FE299

Diagram No. 5531-1

NOAA FORM 76-35A

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

DESCRIPTIVE REPORT

Type of Survey ... Field Examination

Field No. ... PHP-10-1-87

Registery No. ... FE-299

LOCALITY

State ... California

General Locality ... San Pablo Bay

Sublocality ... San Pablo Strait to Carquinez Strait

19 87

CHIEF OF PARTY
LTJG J.A. Miller

LIBRARY & ARCHIVES

DATE ... February 3, 1988

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

FE299

CGD11
Area 3
CHES

18654
18649
18652 sc C

Ref Bo 133821, L-531/87

CARTOG: TO SIGN OFF SEE "RECORD OF APPLICATION"

NOAA FORM 77-28 (11-72)

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

REGISTER NO.

FE-299

HYDROGRAPHIC TITLE SHEET

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

FIELD NO.

PHP 10-1-87

State: California

General locality: San Pablo Bay

Locality: San Pablo Strait to Carquinez Strait

Scale: 1:10,000 Date of survey: March 30 to May 6, 1987

Instructions dated: February 10, 1987 Project No.: OPR-L123-PHP-87

Vessel: Launch 651, Whaler 654

Chief of party: LTJG John A. Miller

Surveyed by: LTJG T.K. Porta, B.H. Lund

Soundings taken by echo sounder, hand lead, pole: Ross Fineline 5000

Graphic record scaled by: PHP Personnel

Graphic record checked by: J.A. Miller, T.K. Porta

Verification by: P. Niland and G. Kay Automated plot by: PMC Xynetics Plotter

Evaluation by: Gordon E. Kay

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

REMARKS: Revisions and marginal notes originated during office processing.

Separates have been removed and filed with the survey records.

AWOIS and SURF ✓ RWD 8/82

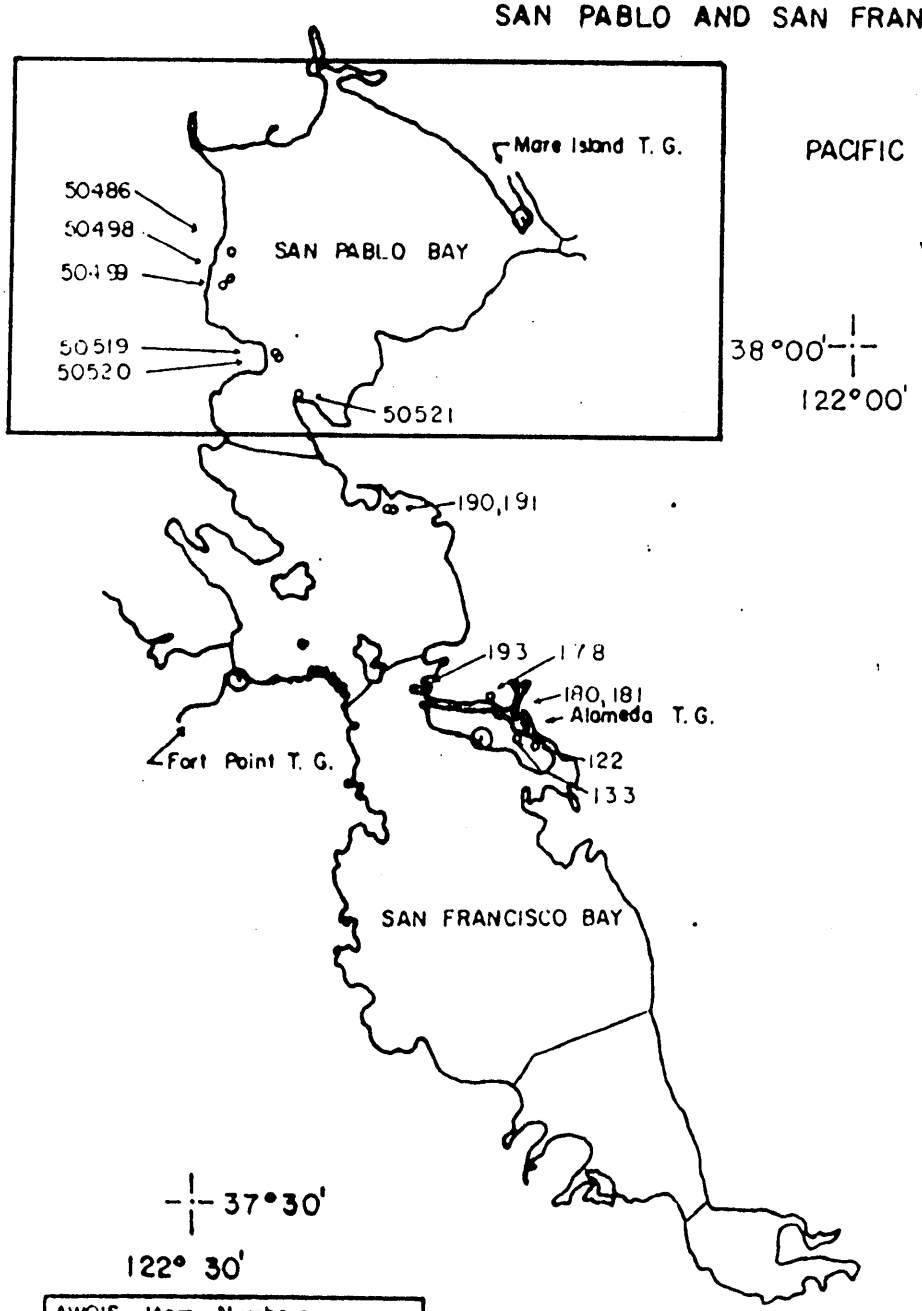
NOAA FORM 77-28 SUPERSEDES FORM C&GS-537.

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

PROGRESS SKETCH TO ACCOMPANY ANNUAL FIELD OPERATIONS REPORT

OPR-L123-PHP-87

SAN PABLO AND SAN FRANCISCO BAY, CALIFORNIA



PACIFIC HYDROGRAPHIC PARTY

Chief of Party:

John A. Miller, Lt(jg), NOAA

(Shoreline from Chart 18652)

AWOIS Item Numbers STATUS OF INVESTIGATION	Month APRIL	Year 1987
DISPROVED	180 181 133 190 191 122 178	
VERIFIED	50520 50521 50519 50499 50486 50498	
IN PROGRESS	50492 193	
RESOLUTION NOT FEASIBLE		

PROGRESS SKETCH TO ACCOMPANY ANNUAL FIELD OPERATIONS REPORT

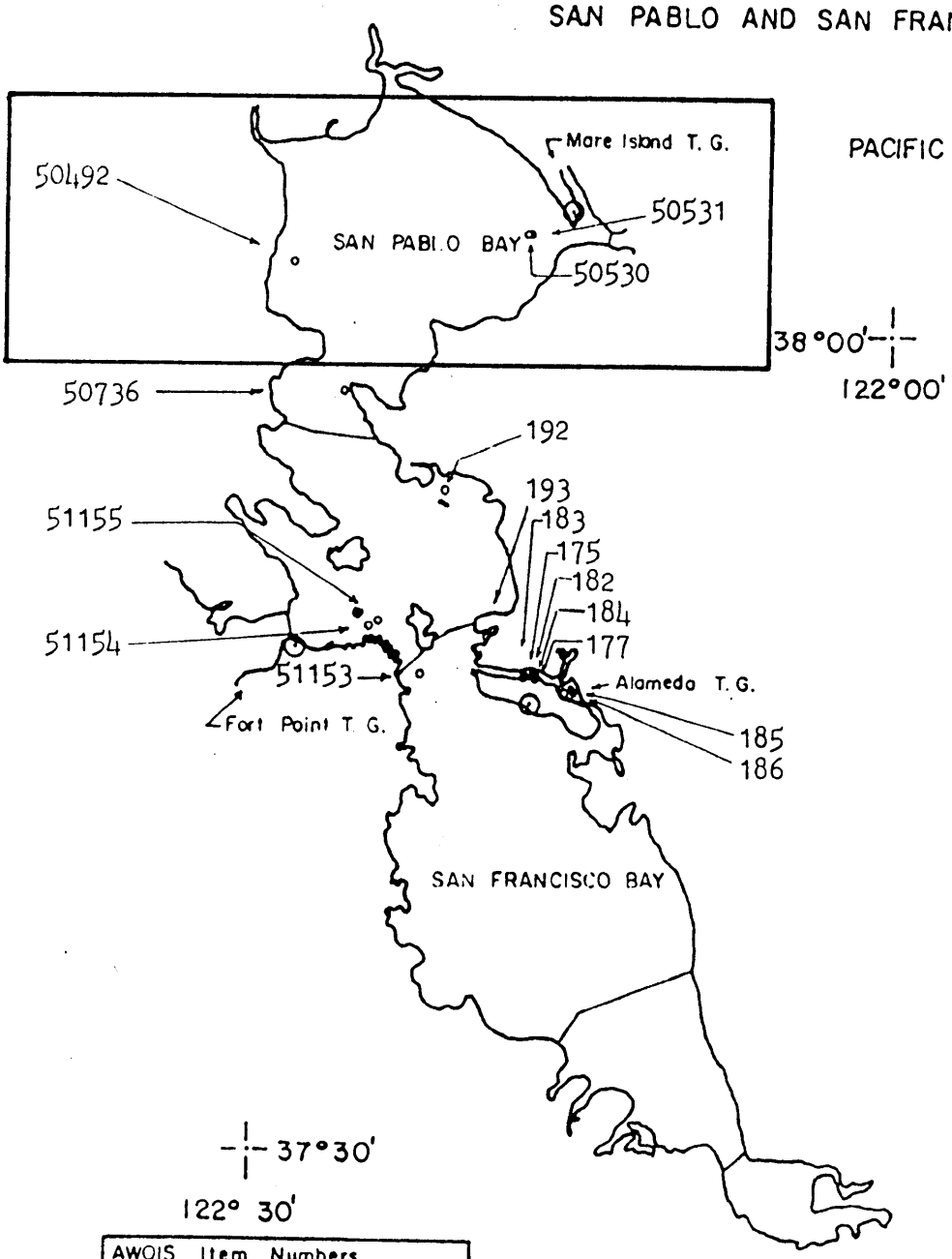
OPR-L123-PHP-87

SAN PABLO AND SAN FRANCISCO BAY, CALIFORNIA

PACIFIC HYDROGRAPHIC PARTY

Chief of Party:

John A. Miller, Lt(jg), NOAA



(Shoreline from Chart 18652)

AWOIS Item Numbers STATUS OF INVESTIGATION	Month MAY	Year 1987
DISPROVED	192, 50531, 50492, 177	
VERIFIED	50530, 175, 182	
IN PROGRESS	183, 184, 185, 186, 193	
RESOLUTION NOT FEASIBLE		

A. PROJECT.

A field examination was performed in accordance with Project Instructions OPR-L123-PHP-87, dated February 10, 1987, and Change No. 1 dated March 20, 1987.

The purpose of these investigations was to completely resolve uncompleted item investigations remaining from basic surveys of San Pablo Bay. The items listed below from the "Additional Items" of the "Office Review", dated October 25, 1984, with addendum dated January 21, 1987, have been completed.

ITEM NUMBER	CHART NUMBER
AWOIS 50486	18654
AWOIS 50492	18654
AWOIS 50498	18654
AWOIS 50499	18654
AWOIS 50519	18654
AWOIS 50520	18654
AWOIS 50521	18654
AWOIS 50530	18654
AWOIS 50531	18654

B. AREA SURVEYED.

The investigations were performed in San Pablo Bay, California from March 30, 1987 (DN 89) to May 6, 1987 (DN 128). The limits of the investigations were:

38/03/23 N to 37/57/50 N
122/19/00 W 122/29/06 W.

C. SOUNDING VESSEL.

Echo sounding data were acquired by survey Launch 1101 (EDP 0651). No unusual vessel configurations were used.

D. SOUNDING EQUIPMENT AND CORRECTIONS TO ECHO SOUNDINGS.

Echo sounding data were acquired using a standard Ross Fineline echo sounder and digitizing system, with a

centerline mounted 7.5 degree, 100 KHz transducer. The Ross system on Launch 1101 (EDP 0651) consists of the following instruments:

Component	Model No.	S/N
Power Inverter	2000	1071
Transceiver	4000	1040-6
Analog Recorder	5000	1080
Digitizer	6000	3787

Leadline PHP-1, a sounding pole, and fiberglass tapes were used for least depth and item measurements for depths under 5 ft. Final field sheet soundings were corrected for leadline calibration and (where appropriate) tape angle. The sounding pole was measured and all the correctors were zero. A 3D Instruments Inc. pressure gage (SN 8604205N) was used for least depths greater than 5 ft. For leadline, and pressure gage calibration information see Appendix D, Abstracts of Corrections to Echo Soundings, following this report.

There were no faults in the equipment that affected the accuracy of the soundings.

Sounding Instrument Accuracy and Adjustments.

The Ross echo sounding system simultaneously produces an analog echogram and a digitized depth value. Digitized soundings sampled by the logging system at predetermined time intervals are the primary source of sounding line data on the field sheet, but these are supplemented by depths scaled from the analog record in areas where digitized depths were incorrect or lacking. The digitized depths are sometimes triggered by a source other than the bottom (sea weeds, fish, etc.) or from an instrument generated source such as side echos. In these instances the digitized depths were replaced by values scaled from the echogram.

Initial error occurs when the echo sounder's transmit pulse trace is not adjusted to coincide with the zero on the echogram paper. The initial trace alignment was monitored and adjusted during survey operations. Any depths scaled from echograms with initial error were corrected before being applied to the survey.

Phase errors are caused by faulty stylus belt timing in the analog recorder due to belt stretching or improper internal adjustment. The system was checked for phase error at the

beginning of each survey day and, with few exceptions, at the end of each survey day (or whenever the analog paper was changed) by introducing simulated depths (e.g. 10', 20', 30', etc.) into the analog recorder via the digitizer phase calibration mode. The analog trace was then compared to the simulated digital depth and the equipment was adjusted as necessary.

The analog's speed had no inconsistencies on this survey.

Static Transducer Draft.

The static transducer draft values for the hull mounted transducer on Launch 1101 was physically measured in two parts. The first part was done while the launch was out of the water. The distance between the transducer face and the bottom of a black line painted on the hull above the water line was measured using a surveying level (Lietz B-1, S/N 214303) and rod. The second part was done with the launch in the water with a normal fuel load on board. The distance between the bottom of the painted black line and the actual water line was measured with a steel tape.

The actual static transducer depth is the distance obtained in part 1 minus the distance measured in part 2. The actual static draft was measured at 1.63 feet.

Sound Velocity Correctors.

Sound velocity correctors were derived from bar check data. Bar checks were made twice daily when wind and sea conditions permitted. Most days the wind is too strong in the afternoon for the keel-less jet launch to obtain usable bar check data.

An 11 x 1 foot aluminum bar suspended on 1/4 inch steel chains with wire-tied and painted markings at 5 foot intervals was used to obtain bar check data. Chain markings were checked for accuracy prior to beginning the survey and and were found to be accurate. Bar checks were abstracted daily using a measured static draft value of 1.6 feet.

