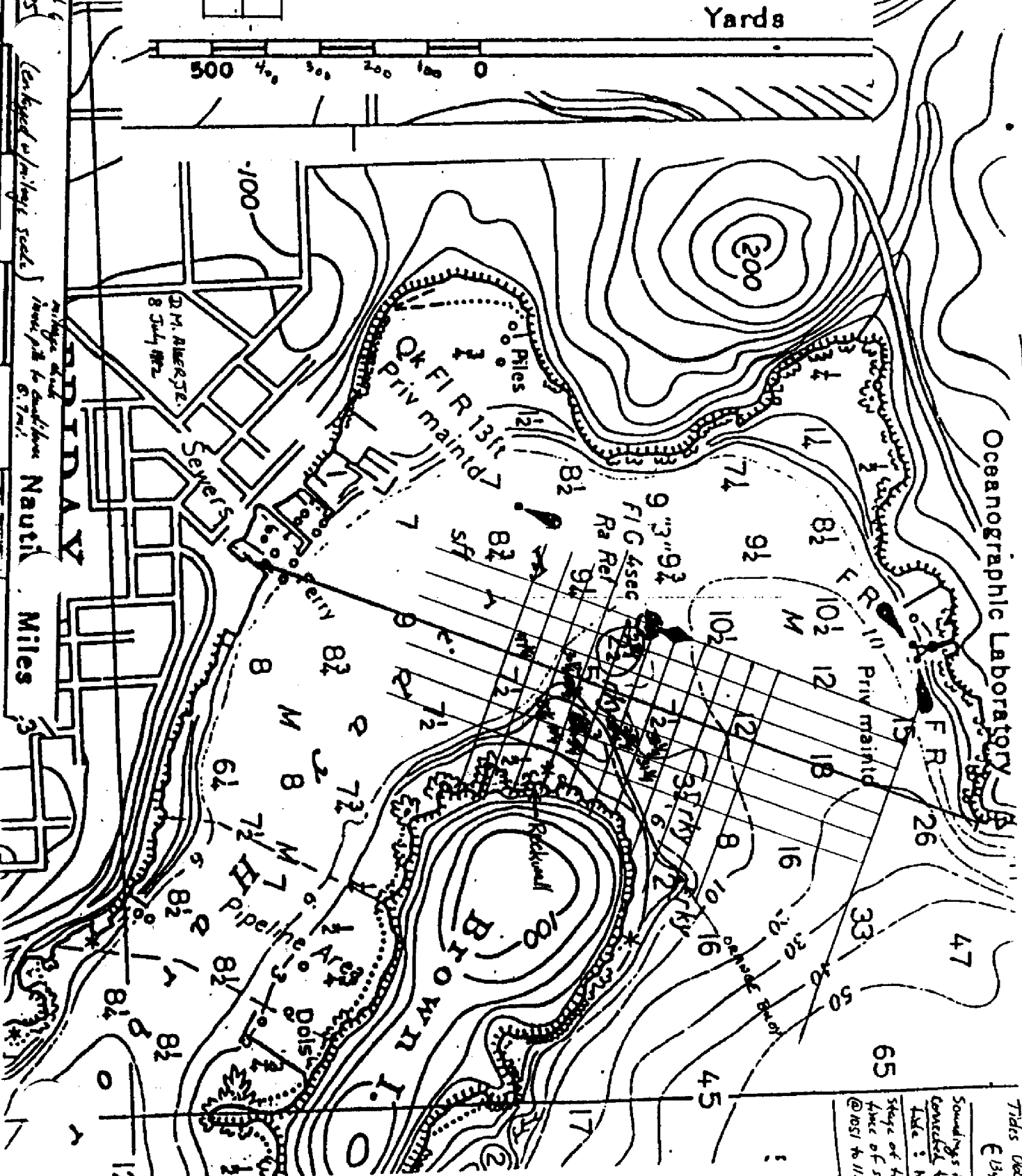
Nautical Miles



ORIGINAL COPY

Oceanographic Laboratory

Chart 6
1975
Length of sailing scale
miles scale
miles per 150 feet
8 July 1972
NAUTICAL MILES



