9793

Diagram No. 5530-5 & 5402-3

NOAA FORM 76-35A

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

DESCRIPTIVE REPORT

Type of Survey Hydrographic

Field No. RA-10-2-78

Registery No. H-9793

LOCALITY

State California

General Locality San Francisco Bay

Sublocality Golden Gate to Tiburon Peninsula

1978

CHIEF OF PARTY
CAPT J.P. Randall

LIBRARY & ARCHIVES

DATE October 9, 1981

☆U.S. GOV. PRINTING OFFICE: 1985—566-054

9793

Area 3
Ref L-112(82)
✓ 18650
✓ 18649
18652 B, A, C
✓ 18653

Cartog:
sign off on
fm in back

NOAA FORM 77-28 (11-72) — U.S. DEPARTMENT OF COMMERCE, NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

REGISTER NO.

HYDROGRAPHIC TITLE SHEET

H-9793

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.
RA 10-2-78

State: California

General locality: San Francisco Bay

Locality: Golden Gate to Tiburon Peninsula

Scale: 1:10,000 — Date of survey: Sept 26 - Nov 21, 1978

Instructions dated: Aug. 10, 1978 — Project No.: OPR-L123-RA-78

Vessel: NOAA Ship RAINIER, Launches 2123 (1007), 2125 (1003), 2126 (1013), 2129

Chief of party: CAPT James P. Randall

Surveyed by: LTJG M. Molchan, LTJG D. Brockhouse, LTJG B. Hillard, LTJG D. Smith, ENS D. Keller, ENS D. Stotler

Soundings taken by echo sounder, hand lead, pole: Ross and Raytheon Fathometers, Hand Lead, Pole

Graphic record scaled by: RAINIER Personnel

Graphic record checked by: RAINIER Personnel

Verification by: John E. Lotshaw — Automated plot by: PMC Xynetics Plotter

Evaluation by: J.S. Green

Soundings in ~~fathoms~~ feet at ~~MLW~~ MLLW

REMARKS: Comments in black are made by the evaluator. Separates have been removed and filed with the survey records.

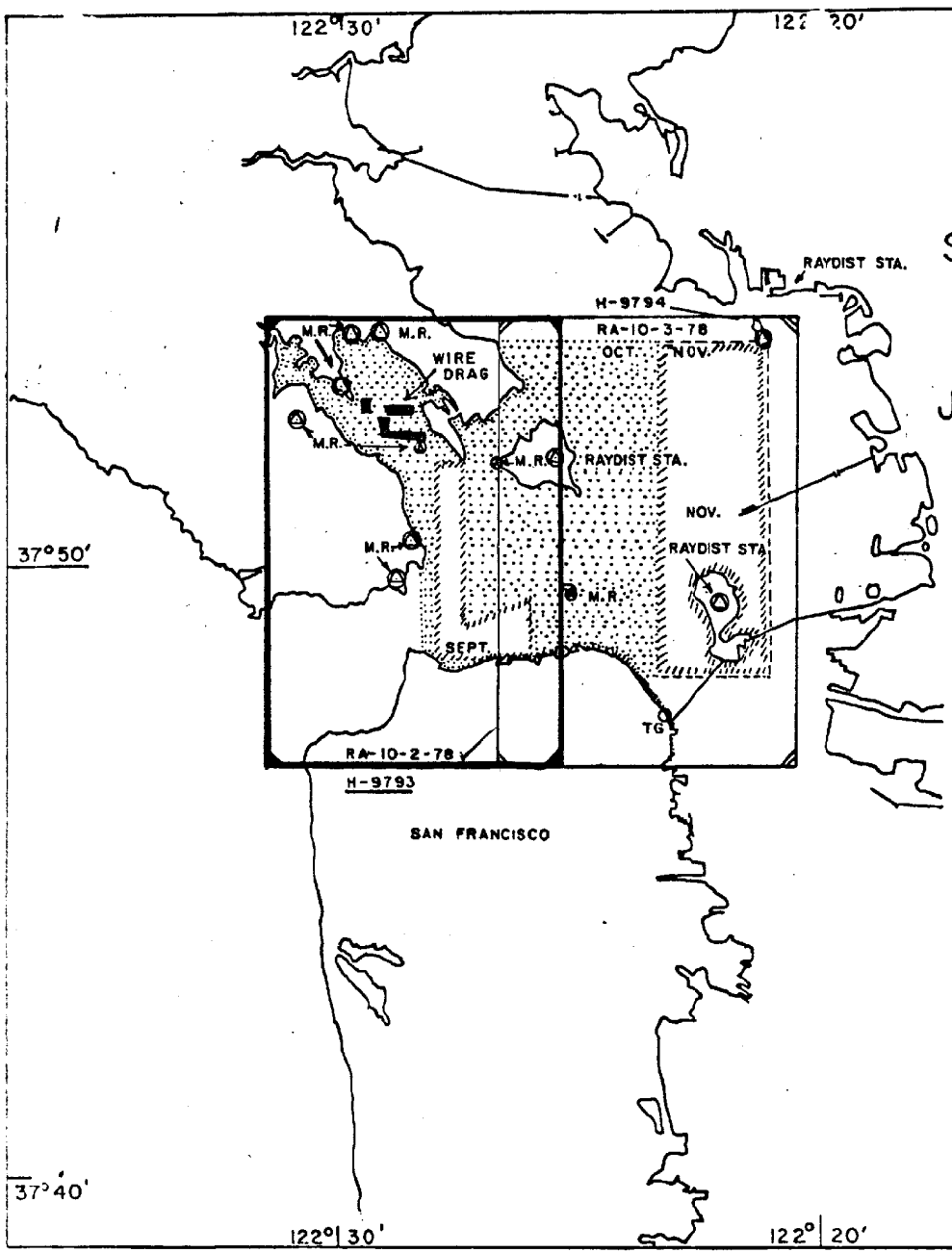
AWOIS + SURF ~ 8/87 RWD

KWW 10/6/92

NOAA FORM 77-28 SUPERSEDES FORM C&GS-537.

☆ U.S. GOVERNMENT PRINTING OFFICE: 1978-665-010-1174

appr to Stds 10-2-87 RWD



PROGRESS SKETCH
OPR-L123-RA-78
HYDROGRAPHIC SURVEY
SAN FRANCISCO BAY, CALIFORNIA
SEPT. 27-NOV. 18, 1978
NOAA Ship RAINIER
JAMES P. RANDALL, CAPT., NOAA
COMD'G.

FROM CHART NO. 18680

37°50'

37°40'

SEPT.	OCT.	NOV.	
0	0	15.5	L.N.M. WIRE DRAG
2.44	20.91	7.55	SQ. N.M. SOUNDING
31.0	401	171.0	L.N.M. MISCELLANEOUS DISTANCE
54.0	719.6	376.5	L.N.M. SOUNDING LINE
0	117	129	BOTTOM SAMPLES (GRAB)
0	8	0	WATER SAMPLES ANALYZED (SALINITY)
3	9	0	CONTROL STATIONS (ELECTRONICS)
0	1	0	TEMPERATURE, DEPTH, CONDUCTIVITY
0	1	0	NANSEN CAST
1	0	0	TIDE GAGE
0	15	24	STATIONS LOCATED BY TRAVERSE
0	0	0.11	SQ. N.M. WIRE DRAG

DESCRIPTIVE REPORT
TO ACCOMPANY HYDROGRAPHIC SURVEY
H-9793. RA-10-2-78

A. PROJECT INSTRUCTIONS

Hydrography was conducted in accordance with OPR-L123-RA-78 San Francisco Bay, Project Instructions dated August 10, 1978; and Change No. 1 dated August 21, 1978 and Change No. 2 dated August 28, 1978.

B. AREA SURVEYED

The area surveyed was that portion of San Francisco Bay bounded on the east by longitude 122°26'00", and on the west by the Golden Gate Bridge. The survey extends fron the Presidio (the southwest corner of the survey) in a north and easterly direction to include all of Richardson Bay and Racoon Strait. Included in this 11.25 square nautical mile survey were the small boat basins of San Francisco's Marina District, Horseshoe Bay, Sausalito, Belvedere Cove, and Ayala Cove.

C. SOUNDING VESSELS

The sounding vessels for the survey were aluminum launches RA-3 (2123) hull number 1007, RA-6 (2126) hull number 1013 and Boston Whaler RA-10 (2129), RA-5 was used solely for bottom samples.

Data acquisition systems aboard RA-3 and RA-6 consisted of a standard hydroplot controller, with a remote thumbwheel option (for digital sextant work), Digital PDP 8/e computer Ross. Fineline Fathometer, Raydist and Miniranger systems, and two Teledyne Gurley Digital sextants. A Ratheon 719B fathometer was installed in RA-10 to collect sounding data in shoal areas in Richardson Bay. A sounding pole was used from RA-10 in those portions of Richardson Bay that were too shoal for an effective bottom trace from the Ratheon fathometer. No problems were encountered in any of the above mentioned vessel configurations which might have affected the accuracy of the survey.

D. SOUNDING EQUIPMENT

For RA-10-2-78, all echo soundings, except those recorded by RA-10 (2129), were taken with Ross Fineline Fathometer Systems which include the following components: Ross Model 4000 Transceiver, Ross Model 5000 Analog Recorder, Ross Model 6000 Digitizer and 100 kHz transducer. RA-10, a Boston Whaler, was rigged for shallow water work in Richardson Bay, by mounting a Raytheon Model DE-719B Fathometer and side mounting a portable transducer. The transducer was located within 2 feet of the

mini-ranger antenna, the source of positioning. A sounding pole was also used, from RA-10, in the shoal areas of Richardson Bay. The survey was conducted in units of feet. The following table summarizes the serial numbers of the various components used in each vessel:

Component	RA-10 (2129)	RA-3 (2123)	RA-5 (2125)	RA-6 (2126)
Transceiver	Model	1080	1040	1042
Analog Recorder	DE-719B	1071	1040	1070
Digitizer	Raytheon	1080	1040	1041-4

For information detailing the procedures to obtain Corrections to Echo Soundings, refer to Echo Sounding Report, OPR-L123-RA-78.

E. HYDROGRAPHIC SHEETS

The transverse Mercator projection, soundings and grid were plotted by RAINIER personnel using PDP-8/e computers (S/N 01015 and 11430) with COMPLOT plotter Models DP-3 (S/N 5445-7 and 5848-18).

Rough plots were made daily and a semi-smooth sounding plot collated as work progressed. Since both the digital sextant, and range-azimuth work were hand plotted during survey operations, a daily position plot was made and examined prior to generating the semi-smooth sheet to insure against the possibility of accepting bad visual fixes. All boatsheets were standard sizes. Neither the boatsheets not the final smooth sheet were skewed. See Eval Rpt Sect 2

The final smooth field sheet was began on OCT 16 (JD 289) and completed on January 3, 1979 (JD 003) on mylar 0.003 inch thick polyester drafting film. No discernable distortion could be detected on the boatsheet during the final plot. Seven expansion sheets (1:2,500 scale) were prepared for clarity in plotting 10 meter development lines over charted shoal soundings. They are numbered Expansion Sheets 1 thru 7 and the area covered by each is outlined on the main sheet. Final velocity, TRA, and predicted tide correctors were applied to all fathometer soundings on the smooth field sheets. All data was transferred to Pacific Marine Center for verification. Not all available

F. CONTROL STATIONS

The hydrographic control stations used in H-9793 consisted of existing geodetic stations, new geodetic stations, established using Third-Order Class I methods and five photogrammetric control stations located in the Raccoon Straits area.

For detailed information on these stations refer to Horizontal Control Report OPR-L123-RA-78. See Eval Rpt Sect 2

G. HYDROGRAPHIC POSITION CONTROL

Five different methods for controlling sounding lines in the RA-102-78 survey area were used. The method along with equipment used were as follows:

Range/Range	Mini-Ranger
Range/Range	Raydist
Range/Azimuth	Mini-Ranger/T-2 Theodolite
Visual	Digital Sextants
Dead Reckoning	

Position control on detached positions was provided by one of the above methods or by three-point sextant fixes (manual sextants).

At no time, while using range-range (Raydist) or visual control, were weak geometric configurations encountered or unusual atmospheric conditions experienced that might have degraded the positional accuracy of the soundings taken during the survey.

Dead reckoning methods were utilized in confined areas where the launch could be accurately located by reference to shoreline features. Distances and directions to reference features were accurately noted on a boat sheet or diagrams of the area, while data was being collected. Three-point visual or range/azimuth fixes were scaled as soon after data was collected as possible to permit automated data processing. Dead reckoning methods were restricted to the northernmost area of Richardson Bay and small boat moorage areas in the Sausalito area.

Numerous problems in the form of electronic interference on Mini-Ranger frequencies, Raydist lane loss/gains, electronically void areas, and equipment failures were experienced. In every case when problems occurred data collection was discontinued until the problems could be corrected or type of control switched. Additionally, all data collected during questionable control periods was either rejected or verified at a later date. A daily breakdown of vessels used, type of control used, and explanatory remarks concerning control is contained in this section.

POSITIONING EQUIPMENT - MOBILE

The following is table of electronic components for each vessel used during the hydrographic survey work:

Mini-Ranger Equipment

Vessel No.	Console	R/T Unit
2123	711	718
2126	715	727
2129	720	720

Raydist Equipment

Vessel No.	Raydist Transmitter	Raydist Navigator	Raydist Position Indicator	Hazlow Navigation Interface
2123	170	117	120	3
2125	166	114	117	17
2126	167	115	118	35

Digital Sextant Equipment

Vessel No.	Left Sextant	Right Sextant	Hazlow Navigation Interface
2123	TG-0322	TG-0321	3
2126	TU-3601	TU-3600	35

Positioning Equipment - Shore Stations

Nine Motorola Mini-Ranger III shore stations were established and used during the survey work in either the range-range or range-azimuth mode. Following is a table of Mini-Ranger shore stations used during this survey:

Station (No., Name)	Code	S/N	Dates on Station
101 ALCATRAZ LIGHTHOUSE 1910	1	PMC-001	268-271
101 ALCATRAZ LIGHTLHOUSE 1910	4	777	271-320
102 CONE ROCK LIGHT 1977	1	PMC-001	285
102 CONE ROCK LIGHT 1977	2	776	273
103 PT STUART LIGHTHOUSE 1928	3	775	268-307
107 RANGE 1931	2	776	285

Station (No., Name)	Code	S/N	Dates on Station
111 ZAN 1978	1	PMC-001	296, 299, 303, 304, 310, 311, 312, 313.
113 PRESERVE 1978	1	PMC-001	305
114 HYDRO 1978	1	PMC-001	305
201 AZMO 1978	1	PMC-001	279, 283, 284, 289, 290, 291, 292, 310
201 AZMO 1978	3	775	311, 312, 313
202 LIME POINT LIGHT 1977	1	PMC-001	284

Two Raydist shore stations, station ANGEL ISLAND PEAK 3 1956, signal 105, and station ALLEY 1978, signal 106, were established and used for controlling hydrography on sheet H-9793. Station ANGEL ISLAND PEAK 3 1956 was equipped with Red Raydist transmitter S/N 232 while station ALLEY 1978 was equipped with Green Raydist transmitter S/N 233. For a detailed discussion of the two Raydist shore stations see ELECTRONIC CONTROL REPORT OPR-L123-RA-78.

ELECTRONIC CONTROL EQUIPMENT - CALIBRATION

Two Mini-Ranger baseline calibrations were performed during this project. The first baseline calibration was performed on Sept. 23, 1978 (Code 1 & 3) and Sept. 25, 1978 (Codes 2 & 4) while the second was performed Nov. 18, 1978 (All Codes). Both calibrations were performed within the survey sheet limits, San Francisco Bay, California. Correctors from the two calibrations were meaned together to produce correctors used in smooth plotting of survey data. Refer to ELECTRONIC CONTROL REPORT OPR-L123-RA-78 for more details on the baseline calibrations.

Daily calibration checks on all Mini-Ranger codes used were accomplished by positioning the vessel alongside a station at known geodetic location. A series of Mini-Ranger rates were then recorded and meaned to determine a daily calibration check. In all cases the calibration check confirmed the validity of the baseline correctors.

Raydist equipment calibrations were performed at least twice daily except when obviated by equipment failures. Calibrations were accomplished by positioning the vessel alongside a station at known geodetic location. At least three readings were made during each Raydist equipment calibration to obtain sufficient data to calculate a mean corrector to the partial (fractional)

lane count. All sets of data for any single day were meaned to obtain the correctors used in plotting of survey data.

When digital sextants were used for hydrographic operations the index correction on both digital sextants in a pair was checked frequently and noted on the Raw Data Printout. The index correction was checked by zeroing both sextants in the pair and annotating the digital readouts in half minutes. This was done at the beginning of each day, at the end of each series of lines and whenever there was a change in anglemen. Whenever an error of more than 1.5 minutes was noted, the sextants were rezeroed.

See Eval Rpt Sect 2

Dead reckoning methods were utilized in confined areas where the launch could be accurately located by reference to shoreline features. Distances and directions to reference features were accurately noted on a boat-sheet or diagrams of the area while data was being collected. Three-point visual or range-azimuth fixes were scaled off of shoreline manuscripts as soon after data was collected as possible to permit automated data processing. Dead reckoning methods were restricted to the innermost pier areas along the water front.

H. SHORELINE

Shoreline for H-9793 was transferred from unedited class III shoreline manuscripts TP-00526 and TP-00528. These shoreline manuscripts were field edited during the course of the survey and include all areas covered by field sheet H-9793. Changes and corrections noted during field edit were not transferred to the field sheet. Contact was maintained between the field editor and hydrographer to prevent duplication of fix information. See Eval Rpt Sect 2

I. CROSSLINES

Crosslines run on this survey amounted to 27.05 nautical miles, which is equivalent to 11% of the mainscheme hydrography. This percentage is within the limits specified in the Hydrographic Manual, Fourth Edition. Crossline agreement was excellent, with 73% of the crossings agreeing exactly or within one foot, 23% agreeing within two or three feet, and 4% between four and seven feet. Those crossings which exceeded 3 feet in agreement were located in areas of steep bottom contour.

J. JUNCTIONS

Hydrographic survey H-9793 (RA-10-2-78) junctions with only one survey, H-9185, 1:5,000 scale, 1971. The junction includes an area east of the Golden Gate Bridge, (the westernmost boundary of H-9793). In the junction area nine soundings were compared. Two-thirds of the soundings compared exactly. One-quarter of the soundings agreed within one to two feet. The remaining sounding is located in an area of steep bottom contour and is in agreement comparing its position with the depth graduation. See Eval Report, Sect #6

The shoreline from Lime Point north and east to Point Cavallo, and all of Horseshoe Bay, were sounded to fill a holiday existing on H-9185 and to better effect the junction with that survey.

K. COMPARISON WITH PRIOR SURVEYS

Comparison of the present survey with H-7704, 1948 (1:10,000 scale) survey was generally good. Agreement was excellent in comparing the zero foot curve in the north-eastern portion of Richardson Bay. In the center portion of the bay the present survey is one to two feet deeper than the 1948 survey. See Eval Report, Sec #6

The entrance to Richardson Bay directly east of south Sausalito shows a general scouring of 1 to 3 feet in areas shoaler than 20 feet. Depth curves and soundings south of the 20 foot curve are in excellent agreement with H-7704.

