

7866

Diag. Cht. No. 369-5

Form 504

U. S. COAST AND GEODETIC SURVEY

DEPARTMENT OF COMMERCE

DESCRIPTIVE REPORT

Type of Survey HYDROGRAPHIC

Field No. Hi-1450 Office No. H-7866

LOCALITY

State NEW JERSEY

General locality SANDY HOOK

FALSE HOOK SHOAL AND CHANNEL

Locality ~~SANDY HOOK CHANNEL~~

19 50

CHIEF OF PARTY

WALTER J. CHOVAN

LIBRARY & ARCHIVES

DATE JUL 23 1951

B-1870-1 (1)

7866

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY

HYDROGRAPHIC TITLE SHEET

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

REGISTER No. H-7866

Field No. Hi-1450

State NEW JERSEY

General locality SANDY HOOK

Locality ~~SANDY HOOK CHANNEL~~ FALSE HOOK SHOAL AND CHANNEL

Scale 1:10,000 Date of survey 2 JUNE - 26 JUNE 1950

Instructions dated 24 MAY 1950

Vessel SHIP HILGARD & SKIFF NO. 736

Chief of party IRA T. SANDERS AND W.J. CHOVAN

Surveyed by WALTER J. CHOVAN

Soundings taken by ~~GRAPHIC~~ graphic recorder, hand lead, ~~AND~~

Fathograms scaled by W.F.W., J.C.H., A.K.P., J.R.B.

Fathograms checked by " " " "

Protracted by STANLEY TARKENTON

Soundings penciled by STANLEY TARKENTON

Soundings in ~~FOOT~~ feet at MLW ~~MLW~~
and are true depths

REMARKS: This survey was smooth plotted by the Hydrographic Section
of the Norfolk Processing Office.

DESCRIPTIVE REPORT,

TO ACCOMPANY

HYDROGRAPHIC SURVEY H-7866 (1950)
FIELD NO. HI-1450

SCALE 1:10,000

JUNE 1950

SHIP HILGARD & SKIFF NO. 736 WALTER J. CHOVAN, COMMANDING

IRA T. SANDERS, CHIEF OF PARTY

SURVEYED BY WALTER J. CHOVAN, COMMANDER

A. PROJECT.- Project CS-337, Supplemental Instructions dated May 24, 1950, 22/MEK, FP-Long Island, (Commander Ira T. Sanders.)

B. SURVEY LIMITS AND DATES.- This is a survey of False Hook Channel, and covers the area from Sandy Hook Channel on the north to latitude $40^{\circ}36.75'N$ on the south, on the West by a meandering line, the position of which forms the minimum limit of safe approach to the shore by the Ship HILGARD, and on the East by the South Channel Range Line. The hydrography was extended across South Channel to include the shoal area between red and black horizontal striped buoy N (REF) and Sandy Hook Channel.

The Hydrography of Swash Channel as called for in paragraph 5 was done on Sheet H-7864 (1950).

Field work on this sheet began on 2 June and ended on 26 June 1950.

This is a special survey made at the request of the District Engineer, Corps of Engineers, New York, N.Y. and no prior surveys or adjoining surveys were furnished. This survey joins with contemporary survey No. H-7864 (1950) at Swash Channel.

C. VESSEL AND EQUIPMENT.- The Ship HILGARD and the Skiff No. 736 were used in this survey.

The Ship HILGARD was used mostly on this survey. One and one half days work was done with the Skiff. The Skiff was used for one half day to investigate the area where breakers were observed in latitude $40^{\circ}28.5'N$ longitude $73^{\circ}59'W$. In this investigation it was found safe to use the HILGARD at high tide, for development work. One days Skiff work was done close to shore.

The portable fathometer, model 808A, No.58S was used in taking the soundings. Bottom specimens were taken with hand lead. Depths varried from 1 foot to 75 feet, reduced.

D. TIDE AND CURRENT STATIONS.- The primary tide station at Sandy Hook, New Jersey, latitude $40^{\circ}28.0'N$, longitude $74^{\circ}00.5'W$ was used for the reduction of soundings.

No current observations were made.

E. SMOOTH SHEET.- To be processed in the Norfolk Processing Office.

The boat sheet was prepared aboard the Ship HILGARD, the projection was made by hand and the shore line was transferred from USC&GS Chart No. 543.

F. CONTROL STATIONS.- Natural objects previously located by triangulation and objects cut in by sextant were used for control.
(see paragraph F.)

For source of the control stations see list of signals attached to this report.

G. SHORELINE AND TOPOGRAPHY.- See paragraph "E" above.

The instructions did not call for determining the low-water line by soundings.

H. SOUNDINGS.- The portable fathometer, type 808A No.58S was used in obtaining soundings for this survey. Transciever units were mounted inboard against hull of all vessels used. Bottom samples were obtained by hand lead. ✓

Corrections were obtained from bar checks.

I. CONTROL OF HYDROGRAPHY.- The sounding lines were controlled by sextant angle fixes to shore objects. ✓

J. ADEQUACY OF SURVEY.- The hydrography as shown on this sheet is complete within the area surveyed and is adequate to supersede prior surveys for charting. ✓

This is a special survey requested by the Army Engineers and no hydrography from prior surveys were furnished for junctions or comparisons.

K. CROSSLINES.- Approximately 10% of crosslines were run. The slight discrepancies that exist on the boat sheet will probably be in agreement after the smooth sheet is processed. ✓

L. COMPARISON WITH PRIOR SURVEYS.- See "J" above. (and Review, par. 5.)

M. COMPARISON WITH CHART.- This comparison should be made with USC&GS Chart No.369 after the smooth sheet has been processed.

Review,
par.6.

NOTE:

False Hook has shoaled considerably, that even the shape of the shoal has changed. The shoalest depth on this shoal as shown on the chart is 11 feet and as found on this survey is 4.6. ✓

N. DANGERS & SHOALS.- One new critical danger was found in latitude $40^{\circ}28.5'N$, longitude $73^{\circ}59.00'W$, sounding of 4.6 feet half way between position 70D and 71D.

