

NOAA FORM 78-35A

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

## DESCRIPTIVE REPORT

Type of Survey ..... Hydrographic  
Field No. .... PHP-10-2-93  
Registry No. .... H-10471

### LOCALITY

State ..... California  
General Locality ... San Francisco Bay  
Sublocality ..... Angel Island to Vicinity  
..... of Southampton Shoal

19 93

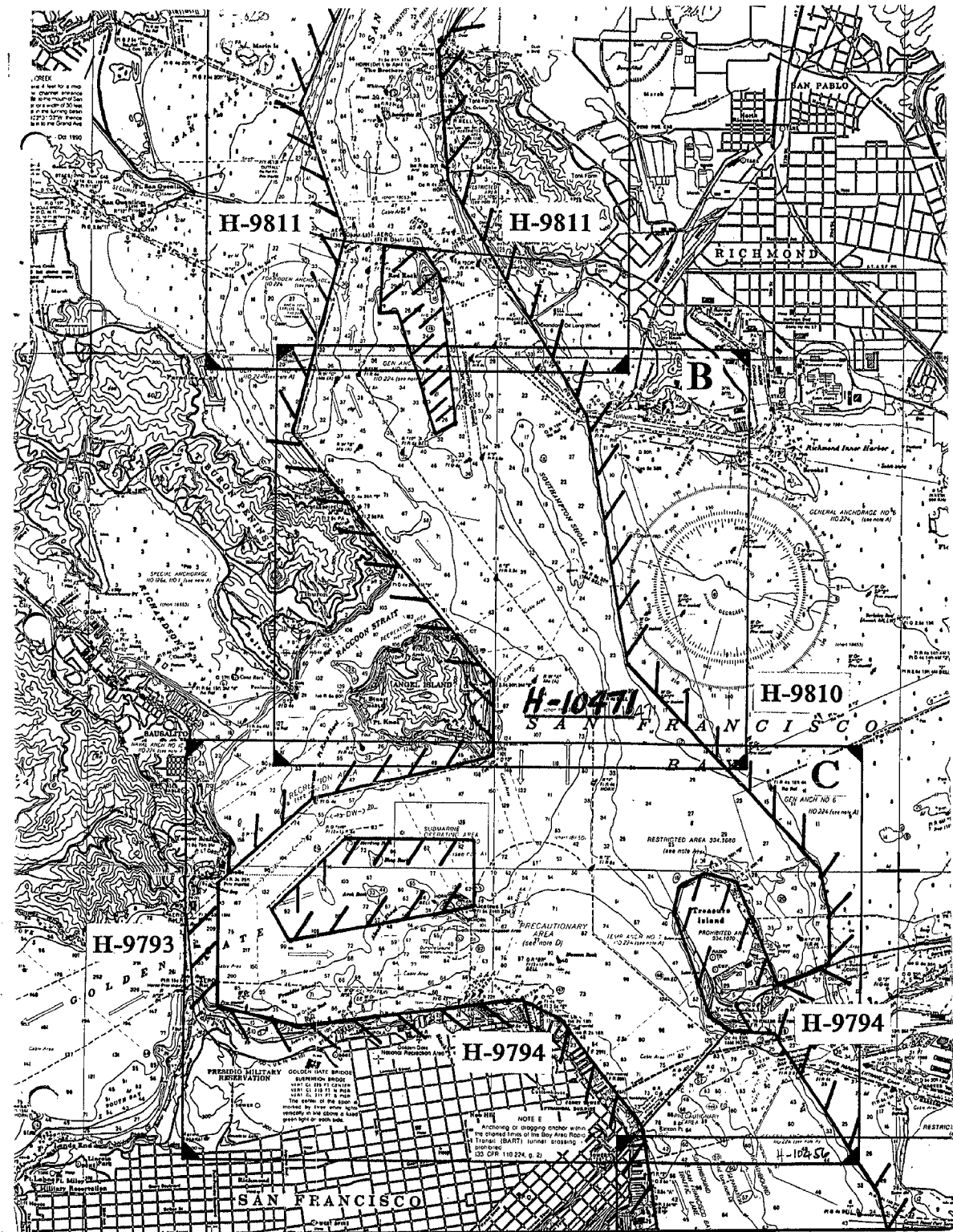
CHIEF OF PARTY  
LT Guy T. Noll, NOAA

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DATE ..... MAR 6 1995

10471

NOAA FORM 77-28 (11-72)	U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION REGISTER NO. H-10471
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. PHP-10-2-93
<p>State <u>California</u></p> <p>General locality <u>San Francisco Bay</u></p> <p>Locality <u>Angel Island to Vicinity of Southampton Shoal</u></p> <p>Scale <u>1:10,000</u> Date of survey <u>April 23 to June 16, 1993</u></p> <p>Instructions dated <u>December 29, 1992</u> Project No. <u>OPR-L344-PHP</u></p> <p>Vessel <u>Jensen Launch 1101 (0651), MonArk Launch 1102 (0652)</u></p> <p>Chief of party <u>LT Guy T. Noll, NOAA</u></p> <p>Surveyed by <u>LT G. Noll, LT R. Fletcher, ST M. Bigelow, ST K. Simmons</u>  <u>ET E. Wernicke, ST R. Adams</u></p> <p>Soundings taken by echo sounder, <del>hand held, pole</del> <u>Innerspace Model 448</u></p> <p>Graphic record scaled by <u>PHP Personnel</u></p> <p>Graphic record checked by <u>PHP Personnel</u></p> <p>Verification by: <u>L. Deodato, I. Almacen, J. Stringham</u> Automated plot by <u>PHS Xynetics Plotter</u></p> <p><del>Examined by</del></p> <p>Evaluation by: <u>I. Almacen</u></p> <p><del>Verified by</del></p> <p>Soundings in <del>fathoms</del> <del>feet</del> <del>meters</del> <del>MLLW</del> <u>MLLW</u> and decimeters</p> <p>REMARKS: <u>Time in UTC. Revisions and marginal notes in black were generated during office processing. Some separates are filed with the hydrographic data, as a result page numbering may be interrupted or non-sequential.</u></p> <p style="text-align: center;"><u>Awols and Surf ✓ 3/95 RWD</u></p>	



**Descriptive Report to Accompany Hydrographic Survey H-10471**

Field Number PHP-10-2-93

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

**A. PROJECT**

This survey was conducted in accordance with Hydrographic Project Instructions OPR-L344-PHP, San Francisco Bay, California, dated December 29, 1992. ✓

Hydrographic survey H-10471 was conducted to obtain data to update coverage of the designated traffic lanes in San Francisco Bay which are frequently transitted by deep-draft vessels and to obtain data for the maintenance of existing nautical charts. This project also responds to the Harbor Safety Committee of the San Francisco Bay Region, the San Francisco Bar Pilots, the State of California Department of Fish and Game, Office of Oil Spill Prevention and Response, and the U.S. Coast Guard (USCG). ✓  
Deposition of waste materials and continuous dredging in specific areas have resulted in shoaling in some areas and deepening in others. San Francisco Bay was last surveyed by the National Ocean Service (NOS) from the late 1970's to the early 1980's. Throughout the project area the U.S. Army Corps of Engineers (COE) maintains dredging projects and provides NOS with supplemental data. ✓

This survey's sheet letter is "B", as specified by the project instructions. Sheet B is the second survey for Project OPR-L344. ✓

**B. AREA SURVEYED (See EVAL RPT, Sec 1)**

The area surveyed for H-10471 extends from approximately latitude  $37^{\circ}51'25''$ N north to latitude  $37^{\circ}55'00''$ N and from longitude  $122^{\circ}21'55''$ W westward to longitude  $122^{\circ}28'00''$ W. ✓  
22 30 27 30

The HDAPS Plotter sheet was skewed to  $65^{\circ}$  to fit the limits of hydrography within a 58 cm plot at 1:10,000 scale. Hydrographic limits for H-10471 are within those required by the Hydrographic Manual (Section 1.2.4, p. 1-6). ✓

Data acquisition for mainscheme and crossline hydrography was conducted from April 23 (DN 113) through May 14 (DN 134). Item investigations were conducted from May 25 (DN 145) through May 27 (DN 147). Final investigation on the Richmond sewer outfall (diffuser) were conducted on June 16 (DN167). ✓

**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. Because of the use for Side Scan Sonar (SSS) in Alaska, Launch 1102 was outfitted with a swing arm davit to help support the weight and distribution of the towfish. NOAA Launch 1101 was used for all velocity casts. No shoreline verification or bottom drags were required. No changes to the standard vessel sounding configuration were necessary.

**D. AUTOMATED DATA ACQUISITION AND PROCESSING**

The standard HDAPS software suite was used throughout this survey. Program names and versions are listed in the HDAPS Program Listing.

The following non-HDAPS computer programs were used:

<u>Program Name</u>	<u>Program Version</u>	<u>Version Date</u>
VELOCITY	2.00	1992
NADCON	1.01	1989
MTEN 4	20	1991
GEOID90	1.00	1990
GEOID93	2.00	1993

The PC-DAS SURVEY Program, version 4.03 (GPS implementation), was used for all data acquisition, a prototype version was used for Side Scan Sonar on days of item investigations. The master printout was annotated whenever software problems affected the data.

**E. SONAR EQUIPMENT**

An E.G. & G. SSS was used to supplement echosounder data on two item investigations. The Serial Numbers for the equipment were as follows: Model number 272, Serial number 015598 for the tow fish and Model number 260, Serial number 015602 for the SSS recorder.