The shoreline along the north-eastern portion of Strawberry Point shows considerable change due to a substantial amount of land fill and dredging during the construction of a boat basin. Other minor shoreline changes have occurred north east of Sausalito. Many new finger piers have been added to the Sausalito and Belvedere Cove areas since the 1948 prior survey. For more detailed information on shoreline and topographic features refer to Shoreline Manuscript T-00526. ~~Field Edit Report, OPR-L123-RA-78~~. Numerous items not disproven have been carried toward to this survey

The current depth curves in Raccoon Straits are nearly identical to those on prior survey H-7704. A 26 foot shoal is located at latitude 37°51'54", longitude 122°26'42" on H-7704. The shoal lines were run throughout this area. The shoalest sounding found was 28½. A leadline and detached position were taken on the 28½ sounding.

A comparison of the present survey with H-7620, 1:10,000 scale, 1947 was made. A general scouring is shown just north of Bluff Point at latitude 37°53'15", longitude 126°26'15". Present soundings in this area are six to eleven feet deeper than those on H-7620. Northwest and southeast from latitude 37°53'20", longitude 122°26'30" the present survey shows deposits of seven to ten feet running along a line approximately 100 meters offshore from the mean high water line. Areas further offshore were generally in agreement. The steep bottom contour directly offshore has not changed since survey H-7620 (1947) was conducted.

See Eval Report Sect #6

← vicinity of sand waves

The comparison between prior survey H-7621 (1:10,000 scale, 1947) and the present survey indicates a general scouring of the bottom of San Francisco Bay in depths less than 150 feet. The differences in depths (less than 150 feet) between the above mentioned surveys range from 0 to 14 feet. At latitude 37°48'50", longitude 122°27'00", H-7621 shows depths between 44 and 53 feet where as the current survey found depths from 59 to 66 feet. East and north of the Golden Gate Bridge depth curves greater than 150 feet are basically the same. That portion of the bay between Angel Island and Lime Point has seen ~~virtually no~~ some change in bottom contours between prior survey H-7621 and H-9793.

See Eval Report Sect #6

vicinity of Presidio Shoal

A comparison was made between H-7621A (1947) (1:2,500 scale) and the present survey's* expansion sheet #1 (1:2,500 scale). The 1947 survey is a sand wave study with survey lines running east and west. The present survey lines in this area are north and south making a comparison of the sand waves nearly impossible. Most soundings on the present survey are two to twelve feet deeper than those on the 1947 survey showing a general scouring of the area. This is not unlikely for a sand bottom that is exposed to constant strong tidal currents. Just west of the sand wave study RA-3 ran east west lines in ten meter developments over a 49 foot charted sounding. The fathogram trace showed many sand waves in the area. * not forwarded

see Eval Report, Sec 2#6

The only general statement that can be made concerning the comparison of 1947-48 and 1978 surveys is the great variability of agreement from one portion of the survey to the next. Some areas agree extremely well and others are totally changed. Sediment transport is a continual process in the Bay area, as evidenced by water visibility of from zero to two feet, and is caused by the combination of strong tidal currents and a soft mud and sand bottom. In areas where significant scouring has occurred in the last 30 years, a considerable amount of development hydrography at 10-meter spacing was run in order to disprove shoaler prior survey soundings, to prevent their being carried forward onto the present survey, and to eventually effect their removal from the chart. It was not feasible, however, to so thoroughly develop all scoured areas. In those less developed areas the general deepening trend shown by the present mainscheme hydrography is considered sufficient to discredit the shoaler prior survey soundings, and these obsolete lesser depths should not be carried forward.

see Eval Report, Sec 2#7, 9

Following is a discussion of each Presurvey Review Item falling within the limits of survey H-9793, including a description of the item, the method of investigation, the results, and a charting recommendation:

PSR ITEM #1 AND #2

DESCRIPTION:

#1 The nondangerous sunken wrecks, charted in the vicinity of latitude 37°52'21", longitude 122°30'05", originated with ~~an undetermined source~~ and have been charted since 1946. T-5926(45), shown as grounded barges, also on H-7704(48),

The area should be thoroughly examined at low water for visible evidence of the wrecks. Local authorities may have information relative to any possible salvage or removal efforts.

#2 The dangerous submerged obstruction, charted at latitude 37°52'25", longitude 122°29'53", originated through H-7704(48), ~~T-5926/45 and is not described.~~ described as steel plates (3)

Should local authorities be unable to provide adequate information relative to the present status of the feature, a wire sweep at low water with an attempt to visually identify the feature is required. Item 2 is not considered disproven. It has been carried foward as a subm obstr, chart as same

METHOD OF INVESTIGATION: Field Edit from Skiff and on foot.

RESULTS: ~~Between~~ PSR items #1 ~~and #2~~ are numerous wrecks. In the vicinity of The area may be referred to as a wreck "junkyard". Many of the wrecks are awash and others are just below the surface at MLLW. ~~Navigable limits surrounding those wrecks are delineated on Field Edit ozalid TP-00526, OPR-L123-RA-78.~~

See Verifier's Report, Para #6

~~Since it is impossible to differentiate these two specific features from the mass of scattered derelicts present~~, It is recommended that ~~these two~~ items be deleted from the chart and the ~~entire~~ area charted as "foul with wreckage" in accordance with the data submitted with ~~field edited~~ the reviewed shoreline manuscript TP-00526.

Concur

PSR ITEM #3

DESCRIPTION:

#3 The dangerous sunken wreck, PA, charted at latitude 37°52'03", longitude 122°28'55", originated with a U. S. Power Squadrons observer reporting in 1971 that this position was the true position of a wreck which is presently charted 650 meters to the southeast (CL 625/71). Since the method of positioning employed bearings from other than accurately charted features, the charted position may be significantly different than the true position.

The hydrographer should attempt to locate the wreck visually and employ a wire sweep only if considered necessary.

METHOD OF INVESTIGATION: Wire Drag

RESULTS: During the wire drag for PSR Item #3 two pieces of submerged ruins (metal plates) were found fixed in the mud bottom. No intact wreck was found. Therefore, it is recommended that the dangerous sunken wreck, PA, be deleted from the chart and that in its place submerged ruins be charted* in accordance with position data from JD 311 RA-10 (2129). This data is also recorded in the Dive Investigation Report, OPR-L123-RA-78.

See Verifier's Report, Sect #6

* chart submerged obstr (metal plates) at lat 37°52'02"N, long 122°28'49"W, positions 0002 and 0003.

Concur

PSR ITEM #4

DESCRIPTION:

#4 A nondangerous sunken wreck, ED, charted at latitude 37°51'57", longitude 122°28'29", originated with a U. S. Power Squadrons report that a fishing vessel blew up and was towed to this location to burn out (CL 889/67). A subsequent report in 1971 indicated the wreck was located as mentioned in item 3 (CL 625/71). A private attempt to locate the wreck in 1975 was unsuccessful (CL 1919/75).

See Verifications Report, Sect #6

METHOD OF INVESTIGATION: Wire Drag.

RESULTS: Wire drag was performed on PSR Item #4 and the surrounding area and no wreck was found. Neither was there any indication of a submerged ruins in the area. This item is considered disproven by wire drag and it is recommended the wreck symbol (ED) be removed from chart 18649. (For more detailed information refer to JD 311-313, RA-3 and RA-6 raw data records.) Concur

PSR ITEMS #5 and #6

DESCRIPTION:

#5 A dangerous sunken wreck, charted at latitude 37°52'32", longitude 122°28'46", originated as a visible wreck with H-7704/48 and was subsequently revised to a sunken wreck through CL 251/70. The position of the wreck was revised in 1971 as a result of a U. S. Power Squadron report (CL 625/71).

The manner in which the wreck was positioned and reported is questionable. While the observer provides a sketch showing the location of a wreck, he describes the location as that for a pipe.

See Verifications Report, Sect #6

#6 A submerged pipe, ED, charted at latitude 37°52'32", longitude 122°28'46", originated in 1972 as described under item 5. Subsequent private attempts to locate the feature have been unsuccessful (CL 1919/75).

METHOD OF INVESTIGATION: Wire Drag.

RESULTS: Many wire drag sweeps were run over PSR Items #5 and #6 and nothing was found. Ten meter development lines were also run throughout the area during hydrography without any positive results. Both the sunken wreck and the submerged pipe, ED, are

considered disproven by wire drag and hydrography and it is recommended that both be removed from chart 18649. Refer to raw data from RA-3, RA-6, JD 311-313 for more detailed information. Concur

PSR ITEM #7

DESCRIPTION:

A nondangerous sunken wreck, ED, charted at latitude 37°52'53", longitude 122°28'22", originated with H-7704/48. The wreck was described merely as being 5 feet awash. A subsequent report in 1971 stated that the wreck had not been apparent, either visible or submerged, for several years (CL 251/70). Accordingly, the feature was revised to existence doubtful.

The hydrographer should examine the area at low water and if further investigation is required, a wire sweep is recommended.

METHOD OF INVESTIGATION: Field Edit from skiff.

RESULTS: This area was searched at negative tide stages and there was no sign of any wreck.* Water depths in the area at the time of investigation were no more than 0.5 feet. Wire drag was not possible due to the shallow surrounding area. This sunken wreck, ED is considered disproven by visual observations and it's removal from chart 18649 is recommended. (Refer to FE Report TP-00526 OPR-L123-RA-78 for more complete information.) Concur

See Verifiers Report, Sect #6

*Water depths in the area at the time of investigation were no more than 0.5 foot.

PSR ITEM #10, See AWOIS Item 50568

DESCRIPTION:

Submerged piling, charted in the vicinity of latitude 37°50'37", longitude 122°28'31", originated with a U.S. Power Squadrons report in 1967 (CL 1629/67) in which a charted pier was observed to have been removed. A subsequent NOS investigation (CL 523/72) attempted to verify the report but was unsuccessful in that the total area of the feature was not examined.

from H-7621(47) Lat 37°50'36.68"N. Long. 122°28'28.19"W

The hydrographer should conduct a further investigation employing divers, if possible, and ensure that he is located over the feature and examines its entire extent.

METHOD OF INVESTIGATION: Dive Investigation.

RESULTS: A submerged sewage outfall line weighted with concrete blocks, (an upwelling pool), and several submerged piles were found in

this area and were positioned. The outfall line runs offshore from the Sausilito Marin County Sanitation Plant.

Recommendation: It is recommended that the outfall line and the discharge pool be charted. The submerged piles are located in an area presently charted (not labeled) as submerged ruins. It is recommended that the charted feature remain the same but that it be labeled as "submerged ruins". One of the piles within those ruins is a hazard to navigation (submerged 2.0 ft at MLLW) and should be charted and labeled as a submerged pile. Further information and position data are contained in the Dive Investigation Report, OPR-L123-RA-78, PSR ITEM #10. The seaward end of charted pier ruin not disproven. It has been carried foward from H-7621 (47) as submerged.

PSR ITEM #27 A pile subm 2.7 ft has been shown for conservative DESCRIPTION: pot power as a pile covered 2 ft at MLLW and should be charted as such. Pos. 300 lat 37°50'37.33"N long 122°28'32.43"W. See FE 242 (1978) for additional information.

The dangerous sunken wreck, charted at latitude 37°50'53", longitude 122°28'39", originated ~~sometime after 1961 from an undetermined source. The vessel is thought to have been a small yacht.~~ with H-7621 (1947) as a sunken wreck (small yacht).

The hydrographer should attempt to verify or disprove the wreck through local knowledge or wire sweep.

METHOD OF INVESTIGATION: Dive Investigation.

RESULTS: Two hazardous sunken wrecks were located in this area. One plotted slightly north and one slightly south of the charted symbol.

Recommendation: It is recommended that the chart be altered to show two wrecks. The symbol for the northern most wreck should be symbol #14, Section 0 - Dangers, of Chart No. 1, Nautical Chart Symbols and Abbreviations, Sixth Edition, July 1975. The southern most wreck should be symbol No. 11 of the same section. For description and position data refer to Dive Investigation Report, OPR-L123-RA-78, PSR ITEM #27. Chart both wrecks as shown on smoothsheet

See Eval Rpt Sect 6

WIRE DRAG INVESTIGATION OF LOCALLY-REPORTED WRECK

DESCRIPTION:

The description and approximate location of an uncharted wreck one quarter mile southeast of Strawberry Point in Richardson Bay was reported to RAINIER personnel by a private citizen. The wreck was described as being awash at minus tides, one to two feet above the mud.

METHOD OF INVESTIGATION: Wire drag, field observation at negative tide stages.

RESULTS: Neither the field observations nor wire drag sweeps showed any evidence of a wreck or wreck ruins. This report is considered disproven and, since there is no wreck charted in this area, no charting action is required. Concur

DESCRIPTION OF WIRE DRAG PROCEDURES

Launches RA-3 and RA-6 were used as the guide and end launches, respectively. Each launch was controlled by range/range Mini-ranger, with transponders located at ZAN 1978 and AZMO 1978. An online plot was maintained aboard each launch to provide positive steering control. At each fix a sextant cut was taken, aboard each launch, from a hydrographic signal to the end buoy to locate the actual ends of the wire. A standard plot of the various sweeps was then generated, off line, and is included with the survey records.

The bottom wire was made up of two sections of steel wire cable, each 60 meters long, and was buoyed at each end and at the junction of the two sections. Each tow cable was 60 meters long. Bottom wire lift was monitored continuously by the standby dive team, using a sounding pole and operating from a Boston Whaler. A buildup of eel grass along the wire caused small negative lifts during portions of the wire drag operations.

L. COMPARISON WITH THE CHART

This survey was compared with two charts: 18649, 45th edition, February 4, 1978 (1:40,000 scale) and 18650, 34th edition, May 20, 1978 (1:20,000 scale). Soundings were compared with blow-ups of both chart 18649 and chart 18650.

CHART 18650

The largest scale chart used during the San Francisco Bay survey was chart 18650. This chart covers all of the survey area except for the southern part of that area north of Angel Island. Depth curve and overall sounding comparison statistics are identical to those discussed in Section K.

In areas where the charted soundings differed from the present survey soundings by 5 feet or more, 10 meter development lines were run. Table I, following this section, includes the Geographic Positions and depths of the charted soundings and compares them to the present survey soundings. Eval Sect #1 see Report.

The charted wreck PA, latitude 37°49.20' N and longitude 122°27.50' W, was deeper than the charted depth. Its geographic position, however, plotted within 10 meters of the charted positions. Therefore, it is recommended that the notation "PA" be removed from the chart. Concur effective cleared See Table I, last item

The degaussing range, latitude 37°49.0' N and longitude 122°26.2' W, has been inactive for five to six years. It is scheduled to be deactivated in January or February of 1979 by the U.S. Navy. For further information contact: Mr. Donald Blair (714) 255-6631
Technical Director
Degaussing Facility See L-1076/87
Naval Station
San Diego, CA

CHART 18649

Chart 18649 (1:40,000 scale) covered the entire survey area. To avoid duplication, the collected survey data will be compared with this chart only in that area north of Angel Island that was not covered by C-18650.

Four charted wrecks in Richardson Bay were investigated as Pre-Survey Review Items. They are discussed in Section K of this report.

Hydrography run in the area of a charted islet, latitude 37°53.18'N and longitude 122°28.7'W, showed soundings greater than 0 at MLLW. The islet was not located. ~~For further discussion see Field Edit Report T-00526.~~ Not addressed in Field Edit Report. The alleged "islet" is really a "pontoon anchored in mud" as described on H-7704(48). This feature and the low water line is considered discredited by the present survey and should be deleted from the chart.

TABLE I

Expansion sheet 4 was not found

LEAST DEPTHS AT MLLW CHART C-18650	PRESENT SURVEY	GEOGRAPHIC POSITIONS LATITUDE N	LONGITUDE W	EXPANSION SHEET NUMBER	REMARKS
44'	61 foot Sounding ~~NOT PLOTTED TOTALLY~~	37°50.90'	122°27.2'	5	TWO 44'SDGS ARE CHARTED IN THIS VICINITY Source of the 44' sounding H-7621. Chart 61' sounding 45' from H-7621.
45'	51' ~~46'~~	37°50.85'	122°26.7'	5	THREE 45'SDGS ARE CHARTED IN THIS VICINITY NOTHING SHOALER THAN ~~46'~~ 51' FOUND. Chart 51'.
41'	49' ~~NOT PLOTTED~~	37°50.93'	122°26.15'	7	Source of 41' is H-7621. The prior sounding is superseded by H-9793 data.
52' ~~54'~~	53' ~~NOT PLOTTED~~	37°50.83'	122°26.40'	7	Source of 52' is H-7621. The prior sounding is superseded by H-9793 data.
COE H-7621 34'/35' (47) BP46340 (49)	36'/38 ~~35'~~	37°50.20'	122°26.65'	1	See Eval report Sect 6 Retain charted depths. THE 35' SOUNDING FROM THE PRESENT SURVEY PLOTS OVER THE CHARTED SDGS. "HARDING ROCK"
60'	59' ~~NOT PLOTTED~~	37°50.20'	122°27.10'	1	Source of the 60' is H-7621. recommend the 59' on H-9793 be charted
H7621(47) 35'/36'	37' and 38' ~~NOT PLOTTED~~	37°50.08'	122°26.4'	1	35' from COE, BP25627(1932); superseded by COE BP118319 "SHAG ROCKS" See Eval report Sect. 7b. Retain charted 36' depth, not considered disproven.
56'/56'	60 and 6.8 ~~OFF SHEET~~	37°49.85'	122°27.10'	1	Source of the Shoal soundings is H-7621. Recommend H-9793 data be used for charting of the Shoal
45'	74' ~~47'~~	37°49.70'	122°27.07'	1	THE 45' SDG IS IN THE SAME DEVELOPMENT AREA AS THE(2)56' SDGS ABOVE. Superseded by H-9793
33'	34' ~~31'~~	37°49.75'	122°26.4'	1	33' from COE ~~34'~~ 35' BP46340(49); not disproven retain charted depths BOTH A ~~33'~~ AND A ~~31'~~ SDG WERE FOUND IN THIS VICINITY "ARCH ROCK" See Eval Report Sect 7b.
44'	63' ~~NOT PLOTTED~~	37°49.55'	122°26.25'	4	Source of the 44' charted depth is H-7621. Recommend soundings from H-9793 be compiled for charting.
42'/49'	51' NOT PLOTTED	37°49.42'	122°26.20'	4	42' from COE CL 581(65), BP67754-5. 49' from CAS. CL 716(76), BP94997 Retain charted depths
43'/45'	55' ~~NOT PLOTTED~~	37°49.25'	122°26.26'	4	Source for the soundings 43' and 45' is H-7621 Recommend the soundings from H-9793 be charted

TABLE I

CHART C-18650	LEAD DEPTHS AT MLLW: PRESENT SURVEY	GEOGRAPHIC POSITIONS: LATITUDE N	GEOGRAPHIC POSITIONS: LONGITUDE W	EXPANSION SHEET NUMBER	REMARKS
49'	58' ~~NOT PLOTTED~~	37°49.18'	122°26.6[2]'	1	Source of the 49' is COE CL 621 (60) BP 59758 The 49' is superseded. Chart according to H9793.
43'/43'	49'/61 ~~47'~~	37°48.93'	122°27.10'	1 or 6	Source of the 43' is COE CL581(65). BP 67754-5. Chart according to H9793.
41'	57' ~~50'~~	37°48.80'	122°27.25'	6	Source of the 41' is H-7621. Chart present survey depths THE NEXT FIVE SOUNDINGS WERE RUN IN ONE BIG GROUP. THE SHOALEST SOUNDING IN THE GROUP WAS ~~46'~~ 48'
40'	50' ~~47'~~	37°48.75'	122°27.35'	6	Source of 40' is COE CL621(60) BP59758. The 40' is superseded by H9793. Chart according to H9793
41'/42'	50' ~~46'~~	37°48.80'	122°27.57'	6	Source of 41 and 42 is COE CL581(65) BP67754-5. The 41' and 42' are superseded by H-9793. Chart according to H9793.
46'	52' ~~50'~~	37048.80'	122°27.7'	6	Source of 46' is COE CL621(60) BP67754-5 The 46' is superseded by H-9793. Chart according to H9793.
53'	90' ~~57'~~	37°48.80'	122°27.9'	6	Source of 53' is H-7621. Recommend H9793 data be used to supersede the 53'.
89'	75' ~~74'~~	37°49.36'	122°28.1'	2	THE 7[5]4' SOUNDING PLOTS WITHIN 50 METERS OF THE CHARTED 89' SOUNDING. H9793 Supersedes the 89'.
60' (cleared depth)	99' ~~97'~~ Pos 4320 & 4322	37°49.20'	122°27.50'	2	THE CHARTED 60'SDG OVER THE WRECK IS TAKEN FROM WIRE DRAG RESULTS. THE PRESENT WRECK POSITION IS WITHIN 10 METERS OF THE CHARTED POSITION.
					RECOMMEND THE "PA" BE REMOVED FROM CHARTED WRECK NOTATION. Concur, Origon of 60 ft cleared depth is Notice to Mariner 4 of 1953, through CL 44(83)
					The 99 ft on H9793 is not necessarily the least depth. Retain the 60 ft cleared depth (WK-FERNSTREAM) AWOIS # 50112

M. ADEQUACY OF SURVEY

Survey H-9793 is complete and adequate to supersede all prior surveys for charting purposes. All fathogram field survey records were scanned and checked for peaks and deeps; appropriate changes were made to the original records. See Eval Report, Sect #8, 3 and A.

