

## HORIZONTAL CONTROL DATA

QUAD 211573 STATION 1101  
HAWAII  
LATITUDE 21 ° 00' TO 21 ° 30'  
LONGITUDE 157 ° 30' TO 158 ° 00'  
DIAGRAM NF 4-11 OAHU

NAME OF STATION: WAIKIKI 2      STATE: Hawaii      COUNTY: Honolulu

CHIEF OF PARTY: D.M.W. YEAR: 1967 Described by: J.S.M.  
HEIGHT OF TELESCOPE ABOVE STATION MARK 1.6 METERS. HEIGHT OF LIGHT ABOVE STATION MARK METERS.

Station is located in the Waikiki District of Honolulu, in the sidewalk running along the southwest side of the Ala Wai Canal at the intersection of Ala Wai Blvd. and Kalaimoku Street.

To reach from the Waikiki Fire Station, at intersection of Kapahulu Ave. and Ala Wai Blvd., go northwest on Ala Wai Blvd. for 1.1 miles to station on right.

Station mark is a standard disk, stamped "WAIKIKI 2 1967", set in concrete sidewalk. It is 10.9 feet northeast of the northeast edge of Ala Wai Blvd., 6.8 feet southwest of Ala Wai Canal sea wall and 31.6 feet east of light pole.

Reference mark number one is a standard disk, stamped "WAIKIKI 2 RM NO 1 1967", set in concrete curb along northeast edge of Ala Wai Blvd.

Reference mark number two is a standard disk, stamped "WAIKIKI 2 RM NO 2 1967", set in the same concrete sidewalk as the station mark.

## RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: WAIKIKI 2  
ESTABLISHED BY: D.M.W. YEAR: 1967 STATE: Hawaii BRANCH MARK(S) ALSO ☐  
RECOVERED BY: C.A.A. YEAR: 1969 COUNTY: Honolulu  
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: In Waikiki District of Honolulu

Detailed statement as to the fitness of the original description; including marks found, stampings, changes made, and other pertinent facts:

The station, reference marks 1 and 2 were recovered as described and in good condition. The distance and direction to reference marks 1 and 2 were not checked at this time.

Note; Due to a bridge being built over the Ala Wai Canal, the station and reference marks will be destroyed.

### ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: WAIKIKI 2  
STATE: HAWAII YEAR: 1967 SECOND

SOURCE: G-14543  
NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE: 21°17'15.43873 GEODETIC LONGITUDE: 157 49 53.85984	ELEVATION: 1.25 METERS 4.1 FEET
--	------------------------------------

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	$\theta$ HOR $\Delta$ $\alpha$ ANGLE
HI 3	5103	557,323.03	43,965.42	+ 0° 03' 40"

\* PLANE AZIMUTH HAS BEEN COMPUTED BY THE  $\theta$  OR  $\Delta$   $\phi$  FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETTIC AZIMUTH (From south)	PLANE AZIMUTH * (From south)	CODE
WAIKIKI 3	133° 08' 47.8	133° 05' 08"	5103

THESE DATA OBTAINED FROM ADJUSTMENT OF NOV 1970  
POSITION DETERMINED BY TRAVERSE FROM STATION WAIKIKI 3

JUN 1978  
U. S. DEPARTMENT OF COMMERCE  
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION  
NATIONAL OCEAN SURVEY, NATIONAL GEODETIC SURVEY

# HORIZONTAL CONTROL DATA

by the  
National Ocean Survey  
OLD HAWAIIAN DATUM

QUAD 211573 STATION 1102  
HAWAII  
LATITUDE 21° 00' TO 21° 30'  
LONGITUDE 157° 30' TO 158° 00'  
DIAGRAM NF 4-11 OAHU

FORM 525  
(9-18-69)

U. S. DEPARTMENT OF COMMERCE  
COAST AND GEODETIC SURVEY

## DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: WAIKIKI 3 STATE: Hawaii COUNTY: Honolulu  
CHIEF OF PARTY: C.A. Annis YEAR: 1969 DESCRIBED BY: J.A. Tisdall

NOTE: DESCRIBE	HEIGHT OF TELESCOPE ABOVE STATION MARK SURFACE-STATION MARK, UNDERGROUND-STATION MARK	HEIGHT OF LIGHT ABOVE STATION MARK METERS.	DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION	DISTANCE		DIRECTION:
				FEET	METERS	
	PUNCHBOWL 1873 1928					0 00 00.00
desc.	R.M. # 1	SE	11.39	3.470	166 45 55	
desc.	R.M. # 2	NW	41.83	12.750	327 43 31	
	R.M. # 1 to R.M. # 2		52.73	16.071		

Station is located in the Waikiki District of Honolulu, 2 1/2 miles southeast of the Federal Building, in the concrete sidewalk between the Ala Wai Canal and Ala Wai Boulevard. At the intersection of Ala Wai Boulevard and Namahana Street.

To reach the station from the Ala Wai Canal Bridge, at the junction of Ala Wai Boulevard and McCully Street. Go southeast on Ala Wai Boulevard for 0.3 mile, to Namahana Street and the station on the left.

Station mark, is a standard disk stamped WAIKIKI 3 1969. It is cemented in a drill hole in the concrete sidewalk which runs along the west side of Ala Wai Canal. It is flush with the surface of the sidewalk, 11.0 feet northeast of a sign "Namahana Street", 5.0 feet north of the south edge of the sidewalk and 3.5 feet south of the edge of the canal headwall.

Reference mark 1, is a standard disk stamped WAIKIKI 3 NO 1 1969. It is cemented in a drill hole in the sidewalk. 12.0 feet north of the north curb of Ala Wai Boulevard, 3.5 feet south of the canal headwall and the same elevation as the station.

Reference mark 2, is a standard disk stamped WAIKIKI 3 NO 2 1969. It is cemented in a drill hole in the southwest corner of a concrete pad which has a storm drain cover in the center. It is 8.5 feet east of a light pole and 7.0 feet south of the south edge of the sidewalk and about the same elevation as the station.

Note: No azimuth mark was established for this station.

\*Refers to notes in manuals of triangulation and state publications of triangulation. †Direction-angle measured clockwise, referred to initial station.  
‡To nearest meter only, when no trigonometric leveling is being done.