**F. SOUNDING EQUIPMENT**

During this survey, the following Innerspace Model 448 (IN-448) echosounders, modified with custom EPROMS for HDAPS, were used:

<u>Echosounder Type</u>	<u>Vessel EDP No.</u>	<u>Serial No.</u>	<u>DN Used</u>
IN-448	0651	236	113-134,167
IN-448	0652	239	120-147

Soundings were recorded in meters, with an assumed speed-of-sound through water of 1500 m/sec. Depths encountered in the survey area ranged from 3.8 meters to 55.0 meters at MLLW based on predicted tides.

The digitized soundings displayed on-line were compared in real time with the analog trace to ensure reasonable agreement. No on-line calibration adjustments are required for the IN-448. Occasional breaks in the on-line echogram occurred when rapid changes in range scale were required. These breaks are not considered significant unless greater than 6 mm at survey scale or unless they occurred over a shoal (potential missed peak), in which cases the section or line was resurveyed.

Metric leadlines were made by PHP in accordance with HSG 69. Each leadline is 7/16-inch double-braided dacron line. Markings are at one-meter intervals from 0 to 19, and are shrink-tubing secured with epoxy glue. This deviation from HSG 69 makes for a more rugged leadline. Markings were calibrated during fabrication with a steel surveyor's tape while the line was under six pounds of constant tension. The throwing end is a standard six-pound lead shackled to a stainless steel thimble bent to the bitter end. Leadlines were used for depth comparisons with the echosounders. Calibration forms are included in Separate IV \* (Sounding Equipment Calibration and Corrections).

\* Filed with the hydrographic data.

#### G. CORRECTIONS TO SOUNDINGS

##### Velocity of Sound

Corrections for the speed of sound through the water column were computed from data obtained with an Applied Microsystems Laboratories (AML) Velocity of Sound Profiler (S/N's 03004 and 03042). The VELOCITY Program was used to determine the speed of sound correctors. The following casts were used to determine the velocity correctors. Please note that Cast 8 was taken in the same position as Cast's 6 and 7 and the depth acquired covered the depth needed for the two item investigations.

<u>Cast</u>	<u>Extrapolated DN</u>				<u>Cast Position</u>	
	<u>DN</u>	<u>Depth</u>	<u>Range</u>	<u>HDAPS Tables</u>	<u>Latitude</u>	<u>Longitude</u>
6	113	66.8	113-120	6	37°52'25"N	122°25'59"W
7	127	64.1	121-134	7	37°52'25"N	122°25'59"W
8	145	48.2	135-147	8	37°52'25"N	122°25'59"W
10	166	39.8	166-178	10	37°57'40"N	122°25'51"W

Copies of all velocity cast data and HDAPS Velocity Corrector Tables are included in Separate IV. \*

The AML instrument was calibrated by Northwest Regional Calibration Center on March 17, 1993. A copy of this calibration report was included in Separate IV\* of the Descriptive Report for Survey H-10456. ✓

#### Leadline Comparison

Leadline comparisons were performed daily to determine proper digitization of the echosounder depth and are annotated on the echograms. No systematic drift or error was observed. ✓

#### Static Draft

A static draft for VN 0651 was determined on January 19, 1993, in two steps. The first step determined the depth of the transducer face from a reference mark on the hull. The second step involved measuring the depth from this reference mark to the launch's waterline with the launch in water (fuel tanks half full and two crew aboard). A static draft of 0.5 meter was determined. ✓

A static draft for VN 0652 was determined in March 15, 1993 using a method similar to above. A static draft of 0.3 meters was determined.

#### Dynamic Draft

Settlement and squat measurements for VN 0651 were conducted on March 17, 1993, in San Francisco Bay at the Tiburon Fisheries Laboratory in Tiburon, CA. Settlement and squat measurements for VN 0652 without SSS gear were conducted on April 13, 1993, measurements with SSS gear were conducted on May 21, 1993, at the same location. ✓

Settlement and squat correctors are applied online to all survey data via the HDAPS Offset Tables. Offset Table 1 corresponds to VN 0651; Offset Table 2 corresponds to VN 0652. Offset Table 3 corresponds to VN 0652 with SSS gear aboard. Field records are included in Separate IV.\* Dynamic draft corrections are re-computed during field processing using the REAPPLY program in HDAPS.

#### Tide Correctors

SHEET B: Two field-determined tidal zones based on data for reference station Fort Point, CA, were applied to sounding data for H-10471. HDAPS Segment line 3 divides Sheet B into two tidal corrector zones and bears 65 degrees from Latitude 37°54'51"N, Longitude 122°28'24"W. The northern correctors were based on Pt. ✓

\* Filed with the hydrographic data<sup>4</sup>.

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Chauncey and the southern correctors were computed from Angel Island East Garrison. Tide Table 10 & Tide Table 13 include tidal zone correctors for Angel Island East Garrison from Fort Point; correctors were as follows: high tide = +16 minutes, +20 minutes for low tide and +0.1 ft. for high tide and 0.0 for low tide. Tide Table 11 & 12 were corrected for Pt. Chauncey from Fort Point; correctors were as follows: high tide = +28 minutes, +32 minutes for low tide and -0.2 ft. for high tide and 0.0 ft. for low tide. Correctors selected for crosslines correspond to the zone in which the longest section of the line falls. All soundings obtained north of Latitude 37°55'00"N, which is the southern boundary for Point Orient (941-4881), were rejected. ✓

#### H. CONTROL STATIONS (See EVAL RPT, Sec. 2)

##### 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~~ <sup>this report</sup> (List of Horizontal Control Stations). A separate Horizontal Control Report OPR-L344, San Francisco Bay, was forwarded in March, 1993. ✓

#### I. HYDROGRAPHIC POSITION CONTROL (See EVAL RPT, Sec. 2)

##### Position Control

Differential GPS (DGPS) was used for position control throughout this survey. The first DGPS reference station, Alcatraz DGPS, 1993, was installed as described in the Horizontal Control Report in accordance with FPM Section 3.4.6. Per FPM Section 3.4.6.3, the reference site was confirmed using the program MONITOR Version 1.2. See comments in Survey H-10456. Another DGPS reference station, TIBU DGPS STATION BLDG 54, 1993, was installed as described in the Horizontal Control Report in accordance with FPM Section 3.4.6. Per FPM Section 3.4.6.3., the reference site was confirmed using the program MONITOR Version 1.2. A copy of the scatter plot and the outlier.sum file are included in Separate III\*(Horizontal Position Control and Corrections to Position Data). ✓

GPS radio differential correctors were partially blocked by Angel Island during periods of data acquisition in the vicinity of the island on the following days: DN 116 (Pos. Nos. 135-137, VN 0651), DN 117 (Pos. Nos. 322-324, 325-326, 347-348, 361-365, VN 0651), DN 118 (Pos. Nos. 409-410, 592-593, VN 0651. Mainscheme line 2700 and 1100 and 700 and 300 and -100 and -1400 were affected. This problem was alleviated by moving the DGPS reference station from Alcatraz to TIBU on DN 120. *These hydro lines were rejected and rerun.* ✓  
\* Filed with the hydrographic data. 5



DGPS Performance Checks

Per FPM Section 3.4.4.1, DGPS performance checks were obtained at the beginning and end of each survey day using Sausalito Channel Light "4", for DN's 113-119, a fixed aid to navigation positioned to Third Order, Class I standards (see Horizontal Control Report). DGPS performance checks were obtained later in the project near Pt. Chauncey at a fixed dolphin positioned to Third Order, Class I standards (see Horizontal Control Report) for DN's 120-167. All DGPS performance checks were successful. DGPS performance check forms are forwarded with the data. ✓

Positioning Equipment

The following GPS equipment was used:

<u>Equipment Location</u>	<u>Type of Receiver/Antenna</u>	<u>Receiver Serial No.</u>	<u>Antenna Serial No.</u>
Alcatraz L.H. (DN 113-119) (DGPS Ref. Sta.)	Trimble 4000SST	2952A00459	2951A00123
Tibu (DN 120-167) (DGPS Ref. Sta.)	Trimble 4000SST	2952A00461	2951A00008
VN 0651	Ashtech Firmware 1E08D	700417B1139 (DN 113-167)	700378A0272
VN 0652	Ashtech Firmware 1E08D	700417A1141 (DN 120-147)	700378A0402

The unique numbers for all equipment serial numbers are annotated on the daily master printout. ✓

**J. SHORELINE** (See EVAL RPT., Sec. 2)

No shoreline was surveyed on this sheet, and no shoreline manuscripts were used. ✓

**K. CROSSLINES**

A total of 16.90 nautical miles of crosslines were run, representing 8.1% of the mainscheme hydrography on H-10471. ✓

**L. JUNCTIONS** (See EVAL RPT., Sec. 5)

M. COMPARISON WITH PRIOR SURVEYS (See EVAL RPT, Sec. 6)

N. COMPARISON WITH THE CHART (See EVAL RPT, Sec. 7)

This survey was compared to Chart No. 18653, 1:20,000, 3rd edition, September 28, 1991. A separate sounding plot was excessed and plotted in feet at a 1:20,000 scale to facilitate chart comparison. All comparisons are based on predicted tide data.