~~drift~~
No drift soundings were taken over this shoal due to strong currents, it was found that the shoal could be better developed by controlled lines running at slow speed. In heavy Southerly swell, breakers were observed. One half days work with Skiff was done over this area to determine if it were safe to use the Ship HILGARD in developing this shoal.

False Hook has shoaled to such an extent that it is impractical to list all shoals. The Chart, in this area should be corrected to conform with this survey.

O. COAST PILOT INFORMATION.- Coast Pilot survey of this area was made in 1949.

P. AIDS TO NAVIGATION.- No new fixed aids to navigation were located, those used as signals were obtained from the geographic positions furnished by the Washington Office.

(Signal Con)
The sextant fix of the Sandy Hook Point (Lighted Beacon) did not agree with the position as furnished by the Washington Office. The geographic position of this Beacon was computed using the observed sextant angles. The computations are enclosed in this report. The Sextant angles are in Vol. 1 Page 4.

charted pos. agrees with survey position
Computed position using sextant angles in substantial agreement with G.P. p 676 of N.S. Original G.P. furnished field party apparently was for an old position.

LIST OF CHARTED DANGERS AND SHOALS

Smooth Sheet

LOCATION LATITUDE LONGITUDE	CHARTED DEPTH IN FEET	PRESENT SURVEY LEAST DEPTH FEET	POSITION NUMBER	RECOMMENDATIONS
0 40 28.33 ²⁹ 73 56.98	(18)	20.8	173J Plot as 21'	Held (18) pending review. LAM
2 40 28.22 73 56.57	18	20.2	216H? (Shoal of 16.0 ft 189H + 181H) see Pos. 180H & 189H	✓
3 40 28.92 73 57.55	17	16.4	125H Plot as 16'. Numerous 19' soundings in vicinity.)	✓
4 40 29.04 73 57.66 ²	22	18.6	165H Plot as 18'	✓
5 40 29.16 ¹⁹ 73 57.16 ⁸⁷	21	20.8	66H Plot as 21'	✓
6 40 28.5 73 59.0 ^{58.98}	12	4.6	70D Plot as 4'	✓
7 40 28.36 ⁵ 73 56.55 ⁰		15.8	180H Plot as 16'	✓
8 40 28.30 ²⁷ 73 56.69 ⁸		17.4	189H Plot as 17'	✓
9 40 28.65 ¹⁰ 73 57.06 ²		20.8	97K Plot as 21'	✓
10 40 28.52 ⁴⁹ 73 57.58 ¹		18.0	36J Plot as 18'	✓
11 40 28.85 ⁷ 73 57.96 ⁰		19.2	50J Plot as 19'	✓
12 40 29.07 ⁹ 73 57.46		18.8	196K Plot as 19'	✓
13 40 28.87 ⁵ 73 57.30 ²⁵		19.0	143H Plot as 19'	✓

Q. LANDMARKS FOR CHARTS.- Landmarks for charts are submitted on form 567 on an area basis, a copy of which is attached to this report. ✓

R. GEOGRAPHIC NAMES.- ^{No} special effort was made to check on geographic names. ✓

Z/ TABULATION OF APPLICABLE DATA.-

<u>DESCRIPTION</u>	<u>DATE SENT TO WASHINGTON OFFICE</u>
Report on Standard Auto. Tide Gage, Sandy Hook, N.J.	27 April 1950
Recovery Notes, Triangulation Stations, Sandy Hook, N.J.	15 June 1950
Advance Information, Tracing of Boat Sheet No. 1450	5 June 1950 C.L. 380 (1950)
Report on Fathometer Corrections. ^{filed with fgms.} (Acc. No. S-2917) (To be submitted)	
Fathograms for Field Survey HI-1450 H-7866 (1950)	
Sent to Norfolk Processing Office on 11 July 1950	

T I D A L N O T E

TO ACCOMPANY DESCRIPTIVE REPORT

FOR

SURVEY NO. H-7866(1950)
FIELD NO. HI-1450

SANDY HOOK, NEW JERSEY

The Sandy Hook, primary Tide Station was used for the reduction of soundings for this survey.

The hourly heights were furnished by the Washington Office.

No time or range corrections were applied to the tidal data in reducing the soundings.

S T A T I S T I C S

FOR

HYDROGRAPHIC SURVEY NO. H-7866(1950)
FIELD NO. HI-1450

SHIP HILGARD - PROJECT CB-337

DATE	DAY- LETTER	VOLUME	NUMBER OF POSITIONS	ECHO	HAND LEAD	STATUTE MILES SOUNDING LINE
Skiff						
5 June	a	8	63	CP		9.6
8 June	b	8	301	CP		32.2
		TOTAL	364	CP	00	41.8
HILGARD						
2 June	A	1	74	CP		9.2
3 June	B	1	298	CP		51.6
6 June	C	2	323	CP		58.2
7 June	D	2 & 3	143	CP		18.9
9 June	E	3	106	CP		17.7
16 June	F	3 & 4	256	CP		43.7
19 June	G	4	219	CP		32.9
22 June	H	4 & 5	326	CP		43.4
23 June	J	5 & 6	256	CP		43.9
24 June	K	6	209	CP	20	27.3
26 June	L	6 & 7	230	CP	8	34.5
		TOTAL	2440	CP	28	381.3
GRAND TOTAL			2804	CP	28	423.1

Area Square Statute Miles: 9.9

A P P R O V A L S H E E T

TO ACCOMPANY

HYDROGRAPHIC SURVEY H-7866 (1950)

FIELD NO. HI-1450

The Boat Sheet and Sounding Records
were inspected daily and at the conclusion
of the field work, both are approved.

The descriptive report has been exam-
ined and is approved.



Walter J. Chovan
Commander, USC&GS
Cdg Ship HILGARD

LIST OF SIGNALS
To Accompany

HYDROGRAPHIC SURVEY H-7866 (H1-1450)

TRIANGULATION STATIONS

BOY NAVESINK LIGHT, NORTH, 1869-1940
ROM ROMER SHOAL LIGHTHOUSE, 1945
FIN SANDY HOOK, LIGHTHOUSE, FINIAL, 1835-1940
TAN SANDY HOOK, STANDPIPE, 1930-40
SANDY HOOK, U.S. WEATHER BUREAU SIGNAL MAST, 1930-40

TOPOGRAPHIC STATIONS

Con (Computed sextant position) Sandy Hook Point (Light Beacon)
(Computations attached) See G.P. 676 N.L. for Δ position

HYDROGRAPHIC STATIONS

Ace Vol. 1 Lone pile on point
Cup " 1 Cupola on old gray wooden building
Dix " 1&7 Lookout tower
Gas " 1&7 South vent of twin ventilators
Hop " 1,4&7 Tall square building on piling about 30 ft. high
Tow " 1&7 Coast Guard Lookout Tower.