7/8/52
Tides 0609 0.5
E 1345 6.2
Soundings in feet
converted to 0.064
Tide: North
Stage of tide at
time of sounding
@ 1051 to 1150 4254

APPROVAL SHEET

for

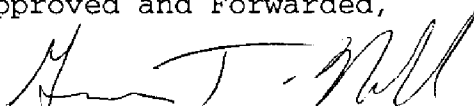
SURVEY FE-399

Standard field surveying and processing procedures were followed in producing this survey in accordance with the Hydrographic Manual, Fourth Edition; the Hydrographic Survey Guidelines; and the Field Procedures Manual, as updated for 1994. The data were reviewed daily during acquisition and processing.

The field sheets and supporting data have been reviewed by me, are considered complete and adequate for charting purposes, and are approved. All records are forwarded for final review and processing to N/CG245, Pacific Hydrographic Section.

Approved and Forwarded,

DATE: August 11, 1994


Guy T. Noll
Lieutenant, NOAA
Chief, Pacific Hydrographic Party

GEOGRAPHIC NAMES

Name on Survey	<div style="display: flex; justify-content: space-between;"> <div style="writing-mode: vertical-rl; transform: rotate(180deg);">A ON CHART NO. 18434</div> <div style="writing-mode: vertical-rl; transform: rotate(180deg);">B ON PREVIOUS SURVEY NO.</div> <div style="writing-mode: vertical-rl; transform: rotate(180deg);">C ON U.S. QUADRANGLE MAPS</div> <div style="writing-mode: vertical-rl; transform: rotate(180deg);">D FROM LOCAL INFORMATION</div> <div style="writing-mode: vertical-rl; transform: rotate(180deg);">E ON LOCAL MAPS</div> <div style="writing-mode: vertical-rl; transform: rotate(180deg);">F P.O. GUIDE OR MAP</div> <div style="writing-mode: vertical-rl; transform: rotate(180deg);">G RAND McNALLY ATLAS</div> <div style="writing-mode: vertical-rl; transform: rotate(180deg);">H U.S. LIGHT LIST</div> <div style="writing-mode: vertical-rl; transform: rotate(180deg);">K</div> </div>											
	BROWN ISLAND	X										
FRIDAY HARBOR	X											2
SAN JUAN ISLAND (TITLE)	X											3
WASHINGTON (TITLE)	X											4
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Approved:

Charles F. Harrington
Chief Geographer - N/Ch 2-5

SEP 29 1994



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEANIC SERVICE
Office of Ocean and Earth Sciences
Silver Spring, Maryland 20910

TIDE NOTE FOR HYDROGRAPHIC SURVEY

ORIGINAL

DATE: August 4, 1994

MARINE CENTER: Pacific

HYDROGRAPHIC PROJECT: OPR-N901-PHP

HYDROGRAPHIC SHEET: FE-399

LOCALITY: Washington, Friday Harbor, Wa., San Juan Islands

TIME PERIOD: June 10 - 21, 1994

TIDE STATION USED: 944-9880 Friday Harbor, San Juan Island, Wa.
Lat. $48^{\circ} 32.8'N$ Lon. $123^{\circ} 00.6'W$

PLANE OF REFERENCE (MEAN LOWER LOW WATER): 3.74 ft.

HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 7.0 ft.

REMARKS: RECOMMENDED ZONING

Times and heights are direct on Friday Harbor, Wa. (944-9880).

Notes: 1. Times are tabulated in Greenwich Mean Time.
2. Data is temporarily stored on #744-9880.