(51672)

There was 1 AWOIS item within the limits of H-10471 (HDAPS Plotter Sheet 23). A Report of this investigation is <sup>included</sup> submitted in ~~Separate VI~~ <sup>this report</sup>. AWOIS Item No. 51985 is within the limits of Sheet B and appears on the survey boat sheet; however, it was developed on H-10456. On April 13, 1993 a letter arrived at PHP in regards to a diffuser section of a Richmond sewer outfall. Paul Matejowsky, Second Mate with the Exxon Shipping Company requested that we locate the offshore end of the diffuser for inclusion on this survey and also for the Notice of Mariners. A report of this investigation ~~will be submitted in Separate VI~~ <sup>is included in this report. Supporting information is filed with the hydrographic data.</sup>

<u>AWOIS/ITEMS</u>	<u>Table</u>
#51672	N1
Sewer Outfall/Diffuser	N2
39' contour East of Angel Island	N3
Richmond Auxiliary Barge Channel	N4
NMFS Pier at Tiburon	N5

Dangers to Navigation

The sewer outfall has been located and is considered a hazard to navigation because it is an uncharted item which lies between two heavily transitted channels. A Danger to Navigation Report has been forwarded to the Commander of the Eleventh Coast Guard District (oan) and has also been forwarded to the Chief of the Nautical Data Section, N/CG221. A detailed review of the records and the position of the outfall has been submitted herein this report in Appendice I.\*

Sounding Comparisons

Most of the discrepancies were found to be in Southampton Shoal Channel and the shipping lanes, both of which have been recently dredged by U.S. Army Corps of Engineers. Between the shipping lanes and west of the Southampton Shoal Channel there has been some shoaling, with charted depths up to 1 meter deeper than soundings from this survey.

\* Filed with hydrographic data.

O. ADEQUACY OF SURVEY (See EVAL RPT., Secs. 6 & 7)

P. AIDS TO NAVIGATION (See EVAL RPT., Sec. 7d)

Detached Positions were taken on all buoys and lights within the project area. Hydrographic positions confirmed the charted position of these aids to navigation, with two exceptions. Richmond Harbor lighted buoy #6, LL# 5700 is shown on Chart 18653, 3rd Ed., 9/28/91, as a fixed light; the hydrographer recommends that the chart be revised to show a lighted buoy using the position obtained in the field. The National Marine Fisheries Service north light, LL# 5489 is shown on Chart 18653, 3rd Ed., 9/28/91, as a west light, it appears to be a chart compilation error in latitude. The hydrographer recommends that the chart be revised to show the light at the northeast end of the pier in ruins instead of on shore. *CONCUR.*

Q. STATISTICS

<u>Description</u>	<u>Quantities</u>
Total Positions, VN 0651	1551
Total Positions, VN 0652	212
Total Detached Positions	22
Total Miles of Hydrography	233.90
Sq. Miles of Hydrography	8.0
Velocity Casts	4
Days of Production	15

R. MISCELLANEOUS (See EVAL RPT., Secs. 6 & 7)

There are very strong currents within this survey area that were observed by party personnel while acquiring hydrography. Most of the time this was annotated on the echogram when encountered.

S. RECOMMENDATIONS (See EVAL RPT., Sec. 9)

The U.S. Army Corps of Engineers conducts periodic hydrography in San Francisco Bay dredged channels and also monitors disposal sites monthly. In light of this, together with the minimal

contour changes over the last ten years as observed during this survey, it does not appear that full-scale surveys at ten-year intervals are warranted. The hydrographer does suggest periodic chart evaluation, especially if any major earthquake activity occurs within this area. *Concur.* ✓

**T. REFERRAL TO REPORTS**

<u>TITLE</u>	<u>DATE</u>
1993 Horizontal Control Report, OPR-L344-PHP	March 1993
Coast Pilot Report	August 1993

 ✓

Submitted for approval,

*Reginald W. Adams, Jr.*

Reginald W. Adams, Jr.  
Survey Technician

Approved and Forwarded,

*Guy T. Noll*

Guy T. Noll  
Lieutenant, NOAA  
Chief of Party

AWOIS INVESTIGATION-N1

ITEM # 51672 DN: 145
CHART # 18649, 18652, 18653 VN: 0652
DESCRIPTION: Dangerous Submerged Wreck
SOURCE: USN Survey 1952, OPR-L123-RA-78, H-9793/1978

\*\*\*\*\*

GEOGRAPHIC POSITION

Table with 4 columns: LATITUDE, LONGITUDE, POSITION #, and an unlabeled column. Rows include CHARTED, OBSERVED, and three specific coordinate entries.

POSITIONED BY: DGPS

METHOD OF INVESTIGATION: Echosounder with 5-meter spacing

FINDINGS: A least depth of 17.2 meters was observed on DN 145, position number 6139 + 5. A drift search was conducted on DN 145, and position 6155 was acquired with a depth of 17.8 meters. A Side Scan Sonar was used to check for any protruding masts or features on the wreck which were not seen with the echosounder. No vertical obstructions shoaler than the digitized depth were seen. The Side Scan Sonargram is included in this investigation as a supplement to the echosounding development, and does not constitute a seperate development of the item.

\*\*\*\*\*

DIVING INVESTIGATION

None.

\*\*\*\*\*

CHARTING RECOMMENDATIONS: The hydrographer recommends charting the wreck at the surveyed least depth position with a clearance depth of 55 feet (16.7 meters). Do not concur. The depths found are just an indication of the wreck and not the least depth. It is recommended that this sunken wreck be retained as chart.

..... COMPILATION USE ONLY

CHART

APPLIED

ITEM INVESTIGATION-N2

ITEM : Richmond Sewer Outfall DN: 120,131,145,147  
167  
CHART # 18649, 18652, 18653 VN: 0652,0651

DESCRIPTION: Richmond Sewer Outfall

SOURCE: USCG Local Notice to Mariners # 23/92  
11th Coast Guard District

\*\*\*\*\*

GEOGRAPHIC POSITION

	LATITUDE	LONGITUDE	POSITION #
CHARTED:	NONE		
OBSERVED:	037°54'44.75"N	122°25'13.54"W	9024 + 3 West end of Diffuser
	037°54'45.08"N	122°24'37.18"W	6047 + 7 East end of Diffuser

POSITIONED BY: DGPS

METHOD OF INVESTIGATION: Side Scan/Echosounder

FINDINGS: Side Scan Sonar revealed a sewer outfall pipeline partially buried that extended 888 meters in length between Richmond Inner Harbor Channel and Southampton Shoal Channel. SSS shadow lengths indicate that the top of the pipeline is 0.2 meters to 2.0 meters above the bottom. The westernmost (offshore) end was located, as well as, the easternmost observed end.

\*\*\*\*\*

DIVING INVESTIGATION

None.

\*\*\*\*\*

CHARTING RECOMMENDATIONS: The hydrographer recommends charting the offshore end of the sewer outfall at the geographic location of position number 9024 + 3. The hydrographer recommends charting the overall length of the outfall as shown on the chartlets enclosed. The hydrographer also recommends that the least depths referenced in the Danger to Navigation letter/positions be charted at each end of the diffuser. *CONCUR.*

COMPILATION USE ONLY

*(This feature was already charted on the 57th Ed. of chart 18649 with a lighted marker at the west end of the sewer outfall.)*

CHART

APPLIED

SOUNDING INVESTIGATION - N3

ITEM # Soundings East of Angel Island DN: 145  
CHART # 18649, 18652, 18653 VN: 0652

DESCRIPTION: Delineation of 39' Contour Line

SOURCE: Survey Request Letter from Commanding Officer, USCG  
Marine Safety Office, San Francisco Bay (Reference Item A-4)  
\*\*\*\*\*

GEOGRAPHIC POSITION

	LATITUDE	LONGITUDE	POSITION #
CHARTED:	None		
OBSERVED:	See attached list of positions.		
POSITIONED BY:	DGPS		
METHOD OF INVESTIGATION:	Mainscheme and 50-meter splits.		

FINDINGS: All observed soundings are the westernmost limits of  
the edge of the 39' contour interval requested.

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DIVING INVESTIGATION

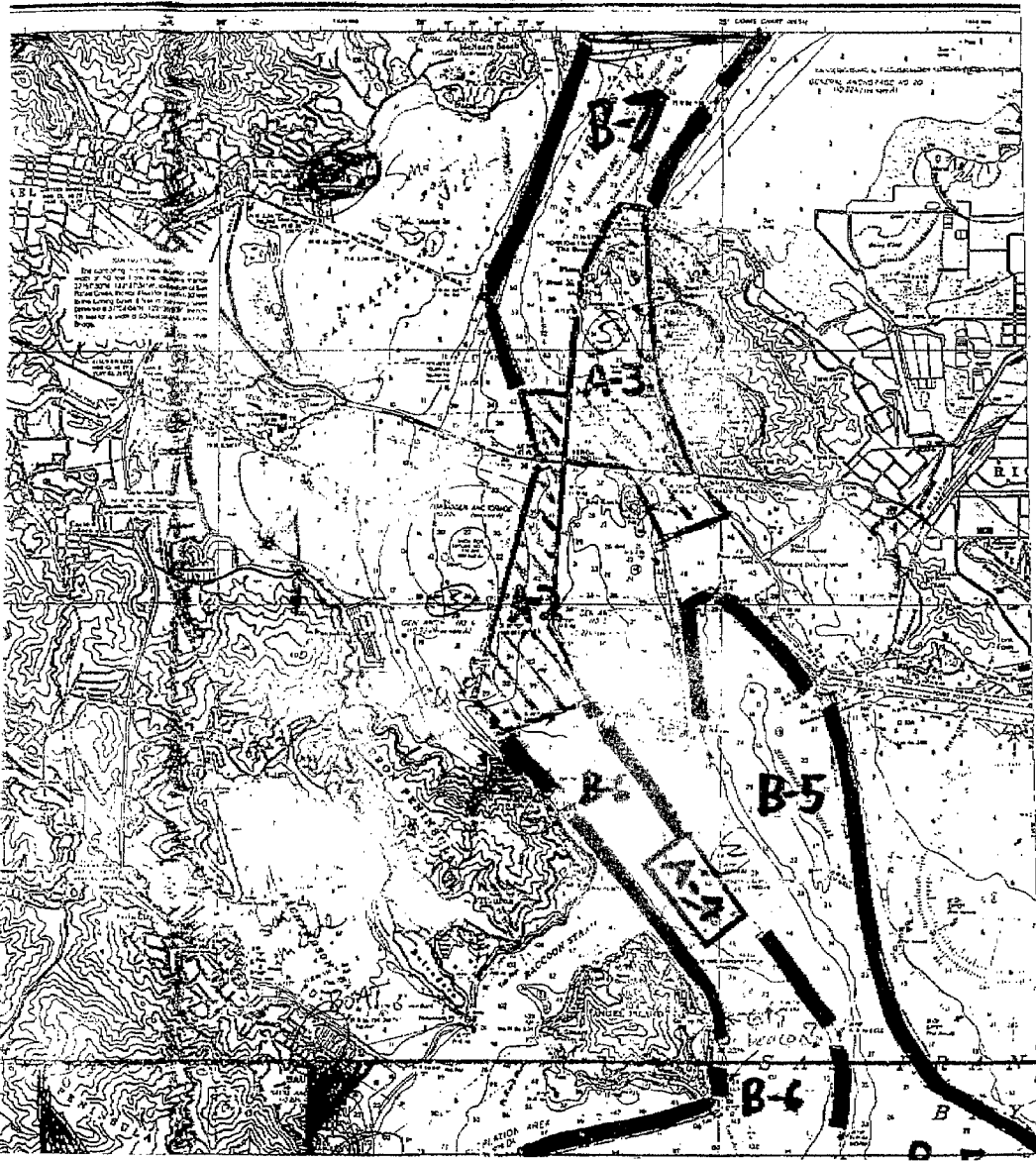
None.