Sound velocity correctors were computed using the mean of the daily values for each bar depth and the appropriate static draft and instrument corrector values. The standard deviation was computed for each bar depth to identify blunders or suspicious data. There appears to be blunders at the 20 ft depth. Since there were only three bar checks it would be difficult to determine which measurement was in error. Also the average of the correctors fit the velocity corrector curve well and agreed with the general shape of

the curves for the last survey of San Pablo Bay H-10223. The overall point corrector values for depths were plotted on a depth versus velocity corrector graph. From this graph a line was drawn through the points and a table of correctors was determined. The following table is appropriate for the dates shown:

Table	Inclusive Dates (Year days)
I	89/87 - 128/87

Sounding data was acquired during most of the bottom drag operations. This information was acquired for the launch crew to facilitate drag operations and should not be used for charting purposes since bar checks were not performed. No velocity or other correctors were applied to bottom drag soundings. Applicable Correctors were applied during Processing. Smooth soundings agree with H-10081

The development on DN 91 (positions 102-109) was the only data where velocity correctors should be applied. An accurate bar check was not possible due to wind and current conditions. A leadline depth was compared to the sum of the digitized depth plus the draft to confirm the echo sounding system was functioning properly. Bar check data from days 89 and 97 were used to compute the velocity correctors for DN 91. These correctors were not applied on the no smooth plot (NSP) expansion sheet for the development.

Settlement and Squat Corrections.

The digital speed log for Launch 1101 was originally acquired in April, 1984 to test for ground effect, which is the change in speed when moving to and from shallow water (see Ground Effect Report, May, 1984). From this testing it was determined that one method to help reduce the need for ground effect correctors was to operate the launch by constant speed through the water instead of fixed rpm. This decision was cleared through PMC and the speed log was permanently mounted in the hull of launch 1101. All soundings collected with Launch 1101 were annotated as to speed through the water, not rpm. Speed through the water was likewise used during the settlement and squat tests.

Settlement and squat measurements were observed for the Pacific Hydrographic Party's Launch (EDP 0651), an aluminum Jensen survey launch, on April 7, 1987 (DN 97). This test was conducted during survey operations on OPR-L123-PHP-86 and OPR-L123-PHP-87. The settlement and squat correctors apply to all data acquired on this survey (DN 89 - DN 128).

Equipment on the launch at the time of the test consisted of normal electronic positioning and depth finding gear (Mini-Ranger, HDL system, Ross echo sounder). The launch is equipped with a Caterpillar Diesel engine coupled to a jet pump. Three people were on board the launch at the time of the test (a normal crew for surveying). ✓

The test was conducted between the General Mills pier ruins (38/04/50 N and 122/14/50 W) and Mare Island Strait Light 4. The test was in the limits of OPR-L123-PHP-86. The launch ran in depths of 20 to 40 feet of water. The weather during the test was calm, with winds 0 to five knots, seas were 0 feet and the current was slack. ✓

The level was set up on a pier ruins at the General Mills flour company, Vallejo, California. A level rod was held on the cabin top, over the position of the hull mounted transducer. The launch ran towards the instrument, stopping for dead in the water (DIW) measurements before and after each run. ✓

The Pacific Hydrographic Party uses a speed log rather than rpm to measure vessel speed during hydrographic operations. Settlement and squat measurements were acquired for all speeds of hydrography. ✓

Changes in transducer draft due to settlement and squat were measured at regular intervals through the range of 3 nm/hr to 10 nm/hr. These point values were plotted and connected to yield continuous speed versus draft correction curves. ✓

Settlement and squat corrections are not applied to the field sheet, but are incorporated on the TC/TI tape. ✓

Correctors Applied to the Expansion Sheet.

Launch 1101 (EDP 0651)	Predicted tide correctors Static Draft correction	✓

Correctors Applied to the Final field Sheet.

PHP-1 Leadline	Leadline correctors Predicted tide correctors	✓
Sounding Pole	Predicted tide correctors	✓
Pressure gage	Pressure gage correctors Predicted tide correctors	✓

E. HYDROGRAPHIC SHEETS.

Five 1:10,000 field sheets and a 1:2,500 expansion sheet were constructed by PHP members with program RK 201 on a Modified Transverse Mercator projection. ✓

The expansion sheet was made to aid PHP in the analysis of the data. All essential soundings were transferred to the smooth field sheets. Parameter tapes for all sheets, as well as the paper expansion sheet, are included in the field records that accompany this report. ✓

Four of the five sheets were cut to 8.5 x 11 inches from one large 1:10000 sheet as required for field examinations. The parameters defined the fifth sheet and the expansion sheet to be 8.5 x 11 inches. ✓

Field records were forwarded to the Pacific Marine Center, Nautical Chart Branch, Seattle, Washington, for verification and smooth plotting. ✓

F. CONTROL STATIONS.

Control stations used on field examinations are:

NEW POSITION OR VERIFICATION OF OLD	STATION	LOCATION METHOD
Verified by PHP	Raceway RM 2	Traverse
"	Hamilton Field Standpipe 1951	"
"	Mare Island Southeast 1852	Triangulation
"	Mare Island Knoll C of E 1970	Traverse
"	Petaluma River Ent Lt 18	"
"	Pet	"
"	San Pablo Bay Chan Lt 17	Intersection
"	San Pablo Bay Chan Lt 13	"
"	Carquinez Strait Range Target 2	"
"	Sister 1941	Triangulation
"	Trans America Building 1976	Intersection
"	East Brother Island Lthouse 1932	Triangulation

Geodetic computations were based on the 1927 North American Datum. See the Horizontal Control Reports, California, Mare Island Strait and Western Approach to Carquinez Strait, OPR-L123-PHP-86, Aug., 1986 to Nov., 1986, and San Pablo Bay and San Francisco Bay, CA., OPR-L123-PHP-87", which will be submitted at the completion of the project, for a complete discussion of horizontal control procedures, equipment, computations and observations.

G. HYDROGRAPHIC POSITION CONTROL.

Electronic launch position control on these investigations were accomplished with a Motorola Mini-Ranger III ultra-high frequency transponder system in the range-range or range azimuth configuration, with the exception of several range azimuth positions using an electronic distance measuring instrument (EDMI) and a Wild T-2.

Electronic Control Equipment.

The following electronic positioning equipment were used on this survey:

Motorola Mini-Ranger III Mobile Station
Launch 1101

Mini-Ranger Console	S/N 701	
Transceiver (RT Console)	S/N C1680	DN 98/87 to 116/87
	S/N C1419	DN 117/87 to 128/87

Motorola Mini-Ranger III Reference Stations

Mini Ranger Transponder, Code A	S/N F3233
Mini Ranger Transponder, Code B	S/N 911059
Mini Ranger Transponder, Code C	S/N E2712
Mini Ranger Transponder, Code 9	S/N 1628

Position Control Equipment Operation.

Baseline calibrations for data collected on this survey were performed February 19, 1987 (DN 50), April 9, 1987 (DN 99), and April 27 (DN 107), over a slope distance of 2189.2 meters at Haire Ranch Camp #6. The correctors used to plot data before DN 125 were from DN 50, the correctors used to plot data on and after DN 125 were from DN 107. No data was acquired between April 9, 1987 to April 27, 1987 for this survey so the correctors for DN 99 were not used.

Corrector/Minimum Signal Strength

Date of BLC	Code A	Code B	Code C	Code 9
February 19, 1987	0/6	0/6	0/6	+1/7
April 9, 1987	+2/7	+1/6	+0/7	+2/8
April 27, 1987	0/10	-1/9	+1/11	0/9

All the range consoles and Mini-Rangers were sent to the Pacific Marine Center, Electronic Engineering Branch for annual maintenance on April 20, 1987.

PHP is adhering to a two month baseline calibration schedule. The next baseline calibration for this project, which is scheduled to end December 31, 1987, will be during the third week of June, 1987. Daily critical systems checks confirm that the Mini-Ranger correctors determined from the April 27 baseline are valid for data collected after April 27, 1987. ✓

There were no positioning equipment equipment failures during these investigations. ✓

Daily Calibrations.

Mini-Ranger critical system checks were performed once each day. Critical system checks were performed at a geodetic monument or compared to simultaneous EDMI readings at a fixed point. All daily system checks on the Mini-Rangers and console/RT unit during this time period showed an average variance of -0.5 meters (See the Abstract of Electronic System Checks, included in Appendix V. Abstracts of Corrections to Electronic Position Control). PHP considers these system checks a confirmation of the BLC and proper Mini-Ranger operation. ✓

Fixed aids to navigation (located to Third Order Class I standards) used for calibration were: ✓

Petaluma River
Ent. Lt. 18

San Pablo Bay
Chan Lt 17

San Pablo Bay
Chan Lt 13

The observed distance from the electronic station was corrected for antenna offset and was compared with the computed slope distance to yield the observed system corrector. The observed system corrector was then compared with the BLC and required to be within 0.5 millimeters at the scale of the item investigated. All hydrographic data meets this requirement. ✓

The geometric configuration of control stations and signal strengths were good. Angles of intersection for all survey data were between 30 and 150 degrees. Signal strength was annotated on the raw data printout frequently during sounding acquisition. "Time and course" methods were annotated on the raw data. No data was submitted with less than minimum signal strength. ✓

There were no unusual methods of electronic control operations, no equipment failures, and no unusual atmospheric conditions on these item investigations. ✓

ANDIST correctors were not needed since the sounding transducer on Launch 1101 is 0.1 meter horizontal distance from the Mini-Ranger antenna. ✓

The theodolite used for range azimuth hydrography and calibrations was a Wild T-2, S/N 276812. ✓

The EDMI used for these investigations was a DM 102, SN 293684. ✓

For further information on electronic calibrations see Appendix E, "Abstracts of Corrections to Electronic Position Control". ✓

A detached position listing is included in Appendix VIII, Carto Code Listing. ✓

H. SHORELINE.

Shoreline information was taken from the sources listed below.

Source	Scale	Enlargement
18654 33rd ed. 1/26/85	1:40,000	1:10,000

✓

Shoreline verification was conducted by the hydrographer for all shoreline within the search radii of the investigations. Changes to the shoreline are shown in red on the final field sheet. A ledge was added to the shoreline at 37/57/59 N, 122/25/39 W as a result of the investigation of item 50521 (see Section L. Comparison To The Chart for a description of methods). ✓

The following stations are seaward of the shoreline:

Station	#
Petaluma River Ent. Lt. 18	118
San Pablo Bay ~~Chan Lt~~ 13 CHANNEL Light	113
Carquinez Strait Range Target 2	603

✓

I. CROSSLINES.

Not applicable.

J. JUNCTIONS.

Not applicable.

K. PRIOR SURVEYS.

Not applicable. See Evaluation Report section 6

L. COMPARISON WITH THE CHART.

The items on this survey were compared to chart 18654 33rd ed. Jan. 26, 1985.

DANGERS TO NAVIGATION

A Dangers to Navigation letter was written to the Commander, Eleventh Coast Guard District, concerning the ledge and the stakes which were positioned during the course of this survey. A copy of this letter is included ~~in Appendix XI~~, Dangers To Navigation. A copy of this letter was also sent to the Chart Information Section, N/CG222, and PMC (N/MOP 21). This letter is dated June 11, 1987.

Description	Latitude	Longitude	Position, Depth (MLLW)
~~Subm Stakes~~ Ruins	38/01/49.75N	122/28/18.61W	123, 0.8 ft
obstruction (Subm Stake)	38/02/08.35N	122/28/05.30W	398, 3.0 ft
Ledge 3RK	37/57/59.14N	122/25/39.06W	110, 3.0 ft

ITEM INVESTIGATIONS

All depths reported in this section have been corrected for predicted tides and were acquired using leadline PHP-1, sounding pole, fiberglass tape, or a pneumatic gage. Elevations and depths may change when smooth tides are applied. Nevertheless all recommendations are in feet (ft.) based on ~~predicted~~ actual tides.

All times are Universal Coordinated Time (UTC).

Inverse distances are from the listed AWOIS or item position to the center of the survey search or observed position of the feature. The distances are in meters (m).

CHART: 18654 33rd ed. Jan. 26, 1985 ITEM: AWOIS 50486 Sheet 2

ITEM DESCRIPTION: Obstruction (Airplane wreck)

SOURCE: H10899/51-CS256
CL280/78--CAS18654 (1977)-OPR-511-DA77, Item 6
H10082/83--OPR-L123-RA-83

INVESTIGATION DATE: 4/1/87 (DN 91) TIME: 1822, 2117

VESSEL: 0651 OIC: LTJG Porta

REFERENCES:

Position No: 141

GEODETIC POSITION	Latitude N	Longitude W
Charted:	38/03/10.22	122/29/05.36
Observed:	38/03/10.145	122/29/05.668
Inverse Distance:	7.7 m	

POSITION DETERMINED BY:

Motorola Mini-Ranger III. The method of positioning the feature was range-range, checked by a third station to 0.2 m. This is adequate for a 1:10,000 scale survey.

METHOD OF INVESTIGATION:

The area was searched visually at less than one foot of tide. The airplane wreck was visible, however there was not enough water to position the obstruction. The elevation of the wreck was estimated at 1.9 ft through binoculars from 300 m at 1822 UTC. Launch 1101 returned to the site at 2117 UTC. The elevation was accurately measured and reduced to -1.9 ft. This elevation should supersede the estimated 1.9 ft and the AWOIS elevation.

CHARTING RECOMMENDATION:

Chart obstruction, ~~bares~~ uncovers 4.0 ft, at 38/03/10.14 N, 122/29/05.668 W. Position Number #141 5 CONCUR

Delete obstruction charted in the same vicinity. The position and elevation of AWOIS 50486 should be superseded. CONCUR

Position	Cartographic Code
141	284

CHART: 18654 33rd ed. Jan. 26, 1985 ITEM: AWOIS 50492 sheet 1

ITEM DESCRIPTION: 3 stakes

SOURCE: H7899/51--CS256 ✓
H10082/83-OPR-L123-RA-83

INVESTIGATION DATE: 4/2/87 (DN 92) TIME: 2208 - 2232
4/7/87 (DN 97) 2100

VESSEL: 0651 OIC: LTJG Porta ✓
ET Lund

REFERENCES:

Position No: 155
Position No: 167

GEODETIC POSITION	Latitude N	Longitude W	POS
Charted:	38/01/35.5	122/27/57.50	
Search:	38/01/35.5~~86~~	122/27/57.41	155
Inverse Distance:	3.3 m		
Shoal:	38/01/38.71	122/27/54.~~87~~ 91	167

POSITION DETERMINED BY:

Motorola Mini-Ranger III. The method of positioning the feature was range-range, checked by a third station to 3.5 m for 155 and 5.0 m for 167. This is adequate for a 1:10,000 ✓ scale survey.

METHOD OF INVESTIGATION:

A 75 m radius bottom drag did not hang in the area. A 50 pound weight with a float was attached to a 75 m 5/8 inch nylon line. A ten pound weight was attached to the other end of the nylon line. A tow line was attached to the ten pound weight and marked with a buoy at 5:1 scope. The 50 # weight was set at the AWOIS position. Two circles were made in one direction, then the launch was pulled to the center ✓ weight to check for hangs and to ensure the center weight was at the same position. There were no hangs and the weight was in the right position. A circle was made in the opposite direction, there were no hangs and the center weight had not moved. The launch speed was adjusted to ensure the weight and line was on the bottom.

The drag covered the entire area required. PHP is confident the drag line was on the bottom the entire search. No duck ✓ blinds or obstructions were found within the search area.

However, a lump of oyster shells was discovered during the drag. The leadline least depth (2.1 ft) and position were ✓ acquired on DN 97, position 167.