USCOMMA-DC 27171-PB

## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: WAIKIKI 3  
STATE: HAWAII YEAR: 1969 FIRST ORDER

SOURCE: G-14543

GEODETIC LATITUDE:	21° 17' 18.65591	ELEVATION:	1.15 METERS
GEODETIC LONGITUDE:	157° 49' 57.52190		3.8 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	∠ HOR Δ ∠ ANGLE *
HI 3	5103	556,976.36	44,289.66	+ 0° 03' 35"

\* PLANE AZIMUTH HAS BEEN COMPUTED BY THE ∠ HOR Δ ∠ FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH (From south)	CODE
PUNCHBOWL	146° 08' 05.2	146° 04' 26"	5103

QG 102

JUN 1978  
U.S. DEPARTMENT OF COMMERCE  
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION  
NATIONAL OCEAN SURVEY, NATIONAL GEODETIC SURVEY

# ATA HORIZONTAL CONTROL DATA

by the  
National Ocean Survey  
OLD HAWAIIAN DATUM

QUAD 211573 STATION 1103  
HAWAII  
LATITUDE 21 ° 00' TO 21 ° 30'  
LONGITUDE 157 ° 30' TO 158 ° 00'  
DIAGRAM NF 4-11 OAHU

See Station WAIKIKI 3

## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: STATE SURVEY 2-12

STATE: HAWAII

YEAR: 1969

SECOND

-ORDER

SOURCE: G-14543

NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE:	21 ° 16 ' 41.86886	ELEVATION	1	METERS
GEODETIC LONGITUDE:	157 49 15.05511	NO CHECK		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	$\phi$ OR $\Delta$ $\phi$ 1 ANGLE *
HI 3	5103	560,996.67	40,582.29	+ 0 ° 03 ' 54 "

\* PLANE AZIMUTH HAS BEEN COMPUTED BY THE  $\phi$  OR  $\Delta$   $\phi$ 1 FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH * (From south)	CODE
WAIKIKI 3	132 ° 44 ' 45.7	132 ° 40 ' 52 "	5103

POSITION DETERMINED BY TRAVERSE FROM STATION WAIKIKI 3

QG 103

# HORIZONTAL CONTROL DATA

by the  
National Ocean Survey  
OLD HAWAIIAN DATUM

QUAD 211573 STATION 1104  
HAWAII  
LATITUDE 21° 00' TO 21° 30'  
LONGITUDE 157° 30' TO 158° 00'  
DIAGRAM NF 4-11 OAHU

## NO ORIGINAL TEXT

ROUND TOP (Hawaii, Territorial Survey, 1927; E.O.H., 1940)  
-This station is located on the S slope of a ridge known as Round Top separating Makiki and Manoa Valleys. It is marked by a Type C monument of the Hawaiian Territorial Survey.

### RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: ROUND TOP  
ESTABLISHED BY: H.G.S. YEAR: 1927 STATE: Hawaii  
RECOVERED BY: W.R. Porter YEAR: 1963 COUNTY: Honolulu

HEIGHT OF TELESCOPE ABOVE STATION MARK 1.5 METERS,		HEIGHT OF LIGHT ABOVE STATION MARK METERS,		
DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION				
OBJECT	BEARING	DISTANCE		DIRECTION
		FEET	METERS	
KALEPEAMOA 1927				00 00 00.0
R.M. No. 1	WSW	14.450	4.404	138 39 50
R.M. No. 2	NNW	13.960	4.256	238 47 03

Re-  
ported recovered in good condition in 1952; however the "Type C" signal at the station was destroyed in 1945 and was never rebuilt. Following are notations obtained from the files of the Hawaii State Survey office:  
1.-"Station torn out by military forces, Reported by McGuire, Ranger of the Division of Forestry, Nov. 7, 1945; also by F.E. Harvey". 2.-"Re-covered pipe (Burnt off by Engrs) 26 June, 1946, see Field Book 1461, page 6". This field book was inspected and the notations stated that only the superstructure was destroyed, and the station pipe had been burnt off with an acetylene torch.

This burnt-off pipe was recovered a few inches below ground surface and its position determined by an angle check. A surface mark was set in concrete above the pipe, and two new reference marks were established. A complete description follows:

Station is located about 2-1/2 miles airline east-northeast of the Federal Building in Honolulu, at about 1048 feet elevation, by a small observation platform at the southwest end of Ualakaa State Park.

To reach station from the Honolulu Police Station, go east on Beretania St. for 2 blocks; turn left on Punahou St. and go 0.35 mile; turn left and go 0.15 mile on Wilder Ave; turn right on Makiki St. and go 0.25 mile; take right fork and follow Round Top Drive for 2.65 miles to sign "UALAKAA STATE PARK"; turn left and go 0.45 mile to end of road at parking area. Go southwest on paved walk about 50 yards to station.

Station mark is a standard disk stamped "ROUND TOP 1927 1963", set in the top of a 10-inch-diameter mass of concrete built around station pipe. It is 9.3 feet west-southwest of the southeast corner of the platform, 13.2 feet south-southeast of the southwest corner of the platform, 57.3 feet southwest of the southwest 1 of 2, 8-inch trees, and about 1 inch below ground surface.

Reference mark number one is a standard disk stamped "ROUND TOP NO 1 1927 1963", set in the top of a 12-inch-square, concrete monument, 1 inch below ground level and 2 feet lower than station mark.

Reference mark number two is a standard disk stamped "ROUND TOP NO 2 1927 1963", cemented in a drill hole in the southwest corner of the concrete observation platform; under a bench and 6 inches in from the northwest end of the platform.