\*\*\*\*\*

CHARTING RECOMMENDATIONS: The hydrographer recommends that a  
few more soundings be applied to Chart 18653 to help delineate  
the 12-meter contour used by deep-draft vessels. Refer to the  
attached reference item A-4 for more information. *Concur. Few more  
soundings from this survey should be charted to better define the configuration  
of the area.*  
..... COMPILATION USE ONLY

CHART

APPLIED





**DETAILED SURVEY REQUEST**

Areas requiring survey are ranked in three priorities: "A" priority areas have heavy deep draft ship traffic and contain shoal areas that have shifted or need to be better defined. These areas should be re-surveyed during FY 93. These areas are laid out on chartlets 1-3. Chartlet 4 shows Bay area traffic patterns.

- A-1: East of Alcatraz (Chartlet 2): Part of the Precautionary Area, with very heavy ship traffic maneuvering to pass under the Bay bridge enroute Oakland or the anchorages. Used by deep draft ships, including tankers to 50 ft. draft. A partial Corps of Engineers survey (survey no.) shows a bar forming at 42 feet in this area and changes to bottom contours closer in to Alcatraz. This survey does not, unfortunately cover near inshore Alcatraz.
- A-2: South of the Richmond-San Rafael bridge (Chartlet 1): very heavy deep draft tanker traffic to 38 ft. draft. A Corps of Engineers survey (with 400 ft. line spacing) strongly suggests scouring under the bridge and shoal development in other areas.
- A-3: Approaches to Point San Pueblo (Chartlet 1): heavy deep draft tanker traffic to 30 ft. draft. The tankers use this area as an approach to the Point and as an informal turning basin for both the Point and Richmond Long Wharf (located south of the bridge). According to the Bar Pilots, the bottom contours in this area have shifted.
- (N3) A-4: East side of the channel abreast Angel Island (Chartlet 2): This small area is transited by heavy tanker traffic with drafts to 45 ft. The tankers turn in this area with the aid of tugs to line up on Southampton Shoal channel. A 39 ft. shoal lies on the east side of the channel, fouling the turn, and needs to be better defined.
- A-5: Approaches to the Oakland harbors (Chartlet 3): Transited by heavy container ship traffic to 43 ft. draft. There is a shoal (to 39 ft.) in this area that needs to be better defined.
- A-6: Off Army St. Terminal (Chartlet 3): Used by container ships coming into the Terminal and points south, with drafts over 35 ft. This area is used both as an approach and as an informal turning basin. It has a complex bottom contour that needs to be better defined.

"B" priority areas have heavy commercial traffic and known significant changes to bottom contours. These areas should be re-surveyed within the next 2-3 years.

- B-1: South of the Bay bridge (Chartlet 3): Used by container ships and tankers with drafts to 50 ft. In this area ships turn to head into Oakland or the anchorages. The proximity of the Bay bridge makes it a critical navigational area.
- B-2: Anchorage 9 and vicinity (Chartlet 3): Used by tankers with drafts to 50 ft. as a lighterage area, as a general anchorage, and by

**DRAFT**

SOUNDING INVESTIGATION - N4

ITEM # Soundings of the "Unofficial Auxilliary Barge Channel" DN: 116,117  
118,119  
133

CHART # 18649, 18652, 18653 VN: 0651

DESCRIPTION: Delineation of Shoaling

SOURCE: Survey Request Letter from Commanding Officer, USCG Marine Safety Office, San Francisco Bay (Reference Item B-5).

\*\*\*\*\*  
GEOGRAPHIC POSITION

	LATITUDE	LONGITUDE	POSITION #
CHARTED:	None 3		
OBSERVED:	37°53'46.82"N	122°24'32.09"W	1290 + 6
	37°52'53.78"N	122°24'04.60"W	1367

POSITIONED BY: DGPS

METHOD OF INVESTIGATION: Echosounder

FINDINGS: No signifigant shoaling was detected by the field party. All DN's aforementioned are 100-meter and 50-meter mainscheme sounding lines, as well as, a crossline conducted on DN 133 which traversed the approximate center of Southampton Shoal. Sounding comparisons with Chart 18653 showed no discrepancies since the last revision of this chart was issued. No signifigant shoaling areas were detected along the crossline where the shoalest depth observed was 5.6 meters located at position # 1367. See the attached list of positions provided for further detail.

\*\*\*\*\*  
DIVING INVESTIGATION

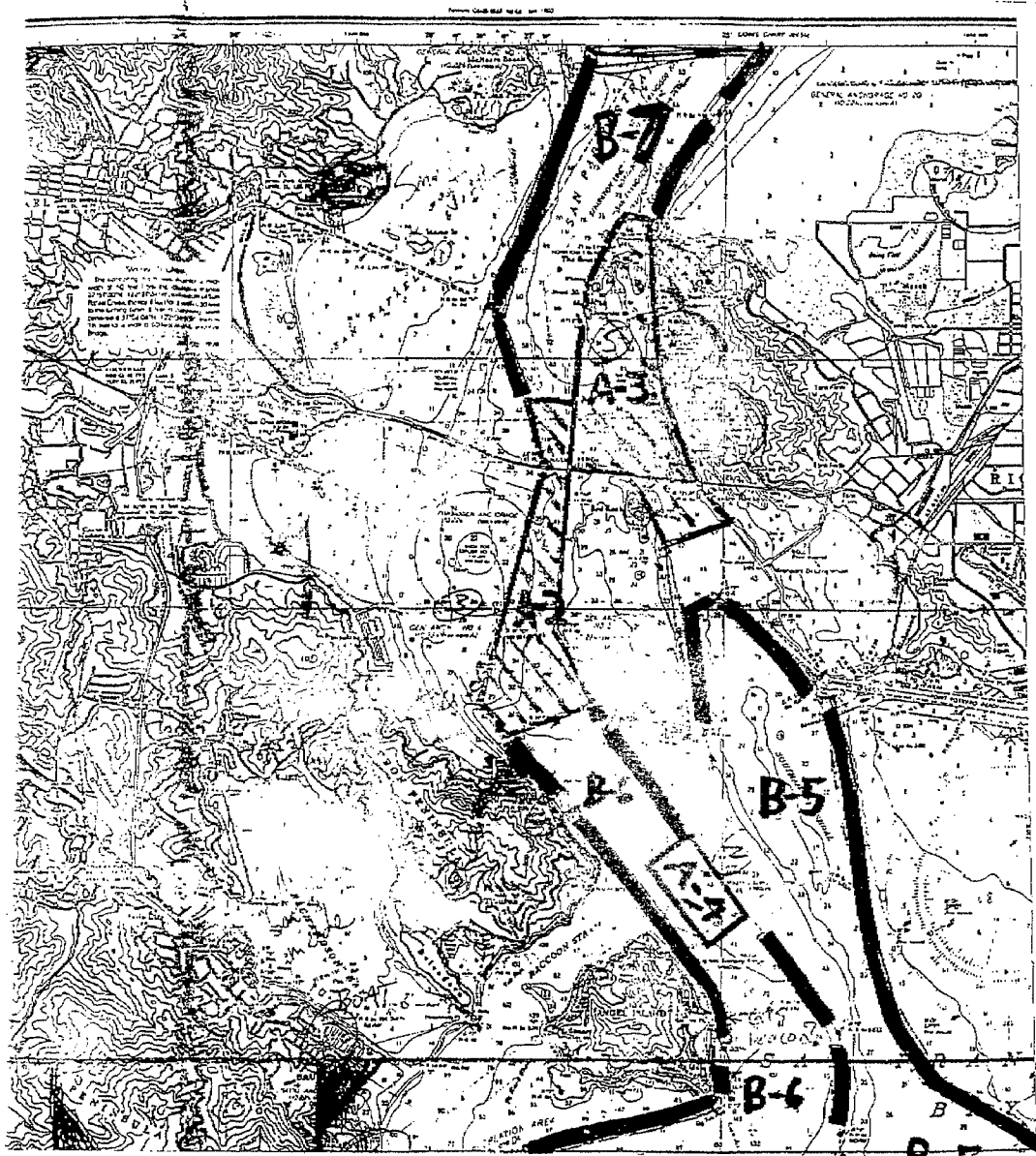
None.