FLOATING AIDS TO NAVIGATION

<u>BUOY</u>	<u>LAT.</u>	<u>MET.</u>	<u>LONG.</u>	<u>MET.</u>	<u>DEPTH</u>	<u>POS. NO.</u>	<u>DATE</u>
FALSE HOOK S.E. END BUOY "1"	40-26	1588	73-57	262	-	195-7G	6/19/50
FALSE HOOK EAST BUOY "3"	40-27	890	73-57	733	-	198G	6/19/50
SOUTH CHAN. BUOY "2"	40-28	1470	73-57	871	24	198L	6/26/50
LUMP BUOY	40-28	730	73-56	1099	-	232H	6/22/51
SANDY HOOK CHAN. LIGHTED BUOY	40-29	356	73-59	706	-	201-3G	6/19/50
SANDY HOOK CHAN. LIGHTED GONG BUOY "9"	40-29	30	73-59	753	-	204-6G	6/19/50
SANDY HOOK CHAN. LIGHTED BELL BUOY "12"	40-28	1774	74-00	616	-	207-10G	6/19/50
SANDY HOOK CHAN. LIGHTED GONG BUOY "13"	40-28	1278	74-01	56	-	214-16G	6/19/50
SANDY HOOK CHAN. LIGHTED BELL BUOY "8"	40-29	714	73-58	728	-	70-73K	6/24/50
GEDNEY CHAN. LIGHTED WHISTLE BUOY "5"	40-29	589	73-57	961	27 $\frac{1}{2}$	197L	6/26/50
SANDY HOOK CHAN. LIGHTED GONG BUOY "7"	40-29	619	73-58	112	37 $\frac{1}{2}$	196L	6/26/50
SANDY HOOK CHAN. BUOY "11"	40-28	1555	74-00	511	-	211-13G	6/19/50
SANDY HOOK CHAN. BUOY "14"	40-28	1508	74-01	199	-	217-19G	6/19/50
THE OIL SPOT BUOY "4"	40-26	1828	73-58	923	20 $\frac{1}{2}$	7K	6/24/50

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY

~~NONFLOATING AIDS~~ OR LANDMARKS FOR CHARTS

TO BE CHARTED

STRIKE OUT ONE

Norfolk, Virginia

8 February, 1951

~~TO BE DELETED~~

I recommend that the following objects which have ~~(have not)~~ been inspected from seaward to determine their value as landmarks be charted on ~~(deleted from)~~ the charts indicated.

The positions given have been checked after listing by Walter J. Chovan

Walter J. Chovan Chief of Party.

STATE	CHARTING NAME	DESCRIPTION	SIGNAL NAME	POSITION				METHOD OF LOCATION AND SURVEY No.	DATE OF LOCATION	HARBOR CHART	INSHORE CHART	OFFSHORE CHART	CHARTS AFFECTED	
				LATITUDE		LONGITUDE								DATUM NA
				° ' "	D. M. METERS	° ' "	D. P. METERS							
South	Twin stack	Southerly stack of twin stacks at U.S. Maritime Training Station	USE	40 34	1309	73 56	185	1927	sextant	5/50	x x x	542, 369		
Coast Guard Tower	Coast Guard Lookout Tower	Coast Guard Lookout Tower	LOG	40 33	336	73 56	304	"	"	5/50	x x x	542, 369		
TOWER		Cable housing structure on Rockaway Beach	HOD	40 33	1230	73 55	857	"	"	5/50	x	542		
Tall stack	Tall stack	Tall Stack	MIN	40 35	1432	73 56	409	"	"	7/50	x	542		
Coast Guard Cupola	Coast Guard Cupola	Coast Guard Cupola	COP	40 34	87	73 53	78	"	"	5/50	x	542		
Weather mast	Storm Warning flagpole	Storm Warning flagpole	WAR	40 34	1019	73 55	1298	"	"	5/50	x x	542, 369		
Elevated Tank	Elevated tank, black	Elevated tank, black	TAN	40 34	703	74 00	382	"	"	5/50	x x	540, 369		
Coast Guard Lookout tower	Coast Guard Lookout Tower, Sandy Hook	Coast Guard Lookout Tower, Sandy Hook	TOW	40 28	512	74 00	999	"	"	6/50	x x x	543, 369		
Tower	Lookout Tower	Lookout Tower	DIX	40 27	1077	73 59	1238	"	"	6/50	x x x	543, 369		
South twin Ventilator	South ventilator of twin vents.	South ventilator of twin vents.	GAS	40 27	238	73 59	780	"	"	6/50	x x	543, 369		
Tower	Tall square tower on piling about 30 feet high	Tall square tower on piling about 30 feet high	HOP	40 25	1720	73 58	1209	"	"	6/50	x x	543, 369		
Sandy Hook Point (Light)	Red Skeleton tower	Red Skeleton tower	CON	40 28	446.1 450.9	74 01	206.3 208.2	"	Δ PCOG Sextant Computed	6/50	x x x	543, 369		

position is on page 676 N.J. Same as letter 107 (1951)

This form shall be prepared in accordance with Hydrographic Manual, pages 800 to 804. Positions of charted landmarks and nonfloating aids to navigation, if redetermined, shall be reported on this form. The data should be considered for the charts of the area and not by