N. AIDS TO NAVIGATION

Twelve fixed aids to navigation were located during this survey. Three of the fixed aids are lighted channel markers and eight are channel day markers in Richarson Bay. The remaining aid is a QK Fl Red 21 ft "2" light east of Stone Tower. The twelve fixed aids have been geodetically located to Third Order Class I accuracy standards. ✓

There are fifteen channel day markers charted in Richardson Bay (on C-18649 with notation Mkr). Eight of these channel markers are still in existence and have been located geodetically. The remaining seven day markers no longer exist and it is recommended that they be removed from the chart. ✓

Detached Positions were taken on 13 buoys in the survey area. All but one of the 13 buoys are charted on either C-18649 or C-18650. The uncharted buoy is located in Richardson Bay. It is an Orange and White sphere buoy at latitude 37°52'30.6~~01~~61"N, longitude 122°28'42.~~488~~61"W; identified as a mooring buoy, position 108. ✓

Position discrepancies of all floating aids, in cases where the charted location differed from the present computed position, were resolved on JD 322 when all of the computed positions were found to be correct. ✓

Tables II and III compare the charted locations of all fixed and floating aids to their present locations. Table II addresses Chart 18649 while Table III addresses Chart 18650. ✓

The eight channel day markers which have been located in Richardson Bay are ~~Coast Guard~~ privately maintained, ~~They have not been mentioned specifically in the Light List (U.S. Coast Guard 1978) but there is a general reference to channel markers in Richarson Bay~~. and were placed by the Dept of Public Works, County of Marin (approx positions) through the Notice to Mariners 24 of 1977 ✓

The following is a list of charted buoys which do not appear in the Local Light List: See Table II

Buoy	Geographic Position	
N "A" W&Or	37°48'38"N	122°26'46"W
N "B" W&Or	37°48'29"N	122°26'44"W
C "C" W&Or	37°48'34"N	122°28'00"W
N "D" W&Or	37°48'31"N	122°27'10"W
Sp "Y" W&Or	37°50'19"N	122°27'58"W

The N"B" buoy mentioned above is charted as N on Chart 18649 (1:40,000 scale), however, it is charted as N"B" on C-18650 (1:20,000 scale). It is recommended that the buoy on C-18649 be corrected to read N"B".

Refer to Horizontal Control Report OPR-L123-RA-78 and NOAA Form 76-40 'Non Floating Aids to Navigation and Landmarks' for more complete information on geodetically located fixed aids to navigation.

T/ E II

(1:40,000 SCALE)

CHARTED MARKER AND BUOY COMPARISON

CHART C-18649

CHARTED LOCATION (SCALED)	CHARACTERISTIC	PRESENT LOCATION/RECOMMENDATIONS	LOCATED BY	A OR B SHEET
* 37°52'21"N 122°29'27"W Indicated in the LNM as OBN 1	Mkr	DOES NOT EXIST RECOMMEND REMOVAL FROM C-18649 Concur	HORIZONTAL CONTROL - THIRD ORDER CLASS I	A SHEET RICHARDSON BAY
* 37°52'22"N 122°29'31"W 30 OBN 2	Mkr	DOES NOT EXIST RECOMMEND REMOVAL FROM C-18649 Concur	"	"
** 37°52'25"N 122°29'37"W	Mkr No.1	37°52'25.534"N 122°29'36.266"W NONE	"	"
** 37°52'27"N 122°29'33"W	Mkr No.2	37°52'26.520"N 122°29'33.356"W NONE	"	"
* 37°52'37"N 36 OBN4 122°29'32"W	Mkr	DOES NOT EXIST RECOMMEND REMOVAL FROM C-18649 Concur	"	"
** 37°52'41"N 122°29'38"W	Mkr No.4	37°52'41.413"N 122°29'38.716"W NONE	"	"
** 37°53'12"N 122°29'52"W	Mkr No.5	37°53'13.306"N 122°29'51.861"W	"	"
* 37°53'14"N 122°29'50"W OBN5	Mkr	DOES NOT EXIST ROCOMMEND REMOVAL FROM C-18649 Concur	"	"
** 37°53'15"N 13 122°29'52"W	Mkr No.6	37°53'15.932"N 122°29'51.224"W NONE	"	"
** 37°53'18"N 17 122°29'53"W 49	Mkr No.7	37°53'17.686"N 122°29'53.578"W NONE	"	"
* 37°53'18"N 17 122°29'54"W 53 OBN 7	Mkr	DOES NOT EXIST Delete from chart	"	"
* 37°53'33"N 33 122°29'50"W JCT OBN	Mkr	DOES NOT EXIST Delete from chart	"	"
* 37°53'34"N 39 122°29'50"W OBN 10	Mkr	DOES NOT EXIST Delete from chart	"	"

TAB[illegible] II

(1:40,00[illegible] SCALE)

CHARTED MARKER AND BUOY COMPARISON

CHART C-18649

CHARTED LOCATION (SCALED)	CHARACTERISTIC	PRESENT LOCATION/RECOMMENDATIONS	LOCATED BY	A OR B SHEET
** 37°53'34"N 122°29'59"W	Mkr No.10	37°53'32.958"N 122°29'57.756"W	HORIZONTAL CONTROL - THIRD ORDER CLASS I	A SHEET RICHARDSON BAY
** 37°53'34"N 122°30'00"W	Mkr No.9	37°53'32.597"N 122°29'59.481"W	"	"
37°52'05"N 122°29'23"W	RED NUN BUOY #8	37°52'04.184"N 122°29'21.247"W See Eval Report Sect 7.c.	#2439	A SHEET JD 322 RA-6
37°51'55"N 122°29'05"W	Fl R 4 SEC 15 ft "6" Channel Marker	37°51'55.754"N 122°29'07.232"W	Signal #317 Geodedically Located Third Order Class I	A SHEET
37°51'41"N 122°28'40"W	Fl R 6 SEC 15 ft Ra Channel 3M"4" Ref Marker	37°51'41.447"N 122°28'39.624"W SAME	Signal #316 Geodedically Located Third Order Class I	A SHEET
37°51'22"N 122°28'04"W	Fl R 4 SEC 15 ft 4M"2" RaRef Channel Marker	37°51'21.528"N 122°28'03.372"W SAME	Signal #315 Geodedically Located Third Order Class I	A SHEET
NOT CHARTED	W/Or Sphere Buoy Mooring buoy	37°52'30.67"N 122°28'42.61"W	HYDROGRAPHY	A SHEET JD 312 WIRE DRAG (par 108)

Source:

* LNM 24/1977, Dept of Public Works, County of Marin, private aids established (approx. position)

** Chart Letter 967/1976 (Item 14c), Chart Adequacy Survey (sextant position)

It is recommended that the charted markers be deleted from the chart and present survey information charted. Refer to NOAA Form 76-40 appended for fixed aids.

TA E III

(1:20,000 Scale)

CHARTED MARKER AND BUOY COMPARISON

C-18650

CHARTED LOCATION (SCALED)	CHARACTERISTIC	PRESENT LOCATION (BY D.P.)	FIX POS#/LOCATED BY	A OR B SHEET	RECOMMENDATIONS
37°50'19"N 122°28'13"W	W Or SP"Y" Buoy	37°50'18.561"N 122°27'57.813"W	2840 HYDROGRAPHIC	B SHEET JD 322	Change Charted Position to Present Position
37°48'36"N 122°27'57"W	W/Or C"C" Buoy	37°48'33.938"N 122°27'59.553"W	6541 HYDROGRAPHIC	B SHEET JD 278	NONE
37°48'27"N 122°27'35"W	R N"2" Buoy	37°48'27.957"N 122°27'34.668"W	6542 HYDROGRAPHIC	B SHEET JD 278	NONE
37°48'30"N 122°27'09"W	W/Or N"D" Buoy	37°48'30.747"N 122°27'09.766"W	6543 HYDROGRAPHIC	B SHEET JD 278	NONE
37°48'27"N 122°26'52"W	FL R 4 SEC 10 ft Light	37°48'27.05"N 122°26'51.75"W	Office Compiled SF submarine Outfall Light on Photo Located Third Order Class I	B SHEET JD 278	NONE T-00528 See Form 76-40
37°48'32"N 122°26'42"W	W/Or N"B" Buoy	37°48'29.146"N 122°26'43.601"W	6546 HYDROGRAPHIC	B SHEET JD 278	Change Charted Position to Present Position
37°48'39"N 122°26'40"W	W/Or N"A" Buoy	37°48'38.184"N 122°26'45.571"W	6545 HYDROGRAPHIC	B SHEET JD 278	Change Charted Position to Present Position
37°48'39"N 122°26'31"W	W/Or SP"X" Buoy	37°48'36.362"N 122°26'32.309"W	6547 HYDROGRAPHIC	B SHEET JD 278	Change Charted Position to Present Position
37°51'40"N 122°27'23"W	Fl 4 SEC "3" Black Buoy	37°51'38.851"N 122°27'23.807"W	2440 HYDROGRAPHIC	B SHEET JD 322	
37°51'10"N 122°26'35"W	Fl R 4 SEC R"2"	37°51'10.242"N 122°26'33.902"W	5013 HYDROGRAPHIC	B SHEET JD 306/307	NONE
37°50'17"N 122°26'42"W	RB "HR" 1 QK Fl R	37°50'17.683"N 122°26'42.431"W	2838 HYDROGRAPHIC	B SHEET JD 322	NONE
37°50'38"N 122°27'07"W	Fl G 4 SEC "1"	37°50'39.730"N 122°27'09.503"W	2839 HYDROGRAPHIC	B SHEET JD 322	NONE
37°52'15"N 122°27'12"W	Fl G 4 SEC Black Buoy #1	37°52'16.460"N 122°27'13.114"W	2441 HYDROGRAPHIC	B SHEET JD 322	NONE

O. STATISTICS

VESSEL NO.	N.M.	SQ. N. MI.	POSITIONS	BOTTOM SAMPLES
2123	281.35	4.5	2480	4
2125	0	0	42	42
2126	194.0	6.0	1813	0
2129	10	0.75	598	22
TOTAL	485.35	11.25	4933	68

P. MISCELLANEOUS

A bird santuary is maintained by the National Audubon Society in that portion of Richardson Bay north and east of Strawberry Point; the area is marked by temporary buoys. A yearly advisory closure is set between October 15 and March 15 by the National Audubon Society, and is published in Local Notice to Mariners. This has proved to be an effective measure to keep mariners out of the area. No charting recommendations are necessary. ✓

While scanning the fathograms east of the Golden Gate Bridge, a definite pattern of sand waves was noted on lines running east and west (refer to raw data fathogram JD 292 RA-3). The sand waves vary in height from 5 to 10 feet. Prior survey H-7621A is a sand wave study on Presidio Shoal which was conducted in 1948. ✓

The waterfront at the head of Richardson Bay is experiencing many changes due to growth and expansion of communities along the shoreline. Construction of additional boat basins and harbors, which will involve shoreline changes and dredging operations, may be expected in the years to come. ✓

Q. RECOMMENDATIONS

This survey is complete and adequate to supersede all previous hydrography in the area.

see Eval. Report, Sect #9

A private sand dredging barge has been observed working on Alcatraz Shoal. Through the Army Corps of Engineers it was learned that the Moe Sand and Gravel Company has a five to ten year permit to dredge up to 250,000 cubic feet of sand and gravel per day in the Alcatraz Shoal area. There are at least two other companies operating under ✓

similar permits currently active in the area.

Maintenance dredging is performed annually by private companies as well as by the Corps of Engineers in active shipping channels. Many private dredging projects are performed in a continuing basis to control the silting which takes place in small boat harbors throughout San Francisco Bay. The boat basin north of Strawberry Point, in Richardson Bay, is a typical example.

R. AUTOMATED DATA PROCESSING

Data acquisition and processing were accomplished as per instructions in the Hydrographic Manual, Fourth Edition, Manual of Automated Hydrographic Surveys, and the PMC OPORDER.

Soundings and position data were obtained by the Hydroplot System using programs RK111, RK171, RK175, RK176, in addition to using the ASI logger for range/azimuth acquisition.

For each master tape there is a corresponding corrector tape which includes the vessels TRA, electronic control corrections, and all corrections to depths. Velocity correctors generated from Nansen Cast data are recorded on the accompanying Velocity Corrector Tapes.

The following is a list of all computer programs used for data acquisition or processing:

PDP 8/e Computer Programs		Version Date
RK111	Range Range Real Time Plot	1/30/76
RK171	Visual Hydrolog	5/18/76
RK175	Visual Hydrolog	5/03/76
RK176	Visual Hydrolog - RK175 Restart	5/01/74
FA181	Range Azimuth Logger	2/23/78
RK201	Grid, Signal, and Lattice Plot	7/12/75
RK211	Range-Range Non-Real Time Plot	1/15/76
RK212	Visual Station Table Load	4/01/74
RK215	Visual Non-Real Time Plot	8/16/74
RK300	Utility Computations	2/10/76
RK330	Data Reformat & Check	8/15/78
PM360	Electronic Corrector Abstract	2/02/76
RK407	Geodetic Inverse/Direct Computation	10/23/75
RK409	Geodetic Utility Package	9/05/73
RK500	Predicted Tide Generator	11/10/72
RK530	Layer Correctors for Velocity	5/10/76
RK561	H/R Geodetic Calibration	2/19/75
RK602	Elinore - Line Oriented Editor	5/20/75
RK603	Tape Consolidator	10/10/72
RK606	Tape Duplicator	8/22/74

S. REFERRAL TO REPORTS

Corrections to Echo Soundings Report, OPR-L123-RA-78
Field Edit Reports, TP-00526, TP-00528, OPR-L123-RA-78
Horizontal Control Report, OPR-L123-RA-78
Electronic Control Report, OPR-L123-RA-78
Coast Pilot Report, OPR-L123-RA-78

Respectfully submitted,

Alan D. Anderson LC, NOAA

for Marianne Molchan
Ltjg NOAA

FIELD TIDE NOTE
OPR-L123-RA-78
H-9793 , H-9794
San Francisco Bay, California

The Presidio tide station (#941-4290) was utilized as the control gage for tidal datums with predicted tides being generated using PROGRAM AM 500, PREDICTED TIDE GENERATOR (version November 10, 1972). One historic tide station was occupied and monitored by a contract tide observer. The gage was operated on Pacific Standard Time to maintain uniformity with the gages that were installed by the California Tide Party.

T1, Pier 22 1/2, 941-4317

The tide station at LAT 37° 47'25"N, LONG 122° 23'13.5"W was occupied from September 25, 1978 to November 22, 1978. A Fisher-Porter ADR gage, SN 7304A1380M11, was installed with 9.90 feet on the gage corresponding to 0.00 feet on the tide staff. Metric installation levels and removal levels, connecting the tide staff to 5 benchmarks, were run on September 23, 1978 and November 20, 1978 respectively.

	Difference of Elevations	
	September 23, 1978	November 20, 1978
staff stop - BM 179	+0.926 m	+0.922 m
BM 179 - BM 1	+1.391 m	+1.394 m
BM 1 - BM M329	-0.398 m	-0.400 m
BM M329 - BM V813	-0.161 m	-0.164 m
BM 1 - BM DD109	+4.767 m	+4.764 m

Staff to gage comparison observations were conducted on September 26, 1978 from before high tide to after low tide with a total of 35 observations for comparison. The maximum deviation from the mean observation was 0.09 feet, as the upper bound, and 0.08 feet, as the lower bound.

The time was reset for this gage on two separate occasions, the first for being 3 minutes fast and the second for being 6 minutes fast. From 1206 L on November 20, 1978 to 1136 L on November 21, 1978 the gage double punched or punched intermittently and as such the data is suspect.

T1 to Predicted Tide Comparison

A table comparing T1 data with predicted tides for three distinct three day sequences follows, in the format of time of high, time of low, and tidal range. All times are local.

	Predicted Tides	T1
September 27, 1978	2046	2030
	0230	0221
	4.84 feet	4.91 feet
September 28, 1978	2136	2121
	0310	0300
	5.06 feet	5.24 feet
September 29, 1978	2220	2212
	0344	0324
	5.06 feet	5.31 feet
October 10, 1978	1829	1824
	0018	0006
	5.72 feet	5.78 feet
October 11, 1978	1949	1954
	0121	0106
	5.72 feet	5.99 feet
October 12, 1978	0907	0851
	0216	0203
	6.05 feet	5.88 feet
November 13, 1978	1031	1027
	1707	1645
	7.48 feet	7.27 feet
November 14, 1978	1106	1054
	1746	1739
	7.48 feet	7.40 feet
November 15, 1978	1142	1148
	1825	1833
	7.37 feet	7.34 feet

Recommended Zoning

Zoning is recommended using the discrete tidal zoning method due to tidal differences within the broad survey limits on H-9793 and H-9794.

Comments

The remaining tide gages, as called for in the project instructions dated August 10, 1978, were installed, operated, and maintained by the California Tide Party.