CHARTING RECOMMENDATION:

Bottom Characteristic: Shells Position #161

Chart the least depth of the ~~1.1~~ 2.0 ft shoal at 38/01/38.71 N, 122/27/54.~~89~~ 91 W. CONCUR

Delete the 3 stakes charted in the area of 38/01/35.50 N, 122/27/57.50 W. Update AWOIS Item 50492 as disproved. CONCUR

Position	Cartographic Code
155	~~07~~ 12
167	~~12~~ 07

CHART: 18654 33rd ed. Jan. 26, 1985 ITEM: AWOIS 50498 sheet 1

ITEM DESCRIPTION: Duck Blind

SOURCE: CL286/78-CAS18654 (1977)-OPR-511-DA77, Item 27
H10082/83-OPR-L123-RA-83

INVESTIGATION DATE: 4/1/87 (DN 91) TIME: 2023 - 2105
5/6/87 (DN 128) 1931 - 2117

VESSEL: 0651 OIC: LTJG Porta

REFERENCES:

Position No: 124, 398

GEODETIC POSITION	Latitude N	Longitude W	POS
Charted:	38/02/08.4	122/28/04.79	
Observed:	38/02/08.35	122/28/05.39 .40	398
Inverse Distance:	14.73 m		
Scaled:	38/02/10	122/27/54	
Search:	38/02/10.064	122/27/54.235	124
Inverse Distance:	5.9 m		

POSITION DETERMINED BY:

Motorola Mini-Ranger III. The method of positioning the feature was range-range, checked by a third station to 1.9 m. This is adequate for a 1:10,000 scale survey.

METHOD OF INVESTIGATION:

A 75 m radius bottom drag did not hang in the area around position 124. A 50 pound weight with a riser was attached to a 75 m 5/8 inch nylon line. A ten pound weight was attached to the other end of the nylon line. A tow line was attached to the ten pound weight and marked with a buoy at 5:1 scope. The 50 # weight was set at the AWOIS position. Two circles were made in one direction, then the launch was pulled to the center weight to check for hangs and to ensure the center weight was at the same position. There were no hangs and the weight was in the right position. A circle was made in the opposite direction, there were no hangs and the center weight had not moved. The launch speed was adjusted to ensure the weight and line were on the bottom.

The drag covered the entire area required. The drag line was on the bottom the entire search. Since there were no hangs in either direction there were no duck blinds or obstructions within the search area of position 124.

The same technique was repeated at the other position for AWOIS 50498. A hang was discovered and investigated by a

skin diver. The depth of the stake was measured with a fiberglass tape. The measurement was taken carefully and is accurate although the reduced depth, based on predicted tides is greater than charted depths in the area. ✓

CHARTING RECOMMENDATION:

Position Number 398

Chart stake submerged 3.~~1~~ 0 ft at 38/02/08.35 N, 122/28/05.~~39~~ .4 W and update the description of AWOIS 50498. CONCUR

Delete the duck blind charted at 38/02/08.4 N, 122/28/04.79 W. CONCUR

Position	Cartographic Code
124	~~078~~ 251
398	236

CHART: 18654 33rd ed. Jan. 26, 1985 ITEM: AWOIS 50499 sheet 1

ITEM DESCRIPTION: Duck Blind

SOURCE: CL280/78--CAS18654 (1977) - OPR-511-DA77, Item 27. H10082/83--OPR-L123-RA-83. Duck blind not disproved.

INVESTIGATION DATE: 4/1/87 (DN 91) TIME: 1903-1931
4/7/87 (DN 97) 2139

VESSEL: 0651 OIC: LTJG Porta
ET Lund

REFERENCES:

Position No: 123, 168
Predicted Tides Applied

GEODETIC POSITION	Latitude N	Longitude W	POS	
Charted:	38/01/49.84	122/28/18.38		
Observed:	38/01/49.775	122/28/18.376	123	Plots
	38/01/51.58	122/28/19.79	168	
Inverse Distance:	5.1 m	(From charted to 123)		

POSITION DETERMINED BY:

Motorola Mini-Ranger III. Position 123 was checked by a third station to 0.1 m. This is adequate for a 1:10,000 scale survey.

METHOD OF INVESTIGATION:

A 75 m radius bottom drag hung up on two stakes. A 50 pound weight with a float was attached to a 75 m 5/8 inch nylon line. A ten pound weight was attached to the other end of the nylon line. A tow line was attached to the ten pound weight and marked with a buoy at 5:1 scope. The 50 # weight was set at an inverse distance of 10 m from the AWOIS position. Two circles were made in one direction, then the launch was pulled to the center weight to check for hangs. The launch speed was adjusted to ensure the weight was on the bottom. A hang was noticed. A sounding pole was used to feel two submerged wooden stakes 3 m apart.

The echogram showed a shoal which was positioned on DN 97, position number 168. A leadline least depth of 1.9 ft on a small shoal of shells, fine sand and grey mud was found which was equal to depth presently charted in the area.

CHARTING RECOMMENDATION: Position Number 123

Chart ~~stakes~~ Ruins (Duckblind), submerged 0.~~3~~ 0 ft, at 38/01/49.~~7~~ 75 N, Concur
122/28/18.57 W. Chart ~~the~~ ~~1.9~~ 2.0 ~~ft least depth~~ at 38/01/51.58
N, 122/28/19.79 W. bottom Characteristics gy,M,fine,S,Sh
The 3.0ft depth is in agreement with H-10082 and therefore is not significant

Delete the duckblind charted in the vicinity. The position, Concur
description and elevation of AWOIS 50499 should be
superseded.

Position	Cartographic Code
123	~~236~~ 893
168	1276

CHART: 18654 33rd ed. Jan. 26, 1985 ITEM: AWOIS 50519 sheet 3

ITEM DESCRIPTION: Rock Awash (PA)

SOURCE: H7867/50--CS256

INVESTIGATION DATE: 3/30/87 (DN 89) TIME: 1630-1746
4/1/87 (DN 91) 1550

VESSEL: 0651 OIC: LTJG Porta

REFERENCES:

Position No: 100

GEODETIC POSITION	Latitude N	Longitude W
Charted:	37/59/20.20	122/26/33.20
Observed:	37/59/19.7~~5~~	122/26/32.2~~7~~8
Inverse Distance:	26.9 m	

POSITION DETERMINED BY:

Motorola Mini-Ranger, EDM, Wild T-2. The method of positioning the feature was range-azimuth checked by a third station to 4.3 m. This is adequate for a 1:10,000 scale survey.

METHOD OF INVESTIGATION:

On day 89 Launch 1101 was driven to the reported position of the item at about one ft of tide. Two rocks were positioned and the elevations were measured (see Item: AWOIS 50520 above). On day 91 the area was searched visually at chart datum. No other rocks were seen in the area. Employees at Dutra Dredging Co. which owns Sisters rocks were questioned about the existence of rocks other than those at position 100 and 101. They confirmed no other rocks existed in the area.

CHARTING RECOMMENDATION:

Chart rock, uncovers ~~1.8~~ 2.0 ft, at 37/59/19.7~~5~~ 4 N, 122/26/32.2~~7~~ 8 W. Position Number 100 .24 3.91 CONCUR

Delete presently charted rock symbol ~~in the same vicinity~~. at Latitude 37/59/20.2 N, Longitude 122/26/33.2 W 26.1
The position and elevation of AWOIS 50519 should be superseded. CONCUR

Position	Cartographic Code
100	291

CHART: 18654 33rd ed. Jan. 26, 1985 ITEM: AWOIS 50520 Sheet 3

ITEM DESCRIPTION: Rock Awash (PA)

SOURCE: TP-00526 (77-78, 79)
H-10080/83 OPR-L123-RA-83

INVESTIGATION DATE: 3/30/87 (DN 89) TIME: 1630-1746
4/1/87 (DN 91) 1550

VESSEL: 0651 OIC: LTJG Porta

REFERENCES:

Position No: 101

GEODETIC POSITION	Latitude N	Longitude W
Charted:	37/59/19.5	122/26/29.0
Observed:	37/59/19.4~~9~~7	122/26/29.8~~1~~2
Inverse Distance:	19.8 m	

POSITION DETERMINED BY:

Motorola Mini-Ranger, EDM, Wild T-2. The method of positioning the feature was range-azimuth checked by a third station to 5.7 m. This is adequate for a 1:10,000 scale survey.

METHOD OF INVESTIGATION:

On day 89 Launch 1101 was driven to the reported position of the item at about one ft of tide. Two rocks were positioned and the elevations were measured (see Item: AWOIS 50519 below). On day 91 the area was searched visually at chart datum. No other rocks were seen in the area. Employees at Dutra Dredging Co. which owns Sisters rocks were questioned about the existence of rocks other than those at position 100 and 101. They confirmed no other rocks existed in the area.

CHARTING RECOMMENDATION:

Chart rock, ~~bares~~ UNCOVERS 3.0 ~~2.8~~ ft at Position NUMBER 101 37/59/19.4~~9~~7 N, 122/26/29.8~~1~~2 W. CONCUR

Delete rock symbol presently charted at Latitude 37/59/19.5 N., Longitude 122/26/29.0W ~~in the area~~. The AWOIS position and elevation should be superseded. CONCUR

Position	Cartographic Code
101	291

ADD
37° 59' 19" 122° 26' 34"

Delete
37° 59' 19" 122° 26' 33"

CHART: 18654 33rd ed. Jan. 26, 1985 ITEM: AWOIS 50521 Sheet 4

ITEM DESCRIPTION: Rock Awash

SOURCE: H-7
~~H~~867/50--CS256
H-10080/83-OPR-L123-RA-83

INVESTIGATION DATE: 4/1/87 (DN 91) TIME: 1556-1715

VESSEL: 0651 OIC: LTJG Porta

REFERENCES:

Position No: 110, 112

GEODETIC POSITION	Latitude N	Longitude W	POS
Charted:	37/57/59.2	122/25/38.0	
Observed:	37/57/59.1~~2~~4	122/25/39.0~~7~~6	110
	37/57/57.21	122/25/38.12	112
Inverse Distance:	26.2	(From charted to 110)	

POSITION DETERMINED BY:

Motorola Mini-Ranger III. The position was range-range checked by a third station to 8.6 meters inverse distance. This is adequate for a 1:10000 scale survey.

METHOD OF INVESTIGATION:

Launch 1101 was driven to the reported position of the item at chart datum. A ledge was visible. The position and elevation were acquired on the onshore highpoint of the submerged ledge. The offshore highpoint on the submerged ledge was positioned and a leadline depth acquired. Eddies formed on the offshore highpoint. The ledge ends about 10 m beyond the highpoint and is about 5 m wide at this point. Inshore the ledge is about 75 m wide. Development lines at 10 m spacing were run in the area. The entire area was searched at chart datum and no other rocks were visible.

CHARTING RECOMMENDATION:

Chart submerged ledge with rock submerged 3.~~1~~0 ft at Position Number 110 37/57/59.1~~2~~4N, 122/25/39.0~~7~~6 W. CONCUR

Delete rock ~~.291~~ 3.91 symbol and contours in the vicinity of 37/57/59.2 N, 122/25/38.00 W. The AWOIS position, description and elevation should be superseded. CONCUR

Position	Cartographic Code
110	089
112	530

CHART: 18654 33rd ed. Jan. 26, 1985 ITEM: AWOIS 50530 sheets
50531

ITEM DESCRIPTION: 3 LCVP reported sunk.

SOURCE: NM 13/47
H7898/51--CS256
CL280/78--CAS 18654 (1977)-OPR-511-DA Item 23

INVESTIGATION DATE: 5/5/87 (DN 125) TIME: 1805 - 2253
5/6/87 (DN 126) 1404 - 2353

VESSEL: 0651 OIC: LTJG Miller

REFERENCES:

Position No: 169-387

GEODETIC POSITION	Latitude N	Longitude W	POS
Charted:	38/03/22.99	122/19/03.09	50530
	38/03/25.9	122/19/01.9	50530
	38/03/23.0	122/19/00.0	50531
Observed:	38/03/22.94	122/19/03.0ZD	387
Inverse Distance:	2.3 m (from AWOIS 50530 to pos 387)		
	73.7 m (from AWOIS 50531 to pos 387)		

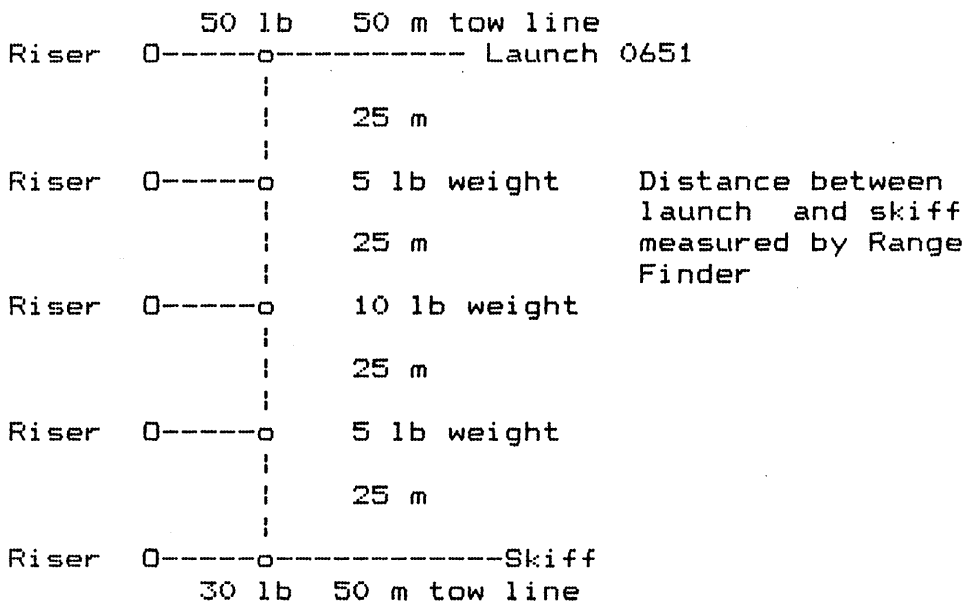
POSITION DETERMINED BY:

Motorola Mini-Ranger III. The method of positioning the feature was range-range, checked by a third station to 3.7 m for 387. This is adequate for a 1:10,000 scale survey.

METHOD OF INVESTIGATION:

A 100 m swath bottom drag between Launch (EDP 0651) and the skiff (EDP 0654) covered an area of 200 m radius of the AWOIS positions listed above. One hang on metal wreckage was investigated by divers.

The configuration of the bottom drag is shown below.



Position control for the launch was Mini-Ranger, range-range. Speed was adjusted (average speed was 1 knot) to ensure the weights at the end of the tow lines were on the bottom. The skiff operated parallel to the launch and at the same speed to keep the launch antenna and the steering station in a line. The distance between the launch and the skiff was measured by a range finder. The average distance between the boats was 125 m. The average coverage of one drag swath was about 100 m since the floats marking the ends of the drag were always less than 15 m inside the vessel's trackline.

On DN 126 the drag hung. An attempt was made to dive on the hang at this time but the currents were too strong for diving. Drag operations continued until the entire area was swept. A 25 m circle search was conducted around the position of the hang. Divers found metal debris about 1 foot off the bottom covering a 3 m radius area. The least depth was determined by pressure depth gage. The debris was marked with a float and positioned by launch 0651. Divers continued the 25 m search and found no other debris or wreckage.

The echo sounder trace shows the bottom throughout the area of the drag to be irregular. Bottom samples in the area show a composition of mud and sand. There were also many fish seen jumping which appear on the analog record. The irregularities in the bottom were natural and not part of any wreckage.

The entire area was swept with 30% overlap. There was only one hang which was investigated by divers. PHP is confident the dragline was on the bottom during the entire search. There were no wrecks or debris other than that found in position 387.

CHARTING RECOMMENDATION:

Chart a submerged ~~obstruction~~ WRECK, Position Number 387 covered 18 ft, at 38/03/22.94 N, 122/19/03.020 W. concur

Delete wrecks and wire drag clearance symbol. Concur Update the position depth and description of AWOIS 50530, 50531. concur

Position	Cartographic Code
387	~~287~~ 272

M. ADEQUACY OF SURVEY.

These investigations are complete and adequate to supersede all prior charted and AWOIS information.