POSITION COMPUTATION, THIRD-ORDER TRIANGULATION

" "					" "												
α	2 Romer Lt.	to 3	S.H.L.H. (Finial)	350	17	24.0	α	3 S.H.L.H. (Finial)	to 2	Romer Lt.	170	17	50.9				
$2^d \angle$		&		+ 15	'04	22.4	$3^d \angle$		&		- 44	41	37.6				
α	2	to 1		005	21	46.4	α	3	to 1		125	36	13.3				
$\Delta\alpha$				-		12.1	$\Delta\alpha$				-		39.0				
				180	00	00.0					180	00	00.0				
α'	1	to 2		185	21	34.3	α'	1	to 3		305	35	34.3				
				120	14												
FIRST ANGLE OF TRIANGLE				305	35	34.3											
ϕ	40	30	46.443	2 Romer Lt.	λ	74	00	50.175	ϕ	40	27	41.798	3 S.H.L.H. (Finial)	74	00	08.811	
$\Delta\phi$	-	02	31.824		$\Delta\lambda$		7	18.661	$\Delta\phi$	7		32.821		$\Delta\lambda$		01	00.025
ϕ'	40	28	14.619	1 S.H. Pt. Bn.	λ'	74	01	08.836	ϕ'	40	28	14.619	1 S.H. Pt. Bn.	λ'	74	01	08.836
s	Logarithms	Values in seconds		" "			s	Logarithms	Values in seconds		" "						
	3.672 433	450.9		$\frac{1}{2}(\phi+\phi')$	40	29	30.531		3.240 335	40		27	58.208				
Cos α	9.998 095	(1399.8)		Logarithms	Values in seconds			Cos α	9.765 054 ⁿ	Logarithms		Values in seconds					
B	8.510 812			s	3.672 433	208.2		B	8.510 816	s		3.240 335					
h	2.181 340	1st term	151.824	Sin α	8.970 642	(1205.4)		h	1.516 205	1st term	-32.825	Sin α	9.910 124 ^f				
s^2	7.344 8			A'	8.509 106			s^2	6.480 6			A'	8.509 106				
Sin ² α	7.941 3			Sec ϕ'	0.118 765			Sin ² α	9.8202			Sec ϕ'	0.118 765				
C	1.336 1			$\Delta\lambda$	1.270 946	18.661		C	1.335 4			$\Delta\lambda$	1.778 330	60.025			
	6.622 2	2d term	+ .000	Sin $\frac{1}{2}(\phi+\phi')$	9.812 471				7.636 2	2d term	+ .004	Sin $\frac{1}{2}(\phi+\phi')$	9.812 244				
h^2	4.363			$-\Delta\alpha$	1.083 417	12.117		h^2	3.032			$-\Delta\alpha$	1.590 574	38.956			
D	2.387							D	2.387								
	6.750	3d term	+ .000						5.419	3d term	+						
		$-\Delta\phi$	151.824							$-\Delta\phi$	-32.821						

See GP p. 676 N.J.

COMPUTATION OF TRIANGLES

State: NEW JERSEY

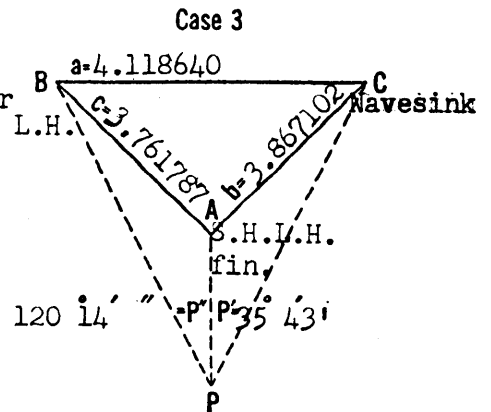
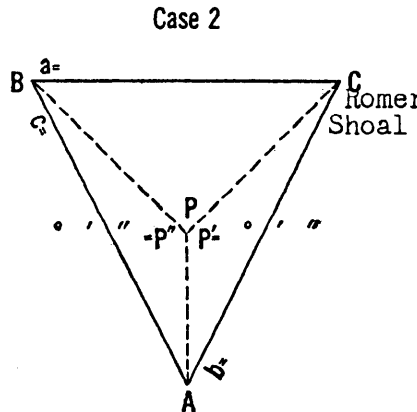
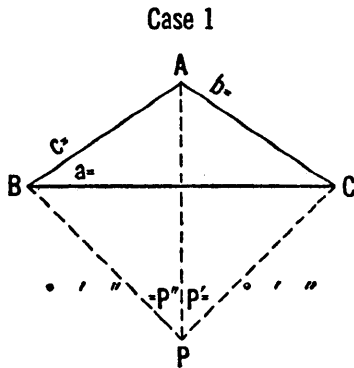
11-9121

NO.	STATION	OBSERVED ANGLE	CORR'N	SPHER'L ANGLE	SPHER'L EXCESS	PLANE ANGLE AND DISTANCE	LOGARITHM
	2-3						4.118 640
	1 S.H. Point BN	155 57				00.1	0.389 837
	2 Romer Lt.	15 39 45.4					9.431.319
	3 Navesink (North)	08 23 14.5					9.163 950
	1-3						3.939 796x
	1-2						3.672 427*
	2-3						3.761 787
	1 S.H. Pt. Bn.	120 14					0.063 495
	2 Romer Lt.	15 04 224					9.415 053
	3 S.H.L.H.(Finial)	44 41 37.6					9.847 151
	1-3						3.240 335
	1-2						3.672 433*
	2-3						3.867 102
	1 S.H. Pt. Bn	35 43					0.233 753
	2 S.H.L.H.(Finial)	136 21 30.8					9.838 939
	3 Navesink (North)	7 55 29.2					9.139 479
	1-3						3.939 794x
	1-2						3.240 334
	2-3						
	1						
	2						
	3						
	1-3						
	1-2						

Do not write in this margin

A = 178°56'51.7
B = 00°35'23.0
C = 00°27'45.3

COMPUTATION OF THREE-POINT PROBLEM



Cases 1 and 2

P'
P''
A
Sum
1/2 Sum

Case 3

P' 35°43'
P'' 120°14'

Sum 155 57
A 178 56 51.7

$S = 180^\circ - \frac{1}{2} \text{sum} =$

A - sum 22 59 51.7
 $S = \frac{1}{2} (A - \text{sum}) = 11 29 55.8$

Log c = 3.761 787
Log sin P' = 9.766 247-10
Colog b = 6.132 898-10
Colog sin P'' = 0.063 495