MASTER STATION LIST
OPR-L123-RA-78
SAN FRANCISCO BAY, CA

FINAL VERSION

```
101 3  37 49 34672 122 25 15758  250 0068 000000
/ALCATRAZ LIGHTHOUSE 1910 M/R                371221(4120)

102 0  37 51 50727 122 28 07118  250 0002 000000
/CONE ROCK LIGHT 1977  M/R                   371221(4139)

103 2  37 51 40053 122 26 42297  250 0021 000000
/PT STUART LIGHTHOUSE 1928  M/R              371221(4176)

105 3  37 51 42422 122 25 45399  250 0210 329649
/ANGEL ISLAND PEAK  3 1956  (RED RAYDIST) 371221(4003)

106 3  37 49 30968 122 22 01346  250 0012 329649
/ALLEY  1978  (GREEN RAYDIST)                371221

107 3  37 50 06483 122 28 17136  250 0017 000000
/RANGE 1931   M/R                            371221(4062)

108 3  37 52 24607 122 26 52462  139 0016 000000
/TIB 1978                                    371221

109 6  37 52 06598 122 26 15682  139 0000 000000
/IONE 1978                                   371221

110 0  37 52 49460 122 26 15595  139 0003 000000
/RACCOON STRAIT LT 5 1978                    371221

111 3  37 52 41199 122 31 05202  250 0080 000000
/ZAN 1978  M/R                               371224

112 3  37 53 47307 122 21 16205  254 0061 329649
/BROOKS ISLAND ECC. (RAYDIST)

113 3  37 53 39120 122 29 50774  250 0027 000000
/PRESERVE  1978  M/R
```

114 3 37 52 43800 122 29 53198 250 0037 000000
/HYDRO 1978 M/R

200 3 37 48 30219 122 27 08821 139 0003 000000
/ANITA ROCK LIGHT 1965 371221(4322)

201 3 37 53 44358 122 29 16945 250 0000 000000
/AZMO 1978 M/R 371221

202 1 37 49 31878 122 28 38028 250 0010 000000
/LIME POINT LIGHT 1977 M/R 371221(4028)

203 7 37 51 40011 122 26 42445 243 0017 000000
/PT STUART LT ECC.

300 3 37 48 50676 122 28 36431 139 0230 000000
/GOLDEN GATE BRIDGE SOUTH PIER 1954 371221(4143)

301 3 37 49 32024 122 28 41266 139 0230 000000
/GOLDEN GATE BRIDGE NORTH PIER 1954 371221(4142)

~~302 3 37 55 26169 122 35 43992 139 0810 000000~~
~~/MOUNT TAMALPAIS RADAR DOME 1962 371224(1017)~~

303 1 37 51 11835 122 25 05197 139 0015 000000
/POINT BLUNT LIGHT 1978 371221

304 3 37 48 08783 122 24 17037 139 0100 000000
/COIT MONUMENT 1933 371221(4137)

305 4 37 48 20492 122 22 07603 139 ~~0000~~ 147 000000
/SAN FRANCISCO OAKLAND BAY BRIDGE PIER 1 1954 371221(4189)

~~306 0 37 48 03080 122 22 26257 139 0000 000000~~
~~/SAN FRANCISCO-OAKLAND BAY BRIDGE PIER 2 1954 371221(4190)~~

307 4 37 47 44337 122 22 46339 139 ~~0000~~ 160 000000
/SAN FRANCISCO OAKLAND BAY BRIDGE PIER 3 1954 371221(4191)

308 0 37 47 ~~26921 122 23 04994 139 0000 000000~~
~~/SAN FRANCISCO-OAKLAND BAY BRIDGE PIER 4 1954 371221(4192)~~

309 3 37 47 42830 122 24 06072 139 ~~0000~~ 270 264 000000
/TRANS AMERICAN BLDG. 1976 371221

310 3 37 45 19566 122 27 05920 139 ~~0000~~ 552 000000
/MT SUTRO N ANTENNA 1976 371221

~~311 3 37 45 18581 122 27 05918 139 0000 000000~~
~~/MT SUTRO S ANTENNA 1976 371221~~

~~312 3 37 45 19078 122 27 06993 139 0000 000000~~
~~/MT SUTRO W ANTENNA 1976 371221~~

313 4 37 48 34964 122 21 51400 139 ~~0000~~ 126 000000
/USCG VTS RADAR, YBI 371221

315 3 37 51 21528 122 28 03372 139 0002 000000
/SAUSALITO CHAN LT 2 1978 371221

316 3 37 51 41447 122 28 39624 139 0002 000000
/SAUSALITO CHAN LT 4 1978 371221

317 3 37 51 55754 122 29 07232 139 0002 000000
/SAUSALITO CHAN LT 6 1978 371221

318 3 37 50 11764 122 28 16033 139 ~~0020~~ 28 000000
/YELLOW BLUFF LIGHT 1978 371221

319 3 37 54 44193 122 22 37471 139 ~~0119~~ 133 000000
/POINT RICHMOND PG AND E GAS TANK 1951 371221(4175)

~~320 3 37 51 03391 122 29 50563 139 0335 000000~~
~~/SAUSALITO RADIO STATION KDFG-KEAR TOWER 1960 371221(4220)~~

321 3 37 52 55248 122 23 56940 139 0000 000000
/SOUTHAMPTON SHOAL LIGHT 1978

~~322 1 37 50 58109 122 21 34039 139 0000 000000~~
~~/BERKELEY BREAKWATER LIGHT 2 1978~~

~~323 3 37 51 45429 122 25 04444 139 0000 000000~~
~~/SAN FRANCISCO BAY N CHANNEL LT 5 1978~~

324 3 37 53 31707 122 26 51629 139 ~~0000~~ 13 000000
/CALIFORNIA CITY NAVAL NET DEPOT STANDPIPE 1947 371221(4122)

325 3 37 55 44700 122 25 47312 139 0052 000000
/RED ROCK 1851 371221

326 3 37 56 24061 122 29 09321 139 0000 000000
/SAN QUENTIN ARSENAL TOWER 1962 371221(4213)

~~327 3 37 56 41440 122 30 16200 139 0000 000000~~
~~/GREEN BRAE RED BRICK STACK 1951 371224(1040)~~

328 3 37 51 58017 122 26 05308 139 0000 000000
/ANGEL ISLAND AYALA COVE FLAG POLE 1978

~~329 3 37 50 02970 122 28 29150 139 0000 000000~~
~~/OKE 1948 371221(4152)~~

330 3 37 47 43804 122 23 33089 139 0000 000000
/SAN FRANSISCO FERRY BLDG. FLAGSTAFF 1910 371221(4186)

332 3 37 48 26462 122 21 40177 139 0000 000000
/YERBA BUENA LIGHT HOUSE 1919 371221(4227)

336 3 37 48 00632 122 19 50118 139 0000 000000
/OAK. HARBOR LIGHT HOUSE 1919 371221(4155)

338 3 37 48 28021 122 19 11606 139 0000 000000
/OAK. NAVY SUPPLY DEPOT RED&WHITE CHECKERED TANK 1947 371221(4158)

341 3 37 47 09761 122 23 28898 139 0000 000000
/SAN FRANSISCO UNION OIL CO BLDG TOWER 1978

342 3 37 45 21857 122 23 50749 139 0000 000000
/SAN FRANCISCO PG&E POTERERO PLANT STACK 1977

343 3 37 49 02432 122 22 10919 139 0000 000000
/TREASURE ISLAND BUILDING ONE CUPOLA 1978

344 3 37 49 09438 122 22 13131 139 0000 000000
/TREASURE ISLAND RED&WHITE RADIO TOWER 1978

345 3 37 49 08432 122 21 56470 139 0000 000000
/SHORT RADIO TOWER

346 3 37 52 19650 122 15 24221 139 0000 000000
/CAMPANILE, UNIV. OF CALIF. 1916 371221(4136)

347 3 37 49 54680 122 17 25860 139 0000 000000
/E. J. IRON WORKS CENTER STACK 1978

348 3 37 49 26790 122 19 11570 139 0000 000000
/RADIO TOWER, WEST OF THREE 1978

349 3 37 49 27150 122 19 09800 139 0000 000000
/RADIO TOWER, CENTER OF THREE 1978

350 3 37 47 04220 122 17 47120 139 0000 000000
/ALAMEDA RED & WHITE TANK 1978

400 5 37 52 13385 122 27 37666 252 0000 000000 OK do not delete
/PILING HYDRO SIGNAL

500 3 37 52 19~~170~~ (212) 122 27 34~~765~~ (928) 243 0000 000000
/WEST YACHT HARBOR BREAKWATER(PHOTO SIGNAL) TP-00526

501 4 37 52 18~~750~~ (22) 122 27 16~~500~~ (664) 243 0000 000000
/EAST YACHT HARBOR BREAKWATER(PHOTO SIGNAL) TP-00526

502 0 37 52 19~~300~~ 405 122 26 ~~58210~~ 57946 243 0000 000000
/ROCK-PT. TIBURON(PHOTO SIGNAL) TP-00526

503 3 37 52 34~~090~~ 510 122 26 ~~31730~~ 31257 243 0000 000000
/ROCK, KIEL COVE(PHOTO SIGNAL) TP-00526

504 4 37 52 0692~~0~~ 8 122 26 025~~10~~ 458 243 0000 000000
/FERRY PIER ANGEL IS.(PHOTO SIGNAL) TP-00526

CALBRATION VALUES:

AT STATION 200
106 - 170.51 105 - 137.96 112 - 236.76

AT STATION 110(RACOON STRAIT LT 5)
106 - 191.91 112 - 165.67

AT STATION 322(BERKELEY BREAKWATER LT 2)
105 - 139.48 106 - 56.96 112 - 119.23

AT STATION TREASURE IS N END LT 6
105 - 131.97 106 - 21.36 112 - 157.71

APPROVAL SHEET

DESCRIPTIVE REPORT TO ACCOMPANY

HYDROGRAPHIC SURVEY

H-9793

RA-10-2-78

In producing this sheet, standard procedures were observed in accordance with the Provisional Hydrographic Manual and the PMC OPORDER. The data was examined by me daily during the execution of the survey.

The boatsheet and the accompanying records have been examined and are complete and adequate for charting purposes and are approved.

James P. Randall
Captain NOAA

May 31, 1979

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

TIDE NOTE FOR HYDROGRAPHIC SHEET

Processing Division: Pacific Marine Center:

Hourly heights are approved for

Tide Station Used (NOAA Form 77-12): 941-4819 Sausalito, COE Dock, CA
941-4290 San Francisco, CA
941-4806 Sausalito, CA

Period: September 26 - November 18, 1978

HYDROGRAPHIC SHEET: H-9793

OPR: L 123

Locality: San Francisco Bay, California

Plane of reference (mean lower low water): 10.60 ft. - Sausalito, COE Dock
5.75 ft. - San Francisco
2.94 ft. - Sausalito

Height of Mean High Water above Plane of Reference is 5.0 ft.

Remarks: Recommended zoning:

(1) South of 37°50' and east of the Golden Gate Bridge zone direct on San Francisco.

(2) In Richardson Bay (north of a line extending between the points 37°51.5'N, 122°28.7'W, and 37°52.1'N, 122°27.9'W) zone direct on Sausalito, COE Dock.

(3) North of 37°50' to Raccoon Strait zone direct on Sausalito.

James R Hubbard
Chief, Datums and Information Branch

NOAA FORM 76-155
(11-72)

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

GEOGRAPHIC NAMES

SURVEY NUMBER

H-9793

1.(9)

Name on Survey	A On chart no. 18650	B ~~On previous survey~~ No. Chart 18644	C On U.S. Quadrangle maps	D From local information	E On local maps	F P.O. Guide or map	G ~~Rand McNally Atlas~~ TP-00526	H U.S. Light List	TP-00528	
ALCATRAZ SHOAL	X	X								1
ALMONTE		X					X			2
ANGEL ISLAND	X	X					X			3
ANITA ROCK	X	X								4
ARCH ROCK	X	X								5
AYALA COVE							X			6
BELVEDERE		X					X			7
BELVEDERE COVE		X					X			8
BELVEDERE ISLAND							X			9
BLUFF POINT		X					X			10
CONE ROCK		X					X			11
FORT POINT	X	X							X	12
GOLDEN GATE	X	X							X	13
GOLDEN GATE BRIDGE (cultural)	X	X							X	14
HARDING ROCK	X	X								15
HILARITA		X					X			16
HORSESHOE BAY	X	X							X	17
KEIL COVE							X			18
LIME POINT	X	X							X	19
~~MANZANITA~~		X					X			20
MARIN CITY		X					X			21
MARIN PENINSULA		X					X		X	22
NEEDLES	X								X	23
PENINSULA POINT		X					X			24
POINT CAVALLO	X	X							X	25

NOAA FORM 76-155 SUPERSEDES C&GS 197

NOAA FORM 76-155
(11-72)

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

SURVEY NUMBER

H-9793

GEOGRAPHIC NAMES

Name on Survey	A ON CHART NO. 18650 ~~OR PREVIOUS SURVEY~~	B NO. CHART 18649	C ON U.S. QUADRANGLE MAPS	D FROM LOCAL INFORMATION	E ON LOCAL MAPS	F P.O. GUIDE OR MAP ~~OTHER~~	G TP-00526	H U.S. LIGHT LIST TP-00528		
POINT CAMPBELL		X					X			1
POINT CHAUNCEY		X					X			2
POINT KNOX	X	X							X	3
POINT KNOX SHOAL	X	X								4
STUART POINT		X					X			5
POINT TIBURON		X					X			6
POINT IONE	X	X							X	7
PRESIDIO SHOAL	X	X								8
RACCOON SHOAL		X								9
RACCOON STRAIT		X					X			10
REED		X					X			11
RICHARDSON BAY		X					X			12
SAN FRANCISCO	X	X							X	13
SAUSALITO	X	X					X		X	14
SAUSALITO POINT	X									15
SHAG ROCKS	X	X								16
SILVA ISLAND		X					X			17
STRAWBERRY POINT		X					X			18
TIBURON		X					X			19
TIBURON PENINSULA		X					X			20
WALDO		X					X			21
YELLOW BLUFF	X	X							X	22
SAN FRANCISCO BAY	X	X					X		X	23
COYOTE CREEK										24
PICKLEWEED INLET		X								25

Approved:

Charles E. Harrington

Chief Geographer - NOS/CG2x5

AUG 07 1984

NOAA FORM 76-155 SUPERSEDES C&GS 197

"Superseded by
Evaluation Report"

PACIFIC MARINE CENTER
VERIFIER'S REPORT

REGISTRY NO: H-9793 FIELD NO: RA-10-2-78

SURVEYED: September 26 - November 21, 1978

SCALE: 1:10,000 PROJECT NO: OPR-L123-RA-78

SOUNDINGS: Ross Fineline Fathometer RA-3 S/N 1080, RA-5 S/N 1040, RA-6 S/N 1042; Raytheon DE 7178 RA-10, Hand Lead, Pole

CONTROL: R/R MiniRanger, R/R Raydist, R/A Miniranger/ T2, Visual, Dead Reckoning

Chief of Party.....CAPT James P. Randall

Surveyed by.....LTJG Marianne Molchan, LTJG Douglas Brockhouse, LTJG Dean A. Keller, ENS Bruce Hillard, ENS Doug Smith, ENS Donna Stotler

Automated Plot by.....PMC Xynetics Plotter

Verified by.....John E. Lotshaw

1. INTRODUCTION

Hydrography on H-9793 covers that portion of San Francisco Bay bounded on the east by Longitude 122°26'00"W on the south by the city of San Francisco, on the west by the Golden Gate Bridge and the shore of Richardson Bay, and on the north by the shorelines of Richardson Bay and the Tiburon Peninsula. The section of H-9793 extending to the east of the Tiburon Peninsula is bounded on the north by Latitude 37°53'50".

Tide parameters were developed from gages located at the Corps of Engineers Dock, Susalito, and San Francisco. Details of tide gage locations and operating parameters are contained in the parameter listing file for H-9793.

No unusual problems were encountered in processing data on H-9793.

2. CONTROL AND SHORELINE

a. A variety of control systems were used during field work on H-9793. Owing to the complex topography of San Francisco Bay, all systems of survey control became unusable at some point. Hydrographers

used Raydist, Mini Ranger, Range Azimuth, and visual fixing systems in various locations within the survey sheet limits. In areas where no fixing system could be used, such as alongside docks and piers, dead reckoning was used. Positioning in such cases was by reference to known objects.

The survey records do not contain any documentation of methodology used to locate hydrographic signal #400. The signal location appears to be correctly located, however.

b. Shoreline on H-9793 was derived from Class I unreviewed maps TP-00526 and TP-00528. Date of photography for both maps was March, 1977. TP-00526 was field edited in October and November, 1978, with final compilation complete in February, 1980. TP-00528 was field edited in October, 1978, and received final compilation in July, 1979.

3. HYDROGRAPHY

Crosslines are in adequate agreement with the main scheme of hydrography. Such differences as do occur are located in areas of steep slopes or rough bottom and do not constitute a conflict of data.

The sounding pattern on H-9793 is relatively dense, allowing detailed depth curves to be drawn in most areas. Dense cultural detail in some inshore areas has required the breaking or deletion of some depth curves in certain inshore areas. The bottom configuration is adequately developed by H-9793. Least depths over critical features are not sufficiently developed in all cases. Insufficiently developed least depths are discussed in detail under sections 4, 6, 7, and 9 below.

4. CONDITION OF SURVEY

The smooth sheet and accompanying overlays, hydrographic records, and reports are adequate and conform to the requirements of the Hydrographic Manual with the following exception:

A 3 foot shoal plotted at Latitude 37°48'30"N, Longitude 122°27'25"W on the boatsheet is not based on the hydrographic records. It appears to have been plotted in error in depths of approximately 40 feet. This feature has been deleted and does not appear on the smooth sheet.

5. JUNCTIONS

H-9185, 1971
H-9894, 1978
H-9811, 1979

H-9793 joins H-9794, 1978, on the east and H-9811, 1979, on the northeast. Junctions with these contemporary surveys have been made in processing and curves in the junction areas have been inked.

H-9793 joins H-9185, 1971, in the vicinity of the Golden Gate Bridge. A firm junction has been made and the junction curves on H-9793 inked. The pencilled 18' curve on H-9185 east of Fort Point should be adjusted to agree with shoal information on H-9793. Similarly, the 300' curve on H-9185 in the vicinity of position 3464-03 should be adjusted to fit the 299' sounding on H-9793.

6. COMPARISONS WITH PRIOR SURVEYS

H-7620	1947	1:10,000
H-7621	1947	1:10,000
H-7621A	1948	1:2,500
H7704	1948	1:10,000

H-7620: A small section of the east shoreline of the Tiburon Peninsula between Latitudes 37°52'35" and 37°53'50" and the immediately adjacent water areas is common to both H-7620 and H-9793. Water depths on H-7620 agree within two or three feet with those on H-9793 in most cases. Along the shoreline of the Tiburon Peninsula several charted rocks appear on H-7620, but have not been located on H-9793. They are also absent from Class I map TP-00526, which contains the field edit of the area.

The southernmost, a rock awash symbol at Latitude 37°53'08"N, Longitude 122°26'29"W, labeled "covered HW" is in the vicinity of a 1 foot sounding on H-9793. This rock and annotation have been carried forward to H-9793.

A group of three rocks, centered at Latitude 37°53'18"N, Longitude 122°26'35"W also appear on H-7620, but have not been located on H-9793. These rocks and associated height information have been carried forward to the smooth sheet.

Thus augumented, H-9793 is complete in the area of common coverage with H-7620, and can be used to supersede that prior survey.

H-7621: This prior survey covers the southern half of H-9793, up to a latitude of approximately 37°51'30". Comparison of H-7621 with H-9793 shows good agreement in inshore and shoal areas, but with increasing disagreement in deeper water. Some differences are caused by evident migration of shoals. For instance, the 48 foot shoal feature now centered at Latitude 37°49'45"N, Longitude 122°27'00"W has evidently migrated 200 to 300 meters to the northwest since 1947.