(Continued on next page)

### ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: ROUND TOP

STATE: HAWAII

YEAR: 1927

FIRST

-ORDER

SOURCE: G-14543

GEODETIC LATITUDE:	21° 18' 59.89637	ELEVATION:	315.7 METERS
GEODETIC LONGITUDE:	157 49 31.80385		1049 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	9° OR Δ 91° ANGLE
HI 3	5103	559,397.22	54,507.37	+ 0° 03' 48"

\* PLANE AZIMUTH HAS BEEN COMPUTED BY THE 9° OR Δ 91° FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH (From south)	CODE
KALEPEAMUA	293° 15' 29.4	293° 11' 41"	5103

THESE DATA OBTAINED FROM ADJUSTMENT OF NOV 1970

QG 104

# HORIZONTAL CONTROL DATA

by the  
NATIONAL GEODETIC SURVEY  
OLD HAWAIIAN DATUM

QUAD 211573 STATION 1104

LATITUDE ° ' TO ° '  
LONGITUDE ° ' TO ° '  
DIAGRAM

ROUND TOP (Continued)

DEPARTMENT OF C  
U.S. COAST AND GEODETIC SURVEY  
PAGES 222

## RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: ROUND TOP STATE: HAWAII COUNTY: HONOLULU  
ESTABLISHED BY: H.G.S. YEAR: 1927 LOCALITY: Puu Ualakaa State Park  
RECOVERED BY: E.H. Fernandes YEAR: 1968

Detailed statement as to the fitness of the original description:

Station and reference marks recovered in good condition as described by W.R. Porter in 1963. In order to further preserve this station which is now exposed to visitors at the nearby lookout, a 6x6 ft.-square, 6-inch high concrete platform was constructed over the old mark. Station mark is a standard U.S.C.&G.S. disk stamped "ROUND TOP 1927 1963 1968", set in the center and top of a 6x6 ft.-square concrete platform and 8-1/2 inches above and exactly at the same position as the mark set in 1963. This work was done by the State of Hawaii, Survey Division on August 29, 1968.

## RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: ROUND TOP  
ESTABLISHED BY: H.G.S. YEAR: 1927 STATE: Hawaii BENCH MARK ALSO ☐  
RECOVERED BY: C.A. Annis YEAR: 1969 COUNTY: Honolulu  
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: 2 miles northeast of Honolulu.  
HEIGHT OF TELESCOPE ABOVE STATION MARK 4 FEET. HEIGHT OF LIGHT ABOVE STATION MARK 4 FEET.

DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION				
OBJECT	BEARING	DISTANCE		DIRECTION
		FEET	METERS	
KALEPEAMO A 1927				0 00 00.0
RM 1	SW	14.44	4.399	138 39 12
RM 2	N	13.96	4.256	238 48 03

The station was recovered in the original location but due to the Hawaii State Survey Office resetting a new mark on a concrete pad, a new description follows.

The station is located about 2 1/2 miles east-northeast of the Federal Building in Honolulu and at the southwest end of Ualakaa State Park.

To reach the station from the Police Station in Honolulu, go east on Beretania Street for 2 blocks to Punahou Street, turn left and go north on Punahou Street for 0.35 mile to Wilder Avenue, turn left and go west on Wilder Avenue for 0.15 mile to Makiki Street, turn right and go northerly on Makiki Street for 0.45 mile to a fork, keep the left fork and continue on Round Top Drive for 2.45 miles to a sign on the left "Ualakaa State Park", turn left and go southerly on the surfaced road for 0.45 mile, passing a parking area on the right, to the end of the road and another parking area. Walk south along a surfaced walk for about 50 yards to a covered observation platform and the station as described.

The station mark is a standard disk stamped ROUND TOP 1927 1963 1968, set in the center of a 5 x 5 foot square concrete pad projecting about 8 inches above the ground. It is 5.7 feet south of the south edge of the observation platform.

Reference mark 1 is a standard disk stamped ROUND TOP NO 1 1927 1963, set in the top of a square concrete post which is 1 inch below the surface of the ground and about 2 feet lower in elevation than the station mark. It is 21.0 feet south of the southwest corner of the observation platform.

Reference mark 2 is a standard disk stamped ROUND TOP NO 2 1927 1963, set in a drill hole in the southwest corner of the concrete observation platform. It is about the same elevation as the station mark.

No measurement was made between the reference marks due to a upright support of the covered observation platform being on line.



# HORIZONTAL CONTROL DATA

by the  
National Ocean Survey  
OLD HAWAIIAN DATUM.

QUAD 211573 STATION 1106  
HAWAII  
LATITUDE 21° 00' TO 21° 30'  
LONGITUDE 157° 30' TO 158° 00'  
DIAGRAM NF 4-11 OAHU

## NO ORIGINAL TEXT

Punchbowl (Oahu Island, Hawaiian Government Survey, 1873;

J. H. Peters, 1928).—This is the same as station *Puowaina*, its name in the earlier surveys. Near southeast coast of Oahu, just northeast of Honolulu, on the highest point of Punchbowl Hill, and on west side of crater. One can go to within 50 yards of station in car. Marked by iron pin set in solid rock around which was later built a concrete pier about 6 feet square with iron pipe set vertically over mark. There is also a heavy signal over mark, maintained permanently for use in fire-control orientation. Reference marks are as follows: No. 1, note 11c, a standard reference disk in concrete gun base, 6.910 meters (22.67 feet) from station in azimuth 333° 58'; No. 2, note 12a, a standard reference disk in outcropping bedrock, 4.15 meters (13.62 feet) from station in azimuth 73° 10'. Re-marked according to note 14A in 1929.

(J.H.P., 1931)--Description is satisfactory except that the following portion of that description should be omitted in future publication: "Marked by iron pin ---- use in fire control orientation."

(H.A.P., 1931)--Recovered in good condition. Marked with Hawaiian Territorial Survey Disk. R.M. 1 recovered in good condition. R.M. 2 not searched for.

(J.H.P., 1933)--In the city of Honolulu, on the highest point of the W rim of Punchbowl crater. Marked according to Note 14A.

(E.O.H., 1940)--Description is correct, except that station is now marked by a standard Territorial Survey disk instead of an iron pin as in the original description.