Sum = log tan Z = 9.724 427-10

Z = 27°55'54.6
Z + 45° = 72°55'54.6

Log cot (Z + 45°) = 9.487 184
Log tan S = 9.308 417

Sum = log tan ε = 8.795 601 (sign)

ε 3°34'26.6
S 11 29 55.8

(Tan ε +)
S + ε = angle ABP 15°04'22.4
S - ε = angle ACP 7 55 29.2

(Tan ε -)
S - ε = angle ABP
S + ε = angle ACP

BPA 120 14
ABP 15°04'22.4
PAB 44 41 37.6

APC 35°43'00.0
PCA 7 55 29.2
CAP 136 21 30.8

PCB 08°23'14.5
CBP 15 39 45.4
BPC 155 57

179 59 59.9

(For explanation of this form see Special Publication No. 138, pages 191 and 192, or Special Publication No. 145, pages 98-100)

INVERSE POSITION COMPUTATION

$$s_1 \sin \left(\alpha + \frac{\Delta\alpha}{2} \right) = \frac{\Delta\lambda_1 \cos \phi_m}{A_m}$$

$$s_1 \cos \left(\alpha + \frac{\Delta\alpha}{2} \right) = \frac{-\Delta\phi_1 \cos \frac{\Delta\lambda}{2}}{B_m}$$

$$-\Delta\alpha = \Delta\lambda \sin \phi_m \sec \frac{\Delta\phi}{2} + F(\Delta\lambda)^3$$

in which $\log \Delta\lambda_1 = \log (\lambda' - \lambda)$ — correction for arc to sin*; $\log \Delta\phi_1 = \log (\phi' - \phi)$ — correction for arc to sin*; and $\log s = \log s_1 +$ correction for arc to sin*.

		NAME OF STATION							
1.	φ	40°	30'	46.443"	Romer Shoal Lighthouse	λ	74°	00'	50.175"
2.	φ'	40	23	47.250	Navesink Light, North.	λ'	73	59	10.544
$\Delta\phi (= \phi' - \phi)$		- 6 59.193			$\Delta\lambda (= \lambda' - \lambda)$		- 01 39.631		
$\frac{\Delta\phi}{2}$		- 3 29.596			$\frac{\Delta\lambda}{2}$				
$\phi_m (= \phi + \frac{\Delta\phi}{2})$		40 27 16.874							
$\Delta\phi$ (secs.)		-419.193 "			$\Delta\lambda$ (secs.)		-99.631 "		
log Δφ		2.622414			log Δλ		1.998394		
cor. arc—sin		—			cor. arc—sin		—		
log Δφ ₁					log Δλ ₁				
log cos $\frac{\Delta\lambda}{2}$					log cos φ_m		9.881339		
colog B_m		1.489183			colog A_m		1.490893		
log {s₁ cos (α + $\frac{\Delta\alpha}{2}$)}		4.111597n			log {s₁ sin (α + $\frac{\Delta\alpha}{2}$)}		3.370626n		
		(opposite in sign to Δφ)			log {s₁ cos (α + $\frac{\Delta\alpha}{2}$)}		4.111597		
log Δλ		1.998394		3 log Δλ	log tan (α + $\frac{\Delta\alpha}{2}$)		.9.259029n		
log sin φ_m		9.812142		log F	α + $\frac{\Delta\alpha}{2}$		349 42 33.37		
log sec $\frac{\Delta\phi}{2}$				log b	log sin (α + $\frac{\Delta\alpha}{2}$)		9.251986		
log a		1.810536			log cos (α + $\frac{\Delta\alpha}{2}$)		9.992957		
a					log s₁		4.118640		
b					cor. arc—sin		+		
-Δα (secs.)		64.645 "			log s				
- $\frac{\Delta\alpha}{2}$		32.323 "							
α + $\frac{\Delta\alpha}{2}$		349 42 33.37							
α (1 to 2)		349 42 01.051							
Δα		7 1 04.645							
		180							
α' (2 to 1)		169 43 05.70							

* Use the table on the back of this form for correction of arc to sin.

NOTE.—For log s up to 4.0 and for Δφ or Δλ (or both) up to 3', omit all terms below the heavy line except those printed (in whole or in part) in heavy type or those underscored, if using logarithms to 7 decimal places.