\*\*\*\*\*  
CHARTING RECOMMENDATIONS: The hydrographer recommends adding a precautionary note on the charts stating that pilots transitting in the "unofficial auxilliary barge channel" should proceed with caution due to the fluctuating <sup>South</sup> tidal currents and the possibility of shoaling within this area. *Concur.*

..... COMPILATION USE ONLY

CHART

APPLIED



**DRAFT**

container ships transiting south. An entire oil refinery is dependent on this lightering operation, making this area critical from both an environmental and an economic standpoint.

- B-3: South of Alcatraz (Chartlet 2): Used by container ships with drafts to 43 ft. The dump site south of Alcatraz is heavily used, resulting in significant changes to bottom contours in this area since the last survey.
- B-4: The Precautionary Area north of the Bay bridge (Chartlet 2): heavy tanker and container ship traffic with drafts to 50 ft. This area is critical as deep draft ships maneuver here close to the Bay bridge.
- (N4) B-5: The "unofficial auxiliary barge channel" east of Southampton Shoal (Chartlet 2): Used by tugs and barges enroute Richmond and points north. Ten groundings have occurred in this area in recent years, which is swept by swift tidal currents. These same currents have had their effect on bottom contours since the last survey.
- B-6: North of Harding Rock (Chartlet 2): This narrow area carries very heavy container ship and tanker traffic with drafts to 50 ft. It is swept by swift tidal currents.
- B-7: San Pedro Bay channels (Chartlet 1): The "dogleg" north of the Richmond-San Rafael bridge is used as an informal anchorage in fog, besides forming a turn for the heavy tanker traffic enroute the refineries in the Carquinez Strait. It has extensive shoaling in the vicinity of Light 17 which needs to be better defined.

"C" priority areas are not shown on our chart, but extend to the north past the Carquinez Strait and Suisun Bay well up towards Sacramento and Stockton, and to the south as far as the Dumbarton bridge. There are numerous zones within these areas used as informal anchorages during fog, informal turning basins, passing zones, and so on. These zones also have known significant changes to bottom contours and should be re-surveyed within the next 5-7 years.

**DRAFT**

ITEM INVESTIGATION - N5

ITEM # Pier at Tiburon SWF/NMFS Laboratory DN:133,145  
on NE side of Tiburon Peninsula

CHART # 18649, 18652, 18653 VN:0651,0652

DESCRIPTION: Pier Ruins

SOURCE: PHP

\*\*\*\*\*  
GEOGRAPHIC POSITION

	LATITUDE	LONGITUDE	POSITION #
Pier:			
CHARTED:	037°53'26.00"N	122°26'45.00"W	
OBSERVED:	037°53'26.00"N	122°26'45.00"W	1399,6159
			6160,6161
			6162
Light:			
CHARTED:	037°53'25.00"N	122°26'47.00"W	
OBSERVED:	037°53'29.81"N	122°26'47.18"W	1400

POSITIONED BY: DGPS

METHOD OF INVESTIGATION: D.P./Visual

FINDINGS: Charts show this item as a fixed pier. Pictures and D.P.'s show that the item is a pier in ruins. The D.P. acquired on DN 133, position # 1400 at the NMFS North light (Light List # 5489) indicates a potential compilation error in charting this light.

\*\*\*\*\*  
DIVING INVESTIGATION

None.

\*\*\*\*\*

CHARTING RECOMMENDATIONS: The hydrographer recommends removing the fixed pier shown presently and replacing it with pier ruins. The hydrographer recommends removing the NMFS North light from its current charted position and charting the light at the northeast corner of the pier in ruins. *Concur. Remove the "PA" for both north & south lights*

..... COMPILATION USE ONLY

CHART

APPLIED

CONTROL STATIONS as of 9 Jun 1993

No	Type	Latitude	Longitude	H	Cart	Freq	Vel	Code	MM/DD/YY	Station Name
001	G	037:48:19.064	122:27:18.198	4	139	0.0	0.0	02/17/93		PRESIDIO JPL 13 7252
002	G	037:50:06.223	122:28:21.045	4	139	0.0	0.0	02/17/93		RANGE RESET
100	G	037:49:34.480	122:29:19.687	36	750	0.0	0.0	03/01/93		ALCATRAZ DGPS STATION
200		037:51:21.232	122:28:07.244	0	200	0.0	0.0	03/23/93		SAUSALITO CHANNEL LIGHT 2
102	G	037:51:41.184	122:28:43.534	-26	139	0.0	0.0	03/23/93		SAUSALITO CHANNEL LIGHT 4
103	G	037:53:28.906	122:26:49.453	-14	139	0.0	0.0	03/23/93		TIBOU DGPS STATION RIDG 5A
104	G	037:53:36.193	122:26:52.957	-27	139	0.0	0.0	03/23/93		PILE AT PT. CHAUNCEY
201	T	037:48:24.000	122:27:54.000	0	244	0.0	0.0	05/13/93		941-4290
202	T	037:46:18.000	122:17:54.000	0	244	0.0	0.0	05/13/93		941-4750
203	T	037:48:36.000	122:21:36.000	0	244	0.0	0.0	05/13/93		941-4782
204	T	037:53:30.000	122:26:48.000	0	244	0.0	0.0	05/13/93		941-4837
205	T	037:57:30.000	122:25:30.000	0	244	0.0	0.0	05/13/93		941-4881



UNITED STATES DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
NATIONAL OCEAN SERVICE  
Coast and Geodetic Survey  
Seattle, Washington 98115-0070

Pacific Hydrographic Party  
Tiburon Fisheries Laboratory  
3150 Paradise Drive  
Tiburon, CA 94920-1211  
(415) 435-9509

June 18, 1993

COPY

Commander  
Eleventh Coast Guard District (oan)  
Federal Building  
501 W. Ocean Blvd.  
Long Beach, CA 90822-5399

Dear Sir:

The NOAA Pacific Hydrographic Party discovered a danger to navigation while conducting hydrographic survey operations in San Francisco Bay, California. This danger to navigation, an uncharted sewer diffuser and outfall, lies within the survey limits of H-10471. I recommend this diffuser be included in the next Local Notice to Mariners. The attached chartlets show the affected portions of the three charts covering this area. Least depths (in feet) of the two ends of the diffuser have been reduced to Mean Lower Low Water using predicted tide correctors.

This danger to navigation has been reported to DMAHTC.