(Hawaiian Territorial Survey, 1942)--On February 18, 1942, Captain Halleck of the U.S.E. called on R.D. King at the Territorial Survey Office and informed him that he "had some bad news" and reported that PUNCHBOWL triangulation station had been destroyed by a detachment of the U.S.E. under misconception of the orders (Gen. Order No. 60 of the Military Governor of Hawaii, dated January 30, 1942). R.D. King stated that he would like to have the site inspected by an assistant of the department and the Captain arranged to have Lt. Finley call and take assistant T.J.K. Evans. On the morning of February 19 Mr. Evans visited the site of the station and his report follows:

## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: PUNCHBOWL

STATE: HAWAII

YEAR: 1873

FIRST

-ORDER

SOURCE: G-14543

GEODETIC LATITUDE:	21° 18' 55.33321	ELEVATION:	152.50 METERS
GEODETIC LONGITUDE:	157 51 06.75850		500.3 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ FOR Δ θ' ANGLE *
HI 3	5103	550,419.48	54,037.76	+ 0° 03' 14"

\* PLANE AZIMUTH HAS BEEN COMPUTED BY THE θ FOR Δ θ' FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH (From south)	CODE
SALT LAKE	132° 46' 15.1	132° 43' 01"	5103

THESE DATA OBTAINED FROM ADJUSTMENT OF NOV 1970

QG 106



# HORIZONTAL CONTROL DATA

by the  
NATIONAL GEODETIC SURVEY  
OLD HAWAIIAN DATUM

QUAD 211573 STATION 1106  
LATITUDE ° ' TO ° '  
LONGITUDE ° ' TO ° '  
DIAGRAM

## PUNCHBOWL (Continued)

In accordance with instructions from R.D. King, T.J.K. Evans visited the above station in company with Lt. Finley of the U.S.E. and found that the concrete platform and the concrete pier below and within it were completely destroyed, having been dynamited by a detachment from the U.S.E. The top portion of the concrete pier together with a Territorial Survey bronze tablet were not found and the remaining portion of the pier was found lying close to its original position with the original pin 1 by 6 inches extending from the bottom of the concrete pier as shown on the sketch:

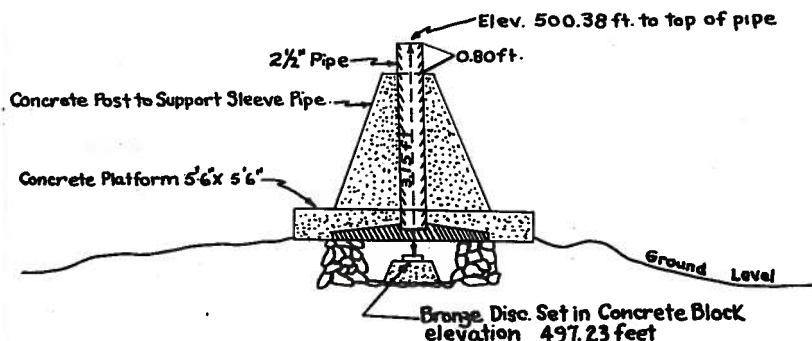


(Hawaiian Territorial Survey, 1942)--With reference to the report of February 18, 1942 on recovery note of 1928-29, the U.S. Engineers were directed to reestablish and re-mark this station. On February 25, 1942, T.J.K. Evans of the Territorial Survey Department supervised the re-marking of this station with a Type "B" marker, as shown below.

The reference marks given in 1928-29 recovery were found and are still in existence, namely: No. 1, the bench mark set by the U.S. Geological Survey 22.67 feet from station in azimuth 333°58' and No. 2, a standard reference-mark disk 13.62 feet from station in azimuth 73°10'.

Mr. Evans occupied PUNCHBOWL EAST Station and observed on the recovered station in azimuth 85°14'39" 2038.4 feet and also transferred an elevation from said PUNCHBOWL EAST (having an altitude of 435.73 feet at the top of pipe) from said station to the bronze disk marking PUNCHBOWL by vertical angles.

The elevation of the bronze disk marking station is 497.23 feet and of R.M. 1 496.50 feet, which elevation was also determined by vertical angles from station.



TYPE "B"

(R.D.H., 1943)--New construction necessitated removal of the original R.M. 1 and it was reinstalled by the U.S.E. in accordance with the following note: R.M. 1 is a standard U.S.C. & G.S. disk set in roof of concrete building, 6.809 meters (22.34 feet) from station in azimuth 334°42'.

The station mark and R.M. 2 were undisturbed and are in agreement with the old description.

Station is reached from Honolulu by going NE on Queen Emma Street to Lusitana Street to Puowaina Drive, continuing on Puowaina Drive to the S rim of Punchbowl Crater. The station is on the highest point of the crater rim.

The new R.M. 1 was reset by Gordon E. Forrest, Survey Section, U.S. Engineers.

(U.S.E., 1943)--R.M. 1 is a standard U.S.C. & G.S. disk set in roof of concrete building, 6.809 meters (22.34 feet) from station in azimuth 334°42'.

Station is reached from Honolulu by going NE on Queen Emma Street to Lusitana Street to Puowaina Drive, continuing on Puowaina Drive to the S rim of Punchbowl Crater. The station is on the highest point of the crater rim.

DEPARTMENT OF COMMERCE  
U. S. COAST AND GEODETIC SURVEY  
NOTED 1955  
(Rev. Feb. 1963)

## RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: PUNCHBOWL

ESTABLISHED BY: Ham. Govt. Sur. YEAR: 1873 STATE: Hawaii

RECOVERED BY: H. O. Fortin YEAR: 1955 COUNTY: Honolulu

Detailed statement as to the fitness of the original description; including marks found, stampings, changes made, and other pertinent facts:

The station mark was recovered in good condition as previously described in 1942 and 1943. A steel, red and white target, of the cross banner type used by the O&GS, has been erected over the mark by Hawaiian Territorial Survey Department. The reference marks were not searched for.

10-15-55

U. S. DEPARTMENT OF COMMERCE  
COAST AND GEODETIC SURVEY

## RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: PUNCHBOWL

ESTABLISHED BY: HGS

RECOVERED BY: W.R. Porter

YEAR: 1873

YEAR: 1963

STATE: Hawaii

COUNTY: Honolulu

HEIGHT OF TELESCOPE ABOVE STATION MARK 1.88 METERS.

HEIGHT OF LIGHT ABOVE STATION MARK METERS.

DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION		DISTANCE		DIRECTIONS
OBJECT	BEARING	FEET	METERS	
KAIMUKI 1872-1927		1943		00 00 00.0 ✓
R.M. No. 1		22.34	6.809	28 25 31 ✓
R.M. No. 2		13.62	4.15	126 53 31 ✓
R.M. No. 1		1963		
R.M. No. 2	SE	22.331	6.807	28 27 31 ✓
R.M. No. 3	WSW	13.599	4.144	127 05 13 ✓
	WSW	6.887	2.100	134 21 42 ✓

(Continued on next page)



# HORIZONTAL CONTROL DATA

by the  
NATIONAL GEODETIC SURVEY  
OLD HAWAIIAN DATUM

QUAD 211573 STATION 1106  
LATITUDE ° ' TO ° '  
LONGITUDE ° ' TO ° '  
DIAGRAM

## PUNCHBOWL (Continued)

Station mark and reference mark number one were recovered in good condition. Reference mark number two was found in poor condition; it was covered with dirt and vegetation, which has caused the rock to erode until the disk extends 1 inch from the rock. The arrow points about 30 degrees right of the station mark and the location of the mark makes it very difficult to measure accurately to the station. Reference mark number two was re-inforced with cement and a new reference mark, number three, was established. A complete description follows:

Station is located about 0.8 mile airline northeast of the Federal Building in Honolulu, on the west rim of Punchbowl Crater, and on the highest knoll on the rim.

To reach station from the office of the Punchbowl Cemetery (National Memorial Cemetery of the Pacific), just inside the entrance gate to Punchbowl Crater, go left and follow S. Outer Drive around south side of cemetery for 0.3 mile to junction with Observation Point Drive, and end of truck travel. Pack westerly on dim trail up through brush for about 75 yards to top of knoll and station.

Station mark is an unstamped, Hawaii Territorial Survey disk, set in concrete, about 7 inches below ground level. It is 4.5 feet northwest of the northwest corner of a concrete pillbox. There is a "Type B", Hawaii Territorial Survey signal centered over the mark.

Reference mark number one is a standard disk, stamped "PUNCHBOWL NO 1", set in the top of a 12-inch-square, concrete block that projects 1 foot from the flat, concrete roof of the pillbox. The mark is 8.7 feet southeast of a tall vent-pipe, 5 feet southwest of a short vent-pipe, and about 4-1/2 feet higher than station mark.

Reference mark number two is a standard disk stamped "PUNCHBOWL NO 2", cemented in a drill hole in the bottom step of a bedrock ledge that drops down to the southwest from station elevation. The mark is 4.7 feet west of a metal stake, 5 feet west of a right-angle jog in the bedrock ledge, and 4.3 feet lower than station mark.

Reference mark number three is a standard disk stamped "PUNCHBOWL 1873-1928 NO 3 1963", cemented in a drill hole in the top of a bedrock ledge. It is 3-1/2 feet east of the metal stake and about 0.3 foot higher than station mark.

## RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: PUNCHBOWL  
ESTABLISHED BY: H.G.S. YEAR: 1873 STATE: Hawaii BENCH MARK(S) ALSO ☐  
RECOVERED BY: C. A. Annis YEAR: 1969 COUNTY: Honolulu  
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: 0.8 mile northeast of Federal Building in Honolulu.

Detailed statement as to the fitness of the original description; including marks found, stampings, changes made, and other pertinent facts:

Station mark, reference marks 1, 2 and 3 were recovered as described in the 1963 description and were found in good condition. The to reach is adequate.

OBJECT	1969 OBSERVATIONS			
	BEARING	FEET	DISTANCE METERS	DIRECTION
SALT LAKE 1873 1942				0 00 00.0
R.M. 1	SE	22.34	6.808	202 00 21
R.M. 2	WSW	13.64	4.156	300 34 00
R.M. 3	WSW	6.92	2.110	307 56 00

No measurement between reference marks due to their location.

## U.S. DEPARTMENT OF COMMERCE - COAST AND GEODETIC SURVEY RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: PUNCHBOWL  
ESTABLISHED BY: H.G.S. YEAR: 1873 STATE: Hawaii  
RECOVERED BY: E.H.F. YEAR: 1970 COUNTY: Honolulu

Detailed statement as to the fitness of the original description; including marks found, stampings, changes made, and other pertinent facts:

Previous description of 1963 is adequate. The reference marks are in good condition.

The Type B superstructure over the station has been converted to Type A. The side walls are built of concrete tile blocks about 6 feet high and supporting a 6x6 foot concrete observing platform. The station mark is accessible for inspection. This work was completed on January 30, 1970.

## RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: PUNCHBOWL  
ESTABLISHED BY: H.G.S. YEAR: 1873 STATE: Hawaii BENCH MARK(S) ALSO ☐  
RECOVERED BY: J.V. Teater YEAR: 1973 COUNTY: Honolulu  
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN:

Detailed statement as to the fitness of the original description; including marks found, stampings, changes made, and other pertinent facts:

The station and reference marks were recovered as described

JUN 1978  
U. S. DEPARTMENT OF COMMERCE  
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION  
NATIONAL OCEAN SURVEY, NATIONAL GEODETIC SURVEY

## HORIZONTAL CONTROL DATA

by the  
National Ocean Survey  
OLD HAWAIIAN DATUM

QUAD 211573 STATION 1107  
HAWAII  
LATITUDE 21 ° 00' TO 21 ° 30'  
LONGITUDE 157 ° 30' TO 158 ° 00'  
DIAGRAM NF 4-11 OAHU

NO ORIGINAL TEXT

Form 556  
(11-2-55)

U. S. DEPARTMENT OF COMMERCE - COAST AND GEODETIC SURVEY  
RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: PUNCHBOWL EAST  
ESTABLISHED BY: L.G.S. YEAR: 1927 STATE: Hawaii  
RECOVERED BY: W.R. Porter YEAR: 1963 COUNTY: Honolulu

Detailed statement as to the status of the original description; including marks found, stampings, changes made, and other pertinent facts:

The station, a Hawaii Territory Survey  
"Type C" signal, was recovered in good condition. There is a crack  
across the concrete floor of the signal, but the structure is solid.  
A complete description follows:

Station is located about 1-1/4 miles airline east-northeast of the  
Federal Building in Honolulu, on the east rim of Punchbowl Crater, about  
600 feet east-northeast of the office building of the National Memorial  
Cemetery of the Pacific which is just inside the entrance gate of Punch-  
bowl Crater.