South of Presidio Shoal the charted 48 foot sounding (source H-7621, 1947) at Latitude 37°48'44"N, Longitude 122°27'05"W lies in an area of 56 to 61 foot depths on H-9793. This sounding was not disproven by the present survey and should continue to be charted.

In general, depths displayed on H-9793 average 3 to 5 feet deeper than on H-7621. The cause of these differences is unknown, but may be related to differences in sounding equipment used, or to movements of bottom sediments. Paragraph K of the descriptive report contains a

lengthy and detailed discussion of changes in the bottom relating to transportation of sediments. In any case, H-9793 shows that significant bottom changes have occurred in the area covered by prior survey H-7621.

A number of rock features appear on H-7621, but not on H-9793 or on TP-00528. These are:

a. A rock awash, no height given, at Latitude 37°50'04"N, Longitude 122°28'15"W.

b. A rock awash, no height given, at Latitude 37°50'06"N, Longitude 122°28'15"W.

c. A rock awash, no height given, at Latitude 37°50'09"N, Longitude 122°28'15"W.

d. A rock awash, no height given, at Latitude 37°50'12"N, Longitude 122°28'13"W.

e. A sunken rock symbol, labeled "from T-2243 (1895)" at Latitude 37°50'14"N, Longitude 122°28'16"W.

The above features have been lifted to the smooth sheet, thus updating shoreline detail for hazards not disproven on the present survey. H-9793 is now complete and adequate to supersede H-7621 in areas of common coverage.

H-7621A: This is a 1:2,500 scale sand wave study conducted in 1948. Several soundings on Charts 18649 and 18650 appear to have originated with this survey. These are annotated on the attached chartlets. In general, soundings from H-7621A agree closely with those of H-7621 and with charted soundings which originate with unknown sources. Agreement is within two feet in most cases. As with H-7621, changes in bottom configuration noted from comparison of H-7621A with H-9793 probably are the results of transported sediments. There are no unexplained differences between H-9793 and H-7621A in areas of common coverage. H-9793 should be used to supersede H-7621A.

H-7704: Soundings on H-7704 agree quite closely with those on H-9793. Most soundings agree within two feet, with no clear distinction as to which survey is deeper or shoaler. A major exception occurs in the channel leading into Sausalito, where the water depth has increased by up to ten feet, evidently as a result of dredging.

Certain shoreline features present on H-7704 have not been addressed or disposed of by H-9793 or T-00526. These are:

a. Three islets centered at Latitude 37°51'19"N, Longitude 122°26'26"W.

b. A foul area containing a group of high water islets on the west side of Angel Island, centered at Latitude 37°51'45"N, and Longitude 122°26'26"W.

These Features have been lifted to the smooth sheet.

Thus augmented, H-9793 is adequate to supersede H-7704 in areas of common coverage.

PSR item #1, a nondangerous sunken wreck charted at Latitude 37°52'21"N, Longitude 122°30'05"W, and PSR item #2, a dangerous submerged obstruction charted at Latitude 37°52'25'N, Longitude 122°29'53"W are adequately disposed of by field edit which places them within an area designated "foul with wrecks" on Class I map TP-00526. This foul feature is displayed on this smooth sheet. It is recommended that these charted features be superceded by the above described foul area. See the descriptive report, section K for further discussion of this topic.

PSR item #3, a dangerous sunken wreck, PA, charted at Latitude 37°52'03"N, Longitude 122°28'55"W, was searched for with wire drag. No wreck was found in the vicinity. The sunken wreck is considered disproven and should no longer be charted. Sunken ruins found by the hydrographer at Latitude 37°52'02"N, Longitude 122°28'49"W are displayed on the smooth sheet. It is recommended that these sunken ruins be charted as a submerged obstruction.

PSR item #4, a nondangerous sunken wreck, ED, charted at Latitude 37°51'57"N, Longitude 122°28'29"W, was searched for, but not found. Since wire drag was used as the search method, the sunken wreck should be considered disproven and removed from the chart.

PSR item #5, a dangerous sunken wreck, and PSR item #6, a submerged pipe, both located at Latitude 37°52'32"N, and Longitude 122°28'46"W, were not located by wire drags. They should be considered disproven and removed from the chart.

PSR item #7, a nondangerous sunken wreck, ED, charted at Latitude 37°52'53"N, Longitude 122°28'23"W, was searched for, but not found. Although wire drag was not used, observations from a skiff in less than one foot of water seem sufficient to disprove the existance of any obstruction. See the Descriptive Report, section K for a detailed description of search techniques. It is recommended that this object be removed from the chart.

PSR item #10, submerged piling in the vicinity of Latitude 37°50'37"N, Longitude 122°28'31"W was investigated by diving. Submerged ruins, an upwelling pool, and a hazardous submerged pile were located. These features are displayed on the smooth sheet and should be charted.

PSR item #27, a dangerous sunken wreck symbol located at Latitude 37°50'53"N, Longitude 122°28'39"W, was investigated by divers. Two sunken wrecks were located and described. They have been plotted on the smooth sheet, with the northernmost wreck marked with a sunken wreck symbol, carto code 100, and the southern wreck marked with a visible wreck symbol, carto code 098. These wrecks should be charted.

With augmentation with above described features carried forward from prior surveys and with dispositon of PSR items as recommended above, H-9793 is adequate to supersede prior surveys in its area of coverage.

7. COMPARISON WITH CHART

a. Comparison with Chart 18649, 45th Ed., February 4, 1978, reveals differences in depths between H-9793 and a number of charted soundings. H-9793 shows some deepening in relation to charted soundings, bearing the same relationships as noted with prior surveys discussed in section 6 above. Many shoal features on this chart were derived from unknown sources, not from the latest prior surveys of the area.

Examples of critical charted depths which are shoaler than those developed on H-9793 are:

1. The 60 foot (PA) wreck Charted at Latitude 37°49'13"N, Longitude 122°27'31"W has been more precisely located on H-9793, but the least depth obtained over the feature was 99 feet.

2. The 36 foot depth obtained over Harding Rock conflicts with the 34 foot depth charted at Latitude 37°50'13"N, Longitude 122°25'41"W.

The 35 foot depth charted over Shag Rock at Latitude 37°50'05"N, Longitude 122°26'20"W conflicts with the minimum depth of 37 feet shown on H-9793.

The 33 foot depth charted over Arch Rock at Latitude 37°49'45"N, Longitude 122°26'25"W conflicts with the minimum depth of 34 feet found on H-9793.

Along Presidio Shoal, the charted 97 foot depth (source unknown) at Latitude 37°48'43"N, Longitude 122°28'05"W lies in an area of 103 to 106 foot soundings on H-9793. It should be retained as a shoal charted sounding which has not been disproven by the present survey.

Near Fort Point the 10 foot charted depth (source unknown) at Latitude 37°48'33"N, Longitude 122°28'06"W lies in the same position as a 20 foot depth on H-9793. This unexplained increase in depth probably is the result of dredging activity. However, the survey methods used on H-9793 have not disproven the existance of a 10 foot shoal in this area and it should be continued to be charted until disproven.

On Presidio Shoal, the charted 35 foot sounding (source unknown) at Latitude 37°48'38"N, Longitude 122°27'34"W is in an area of 52 to 72 foot soundings on H-9793. The change appears to result either from migration of Presidio Shoal or to dredging activities along its south side. This new bottom configuration should be charted in this area.

The 2 foot sounding (source unknown) charted at Latitude 37°48'28"N, Longitude 122°26'48"W is in an area of 8 to 11 foot soundings on H-9793. This sounding has not been disproven and should continue to be charted.

The 42 foot sounding (source unknown) charted at Latitude 37°49'25"N, Longitude 122°26'11"W is in an area of 51 to 57 foot soundings on H-9793. In the absence of definitive evidence disproving this depth, it should continue to be charted.

The above discrepancies in depth may have occurred as the result of transportation of bottom sediments, migration of sand ridges, or dredging. Most such soundings on this chart are derived from sources unknown to the verifier, and can neither be confirmed or positively disproven. It will be necessary to evaluate the source of these charted shoal soundings to determine whether or not they can be superseded by H-9793.

Least depths shown in Section L, Table 1 of the descriptive report are compared to charted depths in the same areas. Recommended disposition of each charted sounding discussed is noted in the "remarks" column of the table where the verifier's recommended disposition differs from the hydrographer.

Comparison with Chart 18650, 36th Edition, June 9, 1980, reveals that the same sources were used in its compilation as Chart 18649. In most of the chart area the same soundings were used, and remarks, problems, and recommendations are the same. On both, many charted features and soundings are derived from sources other than the prior surveys.

Along the north San Francisco waterfront there is considerable differences between the charts. The following are examples of chart disagreements:

1. Northeast of Fort Point at approximately 37°48'35"N, 122°28'06"W, Chart 18649 shows a depth of 10 feet atop the 18 foot curve on Chart 18650. H-9793 shows a depth of 20 feet in the same area.

2. A 25 foot sounding on Chart 18649, at approximate Latitude 37°48'35"N, Longitude 122°27'40"W is outside the 30 foot curve on Chart 18650. Depths shown on H-9793 are 31 to 17 feet in the same area.

3. Near the San Francisco West Yacht Harbor Light 2, at approximately Latitude 37°48'34"N, Longitude 122°26'20"W, a 46 foot depth on Chart 18650 is inside the 30 foot curve on Chart 18649.

b. Controlling Depths

There are no controlling depths governing any area within this survey.

c. Aids to Navigation

All fixed and floating aids to navigation adequately mark the features intended and compare well with the charted positions. Positions of charted and new charted aids to navigation are continued in tables under section N of the Descriptive Report. Positions for floating aids to navigation developed on H-9793 should be used for future charting.

8. COMPLIANCE WITH INSTRUCTIONS

With the exception of the item listed in Section 7, this survey adequately complies with Project Instruction OPR-L123-RA-78, dated August 10, 1978, Change No. 1, dated August 21, 1978 and Change No. 2, dated August 28, 1978.

9. ADDITIONAL FIELD WORK

Additional field work is recommended to resolve the discrepancies in critical depths discussed in section 7. These are the depths above the 60 foot (PA) wreck discussed in paragraph 7.a.1, and the depths above Harding Rock, Shag Rocks, and Arch Rock discussed in paragraph 7.a.2.

10. NOTES TO COMPILER

Charts 18649 and 18650 are evidently based on numerous sources, only part of which are prior surveys. The source of much of this data is unknown to the verifier. While H-9793 is complete and adequate to supersede prior surveys in its area of coverage, other sources must be considered in evaluating whether H-9793 is the best source with which to supersede charted data.

Respectfully submitted,

John E. Lotshaw
Cartographic Technician

The 90 foot curve is shown in violet rather than brown in error. It has not been corrected as it is clear and easily distinguished.

Examined and Approved;

James S. Green
Chief, Verification Branch

APPROVAL SHEET

FOR

SURVEY H-9793

A. All revisions and additions made on the smooth sheet during verification have been entered in the magnetic tape records for this survey. A new final position print-out has been made. A new final sounding print-out has been made.

B. The verified smooth sheet has been inspected, is complete, and meets the requirements of the Hydrographic Manual. Exceptions are listed in the verifier's report.

Date: August 12, 1981

James S. Green
Chief, Verification Branch

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SURVEY
Pacific Marine Center
1801 Fairview Avenue East
Seattle, WA 98102

September 14, 1981 OA/CPM3/JWC

TO: OA/CPM - Charles K. Townsend

FROM: OA/CPM3 - John W. Carpenter

SUBJECT: PMC Hydrographic Inspection Team Report for Survey H-9793

This survey is a basic hydrographic survey of Golden Gate to Tiburon Peninsula, San Francisco Bay, California. This survey was conducted by NOAA Ship RAINIER in 1978 in accordance with Project Instructions OPR-L123-RA-78 dated August 10, 1978; Change No. 1, dated August 21, 1978; and Change No. 2, dated August 28, 1978.

The inspection team finds H-9793 to be a basic survey adequate to supercede common areas of prior surveys and charted hydrography. Administrative approval is recommended.

John W. Carpenter

James M. Wintermyre

James W. Steensland

Stanley H. Otsubo

9/15/81

In reference to Paragraph #9 of the Verifier's Report, the recommendation for additional field work should be considered subsequent to the review of the charting source of the depths in question.

John W. Carpenter

ADMINISTRATIVE APPROVAL
H-9793

The smooth sheet and reports of this survey have been examined and the survey is adequate for charting and to supersede common areas of prior surveys.

Charles K. Townsend
Director
Pacific Marine Center

9/15/81
Date

NOAA FORM 76-40 (6-74)
Replaces C&GS Form 567.

NONFLOATING AIDS

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
FOR CHARTS

ORIGINATING ACTIVITY
- ☐ HYDROGRAPHIC PARTY
- ☐ GEODETIC PARTY
- ☐ PHOTO FIELD PARTY
- ☒ COMPILATION ACTIVITY
- ☐ FINAL REVIEWER
- ☐ QUALITY CONTROL & REVIEW BRP.
- ☐ COAST PILOT BRANCH

(See reverse for responsible personnel)

☒ TO BE CHARTED
☐ TO BE REVISED
☐ TO BE DELETED

REPORTING UNIT (Field Party, Ship or Office): Photogrammetric Branch PMC Seattle, Wa.
STATE: California
LOCALITY: San Francisco and San Pablo Bays
DATE: March 1980

The following objects HAVE ☒ HAVE NOT ☐ been inspected from seaward to determine their value as landmarks.

OPR PROJECT NO.: 411
JOB NUMBER: CM - 7704
SURVEY NUMBER: TP - 00526
DATUM: N.A. 1927

CHARTING NAME	DESCRIPTION (Record reason for deletion of landmark or aid to navigation. Show triangulation station names, where applicable, in parentheses.)	POSITION LATITUDE ° ′	LATITUDE ″ D.M. Meters	POSITION LONGITUDE ° ′	LONGITUDE ″ D.P. Meters	METHOD AND DATE OF LOCATION (See instructions on reverse side) OFFICE	METHOD AND DATE OF LOCATION FIELD	CHARTS AFFECTED
LIGHT	Raccoon Strait Light 4 (Point Stuart Lighthouse,1928)	37°51'	40.053" 1234.9	122°26'	42.297" 1033.9		Triang. Rec. 10/78	18649
LIGHT	Raccoon Strait Light 5, 1978 (Unadjusted Field Position)	37°52'	49.460" 1524.9	122°26'	15.595" 381.1		F-1-6-L 10/78	18649
LIGHT	Cone Rock Light, 1977	37°51'	50.727" 1564.0	122°28'	07.117" 174.0	77B(P)3491 Mar. 18,1977	Triang. Rec. 10/78	18649
LIGHT	Sausalito Channel Light 2, 1978 (Unadjusted Field Position)	37°51'	21.528" 663.7	122°28'	03.372" 82.4	77B(P)3491 Mar. 18,1977	F-3-6-L 10/78	18649
LIGHT	Sausalito Channel Light 4, 1978 (Unadjusted Field Position)	37°51'	41.447" 1277.8	122°28'	39.624" 968.6	77B(P)3491 Mar. 18,1977	F-3-6-L 10/78	18649
LIGHT	Sausalito Channel Light 6, 1978 (Unadjusted Field Position)	37°51'	55.754" 1718.9	122°29'	07.232" 176.8	77B(P)3491 Mar. 18,1977	F-3-6-L , 3/79	18649
Not on H9793 LIGHT	Corte Madera Channel Light 2 (Preliminary Adjusted Field Position1979)	37°55'	42.029" 1295.8	122°28'	02.053" 50.1	77B(P)3521 Mar. 18,1977	F-3-6-L , 3/79	18649
Not on H9793 LIGHT	Corte Madera Channel Light 4 (Private Aid)	37°55'	47.03" 1450	122°28'	15.72" 384	77B(P)3521 Mar. 18,1977	F-V-Vis 3/79	18649
Not on H9793 LIGHT	Corte Madera Channel Light 5 (Private Aid)	37°55'	52.97" 1633	122°28'	39.68" 969	77B(P)3521 Mar. 18,1977	F-V-Vis 3/79	18649
Not on H9793 LIGHT	Corte Madera Channel Light 6 (Private Aid)	37°55'	55.69" 1717	122°28'	38.04" 929	77(B)3521 Mar. 18.1977	F-V-Vis 3/79	18649

NOAA FORM 76-40 (8-74)
Replaces C&GS Form 567.

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

NONFLOATING AIDS

FOR CHARTS

ORIGINATING ACTIVITY
- ☐ HYDROGRAPHIC PARTY
- ☐ GEODETIC PARTY
- ☐ PHOTO FIELD PARTY
- ☒ COMPILATION ACTIVITY
- ☐ FINAL REVIEWER
- ☐ QUALITY CONTROL & REVIEW GRP.
- ☐ COAST PILOT BRANCH

(See reverse for responsible personnel)

☒ TO BE CHARTED ☐ TO BE REVISED ☐ TO BE DELETED

REPORTING UNIT (Field Party, Ship or Office): Photogrammetric Branch PMC Seattle, Wa.

STATE: California

LOCALITY: San Francisco and San Pablo Bays

DATE: March1980

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OPR PROJECT NO.: 411

JOB NUMBER: CM - 7704

SURVEY NUMBER: TP - 00526

DATUM: N.A. 1927

CHARTING NAME	DESCRIPTION (Record reason for deletion of landmark or aid to navigation. Show triangulation station names, where applicable, in parentheses)	POSITION LATITUDE ° ′	LATITUDE ″ D.M. Meters	POSITION LONGITUDE ° ′	LONGITUDE ″ D.P. Meters	METHOD AND DATE OF LOCATION (See instructions on reverse side) OFFICE	FIELD	CHARTS AFFECTED
Not on H9793 LIGHT	San Rafael Creek Range Front Light	37°58'	15.41" 475	122°29'	44.20" 1079	77B(P)3530 Mar. 18,1977	F-V-Vis. 4/79	18649 18654
Not on H9793 LIGHT	San Rafael Creek Range Rear Light ; insufficient data submitted for location, no position determined							18649 18654
Not on H9793 LIGHT	San Rafael Creek Light 1	37°57'	41.87" 1291	122°28'	08.56" 209	77B(P)3530 Mar. 18,1977	F-V-Vis. 3/79	18649 18654
Not on H9793 LIGHT	San Rafael Creek Light 3 (Not in position at time of Field Edit)							
Not on H9793 LIGHT	San Rafael Creek Light 5	37°57'	59.42" 1832	122°28'	59.44" 1451	77B(P)3530 Mar. 18,1977	F-V-Vis. 3/79	18649 18654
Not on H9793 LIGHT	(San Pablo Bay Light 4, 1979 (Preliminary Adjusted Field Position))	37°58'	52.627" 1622.6	122°24'	59.883" 1461.4		F-3-6-L Mar. 1, 1979	18649 18654
Not on H9793 LIGHT	San Pablo Bay Channel Light 5 (Not in position at time of Field Edit)							
MARKER	(Richardson Bay Salt Works Channel Day Mark No 1, 1978 (Unadjusted Field Position))	37°52'	25.534" 787.2	122°29'	36.266 886.4		F-3-6-L 10/78	18649
MARKER	(Richardson Bay Salt Works Channel Day Mark No 2, 1978 (Unadjusted Field Position))	37°52'	26.520" 817.6	122°29'	33.356" 815.2		F-3-6-L 10/78	18649
MARKER	(Richardson Bay Salt Works Channel Day Mark No 4, 1978 (Unadjusted Field Position))	37°52'	41.413" 1276.8	122°29'	38.716" 946.2		F-3-6-L 10/78	18649

No Corr L-112(82)

L-112(82)

NOAA FORM 76-40 (8-74)
Replaces C&GS Form 567.