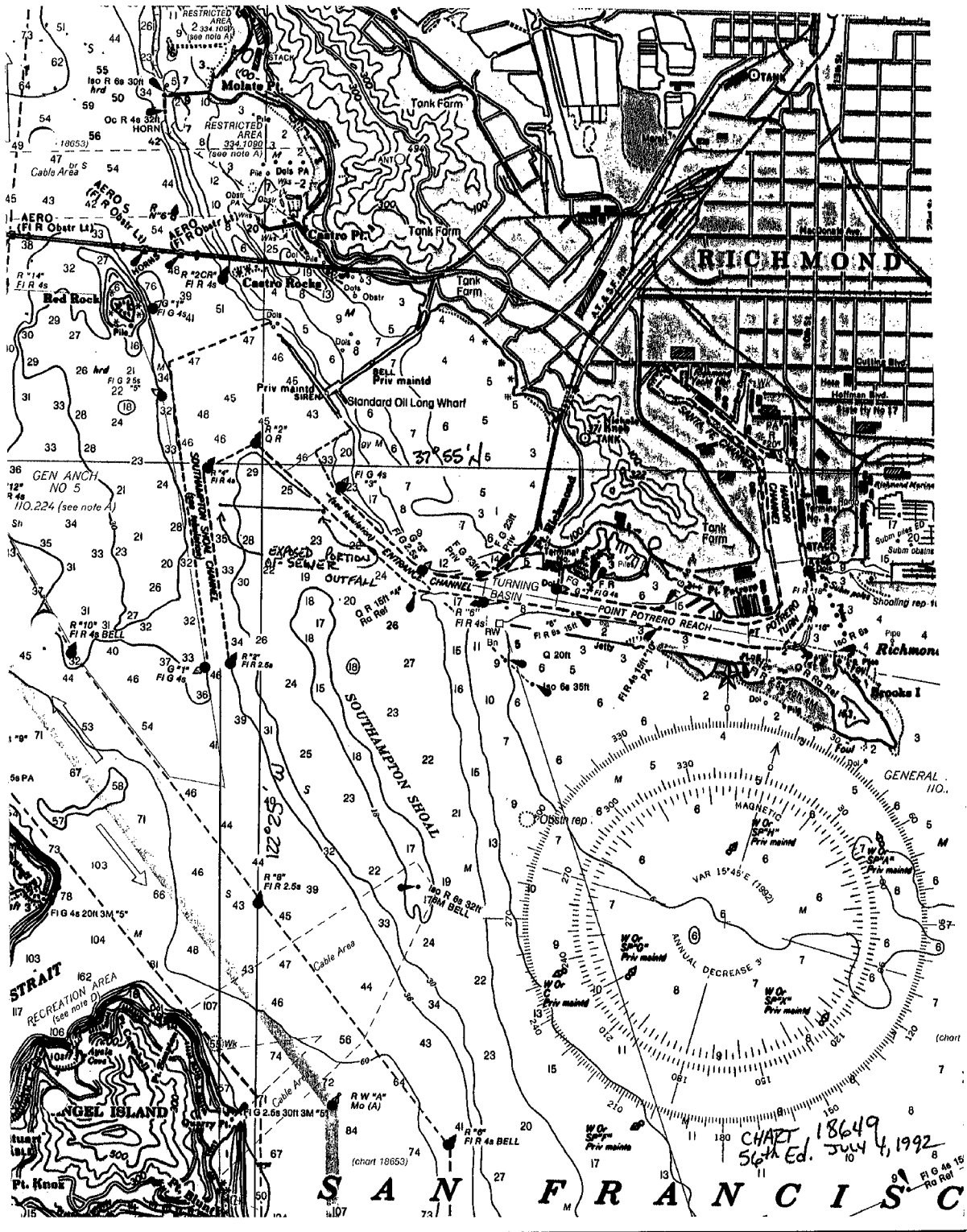
Sincerely,

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

Attachments

cc:DMAHTC  
N/CG221  
N/CG245





SAN FRANCISCO





CHART 18652  
 28th Ed., JULY 25, 1992

RESTRICTED AREA 334.1L  
 (see note A) 24

TEMPORARY ANCHORAGE  
 (see note A) 110.224

PRECAUTIONARY AREA  
 (see note C) 60

SUBMARINE OPERATING AREA  
 1334.1000 (see note A) 112

RECREATION AREA  
 (see note C) 53

GENERAL ANCHORAGE  
 110.224 (see note A) 26

SPECIAL ANCHORAGE  
 110.1200 (see note A) 4

GENERAL ANCHORAGE  
 110.224 (see note A) 26

GENERAL ANCHORAGE  
 110.224 (see note A) 26

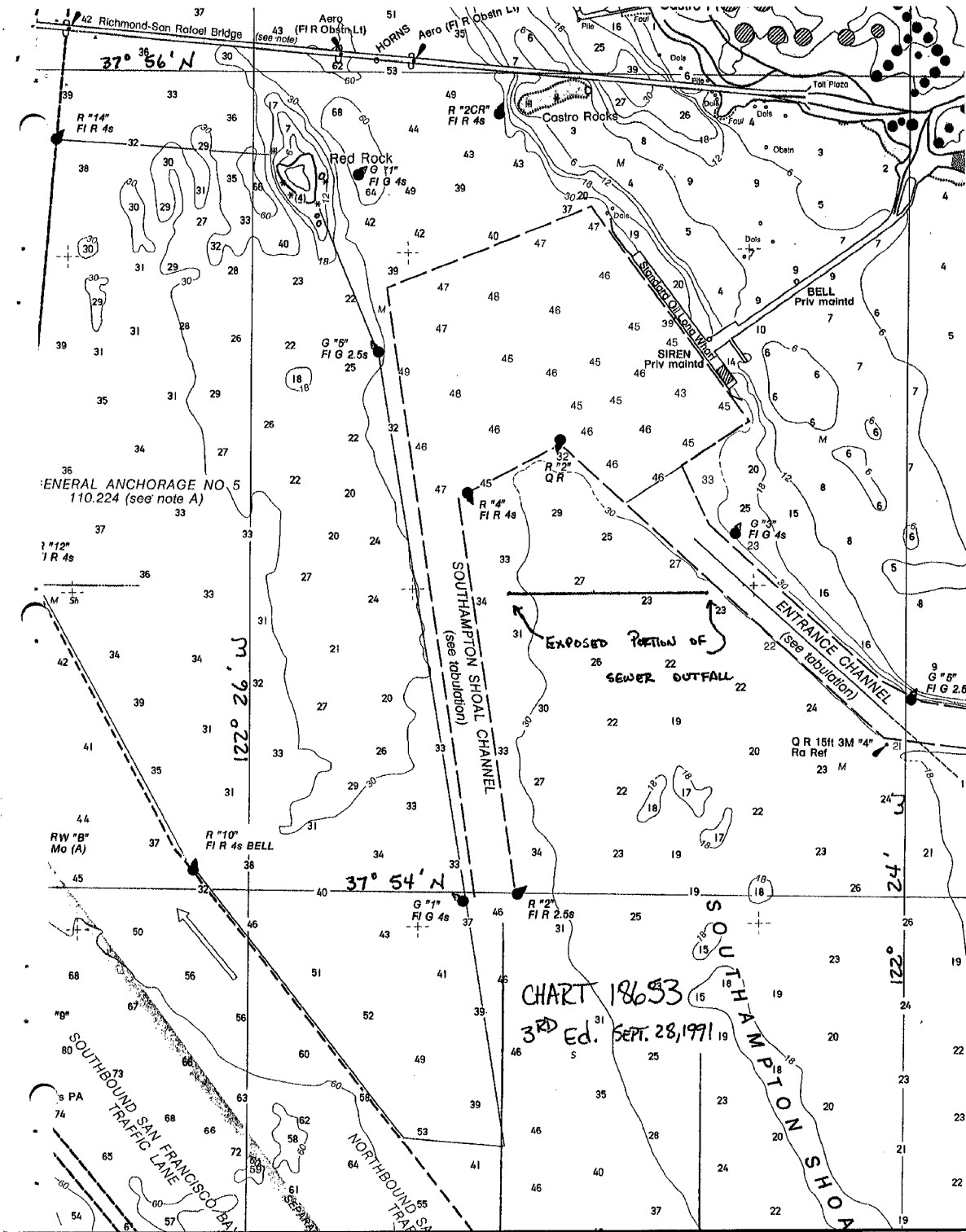
GENERAL ANCHORAGE  
 110.224 (see note A) 26

GENERAL ANCHORAGE  
 110.224 (see note A) 26

GENERAL ANCHORAGE  
 110.224 (see note A) 26

GENERAL ANCHORAGE  
 110.224 (see note A) 26

GENERAL ANCHORAGE  
 110.224 (see note A) 26



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

PACIFIC HYDROGRAPHIC PARTY  
TIBURON FISHERIES LAB.  
3150 PARADISE DRIVE  
TIBURON, CA 94920-1211  
(415) 435-9509  
FAX (415) 435-9511

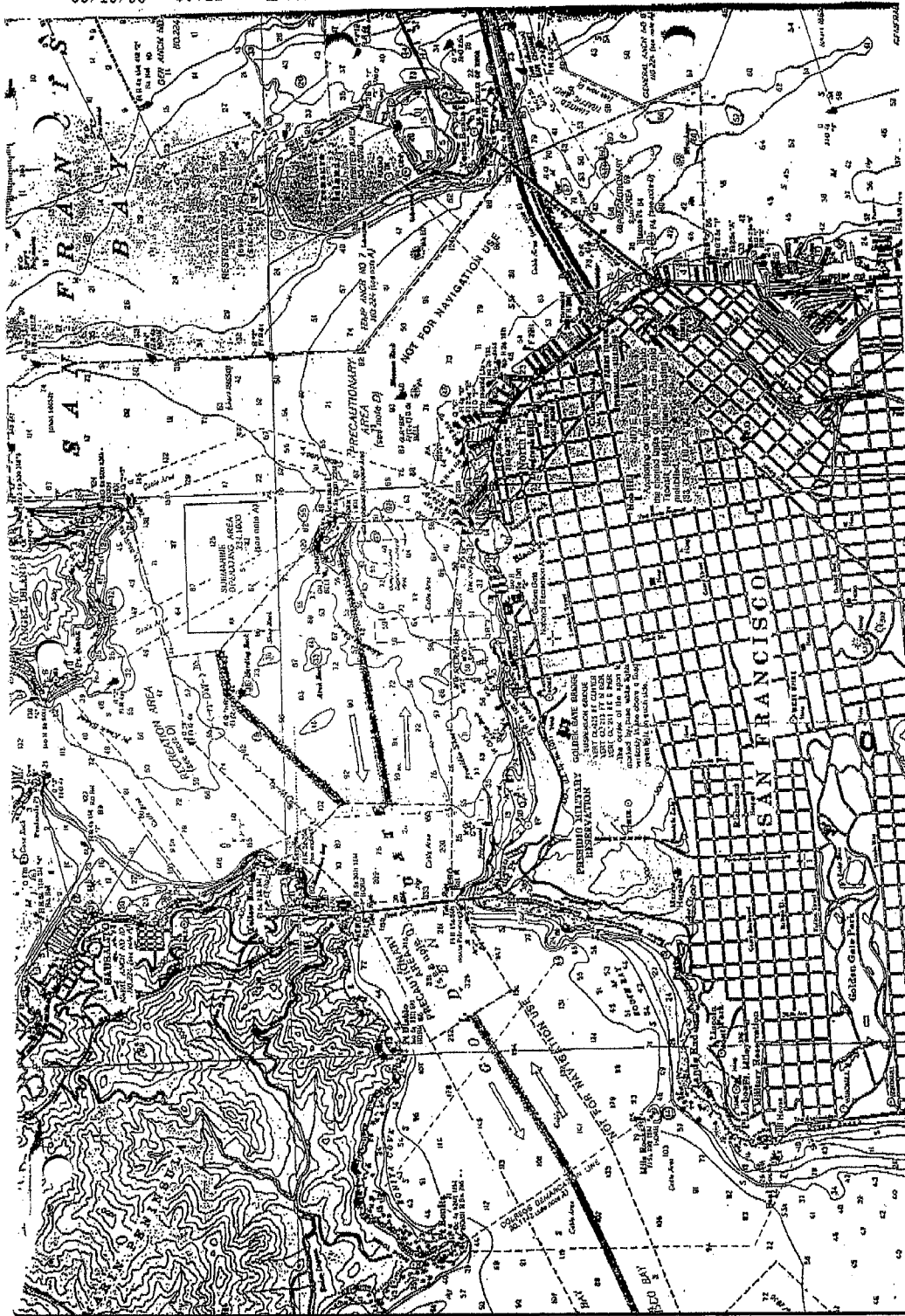
## TELEFAX COVER SHEET

DATE: 13 AUG 1993  
ORIGINATOR: LT NOLL  
ADDRESSEE: LT HAINES  
TELEPHONE: \_\_\_\_\_  
FAX #: \_\_\_\_\_

NUMBER OF PAGES : 2 (INCLUDING THIS PAGE)

## REMARKS:

NEW VTS SCHEME - NOTE  
NO CHANNEL DELIMITED ~~WEST~~  
EAST OF  
ALCATRAZ: PRECAUTIONARY AREA ONLY.  
THIS IS NEW (AS OF JULY 1993) AND  
SUPPORTS ~~THE~~ PRESENT USE OF VTS BY  
LARGE VESSELS.