N. AIDS TO NAVIGATION.

There were no aids to navigation within the areas of these investigations. The ferry between San Francisco and Vallejo was observed passing about 400 m west of the limits of the ledge referenced by positions 110 and 112 (AWOIS 50521).

See EVALUATION REPORT Section 7

O. STATISTICS.

Vessel:	Launch 1101, EDP 0651	
Number of Positions:	295	
N. miles of Sounding Lines:	0.1	
Square nm of Hydrography:	0	
Detached positions:	8	
N. miles of Bottom Drag:	7.7	
Square nm of Bottom Drag:	0.8	
Number of bottom samples:	2	
Number of tide gages:	3	(POG gages: 2. See Field Tide Note.)
Number of current stations:	0	
Number of velocity casts:	0	(bar checks only)
Number of magnetic stations:	0	

P. MISCELLANEOUS.

No bottom samples were retained but were acquired to determine bottom characteristics as required in the project instructions.

There were no anomalous currents, tides, or submarine features in the areas of investigation.

Q. RECOMMENDATIONS.

The Pacific Hydrographic Party is not aware of any dredging or planned construction in the areas of investigation.

R. AUTOMATED DATA PROCESSING.

DEC PDP 8/e Computer

Number	Name	Version Date
RK201	Grid, Signal, and Lattice Plot	4/18/75
RK211	Range-Range Non-Real Time Plot	2/13/84
RK300	Utility Computations	10/21/80
RK330	Reformat and Data Check	5/04/76
RK360	Electronic Corrector Abstract	2/02/76
RK362	Reformat and Data Check and Elinore-Line Oriented Generator	8/20/84
AM500	Predicted Tide Generator	11/10/72
RK561	H/R Geodetic Calibration	12/01/82

Hewlett Packard 9815A Calculator.

Number	Name	Version Date
811101	Geodetic Package	Feb. 1985

IBM PC

Number	Name	Version Date
MTEN	Micro - Terminal Entry Command	Nov. 1984

S. REFERRAL TO REPORTS.

Other reports covering this survey area are:

1) Horizontal Control Report, PHP, San Pablo Bay to San Francisco Bay, OPR-L123-PHP-87 (geodetic work continues report will be sent in the near future).

2) Horizontal Control Report, PHP, California, Mare Island Strait and Western Approach to Carquinez Strait, OPR-L123-PHP-86, Aug., 1986 to Nov., 1986. Submitted in April 1987.

Submitted by,

Thomas K. Porta

LT(JG) Thomas K. Porta, NOAA
Asst. Chief, PHP

FIELD TIDE NOTE

OPR-L123-PHP-87

San Francisco Bay, California (Items)

Reductions

Soundings on the field sheet were reduced on the basis of predicted tides for San Francisco, Golden Gate, Presidio, Fort Point, Calif., station number 941-4290. Tide correctors were generated at 0.2 ft intervals using the PDP-8e computer system and program AM 500 "Predicted Tide Generator".

Stations

Three permanent tide stations bracket the survey area. These three stations are operated by NOAA, Pacific Operations Group, N/OMA 1214. The gage at San Francisco, Fort Point 941-4290 is to the southwest of the survey area, Alameda (Alameda NAS) 941-4750 is to the south, and Port Chicago (Concord, Ca.) 951-5144 is to the east. Frequent checks with POG confirmed that there were no significant breaks in the data from these stations. Alameda 941-4750 was disabled by a jammed punch on 8 May 1987 and returned to service on 10 May 1987. This break did not exceed 72 hrs.

The tide station operated by PHP during this survey is:

Mare Island Naval Shipyard, Ca. 941-5218
Position: 38/04/10.5 N 122/15/03.0 W
Digital Record: 20.2 ft.
Duration: 23 August 1985 to present.

Installation, Levels, and Operation:

Mare Island Naval Shipyard, Ca. (941-5218) was installed on 23 August 1985 during survey H-10182 - San Pablo Bay, Ca., Petaluma to Napa River. The station occupies the historic site on pier 35 at the south end of Mare Island. A new staff was installed adjacent to the old one on 27 May 1986. The new staff was levelled the same day. The old staff was discontinued on 6 June 1986 after a period of tandem observations. The same Fischer/Porter ADR (s/n 7404A0407M17), used for the previous survey, was used during this survey. This machine was running well at the end of the previous survey. No changes were made to the well or the ADR at the start Field Exam survey on Chart 18654.

Five historic bench marks were levelled on 18 March 1987. These levels were normal six month maintenance but they acted as beginning levels for Field Exam survey work on Chart 18654. Removal levels at the completion of survey work on this chart were performed on 27 May 1987. The station was discontinued at this time. This station has performed well during the survey. No significant data breaks have occured.

Tide Zone Correctors

Predicted tides from the San Francisco, Fort Point tide gage were adjusted by the application of correctors supplied by NOAA, Office of Oceanography and Marine Assistance, Sea and Lake Levels Branch, Rockville, Md (N/OMA 121).These correctors accompany project instructions OPR-L123-PHP-87, dated 10 Feb. 1987.

The correctors used for this Field Exam Survey are as follows:

CHART 18654

AWOIS 50486 (mistakenly labled 50468 in the project instuctions).
AWOIS 50492, AWOIS 50498, and AWOIS 50499.

+ 1 hr. 10 min. High Water
+ 1 hr. 30 min. Low Water
X 1.05 Height Ratio

AWOIS 50519, AWOIS 50520, and AWOIS 50521

+ 1 hr. 00 min. High Water
+ 1 hr. 00 min. Low Water
X 1.05 Height Ratio

AWOIS 50530 and AWOIS 50531

+ 1 hr. 25 min. High Water
+ 1 hr. 50 min. Low Water
X 1.05 Height Ratio

All gages were installed on substantial and secure foundations. No major problems were encountered with gage to staff movement. All levels were run to third order accuracy using the Leitz B1 Automatic Level s/n 21303 and a Keuffel and Esser 1 cm. Metagrad rod s/n 81-0167.

No survey data was acquired without the required tide support.

Universal Co-ordinated Time (UTC) was used throughout the survey for tidal record keeping at all tide stations. Pacific Standard Time (120 W.) was used at the permanent stations operated by POG N/OMA 1214 - Fort Point, Ca. 941-4290 and Port Chicago, Ca. 941-51454.

Submitted by

Bruce H. Lund
Eng. Tech.

Approved by

Lt(jg)John A. Miller,NOAA
Chief, PHP (N/MOP223)

SIGNAL TAPE LISTING
PHP-10-1-87
SAN PABLO BAY, CA
FIELD EXAMINATIONS

113	0	38	03	22194	122	18	26479	139	0000	000000	SAN PABLO BAY CHAN LT 13
117	0	38	04	08932	122	15	06467	139	0000	000000	SAN PABLO BAY CHAN LT 17
118	0	38	06	40583	122	28	22137	139	0000	000000	PETALUMA RIVER ENT LT 18
140	0	37	57	47812	122	25	56707	139	0000	000000	EAST BROTHER ISLAND LIGHTHOUSE
412	0	37	47	42826	122	24	06079	139	0264	000000	TRANS AMERICA BUILDING
600	0	38	03	18837	122	31	08940	250	0069	000000	HAMILTON FIELD STANDPIPE
601	0	37	59	17835	122	26	25887	250	0015	000000	SISTER 1941
602	0	38	06	19520	122	29	16312	250	0008	000000	PET
603	0	38	04	40120	122	18	08926	250	0002	000000	CARQUINEZ STRAIT RNG TARGET 2
614	0	38	04	33170	122	15	11719	250	0085	000000	MARE ISLAND KNOLL C OF E 1970
640	0	38	09	17967	122	27	36026	250	0209	000000	RACEWAY RM 2
655	0	38	04	36342	122	15	14142	250	0089	000000	MARE ISLAND SOUTHEAST 1852

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE

Pacific Hydrographic Party
P.O. Box 1001
Sonoma, CA 95476-1001

11 June 1987

Commander (oan)
Eleventh Coast Guard District
400 Oceangate Blvd.
Union Bank Building
Long Beach, CA 90822

Sir:

The following features were observed by the Pacific Hydrographic Party, NOS, NOAA, during a field examination of San Pablo Bay. This field examination is entitled San Pablo Bay, Ca., San Pablo Strait to Carquinez Strait, March 30, 1987 to May 6, 1987. This information, which is field data and is subject to verification, will be used to update future editions of nautical chart 18654. It is, however, considered important enough to warrant immediate publication.

OBSTRUCTIONS

The following uncharted obstructions and hazards were found during the item investigations. The surveyed depths have been corrected to the chart datum, which is mean lower low water (MLLW), by applying predicted tides. The surveyed depths are field data and are subject to change.

CHARTS 18654

Description	Latitude	Longitude	Least Depth (MLLW)
Subm Stakes	38/01/49.77N	122/28/18.57W	0.5 ft.
Subm Stake	38/02/08.35N	122/28/05.39W	3.1 ft.

A ledge, previously charted as a rock, extends from Pt. San Pablo. The offshore least depth of a high point on the ledge is 3.1 ft. located at 37/57/59.15N, 122/25/39.07W. The ledge extends 10 meters seaward of this point. Bearing from least depth to shore is 167T.

For further information concerning the above mentioned obstructions contact the Chief of Party, Pacific Hydrographic Party-NOAA, 1801 Fairview Ave. E., Seattle, Wa., 98102. The Chief of Party may be reached locally in the San Pablo Bay area at the following phone number: 707-642-0299.

Respectfully,

John A. Miller

John A. Miller
LT(JG) NOAA
Chief of Party

cc: Chart Information Section, N/CG222
Nautical Charts Branch, N/MOP21

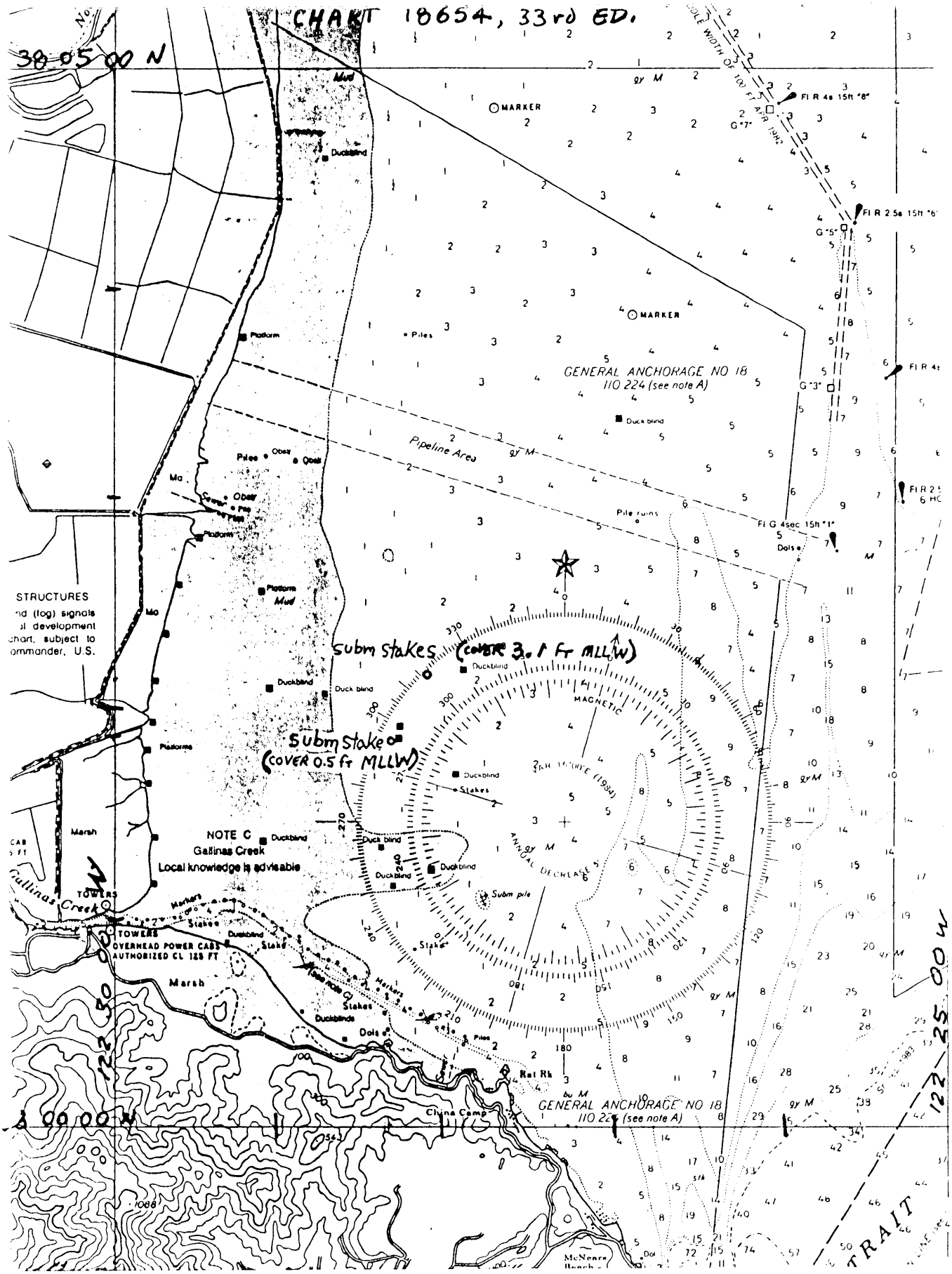


CHART 18654, 33rd ED.
30 05 00 N
122 25 00 W
GENERAL ANCHORAGE NO 18
110 224 (see note A)
Pipeline Area
MARKER
Fl R 4s 15ft "8"
Fl R 2.5s 15ft "6"
Fl G 4sec 15ft "1"
Subm Stakes (COVER 3.1 Ft MLLW)
Subm Stake (COVER 0.5 Ft MLLW)
NOTE C
Gallinas Creek
Local knowledge is advisable
TOWERS
OVERHEAD POWER CABLE
AUTHORIZED CL 135 FT
STRUCTURES
Marsh
Platform
Duckblind
Stakes
Subm pile
Rat Rk
China Camp
McNears Beach
TRAIT
MAGNETIC
ANNUAL DECREASE

Approval Sheet

OPR-L123-PHP-87

Field Examination- San Pablo Bay

The Chief of Party has inspected all field sheets and field data on a weekly basis. All field sheets, reports and records are complete. This survey is adequate for charting purposes and no additional field work is necessary.

Approved by:

John A. Miller

Lt(jg) John A. Miller, NOAA
Chief of Party
Pacific Hydrographic Party
NOS

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

TIDE NOTE FOR HYDROGRAPHIC SHEET

DATE: June 27, 1987

Marine Center: Pacific

OPR: L123

Hydrographic Sheet: Items Chart 18654 FE-299

Locality: San Pablo Bay, California

Time Period: March 30 - May 8, 1987

Tide Station Used: 941-4290 San Francisco, CA
941-5218 Mare Island, CA

Plane of Reference (Mean Lower Low Water): 941-4290 = 5.77 Ft.
941-5218 = 2.85 Ft.

Height of Mean High Water Above Plane of Reference: 941-4290 = 5.2 Ft.
941-5218 = 5.2 Ft.

Remarks: Recommended Zoning:

1. For AWOIS items 50530 & 50531, zone on 941-5218 and apply a -15 minute time correction to all heights.
2. For AWOIS items 50519, 50520, 50521, zone on 941-4290 and apply a +1 hr 00 min. time correction and a X1.05 range ratio to all heights.
3. For AWOIS items 50486, 50492, 50498, 50499, zone on 941-4290 and apply a +1 hr 20 min. time correction and a X1.05 range ratio to all heights.