William M. Huber

CHIEF, DATUMS SECTION



HYDROGRAPHIC SURVEY STATISTICS

FE-399

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

RECORD DESCRIPTION		AMOUNT	RECORD DESCRIPTION		AMOUNT
SMOOTH SHEET (Field Examination)		1	SMOOTH OVERLAYS: POS., ARC, EXCESS		
DESCRIPTIVE REPORT		1	FIELD SHEETS AND OTHER OVERLAYS		
DESCRIP-TION	DEPTH/POS RECORDS	HORIZ. CONT. RECORDS	SONAR-GRAMS	PRINTOUTS	ABSTRACTS/SOURCE DOCUMENTS
ACCORDION FILES	1				
ENVELOPES					
VOLUMES					
CAHIERS					
BOXES					

SHORELINE DATA

SHORELINE MAPS (List): Shoreline Form Chart 18434, 3rd Ed. dated 7/6/91

PHOTOBATHYMETRIC MAPS (List): NA

NOTES TO THE HYDROGRAPHER (List): NA

SPECIAL REPORTS (List): NA

NAUTICAL CHARTS (List):

OFFICE PROCESSING ACTIVITIES

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

PROCESSING ACTIVITY	AMOUNTS		
	VERIFICATION	EVALUATION	TOTALS
SITATIONS ON SHEET			260
SITATIONS REVISED			
SOUNDINGS REVISED			
CONTROL STATIONS REVISED			
	TIME-HOURS		
	VERIFICATION	EVALUATION	TOTALS
PRE-PROCESSING EXAMINATION			
VERIFICATION OF CONTROL			
VERIFICATION OF POSITIONS	29		29
VERIFICATION OF SOUNDINGS	54		54
VERIFICATION OF JUNCTIONS			
APPLICATION OF PHOTOBATHYMETRY			
SHORELINE APPLICATION/VERIFICATION			
COMPILATION OF SMOOTH SHEET	14		14
COMPARISON WITH PRIOR SURVEYS AND CHARTS		2	2
EVALUATION OF SIDE SCAN SONAR RECORDS			
EVALUATION OF WIRE DRAGS AND SWEEPS			
EVALUATION REPORT		18	18
GEOGRAPHIC NAMES			
OTHER*			
*USE OTHER SIDE OF FORM FOR REMARKS			
TOTALS	97	20	117

Pre-processing Examination by LT Mark Larsen	Beginning Date 8/24/94	Ending Date 9/9/94
Verification of Field Data by L.T. Deodato	Time (Hours) 97	Ending Date 10/28/94
Verification Check by B.A. Olmstead	Time (Hours) 1	Ending Date 7/3/94
Evaluation and Analysis by B.A. Olmstead	Time (Hours) 20	Ending Date 7/6/95
Inspection by D. Hill	Time (Hours) 1	Ending Date 7/6/95

LDN 123° 00' 45'

LDN 123° 00' 30'

LDN 123° 00' 15'

LAT 48° 32' 45"

LDN 123° 00' 15'

NAD 27
7/5/95 L.T.D.

LAT 48° 32' 45"

HARBOR

FRIDAY

LAT 48° 32' 30"

BROWN ISLAND

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SERVICE
COAST AND GEODETIC SURVEY

FE-399
WASHINGTON, SAN JUAN ISLAND
FRIDAY HARBOR
FIELD SHEET: PHP-5-1-94
DATE OF SURVEY: JUNE 1994
SOUNDINGS IN METERS AND DECIMETERS AT MLLW
DATUM: NAD 83
PROJECTION: MTM
SCALE: 1:5,000
CONTROLLING LATITUDE: 48° 32' 30"N
AWOIS ITEM: 52115

SHORELINE IN BROWN ORIGINATES WITH CHART 18434, 3RD EDITION
USE FOR REFERENCE ONLY

DEPTH CURVES ARE DEPICTED AT INTERVALS OF
2, 5, 10, 20, AND 40 METERS

EVALUATION REPORT

FE-399

A. PROJECT

Project information is discussed in the Descriptive Report.

B. AREA SURVEYED

The purpose of this survey was to investigate the possibility of shoaling along the ferry route into Friday Harbor, San Juan Island, Washington, which supports considerable tourist trade primarily through recreational and commercial boat traffic. This field examination occurred in Washington and covers an area west and north of Brown Island in Friday Harbor. The surveyed limits extend from latitude 48/32/19N to latitude 48/32/45N, and from longitude 123/00/17W to longitude 123/00/51W. The bottom consists primarily of mud. Generally, depths range from 1.0 to 19 meters. A few isolated areas north of Brown Island were sounded beyond 20 meters.