Table of arc-sin corrections for inverse position computations

log s_1	Arc-sin correction in units of seventh decimal of logarithms	log $\Delta\phi$ or log $\Delta\lambda$	log s_1	Arc-sin correction in units of seventh decimal of logarithms	log $\Delta\phi$ or log $\Delta\lambda$	log s_1	Arc-sin correction in units of seventh decimal of logarithms	log $\Delta\phi$ or log $\Delta\lambda$
4. 177	1	2. 686	5. 223	124	3. 732	5. 525	497	4. 034
4. 327	2	2. 836	5. 234	130	3. 743	5. 530	508	4. 039
4. 415	3	2. 924	5. 243	136	3. 752	5. 534	519	4. 043
4. 478	4	2. 987	5. 253	142	3. 762	5. 539	530	4. 048
4. 526	5	3. 035	5. 260	147	3. 769	5. 543	541	4. 052
4. 566	6	3. 075	5. 269	153	3. 778	5. 548	553	4. 057
4. 599	7	3. 108	5. 279	160	3. 788	5. 553	565	4. 062
4. 628	8	3. 137	5. 287	166	3. 796	5. 557	577	4. 066
4. 654	9	3. 163	5. 294	172	3. 803	5. 561	588	4. 070
4. 677	10	3. 186	5. 303	179	3. 812	5. 566	600	4. 075
4. 697	11	3. 206	5. 311	186	3. 820	5. 570	613	4. 079
4. 716	12	3. 225	5. 318	192	3. 827	5. 575	625	4. 084
4. 734	13	3. 243	5. 326	199	3. 835	5. 579	637	4. 088
4. 750	14	3. 259	5. 334	206	3. 843	5. 583	650	4. 092
4. 765	15	3. 274	5. 341	213	3. 850	5. 587	663	4. 096
4. 779	16	3. 288	5. 349	221	3. 858	5. 591	674	4. 100
4. 792	17	3. 301	5. 356	228	3. 865	5. 595	687	4. 104
4. 804	18	3. 313	5. 363	236	3. 872	5. 600	702	4. 109
4. 827	20	3. 336	5. 369	243	3. 878	5. 604	716	4. 113
4. 857	23	3. 366	5. 376	251	3. 885	5. 608	729	4. 117
4. 876	25	3. 385	5. 383	259	3. 892	5. 612	743	4. 121
4. 892	27	3. 401	5. 390	267	3. 899	5. 616	757	4. 125
4. 915	30	3. 424	5. 396	275	3. 905	5. 620	771	4. 129
4. 936	33	3. 445	5. 403	284	3. 912	5. 624	785	4. 133
4. 955	36	3. 464	5. 409	292	3. 918	5. 628	800	4. 137
4. 972	39	3. 481	5. 415	300	3. 924	5. 632	814	4. 141
4. 988	42	3. 497	5. 422	309	3. 931	5. 636	829	4. 145
5. 003	45	3. 512	5. 428	318	3. 937	5. 640	845	4. 149
5. 017	48	3. 526	5. 434	327	3. 943	5. 644	861	4. 153
5. 035	52	3. 544	5. 440	336	3. 949	5. 648	877	4. 157
5. 051	56	3. 560	5. 446	345	3. 955	5. 652	893	4. 161
5. 062	59	3. 571	5. 451	354	3. 960	5. 656	909	4. 165
5. 076	63	3. 585	5. 457	364	3. 966	5. 660	925	4. 169
5. 090	67	3. 599	5. 462	373	3. 971	5. 663	941	4. 172
5. 102	71	3. 611	5. 468	383	3. 977	5. 667	957	4. 176
5. 114	75	3. 623	5. 473	392	3. 982	5. 671	973	4. 180
5. 128	80	3. 637	5. 479	402	3. 988	5. 674	989	4. 183
5. 139	84	3. 648	5. 484	412	3. 993	5. 678	1005	4. 187
5. 151	89	3. 660	5. 489	422	3. 998			
5. 163	94	3. 672	5. 495	433	4. 004			
5. 172	98	3. 681	5. 500	443	4. 009			
5. 183	103	3. 692	5. 505	453	4. 014			
5. 193	108	3. 702	5. 510	464	4. 019			
5. 205	114	3. 714	5. 515	474	4. 024			
5. 214	119	3. 723	5. 520	486	4. 029			

INVERSE POSITION COMPUTATION

$$s_1 \sin \left(\alpha + \frac{\Delta\alpha}{2} \right) = \frac{\Delta\lambda_1 \cos \phi_m}{A_m}$$

$$s_1 \cos \left(\alpha + \frac{\Delta\alpha}{2} \right) = \frac{-\Delta\phi_1 \cos \frac{\Delta\lambda}{2}}{B_m}$$

$$-\Delta\alpha = \Delta\lambda \sin \phi_m \sec \frac{\Delta\phi}{2} + F(\Delta\lambda)^3$$

in which $\log \Delta\lambda_1 = \log (\lambda' - \lambda)$ - correction for arc to sin*; $\log \Delta\phi_1 = \log (\phi' - \phi)$ - correction for arc to sin*; and $\log s = \log s_1 +$ correction for arc to sin*.

		NAME OF STATION							
1.	φ	40	23	47.250	Navesink Light, North S. H. Lighthouse final	λ	73	59	10.544
2.	φ'	40	27	41.798		λ'	74	00	08.811
$\Delta\phi (= \phi' - \phi)$		/ 3 54.548			$\Delta\lambda (= \lambda' - \lambda)$		/ 58.267		
$\frac{\Delta\phi}{2}$		/ 1 57.274			$\frac{\Delta\lambda}{2}$				
$\phi_m (= \phi + \frac{\Delta\phi}{2})$		40 25 44.524							
$\Delta\phi$ (secs.)		/ 234.548			$\Delta\lambda$ (secs.)		/ 58.267		
log Δφ		2.370232 /			log Δλ		1.765423 /		
cor. arc-sin		-			cor. arc-sin		-		
$\log \Delta\phi_1$					$\log \Delta\lambda_1$				
$\log \cos \frac{\Delta\lambda}{2}$					log cos φ_m		9.881504 /		
colog B_m		1.489181			colog A_m		1.490893		
log {s₁ cos (α + Δα/2)}		3.859413 _n			log {s₁ sin (α + Δα/2)}		3.137820		
		(opposite in sign to Δφ)			log {s₁ cos (α + Δα/2)}		3.859413 _n		
log Δλ		1.765423			log tan (α + Δα/2)		9.278407 _n		
log sin φ_m		9.811914			$\alpha + \frac{\Delta\alpha}{2}$		169 15 01.500		
$\log \sec \frac{\Delta\phi}{2}$					log sin (α + Δα/2)		9.270718		
					log cos (α + Δα/2)		9.992311 _n		
log a		1.577337			log s₁		3.867102		
a					cor. arc-sin		+		
b					log s				
$-\Delta\alpha$ (secs.)		/ 37.7865 "							
$-\frac{\Delta\alpha}{2}$		/ 18.8933 "							
		/ 0 18.8933							
$\alpha + \frac{\Delta\alpha}{2}$		169 15 01.5000							
α (1 to 2)		169 15 20.39							
Δα		- 37.786							
		180							
α' (2 to 1)		349 14 42.60							

* Use the table on the back of this form for correction of arc to sin.

NOTE.—For log s up to 4.0 and for Δφ or Δλ (or both) up to 3', omit all terms below the heavy line except those printed (in whole or in part) in heavy type or those underscored, if using logarithms to 7 decimal places.