James R. Hubbard
Chief, Tidal Datum Quality Assurance Section

NOAA FORM 76-155
(11-72)

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

GEOGRAPHIC NAMES

SURVEY NUMBER

FE-299

Name on Survey	A ON CHART NO.	B ON PREVIOUS SURVEY NO.	C ON U.S. QUADRANGLE MAPS	D FROM LOCAL INFORMATION	E ON LOCAL MAPS	F P.O. GUIDE OR MAP	G RAND MCNALLY ATLAS	H U.S. LIGHT LIST	K	
CALIFORNIA (title)										1
CARQUINEZ STRAIT (title)										2
~~PINOLE SHOAL~~										3
SAN PABLO BAY										4
SAN PABLO, POINT										5
SAN PABLO STRAIT										6
SAN PEDRO, POINT										7
SISTERS, THE										8
										9
BROTHERS, THE										10
										11
										12
										13
										14
										15
										16
										17
				Approved:						18
										19
				Charles E. Harrington						20
				Chief Geographer - N/CG2x5						21
				OCT 13 1987						22
										23
										24
										25

NOAA FORM 76-155 SUPERSEDES C&GS 197

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
Pacific Marine Center
1801 Fairview Avenue East
Seattle, Washington 98102-3767

July 16, 1987 N/MOP21x2/MM

TO: PHP Chief of Party - John A. Miller

FROM: for N/MOP - Robert L. Sandquist Sigmund R. Petersen

SUBJECT: Preprocessing Examination of Hydrographic Survey FE-299, California, San Pablo Bay, San Pablo Strait to Carquinez Strait

Hydrographic survey FE-299 has been reviewed in accordance with Hydrographic Survey Guideline No. 15, and the Preprocessing Examination Critique for this survey is attached. Survey FE-299 is accepted for Pacific Marine Center processing.

The Preprocessing Examination Critique is designed to provide information which will be useful to the Command for maintaining the quality of future hydrographic surveys. I encourage you to use this information constructively. Your comments on specific critique items are welcome.

Attachment

cc: N/MOP2x1
N/MOP21x2
N/MOP211
N/CG2

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
Pacific Marine Center
Nautical Chart Branch
7600 Sand Point Way NE
Seattle, Washington 98115-0070

July 15, 1987 N/MOP21x2/MM

TO: N/MOP - Robert L. Sandquist

FROM: N/MOP21 - Thomas W. Richards

SUBJECT: Preprocessing Examination for FE-299

I. SURVEY INFORMATION

A. Field No. PHP-10-1-87 Registry No. FE-299

B. State: California

General Locality: San Pablo Bay

Sublocality: San Pablo Strait to Carquinez Strait

C. Project Instructions: OPR-L123-PHP-87

Original dated: February 10, 1987

Change No. 1 dated: March 20, 1987

D. Dates:

Field Work Commenced: March 30 1987
Field Work Completed: May 6, 1987

plus 6 weeks: June 17, 1987

Data received at Marine Center: June 22, 1987

plus 1 month: July 22, 1987

Examination critique transmitted to field July 16, 1987

Target for completion of Marine Center processing January 16, 1988

II. PREPROCESSING EXAMINATION CRITIQUE

Hydrographic survey FE-299 was performed by personnel of the Pacific Hydrographic Party, LT(jg) John A. Miller, Officer-In-Charge. The following personnel supervised portions of the data acquisition: LT(jg) Miller, LT(jg) Porta and Survey Technician Lund.

In accordance with the Preprocessing Examination System set forth in Hydrographic Survey Guideline (HSG) No. 15, Section III, the following items are brought to your attention:

A. Danger to Navigation Report

Three dangers to navigation were reported for FE-299. No additional dangers were found during the preprocessing review.

B. Compliance with Instructions

Survey FE-299 complies with the Project Instructions and general survey requirements. There are 9 AWOIS items within the limits of the field examination.

Section 5.8 (Zoning) of the Project Instructions incorrectly lists AWOIS item #50486 as #50468. The error was noted in the Descriptive Report for FE-299 and also during the preprocessing examination. The AWOIS item number is correctly noted on page 4 of the Addendum to Office Review OPR-L123-PHP-84 dated October 25, 1984.

C. Final Field Sheets

The 8.5" x 11" final field sheets within the Descriptive Report were very neat and legible.

D. Descriptive Report

The first page of the Descriptive Report text should include the heading "Descriptive Report to Accompany Field Examination (PHP-10-1-87)". The heading should also include the scale and year of the survey, name of survey vessel or party and Chief of Party [HM 5.3.4, pp.5-5].

Section G (Hydrographic Position Control) incorrectly references Appendix E for Abstracts of Corrections to Electronic Position Control. The abstracts are found in Appendix V.

Section L (Comparison with the Chart) incorrectly references Appendix XI for copy of Dangers to Navigation letter. The letter is in Appendix XII.

Section O (Statistics) should include the days of production necessary to complete the survey [HSG 53].

The letter to the Commander 11th Coast Guard District [Appendix XII (Dangers to Navigation)] states survey depths have been corrected to chart datum (MLLW) by applying predicted tides. Dangers to Navigation letters should also reference the horizontal datum (NAD27 or NAD83) of the chart affected.

F. Sounding Volumes and/or Raw Data Printouts

Raw data printouts were well-organized and header information are completed properly.

The data printouts containing fix computations for detached positions did not include adequate information to verify the data. The hydrographer was contacted and an additional letter of explanation (dated 7 July 1987) is now part of the survey data package. Complete notes regarding computations or changes to computations should be included with the survey data.

G. Sounding Correctors

Sound velocity and settlement and squat correctors for this field examination were determined at 0.1-ft increments. Sections 4.9.2 and 4.9.4.2 of the Hydrographic Manual state that for data collected in feet, correctors in depths less than 120 feet over shoals and dangers need only be determined at 0.2-ft increments.

The Sounding Corrections Abstract (Appendix IV) and TCTI tape listing contain an incorrect +0.2 corrector for settlement and squat (VESNO 0651, DN 091, 155648Z) (see Attachments A, B). The correct value for this data entry as determined from the settlement and squat graph, should be 0.0.

K. Special and/or Ancillary Reports

No additional reports were forwarded with the survey data.

L. Automated Data Check

The Abstract of Positions was accurate; data tapes were labelled properly. No fatal errors occurred during the spooling of the survey.

N. Survey Acceptance

The preprocessing examination of FE-299 was conducted under the time constraints of HSG 15. All comments contained herein are based on a spot check of the data, and it is possible that some problem areas have not been addressed.

Except for the items noted in the critique, survey FE-299 is in compliance with the Project Instructions. I recommend that FE-299 be accepted for Nautical Chart Branch processing.

Prepared by:

Marlene Mozgala

Marlene Mozgala

SETTLEMENT & SQUAT
NOAA LAUNCH 1101 (EDP 065)
PACIFIC HYDROGRAPHIC PARTY
APRIL 7, 1987

LT (jg) John A. Miller, NOAA
Chief of Party

Personnel = 3 Crew
Fuel = 3/4 tanks

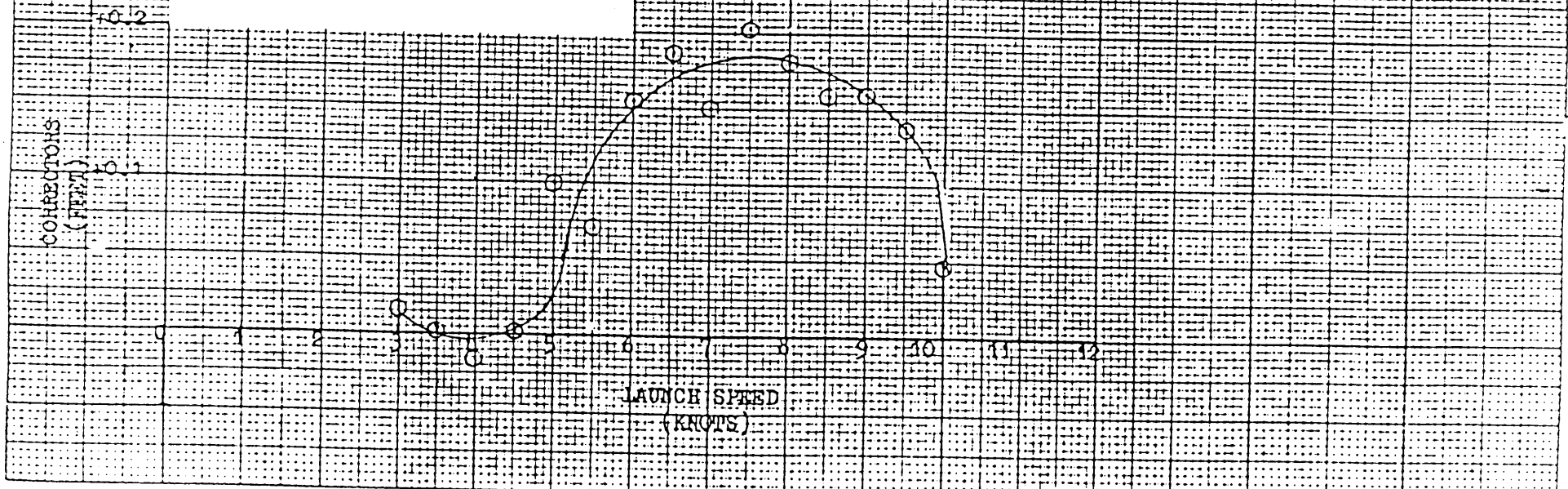
Hull Mounted Transducer
Water Depths greater than 20 feet

Speed (knots)	Corrector (ft.)
0.0 — 5.1	= 0.0
5.1 — 6.0	= +0.1
6.0 — 9.2	= +0.2
9.2 — 10.0	= 0.1

ATTACHMENT A

Settlement and Squat corrector for 3 kts is 0.0 ft.

(See Attachment B)



Correct TRA Corr. is +1.6 ft.

Correct S & S Corr is 0.0 ft.

ATTACHMENT B

Mistake in Settlement & Squat caused errors in Sdg. Corr. Abstract and TCTI tape listing

TRA (TC/TI) Tape: Vessel 0651 Survey FE SAN PABLO BAY Fathometer S/N 1080 Year 1987 Page 1 of 1

From Time(GMT)	TRA Corr.	Day	Vel. Tbl.	TRA Corr. is the algebraic sum of these columns. Initial	Scale-Phase	Draft	F. Arc	Set./Squat	Comments
73305	0.0	89	0	0	0	0.0	0	0.0	OKTS (DPs)
55646	+1.8	91	1	0	0	+1.6	0	+0.2	3 KTS (DEV LINES)
70724	0.0	91	0	0	0	0.0	0	0.0	0 KTS (DPs & BDRYLNS, FATHO DEPTHS NOT KEPT).
215959	0.0	91	0	0	0	0.0	0	0.0	Time greater than last time on master tape.

TCTI tape listing

```
123305 0 0000 0000 089 065100 000000
155646 0 0018 0001 091 000000 000000
170724 0 0000 0000 091 000000 000000
215959 0 0000 0000 128 000000 000000
```

should be 0016

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

U.S. DEPARTMENT OF COMMERCE

HYDROGRAPHIC SURVEY STATISTICS

REGISTRY NUMBER: FE-299

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

RECORD DESCRIPTION	AMOUNT	RECORD DESCRIPTION	AMOUNT
SMOOTH SHEET	5	SMOOTH OVERLAYS: POS., ARC, EXCESS	
DESCRIPTIVE REPORT	1	FIELD SHEETS AND OTHER OVERLAYS	10

DESCRIPTION	DEPTH/POS RECORDS	HORIZ. CONT. RECORDS	SONAR-GRAMS	PRINTOUTS	ABSTRACTS/ SOURCE DOCUMENTS	
ACCORDION FILES						
ENVELOPES						
VOLUMES						
CAHIERS	1					
BOXES						

SHORELINE DATA

SHORELINE MAPS (List):

PHOTOBATHYMETRIC MAPS (List):

NOTES TO THE HYDROGRAPHER (List):

SPECIAL REPORTS (List):

NAUTICAL CHARTS (List):

OFFICE PROCESSING ACTIVITIES

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

PROCESSING ACTIVITY	AMOUNTS		
	VERIFICATION	*EVALUATION*	*TOTALS*
POSITIONS ON SHEET			284
POSITIONS REVISED			3
SOUNDINGS REVISED			224
CONTROL STATIONS REVISED			-0-
	TIME-HOURS		
	VERIFICATION	*EVALUATION*	*TOTALS*
PRE-PROCESSING EXAMINATION			
VERIFICATION OF CONTROL			
VERIFICATION OF POSITIONS	30		30
VERIFICATION OF SOUNDINGS	29.5		29.5
VERIFICATION OF JUNCTIONS			
APPLICATION OF PHOTOBATHYMETRY			
SHORELINE APPLICATION VERIFICATION			
COMPILATION OF SMOOTH SHEET	33		33
COMPARISON WITH PRIOR SURVEYS AND CHARTS		9	9
EVALUATION OF SIDE SCAN SONAR RECORDS			
EVALUATION OF WIRE DRAGS AND SWEEPS			
EVALUATION REPORT		20	20
GEOGRAPHIC NAMES			
OTHER* Digitizing			
*USE OTHER SIDE OF FORM FOR REMARKS — TOTALS	92.5	29	121.50

Pre-processing Examination by M. Mozgala	*Beginning Date* 5/6/87	*Ending Date* 7/16/87
Verification of Field Data by P. Niland, G. Kay	*Time (Hours)* 92.5	*Ending Date* 6/11/87
Verification Check by S. Otsubo, B. Olmstead, J.S. Green	*Time (Hours)* 21	*Ending Date* 10/2/87
Evaluation and Analysis by G.E. Kay	*Time (Hours)* 29	*Ending Date* 12/21/87
Inspection by Dennis J. Hill	*Time (Hours)* 4	*Ending Date* 12/21/87

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

PACIFIC MARINE CENTER
EVALUATION REPORT
FE-299

1. INTRODUCTION

Survey FE-299 is a field examination accomplished by the Pacific Hydrographic Party under the following project instructions.

OPR-L123-PHP-87, dated February 10, 1987
Change Number 1, dated March 20, 1987

This field examination in California, covers five separate areas in San Pablo Bay between San Pablo Strait and Carquinez Strait. These five areas are shown on five page size sheets containing the results of investigations on nine AWOIS items. AWOIS items investigated are: 50486, 50492, 50498, 50499, 50519, 50520, 50521, 50530 and 50531. These items, except 50520, were identified for investigation in an office review of OPR-L123-PHP-84, San Francisco Bay, California, for charts 18649, 18650, 18651 and 18654, dated October 25, 1987.

Field processing used predicted tides for San Francisco (Golden Gate), California (941-4290). Office processing used approved hourly heights zoned from the San Francisco, California gage (941-4290) and the Mare Island, California gage (941-5218).

The field sheet parameters have been revised to center the hydrography on the smooth sheets and to change the projection to polyconic. The TRA was changed to reflect the correctors listed in the hydrographer's report. An accompanying computer printout contains the parameters and the correctors used for this survey.

A digital file, generated for this survey, 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

Adequate discussion of horizontal control and hydrographic positioning can be found in sections F and G of the hydrographer's report. Additional supporting information is contained in the Horizontal Control Reports for OPR-L123-PHP-86 and OPR-L123-PHP-87.

Positions of horizontal control stations used during hydrography are published values based on the NAD 27. The computation of positions accomplished during office processing utilized these same values. The smooth sheet and accompanying overlays have been annotated with a NAD 83 adjustment tick based on values determined by N/CG121. Geographic positions based on the NAD 83 may be plotted on the smooth sheet utilizing the NAD 27 projection by applying the following corrections:

Latitude: +0.262 seconds (+8.1 meters)
Longitude: -3.894 seconds (-95.2 meters)

The year of establishment of the 1941 and 1981 control stations shown on the smooth sheets originates with NGS.