The U.S. Coast Guard is revising the Traffic Routing Scheme in San Francisco Bay. The revised routing scheme is defined in the Chart Corrections section (Sect. IV) of Local Notice to Mariners 29983, dated 05 July 1993. The revised scheme is depicted on the enclosed chartlet. This chartlet shall not be used for navigation. These changes will be reflected on all new editions of applicable charts.

**NOT FOR NAVIGATION USE**

APPROVAL SHEET

for

SURVEY H-10471

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 1993. The data were reviewed daily during acquisition and processing.

Following initial field processing, data were forwarded to Pacific Hydrographic Section, N/CG245, in three batches for verification. The first data submittal included mainscheme and crossline data, the second included developments and item investigations, and the third consisted of a development with a single day of hydrography. No unverifiable data have been reported to this date.

The field sheets and supporting data have been reviewed by me, are considered complete and adequate for charting purposes, and are approved.

Approved and Forwarded,



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

23 June 1993

DATE



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

ORIGINAL

TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE: October 7, 1993

MARINE CENTER: Pacific

HYDROGRAPHIC PROJECT: OPR-L344-PHP

HYDROGRAPHIC SHEET: H-10471

LOCALITY: California, San Francisco Bay, Angel Island to Vicinity  
of Southampton Shoal

TIME PERIOD: April 23 - July 16, 1993

TIDE STATION USED: 941-4837 Point Chauncey, S.F. Bay, Ca.  
Lat.  $37^{\circ} 53.5'N$  Lon.  $122^{\circ} 26.8'W$

PLANE OF REFERENCE (MEAN LOWER LOW WATER): 12.87 ft.

HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 5.1 ft.

REMARKS: RECOMMENDED ZONING

1. North of  $37^{\circ} 51.7'N$ , times and heights are direct on Point Chauncey, Ca. (941-4837).
2. West of  $122^{\circ} 26.0'W$ , north of  $37^{\circ} 50.0'N$  and south of  $37^{\circ} 51.7'N$ , apply a -18 minute time correction and a X0.96 range ratio to Point Chauncey, Ca. (941-4837).
3. East of  $122^{\circ} 26.0'W$ , north of  $37^{\circ} 50.0'N$  and south of  $37^{\circ} 51.7'N$ , apply a -18 minute time correction and heights are direct on Point Chauncey, Ca. (941-4837).

Note: Times are tabulated in Pacific Standard Time.

*William M. Tolson*  
ACTING CHIEF, DATUMS SECTION



GEOGRAPHIC NAMES

H-10471

Name on Survey	A ON CHART NO. 18653 B ON PREVIOUS SURVEY 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											
	ANGEL ISLAND	X										
BLUFF POINT	X											2
BLUNT, POINT	X											3
CALIFORNIA (title)	X											4
CAMPBELL, POINT	X											5
PARADISE COVE	X											6
QUARRY POINT	X											7
SIMPSON, POINT	X											8
RACCOON STRAIT	X											9
RICHMOND, POINT	X											10
SAN FRANCISCO BAY	X											11
SOUTHAMPTON SHOAL	X											12
TIBURON PENINSULA	X											13
												14
												15
												16
												17
												18
												19
												20
												21
												22
												23
												24
												25

Approved:

*Charles E. Harrington*  
Chief Geographer - N/C92x5

APR 12 1994

**HYDROGRAPHIC SURVEY STATISTICS**

H-10471

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

RECORD DESCRIPTION		AMOUNT		RECORD DESCRIPTION		AMOUNT	
SMOOTH SHEET		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	2						
ENVELOPES							
VOLUMES							
CAHIERS							
BOXES							

**SHORELINE DATA**

SHORELINE MAPS (List):

PHOTOBATHYMETRIC MAPS (List):

NOTES TO THE HYDROGRAPHER (List):

SPECIAL REPORTS (List):

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	
POSITIONS ON SHEET			1696	
POSITIONS REVISED				
SOUNDINGS REVISED				
CONTROL STATIONS REVISED				
	TIME-HOURS			
	VERIFICATION	EVALUATION	TOTALS	
PRE-PROCESSING EXAMINATION				
VERIFICATION OF CONTROL				
VERIFICATION OF POSITIONS	77.0		77.0	
VERIFICATION OF SOUNDINGS	86.0		86.0	
VERIFICATION OF JUNCTIONS				
APPLICATION OF PHOTOBATHYMETRY				
SHORELINE APPLICATION/VERIFICATION				
COMPILATION OF SMOOTH SHEET	28.0		28.0	
COMPARISON WITH PRIOR SURVEYS AND CHARTS		14.0	14.0	
EVALUATION OF SIDE SCAN SONAR RECORDS				
EVALUATION OF WIRE DRAGS AND SWEEPS				
EVALUATION REPORT		19.0	19.0	
GEOGRAPHIC NAMES				
OTHER				
USE OTHER SIDE OF FORM FOR REMARKS	TOTALS	191.0	33.0	224.0
Pre-processing Examination by LT D. Haines	Beginning Date 6/28/93	Ending Date 9/1/93		
Verification of Field Data by L. Deodato, I. Almacen, J. Stringham	Time (Hours) 191.0	Ending Date 9/12/94		
Verification Check by J. Stringham	Time (Hours) 18.0	Ending Date 8/5/94		
Evaluation and Analysis by I. Almacen	Time (Hours) 33.0	Ending Date 10/25/94		
Inspection by R. DAVES	Time (Hours) 8.0	Ending Date 1/17/95		



**EVALUATION REPORT  
H-10471**

**1. INTRODUCTION**

Survey H-10471 is a navigable area survey accomplished by the Pacific Hydrographic Party under the following Project Instructions.

OPR-L344-PHP, dated December 29, 1992

This survey was conducted in San Francisco Bay, California, to update coverage of the designated traffic lanes within the bay area which are frequently transited by deep-draft vessels. It was also undertaken in response to the request of the Harbor Safety Committee of the San Francisco Bay Region, the San Francisco Bar Pilots, the State of California Department of Fish and Game, Office of Oil Spill Prevention and Response and the U.S.Coast Guard. This survey extends from the vicinity of Point Richmond at latitude 37/55/00N to the vicinity of Point Blunt at latitude 37/51/13N. It stretches from longitude 122/22/30W to longitude 122/27/30W, covering the area along the eastern coast of Tiburon Peninsula and Angel Island. The bottom generally consists of sand and mud mixed with broken shells. Depths range from 3.1 to 55.0 meters.

Predicted tides for Fort Point, California, gage 941-4290, were used for the reduction of soundings during field processing. Approved hourly heights zoned from Point Chauncey, California, gage 941-4837, were used during office processing.

The field sheet parameters have been revised to center the hydrography on the smooth sheet and to change the projection to polyconic. NAD 83 is used as the horizontal datum for plotting and position computation. The offset table and sound velocity correctors are adequate. An accompanying computer printout contains the parameters and the correctors.

A digital file has been generated for this survey as required by the specifications contained in Hydrographic Survey Guideline No. 52, Standard Digital Data Exchange Format, April 15, 1986. Certain descriptive information, however, may not be in the digital record due to the restrictions of the presently available cartographic codes. The user should refer to the smooth sheet for a complete depiction of the survey data.

**2. CONTROL AND SHORELINE**

Sections H and I of the hydrographer's report and the 1993 Horizontal Control Reports for OPR-L344-PHP, contain adequate discussions of horizontal control and hydrographic positioning.

Differential GPS(DGPS) was used to control this survey. GPS stations ALCATRAZ DGPS, 1993 and TIBU DGPS were established to Third-Order accuracy and served as DGPS reference stations. Sausalito Channel Light 4, 1978 and Pt. Chauncey (Pile),1993, were used as calibration points during this survey.

Positions of horizontal control stations used during this survey are based on NAD 83. The smooth sheet is annotated with NAD 27 adjustment ticks based on values determined with the NGS program, NADCON. Geographic positions based on NAD 27 may be

plotted on the smooth sheet utilizing the NAD 83 projection by applying the following corrections.

Latitude: -0.267 seconds (-8.247 meters)  
Longitude: 3.898 seconds (95.247 meters)

The year of establishment of control stations shown on the smooth sheet originates with the previously referenced horizontal control reports.

The maximum allowable horizontal dilution of precision (HDOP) limits of 3.75 has not been exceeded during this survey and the quality of the data obtained is considered good. The DGPS performance checks conducted in the field were adequate.

There are no shoreline maps required for this survey. The shoreline depicted in brown on the smooth sheet originates from chart 18650 and is shown for orientation purposes only.

### 3. HYDROGRAPHY

Except for the specific items mentioned elsewhere in this report, hydrography 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.

Side Scan Sonar was used during item investigations to supplement the echo-sounding information obtained during the survey.

### 4. CONDITION OF SURVEY

Except for the NOAA Form 76-40 that should have been submitted for the revision of aids, the hydrographic records and reports received for processing are adequate and conform to the requirements of the Hydrographic Manual, 4th Edition, revised through Change No. 3, the Hydrographic Survey Guidelines, and the Field Procedures Manual, March 1991 Edition.

### 5. JUNCTIONS

Survey H-10471 junctions with the following surveys.