Station is center of 2-1/2-inch iron pipe that projects 18 inches  
from the center of a 6-foot-square, concrete platform extending 20 inches  
above ground. It is about 15 yards northeast of a large, prominent  
keawe tree that is the last one at the northeast end of the row of keawe  
trees along the crater rim.

\* Name of chief of party should be inserted here. The officer who actually visited the station should sign his name at the end of the recovery note.  
Note.—One of these forms must be used for every station recovered. COM-DC 34314

### ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: PUNCHBOWL EAST

STATE: HAWAII

YEAR: 1927

SECOND

—ORDER

SOURCE: G-14543  
NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE:	21 ° 18' 57.00819	ELEVATION:	132	METERS
GEODETIC LONGITUDE:	157 50 45.27408	NO CHECK		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	§ 108 Δ 81 ANGLE *
HI 3	5103	552,450.73	54,208.71	+ 0 ° 03' 22 "

\* PLANE AZIMUTH HAS BEEN COMPUTED BY THE § 108 Δ 81 FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH * (From south)	CODE
PUNCHBOWL	85 ° 14' 43.1	85 ° 11' 21 "	5105

THESE DATA OBTAINED FROM ADJUSTMENT OF NOV 1970

POSITION DETERMINED BY TRAVERSE FROM STATION PUNCHBOWL

QG 107

# HORIZONTAL CONTROL DATA

by the  
National Ocean Survey  
OLD HAWAIIAN DATUM

QUAD 211573 STATION 1108  
HAWAII  
LATITUDE 21° 00' TO 21° 30'  
LONGITUDE 157° 30' TO 158° 00'  
DIAGRAM NF 4-11 OAHU

NO ORIGINAL TEXT

## RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: SAND ISLAND SOUTH BASE  
ESTABLISHED BY: L.G.S. YEAR: 1927 STATE: Hawaii  
RECOVERED BY: D.G. Rushford YEAR: 1964 COUNTY: Honolulu

HEIGHT OF TELESCOPE ABOVE STATION MARK 1.53 METERS,		HEIGHT OF LIGHT ABOVE STATION MARK		METERS.		
DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION						
OBJECT	BEARING	DISTANCE		DIRECTION		
		FEET	METERS			
PUNCHBOWL 1873-1928				00	00	00.0
R.M. No. 2	SSE	12.630	3.850	109	42	26
R.M. No. 1	NE	33.461	10.198	354	28	43

A 5-foot-square, concrete platform, with a 1-1/2-inch iron pipe in the center, flush with the platform, was recovered. An angle check proved it to be the station; it was then marked with a station disk and two reference marks were established. A complete description follows:

Station is located on the extreme southeast end of Sand Island, on the northwest side of the entrance to Honolulu Harbor, in a small, fenced-in, Naval Reservation plot.

To reach station from the intersection of Nimitz Highway and Sand Island Access Road, go southerly on Sand Island Access Road for 1.3 miles to drawbridge. Cross bridge and follow main road southeast on Sand Island

for 1.6 miles to fork opposite last buildings on the island. Take right fork and go 0.2 mile to fork near beach. Take left fork and go northeast for 0.1 mile to wire mesh gate. Pass through gate and go 60 yards to station.

Station is marked with a standard disk, stamped "SAND ISLAND S. BASE 1927 1964", cemented in center of iron pipe and countersunk into concrete platform top, which projects about 1 foot above ground. It is 48.8 feet southwest of southwest end of large sign "CAHLE CROSSING", 17 feet south of south corner of old concrete building foundation, 16 feet northwest of water edge of rock seawall and 90 feet southwest of south corner of large quonset building that has a wooden pier extending out into water.

Reference mark number one is a standard disk stamped "SAND ISLAND S BASE NO 1 1927 1964", cemented in a drill hole in a 4 x 5-foot boulder that is part of the seawall and is flush with top of wall. It is 20.5 feet south-southwest of southwest end of the large sign. It is about 1-1/2 feet lower than station mark.

Reference mark number two is a standard disk stamped "SAND ISLAND S BASE NO 2 1927 1964", cemented in a drill hole in the southeast corner of a 4 x 5-foot concrete block that projects 3 feet above ground and has a large iron "U" projecting 10 inches from the top. It is at same elevation as station.

\*Name of chief of party should be inserted here. The officer who actually visited the station should sign his name at the end of the recovery note.

NOTE - One of these forms must be used for every station recovered.

USCOMMA-DC 87178-P89

(continued on next page)

## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: SAND ISLAND SOUTH BASE

STATE: HAWAII

YEAR: 1927

SECOND

ORDER

SOURCE: G-14543

GEODETIC LATITUDE: 21° 18' 09.96431	ELEVATION: 1 METERS
GEODETIC LONGITUDE: 157° 52' 22.37186	NO CHECK

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	S OR Δ G1 ANGLE *
HI 3	5103	543,273.71	49,453.84	+ 0° 02' 46"

\* PLANE AZIMUTH HAS BEEN COMPUTED BY THE S OR Δ G1 FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH * (From south)	CODE
PUNCHBOWL	237° 21' 59.6"	237° 19' 13"	5103

THESE DATA OBTAINED FROM ADJUSTMENT OF NOV 1970

POSITION DETERMINED BY TRAVERSE FROM STATION PUNCHBOWL

AND CHECKED BY ADDITIONAL OBSERVATIONS

QG 108

JUN 1978  
U.S. DEPARTMENT OF COMMERCE  
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION  
NATIONAL OCEAN SURVEY National Geodetic Survey

## HORIZONTAL CONTROL DATA

by the  
NATIONAL GEODETIC SURVEY  
OLD HAWAIIAN DATUM

QUAD 211573 STATION 1108  
LATITUDE ° ' TO ° '  
LONGITUDE ° ' TO ° '  
DIAGRAM

SAND ISLAND SOUTH BASE (Continued)

### RECOVERY NOTE, TRIANGULATION STATION TRAVERSE

R

NAME OF STATION: SAND ISLAND SOUTH BASE /  
ESTABLISHED BY: L.G.S. / YEAR: 1927 / STATE: Hawaii / BENCH MARK(S) ALSO ☐  
RECOVERED BY: C.A.A. / YEAR: 1969 / COUNTY: Honolulu /  
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: On Sand Island in Honolulu /

Detailed statement as to the fitness of the original description; including marks found, stampings, changes made, and other pertinent facts:

The station and reference mark 1 were recovered as described and in good condition. Reference mark 2 was found to be destroyed, with just the stem of the original mark left. The distance and direction to reference mark 1 was not checked at the present time. Reference mark 2 was not reestablished.