Shoreline maps were not available for this survey. Shoreline information originates from chart 18654, 33rd Edition, dated January 26, 1985, scale 1:40,000, and is shown in brown on the smooth sheet for orientation purposes only.

A submerged ledge on sheet 4 at latitude 37°57'59.0'N, longitude 122°25'39.0"W was added to the smooth sheet from the field sheet without supporting position information.

3. HYDROGRAPHY

The hydrography consists of wire drag investigations, a dive investigation and the positioning of features as required to satisfy AWOIS requirements. A few soundings were acquired during a wire drag investigation. Hydrography within the limits of these investigations is adequate to determine least depths for the features investigated.

4. CONDITION OF SURVEY

The hydrographic records and reports received for processing are adequate and conform to the requirements of the Hydrographic Manual, 4th Edition, revised through Change No. 3, the Hydrographic Survey Guidelines, and the PMC OPORDER, except as noted in the attached copy of the Preprocessing Examination Report, dated July 16, 1987.

5. JUNCTIONS

Junctions were not required by the Project Instructions. A comparison with charted depths reveals good agreement with the present survey.

6. COMPARISON WITH PRIOR SURVEYS

H-10080 (1983) 1:10,000
H-10081 (1983) 1:10,000
H-10082 (1983) 1:10,000

The AWOIS items investigated during this field examination were either carried forward to these surveys from 1950 vintage surveys or were recommended for additional field work. Each of these AWOIS items are discussed, completely and adequately in section L of the hydrographer's report.

Survey FE-299 is adequate to supersede the following items originating with the prior surveys.

AWOIS	Feature	Prior	Latitude N	Longitude W	Sheet
50486	Obstruction	H-10082	38°03'10.22"	122°29'05.36"	2
50492	Stakes	H-10082	38°01'35.50"	122°27'57.50"	1
50498	Duck Blind	H-10082	38°02'08.40"	122°28'04.79"	1
50499	Duck Blind	H-10082	38°01'49.84"	122°28'18.38"	1
50519	Rock Awash	H-10080	37°59'20.20"	122°26'33.20"	3
50520	Rock Awash	H-10080	37°59'19.50"	122°26'29.00"	3
50521	Rock Awash	H-10080	37°57'59.20"	122°25'38.00"	4
50530	Wrecks	H-10081	38°03'22.99"	122°19'03.09"	5
50531	Wrecks	H-10081	38°03'23.00"	122°19'00.00"	5

The soundings acquired during the wire drag to resolve AWOIS items 50530 and 50531 (Sheet 5) are adequate to supplement H-10081 within the area of common coverage.

7. COMPARISON WITH CHART

Chart 18654, 33rd Edition, dated January 26, 1985; scale 1:40,000.

a. Hydrography Charted information originates from the prior surveys and miscellaneous sources not readily ascertainable. See the hydrographer's report, section L for a comparison with the charted information.

Survey FE-299 is adequate to supersede the charted information for the features investigated.

b. AWOIS AWOIS items are discussed in section 6 of this report.

c. Controlling Depths Sheet 5 is the only sheet with controlling depths. In Pinole Shoal Channel, present survey depths are deeper than the tabulated depths for the left outside quarter and the middle half.

d. Aids to Navigation The positions of the following aids to navigation were verified as accurate.

East Brothers Island Light, Light List Number 5865
San Pablo Bay Channel Light 13, Light List Number 5930

e. Dangers to Navigation The Pacific Hydrographic Party submitted a Dangers to Navigation Report to the Eleventh Coast Guard District on June 11, 1987 (copy attached). No additional dangers were identified during office processing.

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

8. COMPLIANCE WITH INSTRUCTIONS

Survey FE-299 adequately complies with the Project Instructions.

9. ADDITIONAL FIELD WORK

This is a good field examination. No additional field work is recommended.

Gordon E. Kay
Cartographer

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

Dennis Hill
Chief, Hydrographic Section

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
OFFICE OF CHARTING AND GEODETIC SERVICES
ROCKVILLE, MARYLAND 20852

JUN 6 1989

MEMORANDUM FOR: Russell C. Arnold
Chief, Hydrographic Surveys Branch

FROM: George K. Myers, Jr.
Chief, Standards Section

SUBJECT: Examination of Hydrographic Survey FE-299 (1987), California, San Pablo Bay, San Pablo Strait to Carquinez Strait

Chief of Party	John A. Miller
Field Unit	Pacific Hydrographic Field Party
Processed by	Pacific Marine Center
Examined by	S. R. Baumgardner

An examination of hydrographic survey FE-299 (1987) was accomplished to monitor the survey for adequacy with respect to data acquisition, conformance with applicable project instructions, delineation of the bottom, determination of least depths, navigational hazards, junctions, sounding line crossings, smooth plotting, shoreline transfer, decisions made and actions taken by the evaluator, and the cartographic presentation of data.

The results of the field investigations and processing of the survey data at the Marine Center contributed to the completion of an excellent field examination in all respects. AWOIS items assigned were completely resolved and no additional work is recommended. The survey was found to conform to National Ocean Service standards and requirements.

Digital data on magnetic tape were not available during the examination of this survey. Therefore, an inspection of a graphic plot from the certified tape was not performed.

ATTACHMENT TO DESCRIPTIVE REPORT FOR FE-299

I have reviewed the smooth plots, 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 plots and digital data file for use in nautical charting.

Thomas W. Richards December 24, 1987
Chief, Nautical Chart Branch (Date)

CLEARANCE: SIGNATURE AND DATE:

N/MOP2:LWMordock Lawrence W. Mordock December 24, 1987

After review of the smooth plots 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.

Robert L. Faulkner December 24, 1987
Director, Pacific Marine Center (Date)

122° 28' 00"

122° 27' 30"

38°02'30"

38° 02' 30"

FE-299

CALIFORNIA

SAN PABLO BAY

SAN PABLO STRAIT TO CARQUINEZ STRAIT

DATE OF SURVEY: Mar.-May 1987

SCALE: 1:10,000

SOUNDINGS: in feet at MLLW

SHEET 1 of 5

AWOIS: 50492, 50498, 50499

3 Obstr (stake)

38°02'00"

38° 02' 00"

SAN PABLO BAY

gy M fne S Sh

ruins (duck blind)

(O)

2 Sh

122°28'00"

38°01'30"

38° 01' 30"

NAD 83

12/9/87 GEK

✓CRD

122° 28' 00"

122° 27' 30"

122°29'30" 122°29'00"

38° 04' 00" 38°04'00"

FE-299

CALIFORNIA

SAN PABLO BAY

SAN PABLO STRAIT TO CARQUINEZ STRAIT

DATE OF SURVEY: Mar.-May 1987

SCALE 1:10,000

SOUNDINGS: in feet at MLLW

SHEET 2 of 5

AWOIS: 50486

SAN PABLO BAY

38° 03' 30" 38°03'30"

° (4) obstr (airplane wreck)

38° 03' 00" 38°03'00"

NAD 83 38°03'00"

12/9/87 GEK

✓CRD 122°29'00"

122° 29' 30" 122° 29' 00"

122° 27'00" 122° 26'30"

FE-299

CALIFORNIA

SAN PABLO BAY

SAN PABLO STRAIT TO CARQUINEZ STRAIT

DATE OF SURVEY: Mar.–May 1987

SCALE 1:10,000

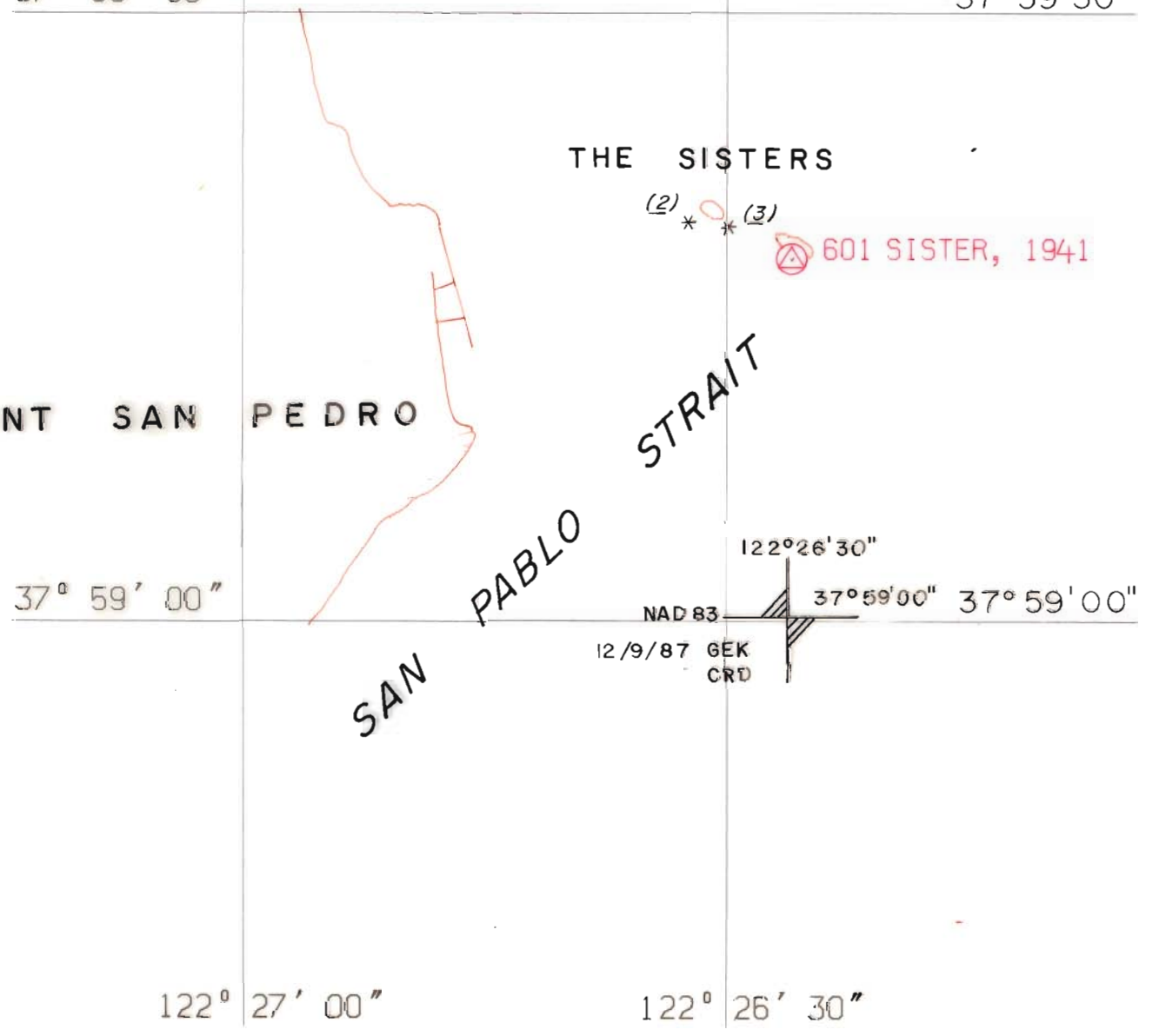
SOUNDINGS: in feet at MLLW

SHEET 3 of 5

AWOIS: 50519, 50520

SHORELINE in brown from chart 18654, 33rd Ed. for orientation only

37° 59' 30" 37°59'30"



122° 27' 00" 122° 26' 30"

122°26'00" 122°25'30"

FE-299

CALIFORNIA

SAN PABLO BAY

SAN PABLO STRAIT TO CARQUINEZ STRAIT

DATE OF SURVEY: Mar.–May 1987

SCALE 1:10,000

SOUNDINGS: in feet at MLLW

SHEET 4 of 5

AWOIS: 50521

SHORELINE in brown from chart 18654, 33rd Ed.

for orientation only

37° 58' 30" 37°58'30"

37° 58' 00" 37°58'00"

SAN PABLO STRAIT

Rk

3 (subm ledge)

(1)

POINT SAN PABLO

140

EAST BROTHER ISLAND LIGHT, 1981

SAN

THE BROTHERS

122°26'00"

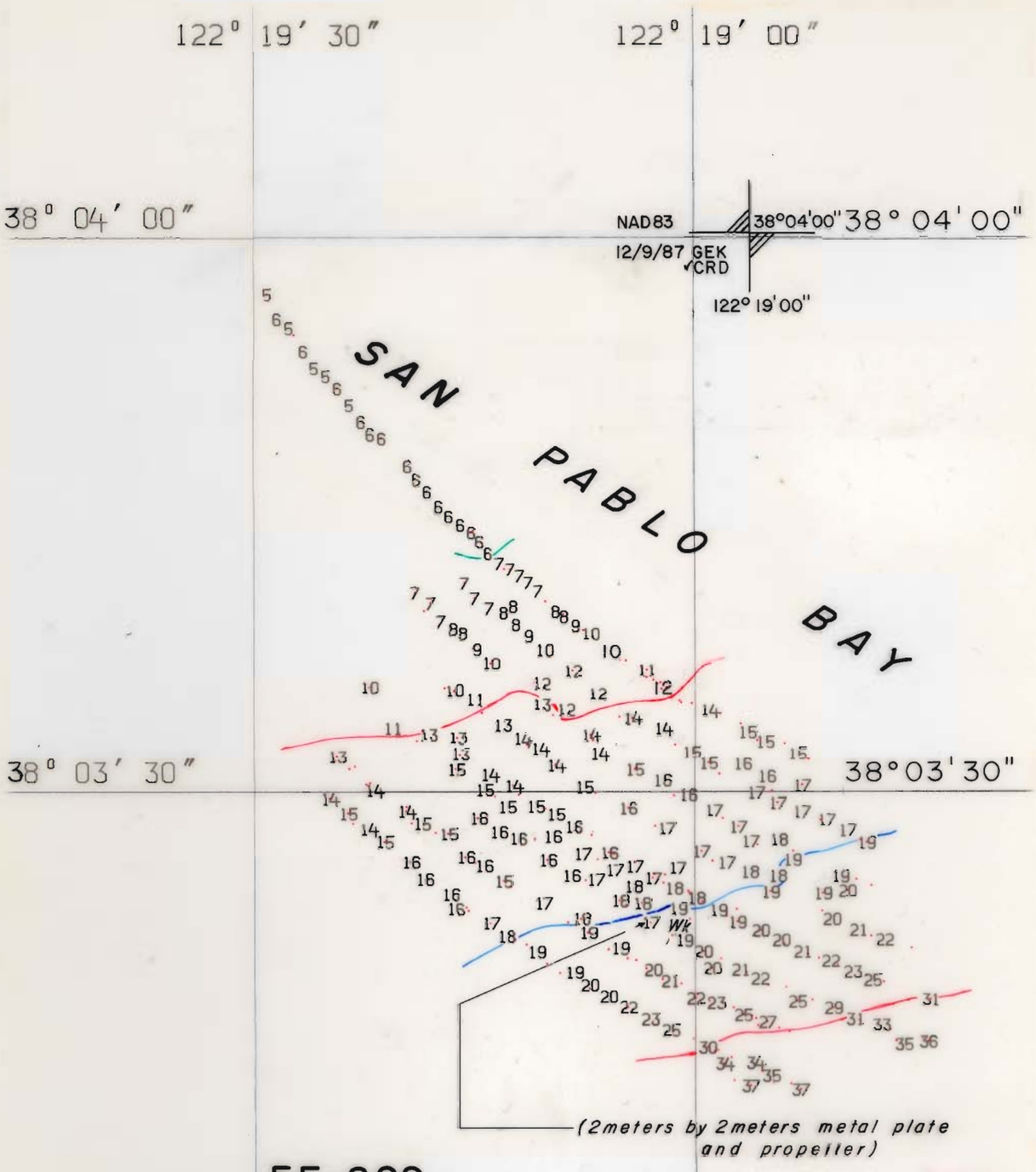
37° 57' 30" 37°57'30" 37°57'30"