Table of arc-sin corrections for inverse position computations

log s_1	Arc-sin correction in units of seventh decimal of logarithms	log $\Delta\phi$ or log $\Delta\lambda$	log s_1	Arc-sin correction in units of seventh decimal of logarithms	log $\Delta\phi$ or log $\Delta\lambda$	log s_1	Arc-sin correction in units of seventh decimal of logarithms	log $\Delta\phi$ or log $\Delta\lambda$
4.177	1	2.686	5.223	124	3.732	5.525	497	4.034
4.327	2	2.836	5.234	130	3.743	5.530	508	4.039
4.415	3	2.924	5.243	136	3.752	5.534	519	4.043
4.478	4	2.987	5.253	142	3.762	5.539	530	4.048
4.526	5	3.035	5.260	147	3.769	5.543	541	4.052
4.566	6	3.075	5.269	153	3.778	5.548	553	4.057
4.599	7	3.108	5.279	160	3.788	5.553	565	4.062
4.628	8	3.137	5.287	166	3.796	5.557	577	4.066
4.654	9	3.163	5.294	172	3.803	5.561	588	4.070
4.677	10	3.186	5.303	179	3.812	5.566	600	4.075
4.697	11	3.206	5.311	186	3.820	5.570	613	4.079
4.716	12	3.225	5.318	192	3.827	5.575	625	4.084
4.734	13	3.243	5.326	199	3.835	5.579	637	4.088
4.750	14	3.259	5.334	206	3.843	5.583	650	4.092
4.765	15	3.274	5.341	213	3.850	5.587	663	4.096
4.779	16	3.288	5.349	221	3.858	5.591	674	4.100
4.792	17	3.301	5.356	228	3.865	5.595	687	4.104
4.804	18	3.313	5.363	236	3.872	5.600	702	4.109
4.827	20	3.336	5.369	243	3.878	5.604	716	4.113
4.857	23	3.366	5.376	251	3.885	5.608	729	4.117
4.876	25	3.385	5.383	259	3.892	5.612	743	4.121
4.892	27	3.401	5.390	267	3.899	5.616	757	4.125
4.915	30	3.424	5.396	275	3.905	5.620	771	4.129
4.936	33	3.445	5.403	284	3.912	5.624	785	4.133
4.955	36	3.464	5.409	292	3.918	5.628	800	4.137
4.972	39	3.481	5.415	300	3.924	5.632	814	4.141
4.988	42	3.497	5.422	309	3.931	5.636	829	4.145
5.003	45	3.512	5.428	318	3.937	5.640	845	4.149
5.017	48	3.526	5.434	327	3.943	5.644	861	4.153
5.035	52	3.544	5.440	336	3.949	5.648	877	4.157
5.051	56	3.560	5.446	345	3.955	5.652	893	4.161
5.062	59	3.571	5.451	354	3.960	5.656	909	4.165
5.076	63	3.585	5.457	364	3.966	5.660	925	4.169
5.090	67	3.599	5.462	373	3.971	5.663	941	4.172
5.102	71	3.611	5.468	383	3.977	5.667	957	4.176
5.114	75	3.623	5.473	392	3.982	5.671	973	4.180
5.128	80	3.637	5.479	402	3.988	5.674	989	4.183
5.139	84	3.648	5.484	412	3.993	5.678	1005	4.187
5.151	89	3.660	5.489	422	3.998			
5.163	94	3.672	5.495	433	4.004			
5.172	98	3.681	5.500	443	4.009			
5.183	103	3.692	5.505	453	4.014			
5.193	108	3.702	5.510	464	4.019			
5.205	114	3.714	5.515	474	4.024			
5.214	119	3.723	5.520	486	4.029			

ADDENDUM

To Accompany

HYDROGRAPHIC SURVEY H-7866 (Field No. Hi-1450)

SOUNDINGS

Numerous bumps, shoaler than surrounding hydrography by from two to four feet, are scattered thru-out this survey. These shoal soundings are identified on an overlay by position number to speed and simplify verification.

fgms. checked

SHORELINE

Shoreline was not drafted on the smooth sheet as the compilation furnished bore little resemblance to the charted shoreline. It is felt a more recent and accurate source of shoreline will be available at the Washington Office.

*Review,
par. 1.*

Respectfully submitted,

Hugh L. Proffitt
Hugh L. Proffitt
Cartographer

Norfolk, Va.
18 July 1951

Approved & Forwarded:

Earl O. Heaton
Supervisor, S.E. Dist.

By Earl O. Heaton

RHC

TIDE NOTE FOR HYDROGRAPHIC SHEET

~~Division of Hydrography and Soundings~~

6 August 1951

Division of Charts: R. H. Carstens

Plane of reference approved in 8
volumes of sounding records for

HYDROGRAPHIC SHEET 7866

Locality Sandy Hook Channel, New Jersey

Chief of Party: W. J. Chovan)
I. T. Sanders) in 1950
Plane of reference is mean low water, reading
2.0 ft. on tide staff at Sandy Hook
9.3 ft. below B. M. 2 (1923)

Height of mean high water above plane of reference is 4.6 feet.

Condition of records satisfactory except as noted below:

E.C. McKay
Section

Chief, ~~Division of Tides and Currents~~

GEOGRAPHIC NAMES

Survey No. H-7866

Name on Survey	Source										
	A	B	C	D	E	F	G	H	K		
<u>New Jersey</u>											1
<u>Sandy Hook</u>				(location of tide gage							2
<u>False Hook</u>				(shoal)							3
<u>False Hook Channel</u>											4
											5
											6
											7
											8
											9
											10
											11
											12
											13
											14
											15
											16
											17
											18
											19
											20
											21
											22
											23
											24
											25
											26
											27

Names underlined in red are approved
7-27-51. L. Heck

See chart 369 for placement of names

Hydrographic Surveys (Chart Division)

HYDROGRAPHIC SURVEY NO. H-7866...

Records accompanying survey:

Boat sheets .1...; sounding vols. .8...; wire drag vols.; bomb vols.; graphic recorder rolls 7 env.; special reports, etc. 1 Descriptive Report; 1 Smooth Sheet; 1 Overlay.. Tracing... 1 Cahier Fathometer Corrections.. filed with H-7864....