C. SURVEY VESSELS

Survey vessel information is found in the Descriptive Report.

D. AUTOMATED DATA ACQUISITION AND PROCESSING

Survey data were processed using the same Hydrographic Data Acquisition/ Processing System (HDAPS) software used by the hydrographer, the Hydrographic Processing System (HPS) and AutoCad, Version 12.

At the time of the survey certification the format for transmission of digital data had not been formally approved. In the interim, digital data for this survey exists in the standard HPS format, which is a database format with the dbf extension.

In addition, the sounding plot data, was created with a dbf (extension) and enhanced using the AutoCad system, are filed both in the AutoCad drawing format, dwg (extension); and in transfer format, dxf (extension). Copies of these files will be retained at PHB until transfer protocols are developed.

The drawing files necessarily contain information that is not part of the HPS data set such as geographic name's text, line-type data, and minor symbolization. In addition, those soundings, deleted from the drawing for clarity purposes, remain unrevised in the HPS digital files to preserve the integrity of the original hydrographic data set. Cartographic codes used to describe the digital data are those authorized by Hydrographic Survey Guideline No. 75.

E. SONAR EQUIPMENT

Sonar equipment information is found in the Descriptive Report.

F. SOUNDING EQUIPMENT

Sounding equipment is discussed in the Descriptive Report.

G. CORRECTIONS TO SOUNDINGS

The sounding data have been reduced to Mean Lower Low Water. The reducers include corrections for actual tide, dynamic draft, and sound velocity. These reducers have been received and are consistent with NOS specifications. Actual tide reduction is derived from the Friday Harbor, San Juan Island gage (944-9880).

H. CONTROL STATIONS

Control station information is discussed in the Descriptive Report and attachments.

The positions of horizontal control stations used during hydrographic operations are field values based on NAD 83. The geographic positions of all survey data are also based on NAD 83. The smooth sheet is annotated with an NAD 27 adjustment tick based on values determined with the NGS program NADCON.

Data based on NAD 27 may be referenced to this survey by applying the following corrections:

Latitude: -0.641 seconds (-19.787 meters)
Longitude: 4.648 seconds (95.331 meters)

I. HYDROGRAPHIC POSITION CONTROL

Differential GPS (DGPS) was used to control this survey. A horizontal dilution of precision (HDOP) not to exceed 1.8 was computed for survey operations. The quality of eight positions exceeds limits in terms of horizontal dilution of precision (HDOP). These positions are isolated and occur randomly throughout the survey area. A review of the data, however, indicates that none of these fixes are used to position dangers to navigation. The soundings located by these fixes are consistent with the surrounding information. These fixes are considered acceptable.

J. SHORELINE

Shoreline has been shown in brown on the smooth sheet from Chart 18434, 3rd Edition.

K. CROSSLINES

Crosslines are discussed in the Descriptive Report.

L. JUNCTIONS

There are no contemporary surveys which junction with FE-399. Comparison with this survey and the charted depths from Chart 18423 reveals adequate agreement.

M. COMPARISON WITH PRIOR SURVEYS

H-8087 (1953) 1:5,000

Survey H-8087 covers the entire area of the present survey. A comparison with the prior survey indicates that the present survey depths are generally deeper by 0.5 to 1 meter. These differences are largely attributed to the data acquisition, positioning and sounding techniques and cultural activities since 1953. However, there are two specific areas where present survey depths are 2.5 to 3.0 meters deeper, latitude 48/32/27N, longitude 123/00/42.50W and latitude 48/32/25N, longitude 123/00/33W. These differences can be accounted for by man-made activities through excavation, and dredging and disposal activities. In addition, there is one area where present survey depths are 3 to 5 meters shoaler. This is an area just south of the charted 3FM/2FT depth (AWOIS item 52115) where the Port of Friday Harbor indicated a disposal area to be established.