NAD 83

12/9/87 GEK

CRD

122° 26' 00" 122° 25' 30"



FE-299

CALIFORNIA

SAN PABLO BAY

SAN PABLO STRAIT TO CARQUINEZ STRAIT

DATE OF SURVEY: Mar.-May 1987

SCALE 1:10,000

SOUNDINGS: in feet at MLLW

SHEET 5 of 5

AWOIS: 50530, 50531

122° 26′ 00″ | 122° 25′ 30″ | 122° 25′ 00″

INSET 4	SCALE 1:10000

37° 58′ 30″

37° 58′ 00″

100
108
110
112

△ 140 EAST BROTHER ISLAND LIGHT, 1981

122°26'00"

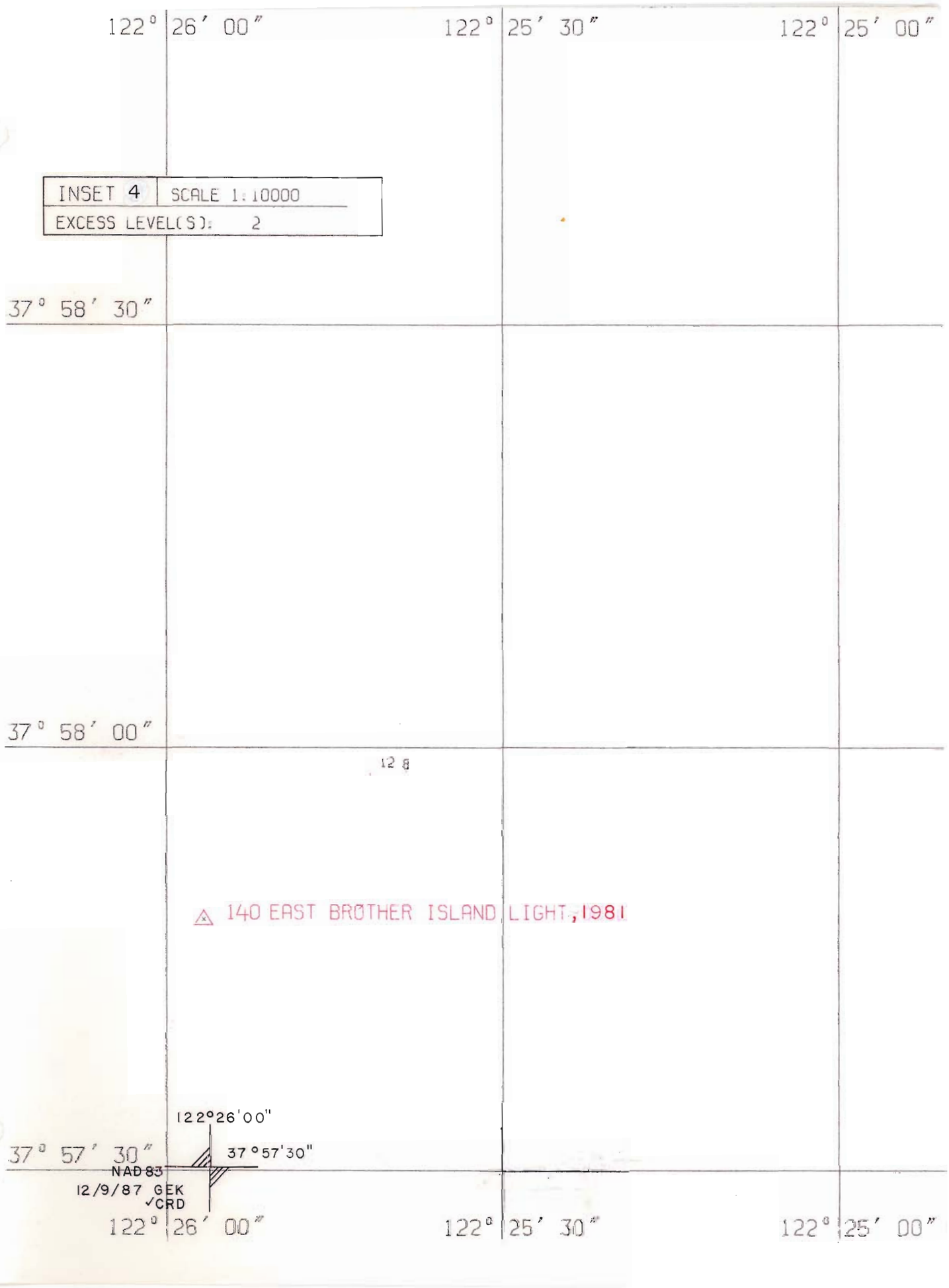
37° 57′ 30″ — 37°57'30"

NAD 83

12/9/87 GEK
✓CRD

122° 26′ 00″ | 122° 25′ 30″ | 122° 25′ 00″


122° 26′ 00″
122° 25′ 30″
122° 25′ 00″
INSET 4
SCALE 1:10000
EXCESS LEVEL(S): 1
37° 58′ 30″
37° 58′ 00″
36 9 3 14 8 10
140 EAST BROTHER ISLAND LIGHT, 1981
122°26'00"
37°57'30"
37° 57′ 30″
NAD 83
12/9/87 GEK
✓CRD
122° 26′ 00″
122° 25′ 30″
122° 25′ 00″


122° 26′ 00″
122° 25′ 30″
122° 25′ 00″
INSET 4
SCALE 1:10000
EXCESS LEVEL(S): 2
37° 58′ 30″
37° 58′ 00″
12 8
140 EAST BROTHER ISLAND LIGHT, 1981
122°26'00"
37°57'30"
37° 57′ 30″
NAD 83
12/9/87 GEK
✓CRD
122° 26′ 00″
122° 25′ 30″
122° 25′ 00″

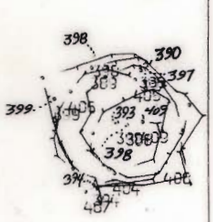

122° 26′ 00″
122° 25′ 30″
122° 25′ 00″
INSET 4
SCALE 1:10000
EXCESS LEVEL(S): 3
37° 58′ 30″
37° 58′ 00″
10
140 EAST BROTHER ISLAND LIGHT, 1981
122°26'00"
37°57'30"
37° 57′ 30″
NAD 83
12/9/87 GEK
✓ CRD
122° 26′ 00″
122° 25′ 30″
122° 25′ 00″

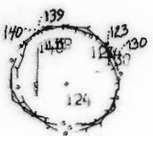
122° 28′ 30″ | 122° 28′ 00″ | 122° 27′ 30″

38° 02′ 30″

38° 02′ 30″

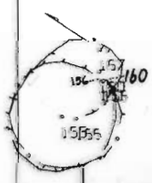
INSET 1	SCALE 1:10000





38° 02′ 00″

38° 02′ 00″



38° 01′ 30″

38° 01′ 30″

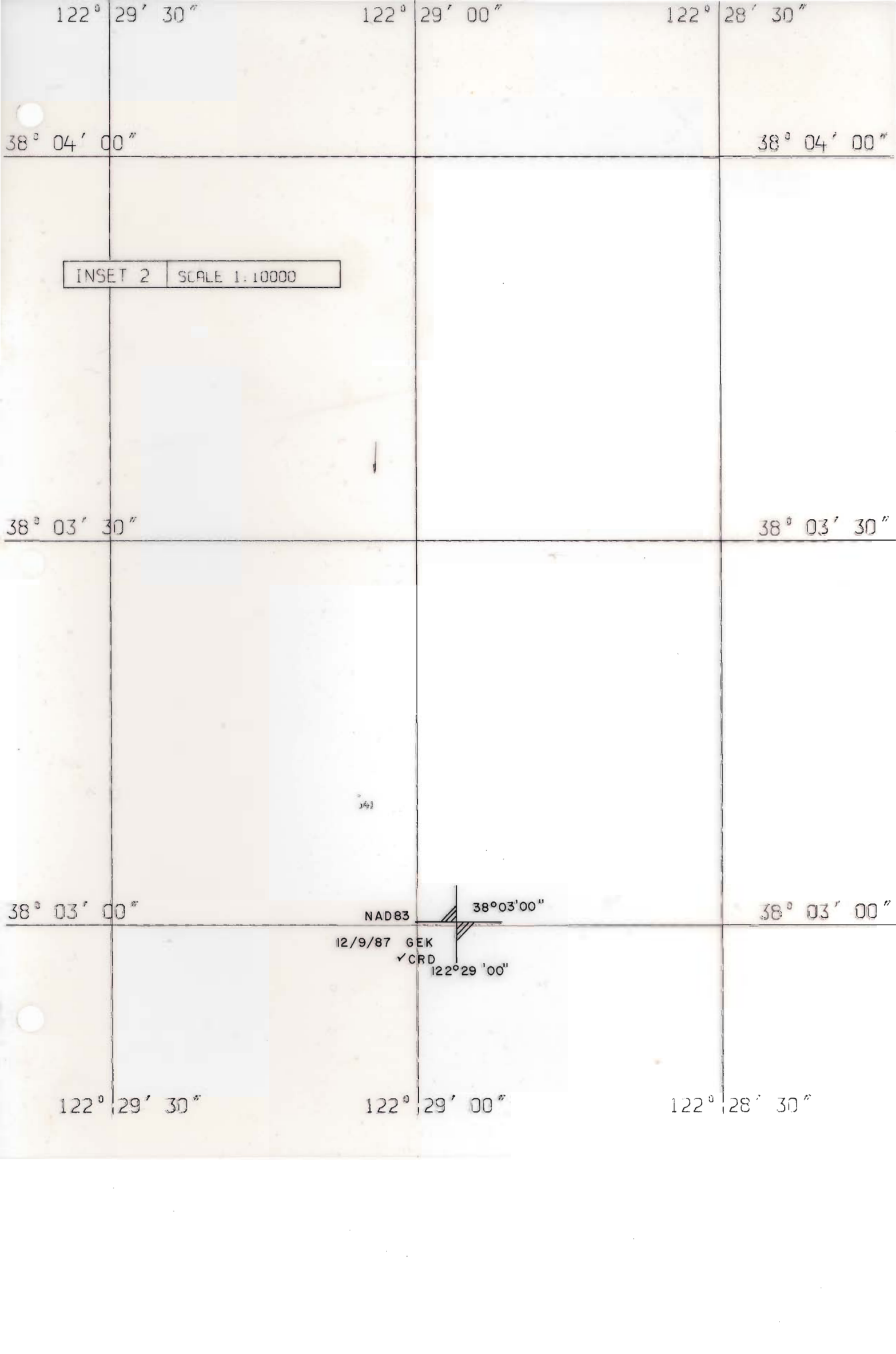
NAD 83 — 38°01'30"

12/9/87 GEK

✓CRD

122°28' 00"

122° 28′ 30″ | 122° 28′ 00″ | 122° 27′ 30″


122° 29′ 30″
122° 29′ 00″
122° 28′ 30″
38° 04′ 00″
38° 04′ 00″
INSET 2
SCALE 1:10000
38° 03′ 30″
38° 03′ 30″
38° 03′ 00″
NAD83
38°03'00"
38° 03′ 00″
12/9/87 GEK
✓CRD
122°29 '00"
122° 29′ 30″
122° 29′ 00″
122° 28′ 30″

122° 27′ 00″ | 122° 26′ 30″ | 122° 26′ 00″

38° 00′ 00″

INSET 3 | SCALE 1:10000

37° 59′ 30″

100 101 601 SISTER, 1941

122°26'30"

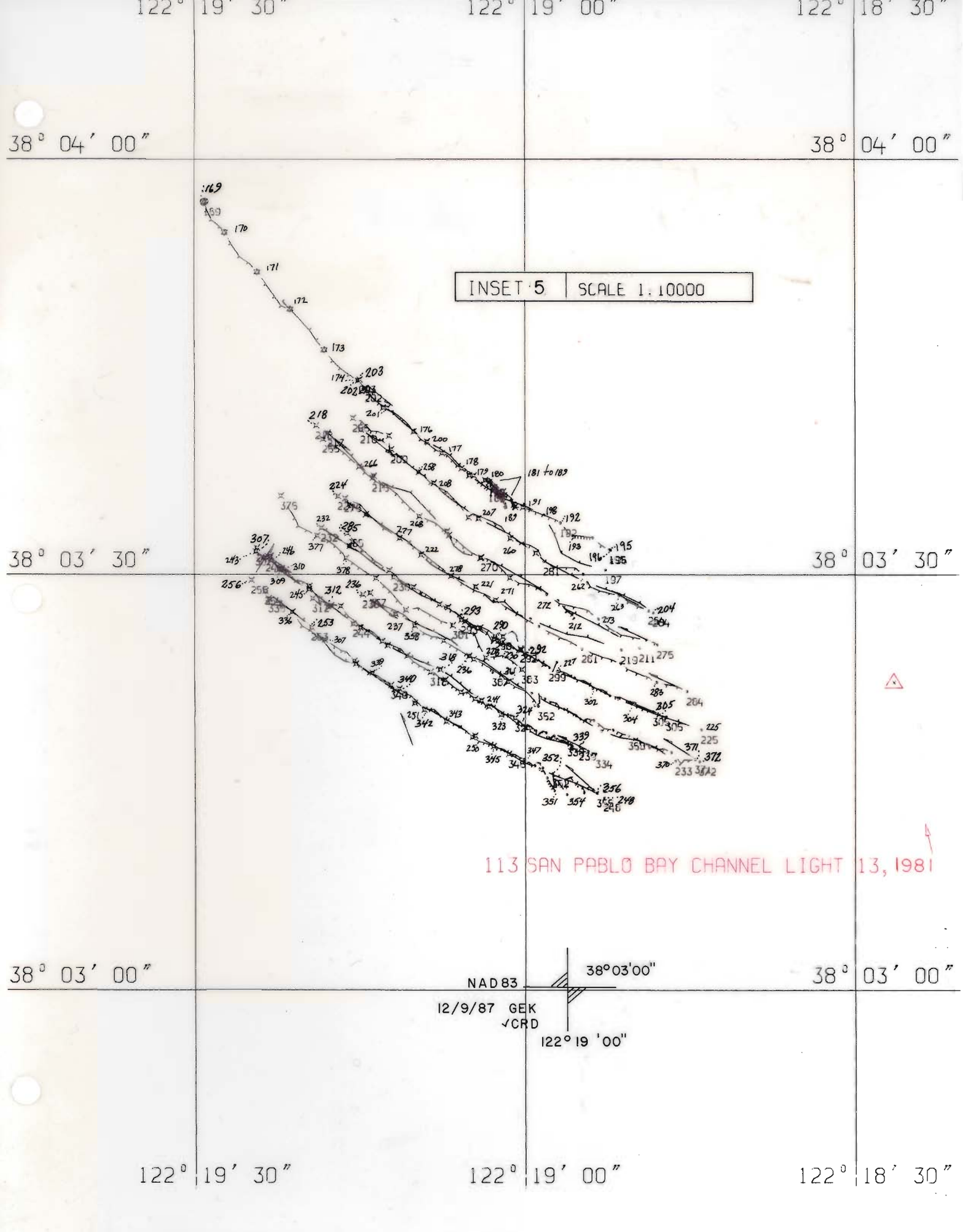
37°59'00"