A Geodimeter Traverse was made between SAND ISLAND SOUTH BASE 1927 1964 and PUNCHBOWL 1872 1928.

Geodimeter distance 2,587.668 meters or (8,489.62 ft.)

# HORIZONTAL CONTROL DATA

by the  
National Ocean Survey  
OLD HAWAIIAN DATUM

QUAD 211573 STATION 1109  
HAWAII  
LATITUDE 21° 00' TO 21° 30'  
LONGITUDE 157° 50' TO 158° 00'  
DIAGRAM NF 4-11 OAHU

## DESCRIPTION OF TRIANGULATION INTERSECTION STATION

NAME OF STATION: STATE SURVEY 1-6

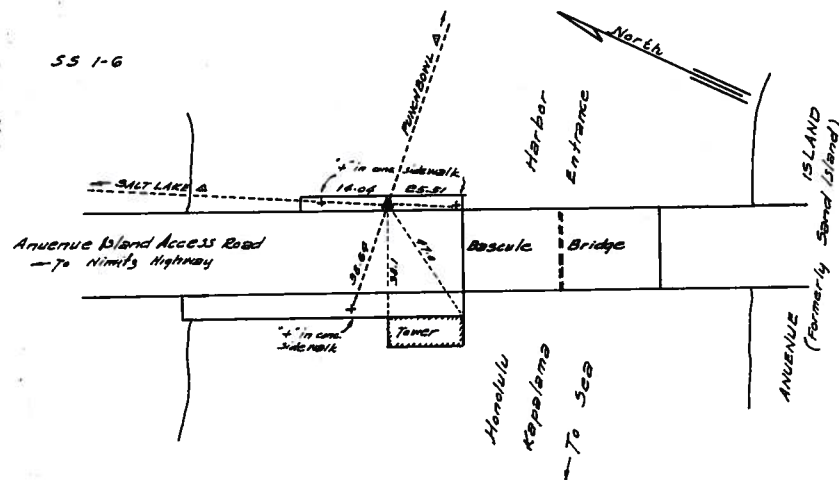
CHIEF OF PARTY: Carl A. Annis YEAR: 1969 STATE: Hawaii COUNTY: Honolulu

Description, including sketch of object:

Station is located in Kapalama, on Anuenue (formerly Sand) Island Access Road, on the northwest side of the bridge to Anuenue (formerly Sand) Island at second entrance to Honolulu Harbor.

Station mark is a standard State Survey disk stamped "1-6 1969" cemented in drill hole in concrete walkway on approach and adjacent to the northwest end of the Bascule Bridge and opposite the operator's lookout tower of bridge. Ties to station are: SW 38.64 feet to "4" in concrete walkway to lookout tower and on line to "PUNCHBOWL 1873 1928", SE 25.51 feet to "4" in concrete walkway and NW 14.04 feet to "4" in concrete walkway and on line to "SALT LAKE 1873 1942".

Geodimeter connection was made between "PUNCHBOWL 1873 1928" to State Survey "1-6 1969".



## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: STATE SURVEY 1-6

STATE: HAWAII

YEAR: 1969

SECOND

-ORDER

SOURCE: G-14543

NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE:	21° 19' 04.49281	ELEVATION:	7	METERS
GEODETIC LONGITUDE:	157° 53' 26.78668	NO CHECK		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	$\theta$ OR $\Delta$ ANGLE °
HI 3	5103	537,178.77	54,951.14	+ 0° 02' 23"

\* PLANE AZIMUTH HAS BEEN COMPUTED BY THE  $\theta$  OR  $\Delta$  FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH* (From south)	CODE
PUNCHBOWL	273° 59' 09.2	273° 56' 46"	5103

POSITION DETERMINED BY TRAVERSE FROM STATION PUNCHBOWL

JUN 1978  
U.S. DEPARTMENT OF COMMERCE  
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION  
NATIONAL OCEAN SURVEY, NATIONAL GEODETIC SURVEY

## HORIZONTAL CONTROL DATA

by the  
National Ocean Survey  
OLD HAWAIIAN DATUM.

QUAD 211573 STATION 1110  
HAWAII  
LATITUDE 21° 00' TO 21° 30'  
LONGITUDE 157° 30' TO 158° 00'  
DIAGRAM NF 4-11 OAHU

### DESCRIPTION OF TRIANGULATION INTERSECTION STATION

NAME OF STATION: STATE SURVEY 1-7

CHIEF OF PARTY: Carl A. Annis YEAR: 1969 STATE: Hawaii COUNTY: Honolulu

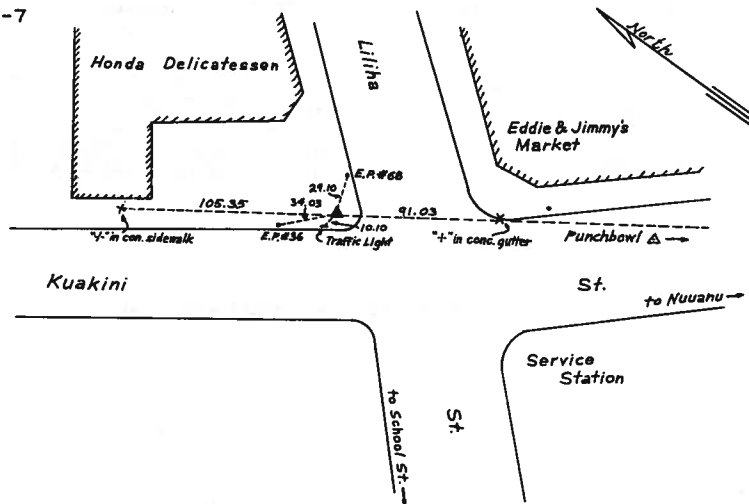
Description, including sketch of object:

Station is located about a mile northerly from downtown Honolulu, at the intersection of Liliha and Kuakini Streets.