NONFLOATING AIDS

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
FOR CHARTS

ORIGINATING ACTIVITY
- ☐ HYDROGRAPHIC PARTY
- ☐ GEODETIC PARTY
- ☐ PHOTO FIELD PARTY
- ☒ COMPILATION ACTIVITY
- ☐ FINAL REVIEWER
- ☐ QUALITY CONTROL & REVIEW GRP.
- ☐ COAST PILOT BRANCH

(See reverse for responsible personnel)

☒ TO BE CHARTED
☐ TO BE REVISED
☐ TO BE DELETED

REPORTING UNIT (Field Party, Ship or Office): Photogrammetric Branch PMC Seattle, Wa.
STATE: California
LOCALITY: San Francisco and San Pablo Bays
DATE: March 1980

The following objects HAVE [X] HAVE NOT [ ] been inspected from seaward to determine their value as landmarks.

OPR PROJECT NO.: 411
JOB NUMBER: CM - 7704
SURVEY NUMBER: TP - 00526
DATUM: N.A. 1927

CHARTING NAME	DESCRIPTION (Record reason for deletion of landmark or aid to navigation. Show triangulation station names, where applicable, in parentheses.)	POSITION LATITUDE ° ′	LATITUDE ″ D.M. Meters	POSITION LONGITUDE ° ′	LONGITUDE ″ D.P. Meters	METHOD AND DATE OF LOCATION (See instructions on reverse side) OFFICE	FIELD	CHARTS AFFECTED
MARKER	(Richardson Bay Salt Works Channel Day Mark No 5, 1978 (Unadjusted Field Position))	37°53'	13.306" 410.2	122°29'	51.861" 1267.3		F-3-6-L 10/78	18649
MARKER	(Richardson Bay Salt Works Channel Day Mark No 6, 1978 (Unadjusted Field Position))	37°53'	15.932" 491.2	122°29'	51.224" 1251.7		F-3-6-L 10/78	18649
MARKER	(Richardson Bay Salt Works Channel Day Mark No 7, 1978 (Unadjusted Field Position))	37°53'	17.686" 545.3	122°29'	53.578" 1309.2		F-3-6-L 10/78	18649
MARKER	(Richardson Bay Salt Works Channel Day Mark No 9, 1978 (Unadjusted Field Position))	37°53'	32.597" 1005.0	122°29'	59.481" 1453.4		F-3-6-L 10/78	18649
MARKER	(Richardson Bay Salt Works Channel Day Mark No 10, 1978 (Unadjusted Field Position))	37°53'	32.958" 1016.1	122°29'	57.756" 1411.2		F-3-6-L 10/78	18649

No Corr 4-112(82)

4-112 (PL)

NOAA FORM 76-40 (8-74)
Replaces C&GS Form 567.

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

LANDMARKS FOR CHARTS

ORIGINATING ACTIVITY
- [ ] HYDROGRAPHIC PARTY
- [ ] GEODETIC PARTY
- [ ] PHOTO FIELD PARTY
- [x] COMPILATION ACTIVITY
- [ ] FINAL REVIEWER
- [ ] QUALITY CONTROL & REVIEW GRP.
- [ ] COAST PILOT BRANCH

(See reverse for responsible personnel)

- [x] TO BE CHARTED
- [ ] TO BE REVISED
- [ ] TO BE DELETED

REPORTING UNIT (Field Party, Ship or Office): Photogrammetric Branch PMC Seattle, Wa.
STATE: California
LOCALITY: San Francisco and San Pablo Bays
DATE: April 1980

The following objects HAVE [x] HAVE NOT [ ] been inspected from seaward to determine their value as landmarks.

OPR PROJECT NO.: 411
JOB NUMBER: CM - 7704
SURVEY NUMBER: TP - 00526
DATUM: N.A. 1927

CHARTING NAME	DESCRIPTION (Record reason for deletion of landmark or aid to navigation. Show triangulation station names, where applicable, in parentheses.)	POSITION LATITUDE ° / // D.M. Meters	POSITION LONGITUDE ° / // D.P. Meters	METHOD AND DATE OF LOCATION (See instructions on reverse side) OFFICE	METHOD AND DATE OF LOCATION FIELD	CHARTS AFFECTED
Not on H-9793 TOWER	(Gallinas Creek, South Transmission Tower, 1922)	38°00' 55.98" 1726.0	122°30' 01.52" 37.1	77B(P)3557 Mar. 18,1977	F-V-Vis. 4/79	18654
Not on H-9793 TOWER	(San Quentin Tower No 3, 1962)	37°56' 13.814" 425.9	122°29' 17.203" 420.1	77B(P)3480 Mar. 18,1977	F-V-Vis. 4/79	18649
Not on H-9793 STACK	(Green Brae, Red Brick Stack, 1951)	37°56' 41.44" 1277.6	122°30' 16.20" 395.6	77B(P)3480 Mar. 18,1977	F-V-Vis. 4/79	18649
STANDPIPE	(California City Naval Net Depot Standpipe, 1947)	37°53' 31.707" 977.6	122°26' 51.629" 1261.5	77B(P)3519 Mar. 18,1977	Triang. Rec. 4/79	18649
FLAGPOLE Not on H-9793	(Angel Island Ayala Cove Flagpole, 1978 (Unadjusted Field Position))	37°51' 58.017" 1788.7	122°26' 05.308" 129.7		F-2-6-L 10/78	18649
GABLE		37°51' 34.45" 1062	122°26' 31.95" 781	77B(P)3518 Mar. 18,1977	F-V-Vis. 10/78	18649
STACK Not on H-9793	(Brick, 1916)	37°58' 57.477" 1772.1	122°27' 39.554" 965.3	77B(P)3478 Mar. 18,1977	Triang. Rec. April 4, 1979	18649 18654
STACK Not on H-9793	East of three	37°58' 59.06" 1821	122°27' 39.42" 962	77B(P)3478 Mar. 18,1977	F-V-Vis. 4/79	18649 18654
STACK Not on H-9793	West of three.	37°58' 59.52" 1835	122°27' 41.10" 1003	77B(P)3478 Mar. 18,1977	F-V-Vis. 4/79	18649 18654

NOAA FORM 76-40 (8-74)
Replaces C&GS Form 567.

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

LANDMARKS FOR CHARTS

ORIGINATING ACTIVITY
- ☐ HYDROGRAPHIC PARTY
- ☐ GEODETIC PARTY
- ☐ PHOTO FIELD PARTY
- ☒ COMPILATION ACTIVITY
- ☐ FINAL REVIEWER
- ☐ QUALITY CONTROL & REVIEW BRP.
- ☐ COAST PILOT BRANCH

(See reverse for responsible personnel)

- ☒ TO BE CHARTED
- ☐ TO BE REVISED
- ☐ TO BE DELETED

REPORTING UNIT (If field Party, Ship or Office): Photogrammetric Branch PMC Seattle, Wa.
STATE: California
LOCALITY: San Francisco and San Pablo Bays
DATE: April 1980

The following objects HAVE ☒ HAVE NOT ☐ been inspected from seaward to determine their value as landmarks.

OPR PROJECT NO.: 411
JOB NUMBER: CM - 7704
SURVEY NUMBER: TP - 00526
DATUM: N.A. 1927

CHARTING NAME	DESCRIPTION (Record reason for deletion of landmark or aid to navigation. Show triangulation station names, where applicable, in parentheses.)	POSITION LATITUDE ° ′	LATITUDE // D.M. Meters	POSITION LONGITUDE ° ′	LONGITUDE // D.P. Meters	METHOD AND DATE OF LOCATION (See instructions on reverse side) OFFICE	FIELD	CHARTS AFFECTED
TOWER Not on H-9793	(San Quentin Arsenal Tower, 1962)	37°56'	24.061" 741.8	122°29'	09.321" 227.6	77B(P)3480 Mar.18,1977	Triang. Rec. 4/79	18649
FLAGPOLE	Sausalito Yacht Club Flagpole	37°51'	24.61" 759	122°28'	37.86" 926		F-4-8-L 10/78	18649
BELL	Point Knox, Angel Island Bell	37°51'	22.71" 700	122°26'	29.30" 716		F-4-8-L 10/78	18649 18650

No Corr L-11260

NOAA FORM 76-40 (8-74)
Replaces C&GS Form 567.

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

NONFLOATING AIDS [redacted] FOR CHARTS

ORIGINATING ACTIVITY
- ☐ HYDROGRAPHIC PARTY
- ☐ GEODETIC PARTY
- ☐ PHOTO FIELD PARTY
- ☒ COMPILATION ACTIVITY
- ☐ FINAL REVIEWER
- ☐ QUALITY CONTROL & REVIEW GRP.
- ☐ COAST PILOT BRANCH

(See reverse for responsible personnel)

☒ TO BE CHARTED ☐ TO BE REVISED ☐ TO BE DELETED	REPORTING UNIT (Field Party, Ship or Office)	STATE	LOCALITY	DATE
	CPM-33 PhotogrammetryBr PMC Seattle, Wa.	California	San Francisco and San Pablo Bays	5/27/80

The following objects HAVE ☒ HAVE NOT ☐ been inspected from seaward to determine their value as landmarks.

OPR PROJECT NO.	JOB NUMBER	SURVEY NUMBER	DATUM
411	CM-7704	TP-00528	N.A. 1927

CHARTING NAME	DESCRIPTION (Record reason for deletion of landmark or aid to navigation. Show triangulation station names, where applicable, in parentheses)	POSITION LATITUDE ° ′	LATITUDE // D.M. Meters	POSITION LONGITUDE ° ′	LONGITUDE // D.P. Meters	METHOD AND DATE OF LOCATION (See instructions on reverse side) OFFICE	METHOD AND DATE OF LOCATION FIELD	CHARTS AFFECTED
LIGHT	(Golden Gate Bridge South Pier Light1964)	37 48	51.394 1584.5	122 28	36.512 893.1		Triang Rec. 10/78	18650
LIGHT	Golden Gate Bridge Mid Channel Fog Signal	37 49	11.45 353	122 28	39.58 968	77B(P)3549 Mar. 18, 1977	V-Vis 10/78	18650
LIGHT	(Anita Rock Light, 1965)	38 48	30.219 931.7	122 27	08.821 215.8	77B(P)3549 Mar. 18, 1977	Triang Rec. 10/78	18650
LIGHT	San Francisco Submarine Outfall Light	37 48	27.05 834	122 26	51.75 1266	77B(P)3548 Mar. 18, 1977	V-Vis 10/78	18650
LIGHT	(San Francisco West Yacht Harbor Light 2, 1978 (Field Position))	37 48	31.754 979.0	122 26	20.300 496.6		F-4-6-L 10/78	18650
LIGHT	(San Francisco East Yacht Harbor Light 2, 1978 (Field Position))	37 48	28.780 887.3	122 25	54.594 1335.5		F-4-6-L 10/78	18650
Not on H9793 LIGHT	Alcatraz Light (Alcatraz Lighthouse, 1910)	37 49	34.672 1069.0	122 25	15.758 385.4	77B(P)3493 Mar. 18, 1977	Triang Rec 10/78	18650
Not on H9793 HORN	Alcatraz South Fog Signal	37 49	30.81 950	122 25	13.29 325		P-5-L 77B(P)3547	18650
Not on H-9793 HORN	Alcatraz North Fog Signal	37 49	41.51 1280	122 25	27.89 682		F-4-8-L 11/78	18650
Not on H-9793 LIGHT	Pier 45 East Light (San Francisco Waterfront Pier 45 East Light, 1978 (Field Position))	37 48	41.520 1280.1	122 25	09.480 231.9		F-4-6-L 11/78	18650

11 JUN 80

NOAA FORM 76-40 (8-74)

Replaces C&GS Form 567.

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

NONFLOATING AIDS [redacted] FOR CHARTS

ORIGINATING ACTIVITY
- ☐ HYDROGRAPHIC PARTY
- ☐ GEODETIC PARTY
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- ☒ COMPILATION ACTIVITY
- ☐ FINAL REVIEWER
- ☐ QUALITY CONTROL & REVIEW GRP.
- ☐ COAST PILOT BRANCH

(See reverse for responsible personnel)

☒ TO BE CHARTED ☐ TO BE REVISED ☐ TO BE DELETED

REPORTING UNIT (Field Party, Ship or Office): CPM-33 PhotogrammetryBr PMC Seattle, Wa.

STATE: California

LOCALITY: San Francisco and San Pablo Bays

DATE: 5/27/80

The following objects HAVE [X] HAVE NOT [ ] been inspected from seaward to determine their value as landmarks.

OPR PROJECT NO.: 411

JOB NUMBER: CM-7704

SURVEY NUMBER: TP-00528

DATUM: N.A. 1927

CHARTING NAME	DESCRIPTION (Record reason for deletion of landmark or aid to navigation. Show triangulation station names, where applicable, in parentheses)	POSITION LATITUDE ° ′	LATITUDE // D.M. Meters	POSITION LONGITUDE ° ′	LONGITUDE // D.P. Meters	METHOD AND DATE OF LOCATION (See instructions on reverse side) OFFICE	METHOD AND DATE OF LOCATION FIELD	CHARTS AFFECTED
Not on H9793 LIGHT	Pier 45 West Light (San Francisco Waterfront Pier 45 West Light, 1978 (Field Position))	37 48	40.901 1261.0	122 25	10.043 245.7		F-4-6-L 11/78	18650
AERO	(Golden Gate Bridge North Aero Light, 1964)	37 49	32.068 988.7	122 28	40.705 995.5		Triang Rec. 10/78	18650
AERO	(Golden Gate Bridge South Aero Light, 1964)	37 48	50.720 1563.7	122 28	35.872 877.4		Triang Rec. 10/78	18650
LIGHT	(Lime Point Light, 1977)	37 49	31.878 982.8	122 28	38.028 930.0	77B(P)3549 Mar. 18, 1977	Triang Rec. 10/78	18650
LIGHT	(Yellow Bluff Light, 1978 (Field Position))	37 50	11.764 362.7	122 28	16.033 392.1	77B(P)3492 Mar. 18, 1977	F-3-6-L 10/78	18650

NOAA FORM 76-40 (8-74)
Replaces C&GS Form 567.

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

LANDMARKS FOR CHARTS

ORIGINATING ACTIVITY
- [ ] HYDROGRAPHIC PARTY
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- [ ] PHOTO FIELD PARTY
- [X] COMPILATION ACTIVITY
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(See reverse for responsible personnel)

- [X] TO BE CHARTED
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REPORTING UNIT (If field party, Ship or Office): CPM-33 PhotogrammetryBr. PMC Seattle, Wa.
STATE: California
LOCALITY: San Francisco and San Pablo Bays
DATE: 5/27/80

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OPR PROJECT NO.: 411
JOB NUMBER: CM-7704
SURVEY NUMBER: TP-00528
DATUM: N.A. 1927

CHARTING NAME	DESCRIPTION (Record reason for deletion of landmark or aid to navigation. Show triangulation station names, where applicable, in parentheses)	POSITION LATITUDE ° ′	LATITUDE ″ D.M. Meters	POSITION LONGITUDE ° ′	LONGITUDE ″ D.P. Meters	METHOD AND DATE OF LOCATION (See instructions on reverse side) OFFICE	FIELD	CHARTS AFFECTED
Not on H-7793 COIT TOWER	(Coit Monument, 1933)	37 48	08.783 270.8	122 24	17.037 416.8	77B(P)3547 Mar. 18,1977	Triang Rec. 10/78	18650
~~FLAGPOLE~~	~~(New object rejected, see addendum to comp. repo Flagpole at south edge of Sausalito~~	~~37 50~~	~~48.34 1490~~	~~122 28~~	~~34.86 852~~		~~F-4-8-L 10/78~~	~~18650~~
DOME		37 48	10.86 335	122 26	50.28 1230	77B(P)3548 Mar. 18, 1977	V-Vis 11/78	18650
STONE TOWER	Light inoperable (San Francisco, Saint Francis Yacht club, Naval Beacon, 1932)	37 48	27.446 846.2	122 26	33.920 829.8	77B(P)3548 Mar. 18, 1977	Triang Rec. 10/78	18650
GABLE	(Sausalito, Powerhouse Gable, 1916)	37 50	43.639 1345.4	122 28	44.438 1086.5	77B(P)3492 Mar. 18, 1977	Triang Rec. 10/78	18650
Not on H-7793 RADIO TOWER	704 foot tower on a building	37 47	35.61 1098	122 24	47.33 1158	77B(P)3494 Mar. 18, 1977	V-Vis. 10/78	18650
TOWER	U.S. Army Radio Station Mars - A/w6USA	37 47	39.44 1216	122 27	47.50 1162	77B(P)3549 Mar. 18, 1977	V-Vis. 10/78	18650
FLAGPOLE	U.S. Coast Guard Flagpole Pesidio	37 48	20.80 641	122 27	57.69 1411		F-4-8-L 10/78	18650
CUPOLA	U.S. Naval Degaussing Station (Currently Not charted, December 1981)	37 48	26.47 816	122 26	12.18 298	77B(P)3548 Mar. 18,1977	V-Vis 10/78	18650
WATER TANK Not on H-7793	(Alcatraz Water Tank, 1940)	37 49	39.411 1215.1	122 25	21.835 534.0	77B(P)3493 Mar. 18, 1977	Triang Rec 10/78	18650

NOAA FORM 76-40 (8-74)
Replaces C&GS Form 567.

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

LANDMARKS FOR CHARTS

ORIGINATING ACTIVITY
- [ ] HYDROGRAPHIC PARTY
- [ ] GEODETIC PARTY
- [ ] PHOTO FIELD PARTY
- [X] COMPILATION ACTIVITY
- [ ] FINAL REVIEWER
- [ ] QUALITY CONTROL & REVIEW GRP.
- [ ] COAST PILOT BRANCH

(See reverse for responsible personnel)

- [ ] TO BE CHARTED
- [ ] TO BE REVISED
- [X] TO BE DELETED

REPORTING UNIT (Field Party, Ship or Office): CPM-33 PhotogrammetryBr PMC Seattle, Wa.
STATE: California
LOCALITY: San Francisco and San Pablo Bays
DATE: 5/27/80

The following objects HAVE [X] HAVE NOT [ ] been inspected from seaward to determine their value as landmarks.