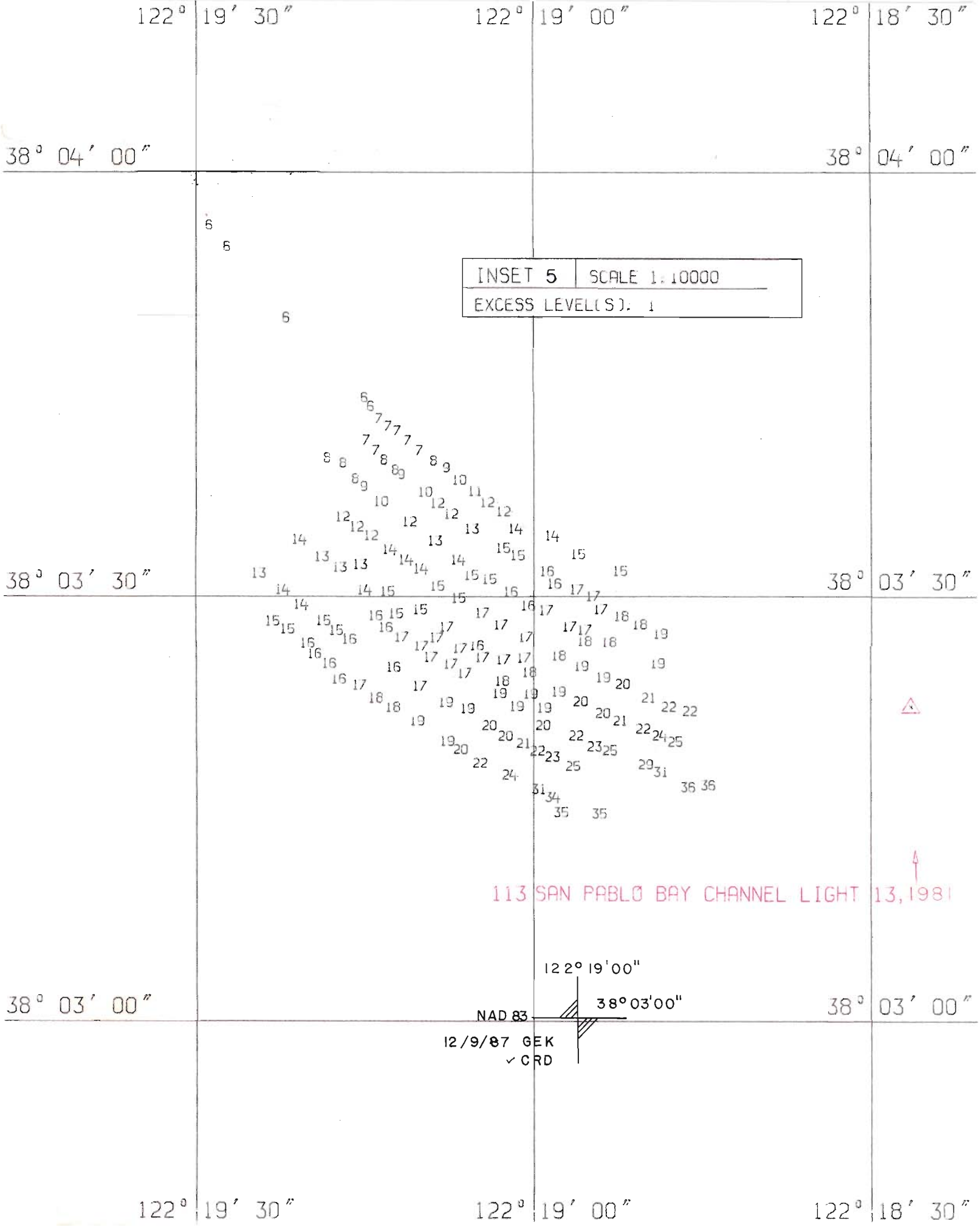
NAD 83

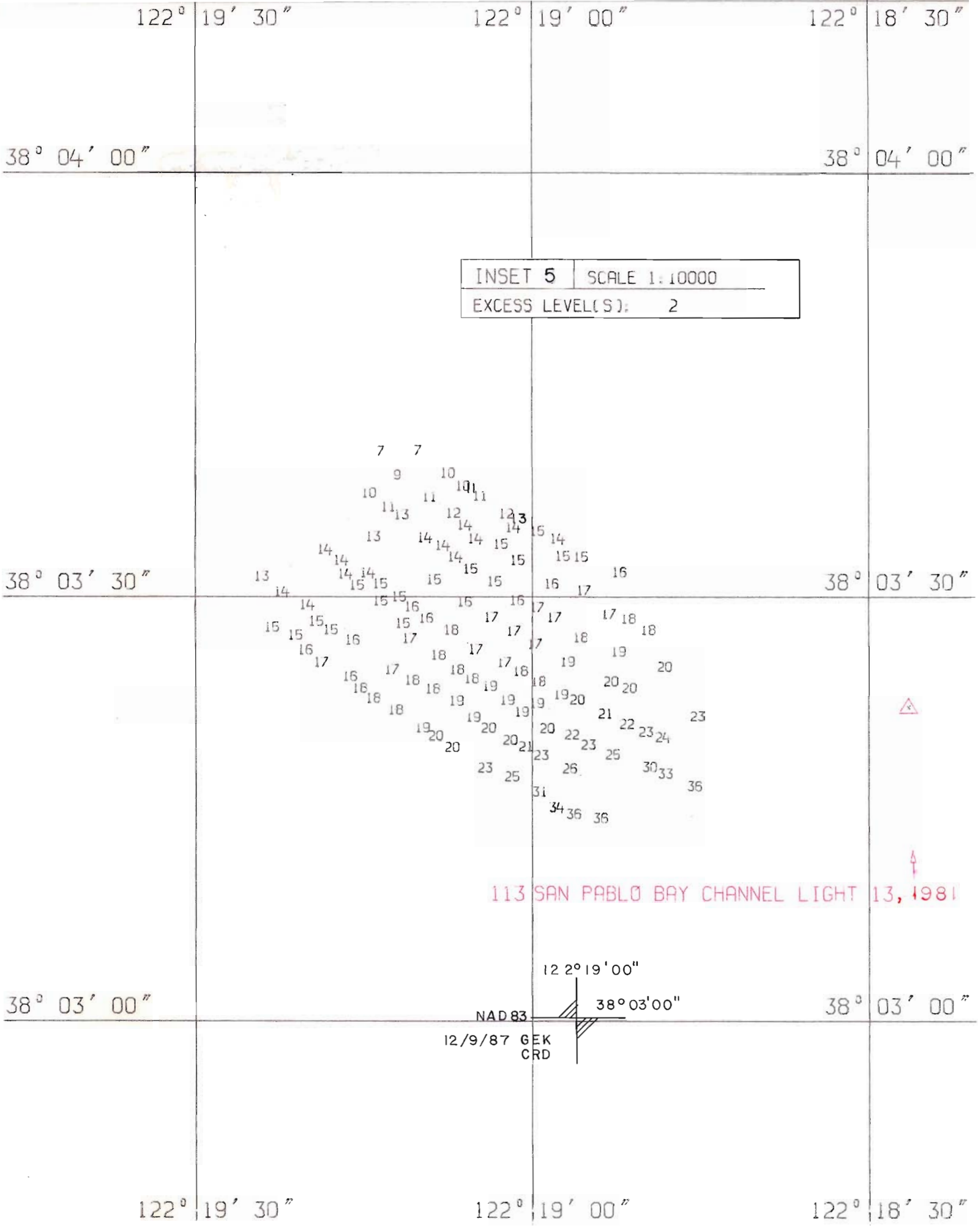
12/9/87 GEK
✓ CRD

37° 59′ 00″

122° 27′ 00″ | 122° 26′ 30″ | 122° 26′ 00″


122° 19' 30"
122° 19' 00"
122° 18' 30"
38° 04' 00"
38° 03' 30"
38° 03' 00"
INSET 5 | SCALE 1:10000
181 to 189
113 SAN PABLO BAY CHANNEL LIGHT 13, 1981
NAD 83
38°03'00"
12/9/87 GEK
✓CRD
122° 19 '00"


122° 19′ 30″
122° 19′ 00″
122° 18′ 30″
38° 04′ 00″
38° 03′ 30″
38° 03′ 00″
INSET 5 | SCALE 1:10000
EXCESS LEVEL(S): 1
113 SAN PABLO BAY CHANNEL LIGHT 13,1981
122° 19'00"
38° 03'00"
NAD 83
12/9/87 GEK
✓ CRD

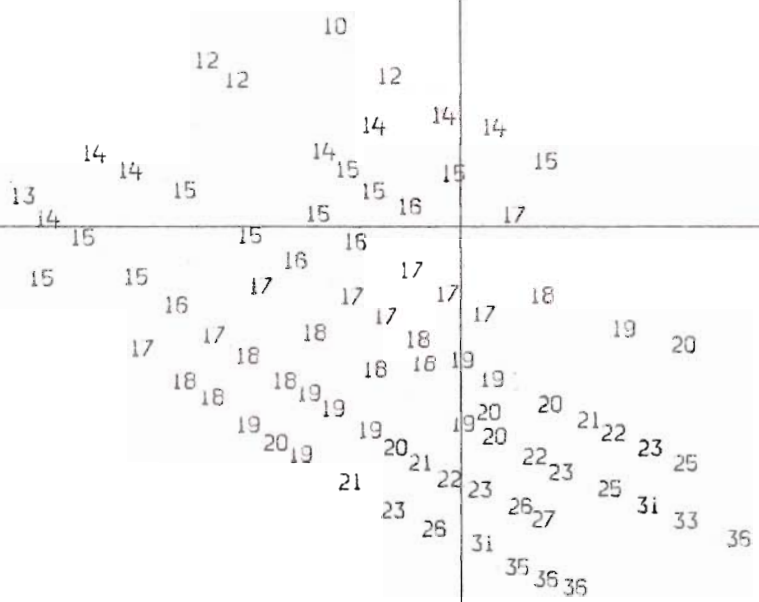

122° 19′ 30″
122° 19′ 00″
122° 18′ 30″
38° 04′ 00″
38° 03′ 30″
38° 03′ 00″
INSET 5 | SCALE 1:10000
EXCESS LEVEL(S): 2
113 SAN PABLO BAY CHANNEL LIGHT 13, 1981
122°19'00"
38°03'00"
NAD 83
12/9/87 GEK
CRD

122° 19′ 30″ | 122° 19′ 00″ | 122° 18′ 30″

38° 04′ 00″ | 38° 04′ 00″

INSET 5	SCALE 1:10000
EXCESS LEVEL(S):	3

38° 03′ 30″ | 38° 03′ 30″



113 SAN PABLO BAY CHANNEL LIGHT 13, 1981

38° 03′ 00″ | 38° 03′ 00″

NAD 83 38°03'00"

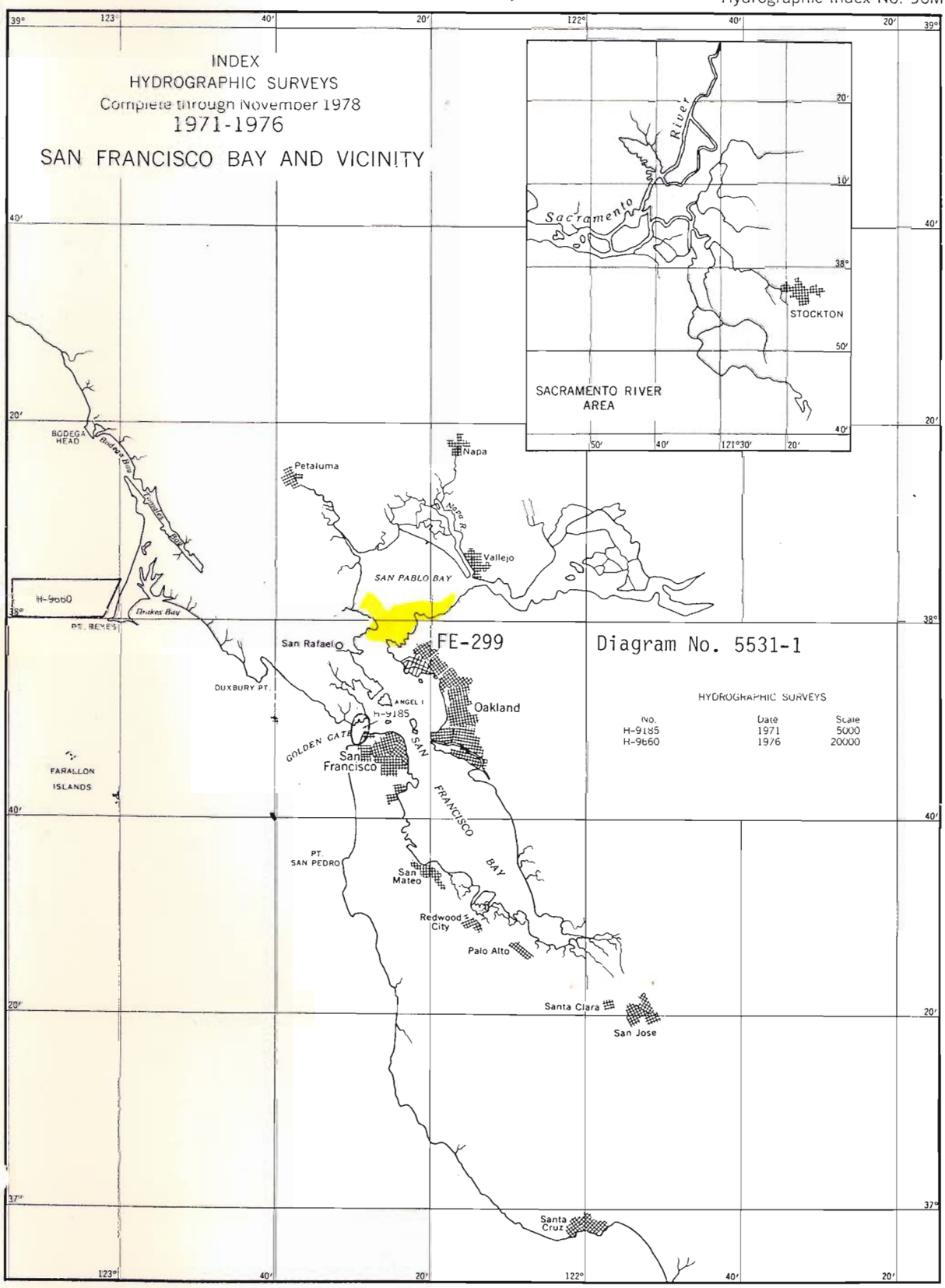
12/9/87 GEK
√CRD

122°19'00"

122° 19′ 30″ | 122° 19′ 00″ | 122° 18′ 30″

DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Ocean Survey
Rockville, Maryland

Hydrographic Index No. 96M



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. FE-299

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
18654	9-6-88	JG	[redacted] Part [redacted]e After Marine Center Approval Signed Via
			Drawing No. 49
			Examined for Critical Corrections Only - No Corr
18649	9-6-88	JG	[redacted] Part ~~Before~~ After Marine Center Approval Signed Via
			Drawing No. 67
[illegible]	[illegible]		Examined for critical corrections only - No Corr
18652	9-6-88	JG	[redacted] Part ~~Before~~ After Marine Center Approval Signed Via
			Drawing No. 29
			Examined for critical corrections only - No Corr
18649	2-23-90	PH	Full ~~Part Before~~ After Marine Center Approval Signed Via
			Drawing No. 68 Examined, ~~no correction~~ applied, partly previously applied thr
			L-531/87 and BP 133821
18652	2-27-90	PH	Full ~~Part Before~~ After Marine Center Approval Signed Via
			Drawing No. 30
			Examined, no correction
18654	4-17-90	Trey Sanford	Full ~~Part Before~~ After Marine Center Approval Signed Via
			Drawing No. 49
			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

Appd To Side 2-4-88 PH