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

Number of positions on sheet	2804
Number of positions checked	106
Number of positions revised	—
Number of soundings revised (refers to depth only)	13
Number of soundings erroneously spaced	1
Number of signals erroneously plotted or transferred	—
Topographic details	Time —
Junctions	Time —
Verification of soundings from graphic record	Time 3

Verification by *H. Williams* Total time 235 Date 9/26/51

Reviewed by *J. A. Dinsmore* Time 28 hrs. Date 13 Febr. 1952

Stirni - 8 hrs

DIVISION OF CHARTS
REVIEW SECTION - NAUTICAL CHART BRANCH
REVIEW OF HYDROGRAPHIC SURVEY

REGISTRY NO. H-7866

FIELD NO. HE-1450

New Jersey, Sandy Hook, False Hook Shoal and Channel

Project No. CS-337

Surveyed in June 1950

Scale 1:10,000

Soundings:

Control:

808 Fathometer

Sextant fixes on shore signals

Chief of Party - I. T. Sanders and W. J. Chovan
Surveyed by - W. J. Chovan
Protracted by - S. Tarkenton
Soundings plotted by - S. Tarkenton
Verified and inked by - H. G. Williams
Reviewed by - T. A. Dinsmore, 13 February 1952
Inspected by - R. H. Carstens

1. Shoreline and Signals

No contemporary shoreline is available for Sandy Hook Peninsula.

The origin of the signals is given in the Descriptive Report.

2. Sounding Line Crossings

Considering the unevenness of much of the bottom, depths at crossings are in good agreement.

3. Depth Curves and Bottom Configuration

The usual depth curves are adequately delineated except close inshore. The project instructions did not specify that hydrography be developed to the low-water line.

False Hook Shoal, as delineated by the 18-ft. depth curve, together with False Hook Channel is partially encompassed by the hook-shaped shoal and combines to form an interesting and unusual feature of bottom configuration. The crest of the shoal is indicated by a least depth of 4 ft. in lat. $40^{\circ} 28.5'$, long. $73^{\circ} 59.0'$, Maximum depths of 31 ft. were

obtained in the inshore channel.

The bottom for the most part of the area is uneven with sharp irregularities apparent in scattered localities.

4. Junctions with Contemporary Surveys

An adequate junction was effected in Swash Channel on the north with H-7864 (1950). No other contemporary surveys adjoin the present survey. However, charted depths at the offshore limits of the present survey are in harmony with present depths.

5. Comparison with Prior Surveys

a. Numerous early surveys covering the period 1835 to 1926 have been compared with and are superseded by the surveys of 1932-34 which are discussed in the succeeding paragraph. Further consideration of the early surveys is, therefore, considered unnecessary in the present review.

b. H-5234a (1932-34) 1:10,000 H-5735 (1934) 1:20,000
H-5639 (1934) 1:20,000

These prior surveys taken together cover the area of the present survey. A comparison of the prior and present surveys reveals that important bottom changes have taken place. False Hook Shoal has noticeably expanded in an easterly and southeasterly direction. The crest of the shoal now occurs in lat. $40^{\circ} 28.5'$, long. $73^{\circ} 59.0'$, where present depths of 4-5 ft. supersede prior depths of 19-20 ft. Conversely, prior depths of 13-14 ft. in lat. $40^{\circ} 28.50'$, long. $73^{\circ} 59.85'$, (False Hook Channel) have since deepened to 27-29 ft.

Numerous other differences in depths and locations of shoals are revealed by the comparison of the prior and present surveys. A considerable amount of channel dredging together with spoil disposal occurs periodically in the general vicinity of the present survey. The changeable nature of the bottom is attributed to both artificial and natural causes. The present survey is adequate to entirely supersede the prior surveys within the common area.

c. H-6994 W.D. (1944) 1:20,000

This wire-drag survey covers Sandy Hook Channel on the north. No conflicts are noted between the effective drag depths and depths on the present survey.

6. Comparison with Chart 369 (Latest print date 8/27/51)A. Hydrography

Charted hydrography originates principally with the present survey. A few soundings have been retained from prior surveys by this Bureau and the Corps of Engineers. In view of the highly changeable nature of this area, all charted information originating with prior sources is superseded by the present survey.

The sunken wreck charted in lat. $40^{\circ} 27.35'$, long. $73^{\circ} 57.28'$, originates with Chart Letter 254 (1929). The removal of the wreck symbol from the chart was recommended and approved in the review of H-5639 (1934). No evidence of the wreck was found on the present survey.

B. Aids to Navigation

Buoys located on the present survey in positions appreciably different than the charted positions are noted as follows:

<u>Survey Position</u>	<u>Charted Position</u>
Lat. $40^{\circ} 28.79'$, Long. $73^{\circ} 57.62'$	90 meters N
Lat. $40^{\circ} 26.99'$, Long. $73^{\circ} 58.65'$	110 " NNW
Lat. $40^{\circ} 28.39'$, Long. $73^{\circ} 56.78'$	175 " S

In the latter instance the charted position more adequately marks the shoal to the southeast. In the other instances, either the survey or charted positions adequately serve the purpose intended.

The buoys charted in lat. $40^{\circ} 28.55'$, long. $73^{\circ} 58.90'$, and lat. $40^{\circ} 26.80'$, long. $73^{\circ} 56.32'$, were established subsequent to the present survey as reported in H. O. Notices to Mariners Nos. 19 and 48, respectively, of 1951.

Except as noted above, other aids to navigation located on the present survey are in substantial agreement with the charted aids and adequately mark the features intended.

C. Dredged Channels

The charted controlling depths of $32\frac{1}{2}$ and 35 ft. in Sandy Hook and Gedney Channels, respectively, originate with a Corps of Engineers survey of April 1951 (Bps. 47654-55). Depths on the present survey are in harmony with the charted controlling depths.

7. Condition of Survey

- a. The sounding records and Descriptive Report are complete and comprehensive.
- b. The smooth plotting was accurately done.


8. Compliance with Project Instructions

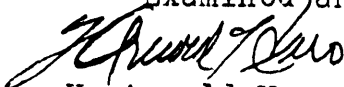
The survey adequately complies with the Project Instructions.


9. Additional Field Work


This is a basic survey of the area covered and requires no additional work within its limits. In accordance with Project Instructions, development was not carried to the low-water line of Sandy Hook.

Examined and approved:


H. R. Edmonston
Chief, Nautical Chart Branch


H. Arnold Karo
Chief, Division of Charts


L. S. Hubbard
Chief, Section of Hydrography


W. M. Scaife
Chief, Division of Coastal Surveys