OPR PROJECT NO.: 411
JOB NUMBER: CM-7704
SURVEY NUMBER: TP-00528
DATUM: N.A. 1927
POSITION

CHARTING NAME	DESCRIPTION (Record reason for deletion of landmark or aid to navigation. Show triangulation station names, where applicable, in parentheses)	LATITUDE ° / // D.M. Meters	LONGITUDE ° / // D.P. Meters	METHOD AND DATE OF LOCATION (See instructions on reverse side) OFFICE	FIELD	CHARTS AFFECTED
CUPOLA	U.S. Coast Guard Station Cupola, Not most prominent object in area. New Idmf. determined	37 48 19.8 610	122 27 57.4 1405	77B(P)3549 Mar. 18,1977	V-Vis 10/78	18650
TOWER	Destroyed, Currently Not charted Dec/81	37 48 11.6 358	122 27 38.3 937	77B(P) 3549 Mar. 18,1977	V-Vis. (Dest) 10/78	18650
Not on H-9793 STACK	Destroyed, Currently Not charted Dec/8 (San Francisco, Black Point Stack,1916)	37 48 28.2 869	122 25 33.6 821		V-Vis. (Dest) 10/78	18650
Not on H-9793 BUILDING	*Building is not prominent, area is sky-lined by large buildings. Area adequate-ly represented by "PYRAMIDAL BUILDING"	37 47.5	122 24.2	77B(P)3494 Mar. 18, 1977	*V-VIS 10/78	18650

No Corr L-112(82)

NOAA FORM 77-27(H) (9-83)

U.S. DEPARTMENT OF COMMERCE

HYDROGRAPHIC SURVEY STATISTICS

REGISTRY NUMBER: H-9793

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

RECORD DESCRIPTION	AMOUNT	RECORD DESCRIPTION	AMOUNT
SMOOTH SHEET	1	SMOOTH OVERLAYS: POS., ARC, EXCESS	10
DESCRIPTIVE REPORT	1	FIELD SHEETS AND OTHER OVERLAYS	12

DESCRIPTION	DEPTH/POS RECORDS	HORIZ. CONT. RECORDS	SONAR-GRAMS	PRINTOUTS	ABSTRACTS/ SOURCE DOCUMENTS	
ACCORDION FILES	3					
ENVELOPES						
VOLUMES	2					
CAHIERS						
BOXES						

SHORELINE DATA

SHORELINE MAPS (List): TP-00526, TP-00528

PHOTOBATHYMETRIC MAPS (List):

NOTES TO THE HYDROGRAPHER (List):

SPECIAL REPORTS (List): Corrections to Echo Sounder, Electronic Control Report, Dive

NAUTICAL CHARTS (List): Investigation Report

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			5441
POSITIONS REVISED			107
SOUNDINGS REVISED			744
CONTROL STATIONS REVISED			5
	TIME-HOURS		
	VERIFICATION	*EVALUATION*	*TOTALS*
PRE-PROCESSING EXAMINATION			
VERIFICATION OF CONTROL			
VERIFICATION OF POSITIONS	228		228
VERIFICATION OF SOUNDINGS	456		456
VERIFICATION OF JUNCTIONS			
APPLICATION OF PHOTOBATHYMETRY			
SHORELINE APPLICATION/VERIFICATION			
COMPILATION OF SMOOTH SHEET	152		152
COMPARISON WITH PRIOR SURVEYS AND CHARTS		96	96
EVALUATION OF SIDE SCAN SONAR RECORDS			
EVALUATION OF WIRE DRAGS AND SWEEPS			
EVALUATION REPORT		237	193
GEOGRAPHIC NAMES			
OTHER* Digitizing			
*USE OTHER SIDE OF FORM FOR REMARKS — TOTALS	836	330	

Pre-processing Examination by J.S. Green	*Beginning Date* 3/30/79	*Ending Date* 3/30/79
Verification of Field Data by J.E. Lotshaw	*Time (Hours)* 5/17/79	*Ending Date* 7/1/81
Verification Check by J.S. Stringham, A. Eichelberger, J.S. Green	*Time (Hours)* 141	*Ending Date* 12/22/86
Evaluation and Analysis by J.S. Green	*Time (Hours)* 330	*Ending Date* 6/5/87
Inspection by D. Hill	*Time (Hours)* 20	*Ending Date* 6/18/87

☆ U.S. GOVT. PRINTING OFFICE 1983: 764-006/6061

PACIFIC MARINE CENTER
EVALUATION REPORT
H-9793

1. INTRODUCTION

H-9793 (1978) is a basic hydrographic survey of a portion of San Francisco Bay, conducted in accordance with the Project Instructions for OPR-L123-RA-78, San Francisco Bay, California, dated August 10, 1978, Change 1, dated August 21, 1978 and Change 2, dated August 28, 1978.

H-9793 is bounded on the south by the San Francisco waterfront. On the west it extends from the Golden Gate Bridge north to Marin Peninsula and includes all of Richardson Bay. To the north it includes the southern tip of the Tiburon Peninsula and extends to latitude 37°53'50"N in San Francisco Bay. The eastern limit is longitude 122°26'00"W, where it includes the western shore of Angel Island. The area is heavily developed and trafficked.

H-9793 was previously approved for chart application on September 15, 1981. Headquarters inspection noted discrepancies in the survey, so it was returned to the marine center for additional processing. It was further determined that additional field work would be required to resolve some of the noted discrepancies. This additional field work was accomplished in 1983 by NOAA Ship RAINIER and processed as FE-242. The areas superseded by FE-242 are delineated on H-9793. Other areas affected by the additional work on FE-242 are addressed in this report considering the additional information or referred to FE-242 for resolution depending on what is most appropriate. The evaluator's report, the smooth sheet, and the digital records have also been revised according to headquarters instructions.

Projection parameters used to prepare the smooth field sheet have been revised to center the hydrography on the smooth sheet and to change the projection to polyconic. Parameters used by the Pacific Marine Center are listed in the appended smooth position/sounding printout.

Predicted tides from the Presidio tide station were used to reduce soundings on the field sheet. Approved tides from the San Francisco tide station were used for the final sounding reduction as displayed on the smooth sheet.

A digital file for this survey has been generated and includes categories of information required to comply with N/CG2 Hydrographic Survey Guideline No. 23, Completion of Digital Hydrographic Surveys, September 7, 1983. Certain descriptive information, however, may not be included in the digital record due to the restrictions of the presently available cartographic codes. The user should refer to the smooth sheet for complete information.

2. CONTROL AND SHORELINE

Horizontal control and positioning are adequately described in Sections F and G of the Descriptive Report and in the Horizontal Control Report, OPR-L123-RA-78.

Positions of horizontal control stations used during the processing of this survey are published and field positions based on the North American Datum of 1927. The computation of positions accomplished during office processing utilized these same values. The smoothsheet and accompanying overlays have been annotated with a NAD 83 datum adjustment tick. This adjustment amounts to -0.257 seconds of latitude and +3.906 seconds of longitude (NAD 27 position to NAD 83 position).

Raydist and Mini-Ranger positioning systems were used in the range-range and range-azimuth configurations. In addition, sextant positioning was utilized where electronic systems would not function. Dead reckoning and visual reference to known objects were utilized in areas where none of the other methods would work, particularly along shore and adjacent to piers.

Some sextant position computations were previously deficient due to the lack of consideration for control station elevation. A recomputation resulted in some position differences of approximately 2 mm at the scale of the survey. The most significant differences were located in the vicinity of Angel Island, an area subsequently resurveyed and superseded by FE-242. Plottable differences in excess of 1 mm resulted in the digital record being rejected.

The positions of five hydro signals (500-504) were generated in the field by scaling the location of photo identified points from the photomanuscript. Headquarters subsequently provided analytic aerotriangulation positions for these signals (see attached C3421 letter, Field Positional Hydro Control OPR-L123 (Related to H-9793, 1978), August 23, 1982). The position for station 503 was changed approximately 18 meters, the other signal positions changed only slightly, 1 to 7 meters. H-9793 was recomputed utilizing these updated positions. Soundings and features with position changes of more than 1 millimeter at survey scale were replotted; however the area of Raccoon Strait contained so many changes that the data was replotted onto a page-sized overlay (Figure 1) to the smooth sheet. This area is superseded by this overlay and is so annotated on the smooth sheet.

The survey records do not contain any documentation of methodology used to locate hydrographic signal #400. The signal appears to be correctly located.

The shoreline originates with reviewed Class I shoreline maps TP-00526 and TP-00528, filed as blueprints 115943 and 115945, respectively. Both manuscripts are based on photography flown in March 1977, updated by revision photography of May 1981. TP-00526 was field edited in November 1978 and April 1979. TP-00528 was field edited during November 1978.

3. HYDROGRAPHY

Crosslines are in adequate agreement with the main scheme of hydrography. Such differences as do occur are located in areas of steep slopes or rough bottom and do not constitute a conflict of data.

The sounding pattern on H-9793 is relatively dense, allowing detailed depth curves to be drawn in most areas. Dense cultural detail in some inshore areas has required the breaking or deletion of some depth curves.

The bottom configuration is adequately developed in most areas. Least depths over critical features are not sufficiently developed in all cases. Insufficiently developed features are discussed in detail in sections 6, 7, and 9 below.

In the vicinity of two marinas, latitude 37°52'18"N, longitude 122°27'30"W (Belvedere Cove) the bottom configuration was not adequately developed to emphasize their access channels; the area was subsequently resurveyed during FE-242 (1983).

The charted 36-foot supplemental curve (chart 18649) and the 90-foot supplemental curve (chart 18650) have been shown on the smooth sheet. The 90-foot supplemental curve is shown in violet.

4. CONDITION OF SURVEY

The smooth sheet and accompanying overlays, hydrographic records, and reports are adequate and conform to the requirements of the Hydrographic Manual with the following exception:

> The present survey is considered deficient in that in vicinities of cultural features adequate development of the bottom configuration was not always accomplished. It would have been desirable to survey pertinent inshore areas at a scale greater than that of the basic survey with the utilization of insets or sub plans, as necessary. This is addressed in the Hydrographic Manual, sections 2.4.2 and 4.5.12; and figure 7-7.

5. JUNCTIONS

H-9793 junctions with the following surveys:

> H-9185 (1971), to the west
> H-9794 (1978), to the east
> H-9811 (1979), to the northeast

H-9793 joins H-9794 (1978) on the east and H-9811 (1979) on the north. Junctions with these contemporary surveys have been made and curves in the junction areas are in agreement.

H-9793 junctions with H-9185 (1971) in the vicinity of the Golden Gate Bridge. A junction has been made and the junction curves shown on H-9793 should be used. The pencilled 18' curve on H-9185 east of Fort Point should be adjusted to agree with shoal information on H-9793. Similarly, the 300' curve on H-9185 should be adjusted to fit the 299' sounding on H-9793.

6. COMPARISON WITH PRIOR SURVEYS

H-7620	(1947)	1:10,000
H-7621	(1947)	1:10,000
H-7621A	(1948)	1: 2,500
H-7704	(1948)	1:10,000

H-7706	(1948-49)	1: 5,000
H-7717	(1948)	1: 2,400
FE-136	(1956)	1: 5,000

H-7620:

A small section of the east shoreline of the Tiburon Peninsula between latitude 37°52'35" and 37°53'50" and the immediately adjacent water areas is common to both H-7620 and H-9793. Water depths on H-7620 agree within two or three feet with those on H-9793 in most cases. Along the shoreline of the Tiburon Peninsula several charted rocks appear on H-7620, but have not been located on H-9793. They are also absent from Class I map TP-00526, which contains the field edit of the area. These rocks and a few soundings have been carried forward to the present smooth sheet.

The southernmost, a rock awash at latitude 37°53'08"N, longitude 122°26'29.5"W, labeled "covered HW" is in the vicinity of a 1 foot sounding on H-9793. This rock and annotation have been carried forward to H-9793.

A group of three rocks, centered at latitude 37°53'18"N, longitude 122°26'36"W appear on H-7620, but have not been located on H-9793. These rocks and associated height information have been carried forward to the smooth sheet.

Thus augmented, H-9793 is complete in the area of common coverage with H-7620, and can be used to supersede that prior survey.

H-7621:

This prior survey covers the southern half of H-9793, up to a latitude of approximately 37°51'25". Comparison of depths shows good agreement inshore, but increasing disagreement in deeper water. The cause of these differences is attributed to movement of bottom sediments, dredging, and possibly the deposition of spoil. Section K of the descriptive report contains a lengthy and detailed discussion of changes in the bottom relating to transportation of sediments. In any case, H-9793 shows that significant bottom changes have occurred in some of the area covered by prior survey H-7621.

The sunken wreck, Presurvey Review Item 27, charted at latitude 37°50'53"N, longitude 122°28'39"W, originating with H-7621 (1947), was not disproved by the present survey. Subsequently the Photogrammetric Branch (N/MOA22) provided an overlay (Attachment E) supplementing the reviewed shoreline map TP-00528 (1977-78) by redescribing the "groins" in the immediate area with "foul with piling." The present survey located two wrecks in the immediate area and N/MOA22 provided an accurate delineation of these on the aforementioned overlay. The elevations determined by the present survey, one uncovering 2 feet at MLLW and the other covered 1 foot at MLLW, and the delineation provided by N/MOA22 have been shown on the smooth sheet.

A rock awash, no height given, at latitude 37°50'04"N, longitude 122°28'16"W appears on H-7621, but not on H-9793 or on TP-00528. The rock awash has been brought forward onto H-9793.

Soundings in areas of little or no change between the past and present survey have been carried forward to the present survey.

The shoreline in the vicinity of latitude 37°48'21"N from longitude 122°26'51"W to 122°28'00"W has been accreted by as much as 40-50 meters.

A charted ruin shown on the present shoreline map at latitude 37°48'24"N, longitude 122°27'54"W has been reexamined (by N/MOA22x1) and was determined to be a breakwater. This designation has been carried forward to the present survey. A charted pile seaward of the breakwater has been carried forward as submerged to the present survey.

The 3-foot depth charted at latitude 37°48'22"N, longitude 122°27'45"W is not considered disproved by the present survey and has been carried forward. A Chart Adequacy Survey (Chart Letter 716 of 1976; item 23) located a 3-foot depth in the immediate area; however, it was reduced using predicted tides.

Numerous cultural improvements to the shoreline from Horseshoe Bay to Sausalito have taken place since the prior survey. These alterations include the reclaiming of areas and the construction of bulkheads, etc. In areas of improvement where a new bulkhead or riprap is in proximity to prior piers, dolphins, piles, or rocks, and it is evident that changes have occurred, the prior data have not been carried forward.

With the transfer of the above features, H-9793 is adequate to supersede H-7621 in areas of common coverage. However, significant portions of H-9793 were subsequently investigated during FE-242 and superseded. These areas are:

a. South of Angel Island centered at latitude 37°51'12"N, longitude 122°26'21"W.

b. Off Yellow Bluff centered at latitude 37°50'08"N, longitude 122°28'09"W.

c. Presidio Shoal centered at latitude 37°48'36"N, longitude 122°27'30"W.

H-7621A:

H-7621A is a 1:2,500 scale sand wave study conducted in 1948 of the area east of the Presidio Shoal, centered at latitude 37°49'00"N, longitude 122°26'30"W. Agreement between the surveys is within two feet in most cases. As with H-7621, changes in bottom configuration probably are the result of transported sediments. The variability of the bottom in this area indicates the continued presence of sand waves. There are no unexplained differences between H-9793 and H-7612A in areas of common coverage. H-9793 should be used to supersede H-7621A.

H-7704:

H-7704 provides coverage of the area north of latitude 37°51'00"N. Most soundings agree within two feet, with no clear distinction as to which survey is deeper or shoaler. A major exception occurs in the channel leading into Sausalito, where the water depth has increased by up to ten feet, evidently as a result of dredging.

The following features have been brought forward to H-9793:

a. A foul area containing three islets (symbolized as awash) on the west side of Angel Island, centered at latitude 37°51'46"N, and longitude 122°26'26"W.

b. A 20-foot elevation on a rock (Signal 502 on the present survey) at latitude 37°52'19.41"N, longitude 122°26'57.96"W.

With the transfer of this information, H-9793 is adequate to supersede H-7704 in areas of common coverage. However, two areas on H-9793 common to H-7704 have also been superseded by FE-242:

a. In the vicinity of Belvedere Cove, centered at latitude 37°52'12"N, longitude 122°27'15"W.

b. South of Angel Island, centered at latitude 37°51'12"N, longitude 122°26'21"W.

H-7706:

H-7706 covers the San Francisco waterfront area east of Anita Rock. The depths generally agree well, within two feet. There is considerable change to the highwater line where yacht basins have been expanded and established. In addition, the high water line west of longitude 122°26'51"W has accreted up to 50 meters.

H-9793 is adequate to supersede H-7706 within the area of common coverage.

FE-136 (1956) 1:5,000

This field examination is centered in the area of latitude 37°48'30"N, longitude 122°26'15"W at the entrance to the yacht harbor. The purpose of the examination was to establish the position of the new jetty and determine the surrounding depths. A comparison between the prior and present work reveals the only significant bottom change to be a present 26-foot depth at latitude 37°48'33.76"N, longitude 122°26'21.75"W where prior depths were 47 feet. This change is attributed to the natural deposition of bottom sediment along the jetty. Cultural changes since the prior survey include dredging, filling, and the obvious removal of numerous piles.

H-9793 is adequate to supersede FE-136 in the area of common coverage.

H-3837 (1917) WD 1:20,000
H-3968 (1917) WD & Add. WK (1936) 1:20,000 & 1:10,000

A prior 35-foot depth in latitude 37°49'21"N, longitude 122°26'15"W falls in present depths of 46-55 feet; the prior depth is considered discredited by the present survey.

Prior depths of 29 and 36 feet were found at Harding Rock at approximate latitude 37°50'13"N, longitude 122°26'41"N. A subsequent Corps of Engineers survey (BP 46340 of 1949) and survey H-7621 (1947) have determined least depths over the feature of 34 and 35 feet, respectively. These differences are attributed to a rock removal project of 1932. The charted 35-foot depth is not considered disproved and has been carried forward from H-7621 (1947). See Table 1 of the Descriptive Report for the disposition of the 34-foot depth.

Shoaler depths on the prior wire drag surveys that are not charted are to be considered discredited by subsequent surveys and have not been carried forward.

7. COMPARISON WITH CHARTS

Chart 18649 (45th Edition, February 4, 1978) 1:40,000
Chart 18650 (36th Edition, June 9, 1980) 1:20,000

a. Hydrography

The charted hydrography originates with the previously discussed prior surveys which require no further consideration, supplemented with items addressed in sections K and L and Tables I, II, and III of the Descriptive Report, numerous Corps of Engineer surveys, Port of San Francisco surveys, and two Chart Adequacy Surveys (Chart Letters 716 and 967 of 1976, and accompanying blueprints).

Attention is directed to the following:

(1) The 97-foot depth (chart 18649, source unknown) at latitude 37°48'43"N, longitude 122°28'05"W, on Presidio Shoal, lies in an area of 103 to 106 foot soundings on H-9793. Chart present survey depths.

(2) The 10-foot (chart 19649) depth at latitude 37°48'33"N, longitude 122°28'06"W, near Fort Point, originates with the Corps of Engineers (BP 55618). The development on H-9793 has not disproven the existence of a 10-foot shoal in this area and it should continue to be charted until disproven.

(3) The charted 35-foot sounding (chart 18650) at latitude 37°48'38"N, longitude 122°27'34"W, originates with the Corps of Engineers (CL970/73, BP 86538), and is in an area of 52 to 72 foot soundings on H-9793. This area has been superseded by FE-242 (1983). (AWOIS #50563).

The Nautical Chart Section (N/CG221) has elected to reapply a June 1973, Corps of Engineers survey (BP 118319 also filed as BP 87363, Chart Letter 1612 of 1973), pertinent to several of the rocks within the survey area. In so doing, Harding and Shag Rocks have been revised on the 38th edition of chart 18650, December 17, 1983. At Harding Rock the charted 35-foot depth from survey H-7621 (1947) has been revised to 36 feet, and the charted 35-foot depth at Shag Rock (source-Corps of Engineers survey, BP 25627 of 1932) has been revised to 37 feet. These 1973 depths are in better agreement with the depths determined by the present survey (see section 6 of this report for further discussion of Harding Rock). The minimum depth of Arch Rock as determined by the 1973 Corps of Engineers work is 36 feet; however, the present survey has a depth of 34 feet in the vicinity, and a charted 35-foot depth from H-7621 (1947) at latitude 37°49'45"N, longitude 122°26'25"W is not considered disproved and has been carried forward to the present survey. The charted 33-foot depth (source Corps of Engineers survey, BP 46360 of 1949) is not considered disproved and should be retained for conservative reasons.