<u>Survey</u>	<u>Year</u>	<u>Scale</u>	<u>Area</u>
H-10456	1993	1:10,000	South
H-10480	1993	1:10,000	North

The junctions with surveys H-10456 and H-10480 are complete. Comparison is considered good. Surveys H-9793, H-9794 and H-9811 adjoins with this present survey, however, the comparisons with these prior surveys are discussed in the succeeding section of this report.

## 6. COMPARISON WITH PRIOR SURVEYS

H-9793(1978), 1:10,000  
H-9794(1978), 1:10,000  
H-9811(1979), 1:10,000

Surveys H-9793, H-9794 and H-9811, provides the basic coverage of the entire area of this survey. Comparison with these 1978 and 1979 surveys is considered satisfactory. The present soundings are generally within 0.3 meter (1 foot) compared with the prior surveys except around the areas where strong current prevails or where periodic dredging was undertaken by the Corps of Engineers causing some significant changes in the natural configuration of the bottom.

The following changes were noted during this survey.

a. The configuration of the Southampton Shoal has greatly changed after the recent Corps of Engineers dredging operation in the area. With the exception of the shoaler depths around the area of the light and some isolated 18-foot soundings on the northern portion of the shoal, the area previously covered by the charted 18-foot curve portraying the shape of the shoal was gone.

b. The area covered by the isolated 60-foot depth curves in the vicinity of latitude 37/53/20N, longitude 122/26/00W, off Bluff Point have appreciably deepened by about 0.6 (2 feet), with the exception of an 18.0-meter (59 feet) sounding presently located at latitude 37/53/10.70N, longitude 122/26/18.07W.

The sunken wreck in 55 feet of water (AWOIS 51672) originating from survey H-9794 and charted at latitude 37/52/08.0N, longitude 122/25/15.0W, was investigated during this survey. A shoal depth of 17.1 meters (56 feet) was found close to the location of the charted feature, an indication of the existence of the wreck. The 55-foot (16.7 meters) sounding on wreck was carried forward on the smooth sheet.

The isolated 12-foot (3.6 meters) sounding charted at latitude 37/51/16.0N, longitude 122/22/44.0W, originating from survey H-9794 was not investigated during this survey. It was carried forward on the smooth sheet.

With the transfer of the features mentioned above, Survey H-10471 is adequate to supersede the prior surveys for the area of common coverage.

## 7. COMPARISON WITH CHART

Chart 18649, 57th edition, dated Jan. 22, 1994; scale 1:40,000  
Chart 18650, 45th edition, dated March 5, 1994; scale 1:20,000  
Chart 18653, 4th edition, dated July 10, 1993; scale 1:20,000

The prior editions of the above listed charts were used in the field for comparison. The latest editions of these charts were used during office processing and evaluation of this survey.

a. Hydrography

The charted hydrography originates with prior surveys mentioned in the preceding section of this report and the rest from miscellaneous sources. No significant changes were noted concerning the bottom configuration of the bay, other than the results of periodic dredging operations by the Corps of Engineers and the effects of strong current within the survey area.

With the exception of the items mentioned in the preceding section of this report, survey H-10471 is adequate to supersede charted hydrography within the common area.

b. AWOIS

AWOIS item 51672 was investigated during this survey. This item originate with prior survey H-9794. Discussion and disposition of this feature is included in the hydrographer's report.

Three (3) separate charted items (N3,N4 & N5) were also investigated during this survey. Discussion and disposition of each of these items is included in the hydrographer's report.

c. Controlling Depths

The depths found during this survey are consistent with or deeper than the presently charted controlling depths along Southampton Shoal channel and Richmond Entrance channel.

d. Aids to Navigation

There are seventeen (17) aids to navigation located during this survey. The detached positions taken on each of the following aids using DGPS positioning system confirms its presently charted locations, with the exception of the items mentioned in section P of the hydrographer's report. They were found in good condition and adequately serve their intended purpose.

<u>Name of aid</u>	<u>Lt.List #</u>	<u>Latitude(N)</u>	<u>Longitude(W)</u>
(San Francisco Bay)			
North Channel Lighted Buoy A	5410	37/54/45.80	122/26/57.25
North Channel Lighted Bell Buoy 6	5415	37/51/39.55	122/23/46.93
Southampton Shoal Lt.	5480	37/52/54.93	122/24/01.03
North Channel Lighted Buoy 8	5485	37/52/49.01	122/24/57.61
NMFS Light South	5488	37/53/26.40	122/26/44.72
NMFS Light North	5489	37/53/29.82	122/26/47.17
North Channel Light 9	5490	37/53/39.67	122/26/58.45
North Channel Lighted Buoy B	5495	37/54/07.09	122/26/41.41
North Channel Lighted Bell Buoy 10	5500	37/54/03.36	122/26/10.42

North Channel Lighted Buoy 12	5505	37/54/47.36	122/26/48.58
North Channel Lighted Buoy C (Southampton Shoal Ch.)	5510	37/54/45.80	122/26/57.25
Lighted Buoy 1	5640	37/53/58.99	122/25/20.56
Lighted Buoy 2 (Richmond Harbor Channel)	5645	37/54/00.42	122/25/11.20
Lighted Buoy 3	5680	37/54/53.10	122/24/31.10
Light 4	5685	37/54/22.37	122/24/03.53
Lighted Buoy 5	5690	37/54/29.26	122/23/58.13
Lighted Buoy 6	5700	37/54/20.89	122/23/38.80

The privately maintained mooring buoy "NSYC" charted at latitude 37/51/33.0N, longitude 122/24/58.0W, was not investigated during this survey and therefore should be retained as charted.

See section P of the hydrographer's report for further information concerning aids to navigation located during this survey.

A redefined Traffic Routing Scheme in San Francisco Bay was issued by the Coast Guard, effective July 1993. The revised routing scheme was published in the Local Notice to Mariners on July 6, 1993. This changes will be reflected on all future editions of applicable charts. A copy of the chartlet depicting the new traffic routing scheme is included in this report.

e. Geographic Names

Names appearing on the smooth sheet and in the survey title have been approved by the Chief Geographer.

Pt. Chauncey was omitted during compilation of geographic names on chart 18653. It is recommended that this name be incorporated on the next edition of this chart.

f. Dangers to Navigation

A danger to navigation was reported to the USCG on June 10, 1993, concerning an uncharted sewer outfall located within the area of the survey. A copy of this report is attached. No additional dangers were discovered during office processing. The sewer outfall was already charted on the latest edition of chart 18649 with a lighted marker at the west end of the outfall.

The charted cable area from the vicinity of Point Simpton and Quarry Point extending towards the area around Southampton Shoal Light should be retained.

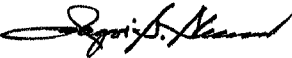
**8. COMPLIANCE WITH INSTRUCTIONS**

Survey H-10471 adequately complies with the Project Instructions.

**9. ADDITIONAL FIELD WORK**

This is a good hydrographic survey and no additional field work is required. However, due to the periodic dredging operations around the bay particularly along the charted


channels, contact must be maintained with the Corps of Engineers and the Coast Guard to regularly update the chart of the area.

  
Isagani A. Almacén  
Cartographer

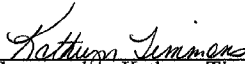
APPROVAL SHEET  
H-10471

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 disproval 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. Final control, position, and sounding printouts have been made and are included with the survey records. The survey records and digital data comply with NOS requirements except where noted in the Evaluation Report.

  
\_\_\_\_\_  
Dennis J. Hill  
Chief, Hydrographic Processing Unit  
Pacific Hydrographic Section  
Date: 1/17/95

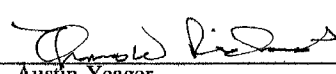
I have reviewed the smooth sheet, accompanying data, and reports. This survey and accompanying digital data meet or exceed NOS requirements and standards for products in support of nautical charting except where noted in the Evaluation Report.

  
\_\_\_\_\_  
Commander, Kathryn Timmons, NOAA  
Chief, Pacific Hydrographic Section  
Date: 1/22/95

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Final Approval

Approved:

  
\_\_\_\_\_  
J. Austin Yeager  
Rear Admiral, NOAA  
Director, Coast and Geodetic Survey  
Date: 2/8/95

MARINE CHART BRANCH  
**RECORD OF APPLICATION TO CHARTS**

FILE WITH DESCRIPTIVE REPORT OF SURVEY NO. H-10471

**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
18022	6/17/93	Mr. Isageni Almecan	<del>Full Part Before</del> After Marine Center Approval Signed Via Drawing No. <u>Examined, no corrections and soundings applied</u>
530	6/17/93	Bruce A. Omsted	<del>Full Part Before</del> After Marine Center Approval Signed Via Drawing No. <u>Examined, no corrections and soundings applied</u>
18007	6/17/93	Bruce A. Omsted	<del>Full Part Before</del> After Marine Center Approval Signed Via Drawing No. <u>Examined, no corrections and soundings applied.</u>
18020	6/17/93	Bruce A. Omsted	<del>Full Part Before</del> After Marine Center Approval Signed Via Drawing No. <u>Examined, no corrections and soundings applied.</u>
18680	1/22/95	Bruce A. Omsted	<del>Full Part Before</del> After Marine Center Approval <del>Signed</del> Via Drawing No. <u>Examined, no corrections and soundings applied.</u>
18650	8/15/95	A. Chappell	<del>Full Part Before</del> After Marine Center Approval Signed Via Drawing No. <u>Examined, curves + soundings applied.</u>
			<del>Full Part Before</del> After Marine Center Approval Signed Via Drawing No.
			<del>Full Part Before</del> After Marine Center Approval Signed Via Drawing No.
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