There are no AWOIS items originating from survey H-8087 applicable to the present survey.

Field Examination FE-399 is adequate to supersede the prior survey within the common area.

N. ITEM INVESTIGATIONS

AWOIS item 52115, a charted 3FM/2FT depth (6.1 meters), located at latitude 48/32/27N, longitude 123/00/42.50W, originates from a Local Notice to Mariners in 1979. Present survey operations were conducted in accordance with the required specifications and a least depth of 7.1 meters (3FM/5FT) was found at latitude 48/32/26.67N, longitude 123/00/40.95W. The results of this survey indicate that the area is now three feet deeper than reported in 1979. Of note, a shoal removal proposal was generated by the Port of Friday Harbor in October 1986 to excavate the AWOIS item(attached). The proposal involved blasting out the bedrock and creating a disposal area.

In consideration of the work performed by the Port of Friday Harbor, the results of this field examination should supersede the charted 3FM/2FT depth.

O. COMPARISON WITH CHART

Chart 18423SC, 30th Edition, dated June 18, 1994; scale 1:20,000
Chart 18434, 3rd Edition, dated July 6, 1991; scale 1:25,000

a. Hydrography

Charted hydrography originates with the previously discussed prior survey and miscellaneous sources and requires no further discussion.

FE-399 is adequate to supersede charted hydrography within the common.

P. ADEQUACY OF SURVEY

Hydrography contained on FE-399 is adequate to:

- a. delineate the bottom configuration, determine least depths, and draw the standard depth curves;
- b. reveal there are no significant discrepancies or anomalies requiring further investigation; and
- c. show the survey was properly controlled and soundings are correctly plotted.

In addition, there was no requirement to define the zero curve, verify the charted shoreline and nearshore features, and collect bottom samples.

The hydrographic records and reports received for processing are adequate and conform to the requirements of the following:

Hydrographic Manual, 4th Edition, revised through Change No. 3, the
Hydrographic Survey Guidelines, and the
Field Procedures Manual, March 1991 Edition, except as follows.

Q. AIDS TO NAVIGATION

There are no fixed or floating aids to navigation located within the surveyed area. There are no landmarks or features of landmark value within the surveyed area.

R. STATISTICS

Statistics are discussed in the Descriptive Report.

S. MISCELLANEOUS

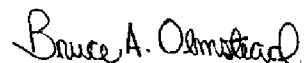
Miscellaneous information is discussed in the Descriptive Report. No additional items were noted during office processing.

T. RECOMMENDATIONS

FE-399 is a good hydrographic survey. No additional work is recommended. Concur with the hydrographer's recommendation to mark this area for ferry traffic navigating into Friday Harbor. It is recommended that the United States Coast Pilot, Volume 7, be revised to reflect the current survey information.

U. REFERRAL TO REPORTS

Ancillary report information is discussed in the Descriptive Report.


Bruce A. Olmstead
Senior Cartographer

APPROVAL SHEET
FE-399

Initial Approvals:

The completed survey has been inspected with regard to survey coverage, delineation of the depth curves, development of critical depths, cartographic symbolization, comparison with prior surveys and verification or disproof of charted data. The digital data have been completed and all revisions and processing have been entered in the magnetic tape record for this survey. The survey records and digital data comply with NOS requirements except where noted in the Evaluation Report.

Bruce A. Oelshlag
for Dennis J. Hill Date: 7/7/95
Chief, Hydrographic Processing Section
Pacific Hydrographic Branch

I have reviewed the smooth sheet, accompanying data, and reports. This survey and accompanying digital data meet or exceed NOS requirements and standards for products in support of nautical charting except where noted in the Evaluation Report.

Kathy A. Timmons
Kathy A. Timmons Date: 7/10/95
Commander, NOAA
Chief, Pacific Hydrographic Branch

Final Approval

Approved:

Andrew A. Armstrong III
Andrew A. Armstrong III Date: 8-16-95
Captain, NOAA
Chief, Hydrographic Surveys Division