With the exceptions noted, the present survey is adequate to supersede the charted hydrography in the common area.

b. Controlling Depths

There are no charted controlling depth notes or tabulations that refer to the area common to the present survey; however, the Corps of Engineers has several projects such as the minimum depths to be maintained at Alcatraz and Presidio Shoals at 40 feet; and Arch Rock, Harding Rock, Shag Rocks, and Point Knox Shoal at 35 feet.

c. Aids to Navigation

All fixed and floating aids to navigation adequately mark the features intended and compare well with the charted positions with the exception of Sausalito Channel Buoy charted at latitude 37°52'05"N longitude 122°29'23"W (U.S. Coast Guard Light List name - not official). This buoy is located in 6 feet of water on the present survey and marginally marks the channel. The U.S. Coast Guard Light List indicates that the buoy is in 8 feet of water. Positions of charted aids to navigation are contained in tables in section N of the Descriptive Report.

8. COMPLIANCE WITH INSTRUCTIONS

With the exceptions noted, this survey adequately complies with the project instructions noted in Section 1 of this report.

9. ADDITIONAL FIELD WORK

This is an adequate hydrographic survey. Additional field work was conducted in 1983 to clarify several items within the common area of this survey and is registered as FE-242. Additional field work is recommended to determine the least depth of the charted 60-ft wreck (cleared effective depth), Harding Rock, Shag Rocks, and Arch Rock shown in Table I of the Descriptive Report.

Respectfully submitted,

James S. Green
Supervisory Cartographer

This survey has been examined and it meets Charting and Geodetic Services standards and requirements for use in nautical charting. The survey is recommended for approval.

Dennis Hill
Chief, Hydrographic Section

REC'D AUG 24 1982
HYDROGRAPHIC SURVEYS DIVISION
MARINE SURVEYS AND MAPS

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SURVEY
Rockville, Md. 20852

August 23, 1982 C3421:GF

TO: C35 - Glen R. Schaefer

FROM: C3421 - Greg Fromm

SUBJECT: Field Positioned Hydro Control OPR-L123
(Related to H-9793, 1978)

Visual control sites, signals 500 through 504, were selected and located during 1978 field operations using photogrammetric data from CM-7704. Visual control signals were identified (pricked) on ratio photographs and graphically intersected by field personnel using radial plot principles on a film copy of Class III map TP-00526. Plotted field positions were then scaled from the map copy and entered into the hydrographic record. Photographs were entered into the photogrammetric records. Paragraph 55 of the 1978 field report for TP-00526 makes reference to the positioning method and entry of these five signals into the hydrographic record. * See HM sect. 31.3.2.2.

At the request of C352, analytic aerotriangulation methods were used to determine positions for photoidentified signals 500 through 504. Aerotriangulated positions represent a higher degree of accuracy location then does the field determined positions used by the hydrographer. It is suggested that the following aerotriangulated signal positions be used in final processing of the hydrographic survey.

Signal No.	Aerotriangulated GP's	
500 (bkw)	37°52'19.212" .170" 1m **	122°27'34.928" .765" 4m
501 (bkw)	37°52'18.722" .750" 1m	122°27'16.664" .500" 4m
502 - rock on H-7704	37°52'19.405" .300" 3m	122°26'57.946" 58.210 6m
503 (rock)	37°52'34.510" .090" 13m	122°26'32.257" 31.730 13m
504 (ferry pier)	37°52'06.928" .920" -	122°26'02.458" .510" 1m

* 55 Miscellaneous (Field Edit Report; CM 7704, 1978, TP00526
"The 5 photo-hydro signals located in this survey were positioned by radial plot on the Master Field Edit Ozalid.

** Difference in meters between survey positions and aerotriangulated GP's.

Attachment "D"

ATTACHMENT TO DESCRIPTIVE REPORT FOR H-9793

I have reviewed the smooth sheet, accompanying data, and reports of this hydrographic survey. Except as noted in the Evaluation Report, the hydrographic survey meets or exceeds Charting and Geodetic Services (C&GS) standards, complies with instructions, and is accurately and completely represented by the smooth sheet and digital data file for use in nautical charting.

Chief, Nautical Chart Branch 6/18/87 (Date)

CLEARANCE: SIGNATURE AND DATE:

N/MOP2:LWMordock 6/19/87

After review of the smooth sheet and accompanying reports, I hereby certify this survey is accurate, complete, and meets appropriate standards with only the exceptions as noted above. The above recommendations are forwarded with my concurrence.

Director, Pacific Marine Center 6/19/87 (Date)

ATTACHMENT "E" INSERT THIS PAGE INTO DESCRIPTIVE REPORT. DERK

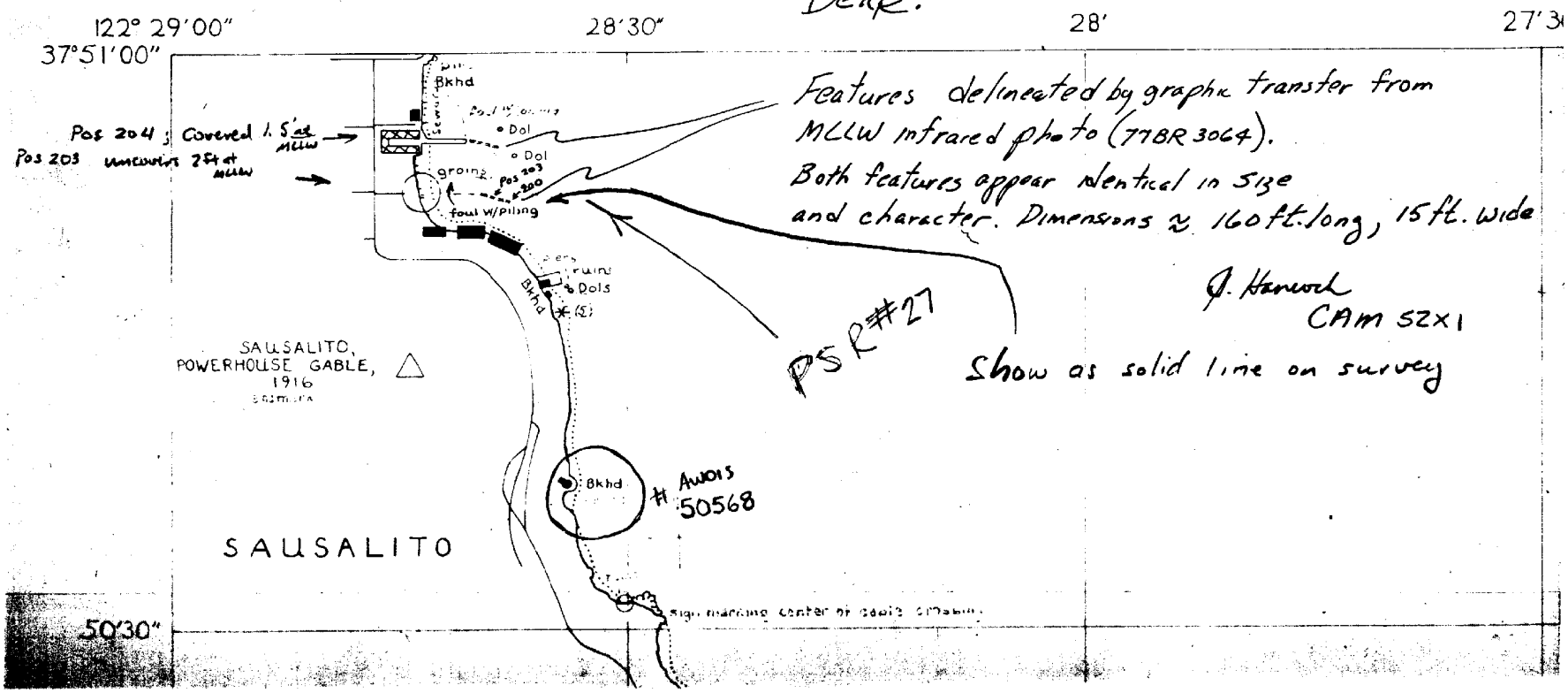
CM-7704 (SAN FRAN)

TP-00528

Final Map

April 26/82

DERK:



Features delineated by graphic transfer from MLLW infrared photo (77BR 3064). Both features appear identical in size and character. Dimensions ≈ 160 ft. long, 15 ft. wide

J. Harwood
CAM 52X1

PSR #27

Show as solid line on survey

Attachment #1

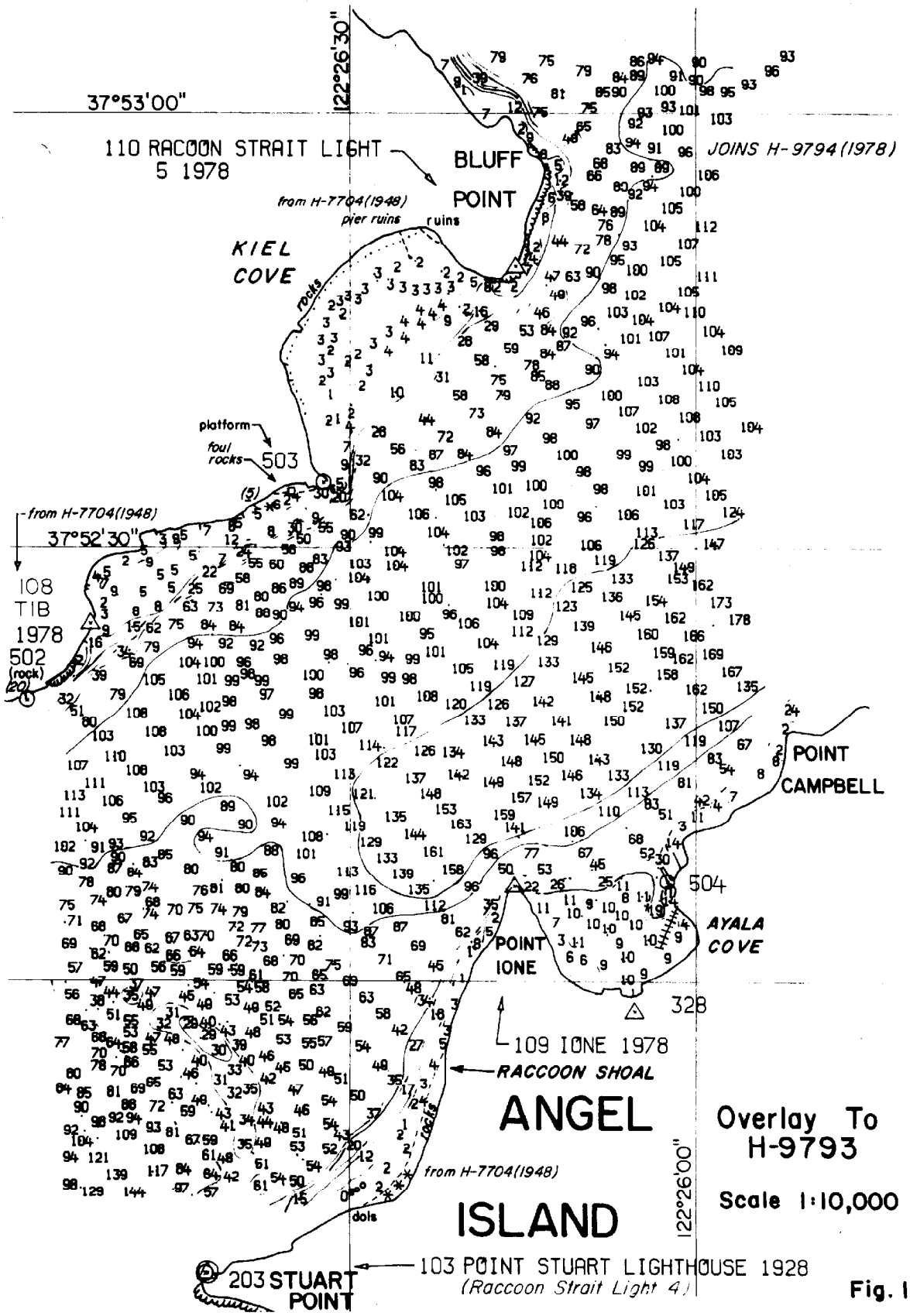
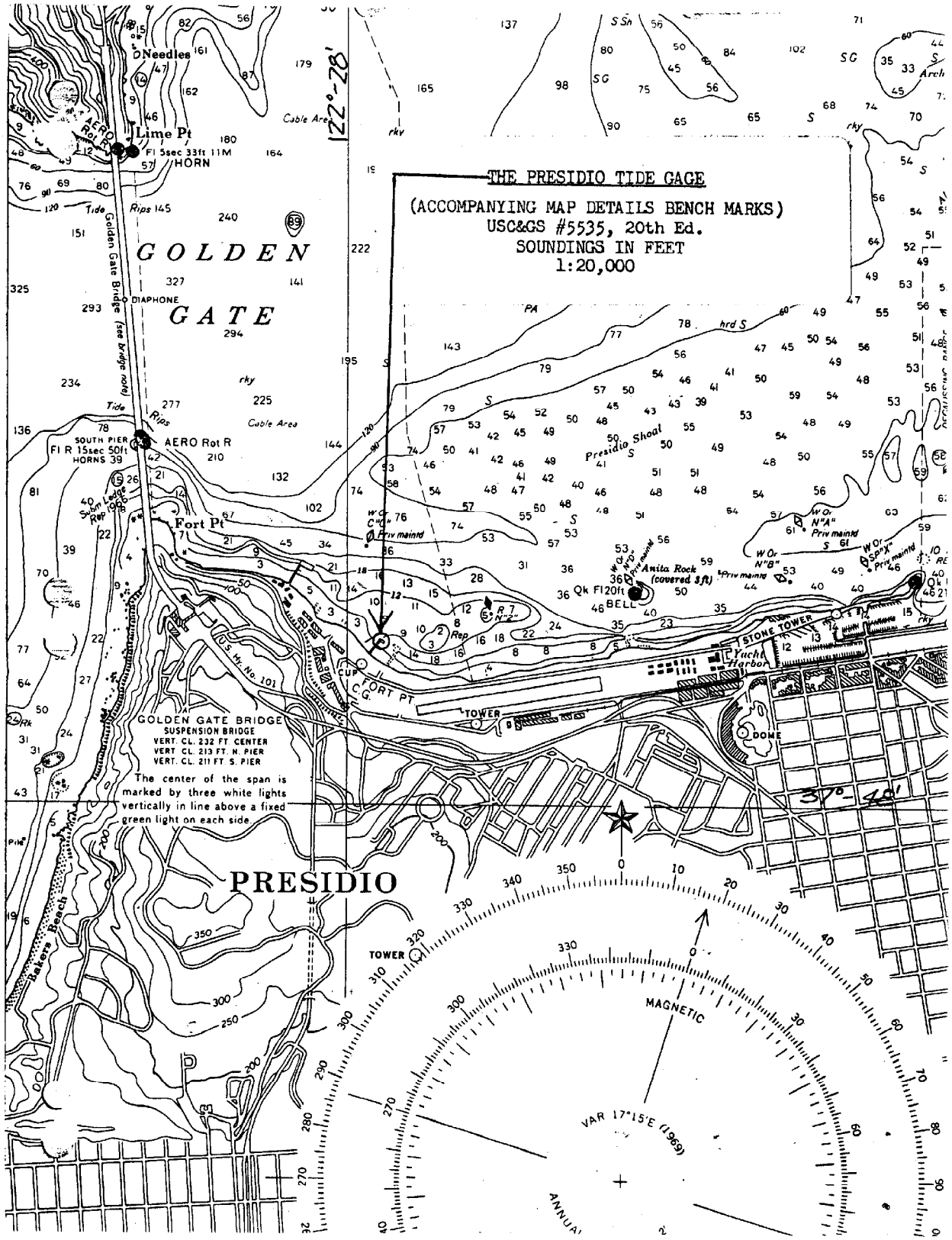

37°53'00"
122°26'30"
110 RACOON STRAIT LIGHT
5 1978
BLUFF
POINT
JOINS H-9794 (1978)
from H-7704 (1948)
pier ruins
ruins
KIEL
COVE
rocks
platform
foul
rocks
503
from H-7704 (1948)
37°52'30"
108
TIB
1978
502
(rock)
POINT
CAMPBELL
504
AYALA
COVE
POINT
IONE
328
109 IONE 1978
RACCOON SHOAL
ANGEL
ISLAND
from H-7704 (1948)
dols
122°26'00"
Overlay To
H-9793
Scale 1:10,000
103 POINT STUART LIGHTHOUSE 1928
(Raccoon Strait Light 4)
203 STUART
POINT

Fig. 1


THE PRESIDIO TIDE GAGE
(ACCOMPANYING MAP DETAILS BENCH MARKS)
USC&GS #5535, 20th Ed.
SOUNDINGS IN FEET
1:20,000
122°-28'
37°-48'
GOLDEN GATE
PRESIDIO
Needles
Lime Pt
Fl 5sec 33ft 11M
HORN
Golden Gate Bridge (see bridge note)
DIAPHONE
SOUTH PIER
Fl R 15sec 50ft
HORNS 39
AERO Rot R
Fort Pt
Presidio Shoal
Anita Rock
(covered 3 ft)
Qk Fl 20ft
BELL
STONE TOWER
Yacht Harbor
DOME
TOWER
FORT PT
U.S. Hy. No. 101
GOLDEN GATE BRIDGE
SUSPENSION BRIDGE
VERT. CL. 232 FT. CENTER
VERT. CL. 213 FT. N. PIER
VERT. CL. 211 FT. S. PIER
The center of the span is marked by three white lights vertically in line above a fixed green light on each side.
Baker Beach
MAGNETIC
VAR 17°15'E (1969)
ANNUAL

NOAA FORM 75-96
(10-83)

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

MARINE CHART BRANCH

RECORD OF APPLICATION TO CHARTS

FILE WITH DESCRIPTIVE REPORT OF SURVEY NO. H - 9793

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
18650	11/10/87	[illegible]	Full ~~Part Before~~ After Marine Center Approval Signed Via
			Drawing No. 58, 40th Ed
18653	12/3/87	[illegible]	~~Full~~ Part ~~Before~~ After Marine Center Approval Signed Via
			Drawing No. 1, new chart
			Examined for critical corrections
18649	12/7/87	[illegible]	Full ~~Part Before~~ After Marine Center Approval Signed Via
			Drawing No. 67, 52nd Ed.
18652-SC	12/30/87	[illegible]	Full ~~Part Before~~ After Marine Center Approval Signed Via
ABc			Drawing No. 29, 25th Ed.
18653	11-27-89	Ed Martin	Full ~~Part Before~~ After Marine Center Approval Signed Via
			Drawing No. 2
			Full Part Before After Marine Center Approval Signed Via
			Drawing No.
			Full Part Before After Marine Center Approval Signed Via
			Drawing No.
			Full Part Before After Marine Center Approval Signed Via
			Drawing No.
			Full Part Before After Marine Center Approval Signed Via
			Drawing No.
			Full Part Before After Marine Center Approval Signed Via
			Drawing No.

SUPERSEDES C&GS FORM 8352 WHICH MAY BE USED