Station mark is a standard State Survey disk stamped "1-7 1969" cemented in drill hole in concrete sidewalk at the north corner of the street intersection and fronting the Honda Delicatessen. Ties from the station are: NW 105.35 feet to "+" in concrete sidewalk, SE 91.03 feet to "+" in concrete street gutter at the east corner of intersection and on line with "PUNCHBOWL 1873 1928" and 10.10 feet to traffic light.

Geodimeter connection was made between "PUNCHBOWL 1873 1928" and State Survey "1-7 1969".

SS 1-7



### ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: STATE SURVEY 1-7

STATE: HAWAII

YEAR: 1969

SECOND

ORDER

SOURCE: G-14543

NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE:	21° 19' 36.63782	ELEVATION:	22	METERS
GEODETIC LONGITUDE:	157° 51' 36.85583	NO CHECK		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	$\phi$ OR $\Delta$ $\phi$ ANGLE *
HI 3	5103	547,570.00	58,202.76	+ 0° 03' 03"

\* PLANE AZIMUTH HAS BEEN COMPUTED BY THE  $\phi$  OR  $\Delta$   $\phi$  FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH * (From south)	CODE
PUNCHBOWL	325° 40' 22.2"	325° 37' 19"	5103

POSITION DETERMINED BY TRAVERSE FROM STATION PUNCHBOWL

QG 110

# HORIZONTAL CONTROL DATA

by the  
National Ocean Survey  
OLD HAWAIIAN DATUM

QUAD 211573 STATION 1111  
HAWAII  
LATITUDE 21° 00' TO 21° 30'  
LONGITUDE 157° 30' TO 158° 00'  
DIAGRAM NF 4-11 OAHU

## DESCRIPTION OF TRIANGULATION INTERSECTION STATION

NAME OF STATION: STATE SURVEY 1-8

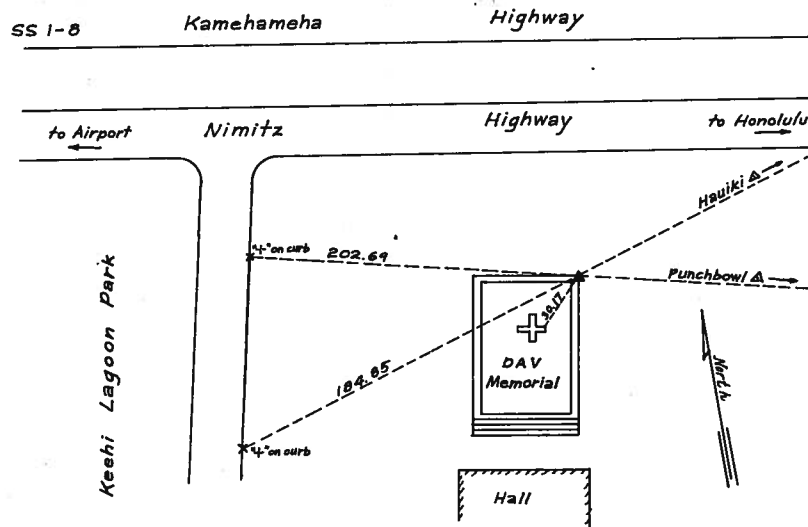
CHIEF OF PARTY: Carl A. Annis YEAR: 1969 STATE: Hawaii COUNTY: Honolulu

Description, including sketch of object:

Station is located 0.50 mile east of Honolulu International Airport, between Nimitz Highway and the north end of Keehi Lagoon. The Station is in the Pacific War Memorial Site, about 192 ft. south of Nimitz Highway and adjoining the northeast side of Keehi Lagoon Beach Park. To reach the station from Nimitz Highway and Lagoon Drive, go south along Lagoon Drive for 0.9 mile to Aolele Street, turn left into Keehi Lagoon Beach Park and continue thru Park to its northeast corner. The Memorial site is just ahead.

Station mark is a standard State Survey disk stamped "1-8 1969" cemented in drill hole in concrete top of stonewall at the northeast corner of the Pacific War Memorial. Ties from the station are: SW 184.85 ft. to a cross cut in concrete curb on east side of access road to site and on line with "HAUIKI" Station, W 202.69 ft. to a cross cut in concrete curb on east side of access road and on line with "PUNCHBOWL" Station.

Geodimeter connection was made between "PUNCHBOWL 1873 1928 to State Survey "1-8 1969". This station is also Bench Mark 1-8 (SS) of the 1969 First Order Levels.



## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: STATE SURVEY 1-8

STATE: HAWAII

YEAR: 1969

SECOND

ORDER

G-14543

SOURCE: NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE:	21° 20' 11.01811	ELEVATION:	2.63 METERS
GEODETIC LONGITUDE:	157 53 51.02557		8.6 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	S OR Δ & ANGLE °
HI 3	5103	534,882.59	61,661.95	+ 0° 02' 14"

\* PLANE AZIMUTH HAS BEEN COMPUTED BY THE S OR Δ & FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH (From south)	CODE
PUNCHBOWL	296° 10' 30.6	296° 08' 16"	5103

POSITION DETERMINED BY TRAVERSE FROM STATION PUNCHBOWL

QG 111



JUN 1978  
U. S. DEPARTMENT OF COMMERCE  
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION  
NATIONAL OCEAN SURVEY, NATIONAL GEODETIC SURVEY

# HORIZONTAL CONTROL DATA

by the  
National Ocean Survey  
OLD HAWAIIAN DATUM

QUAD 211573 STATION 1112  
HAWAII  
LATITUDE 21 ° 00' TO 21 ° 30'  
LONGITUDE 157 ° 30' TO 158 ° 00'  
DIAGRAM NF 4-11 OAHU

## DESCRIPTION OF TRIANGULATION INTERSECTION STATION

NAME OF STATION: STATE SURVEY 1-9

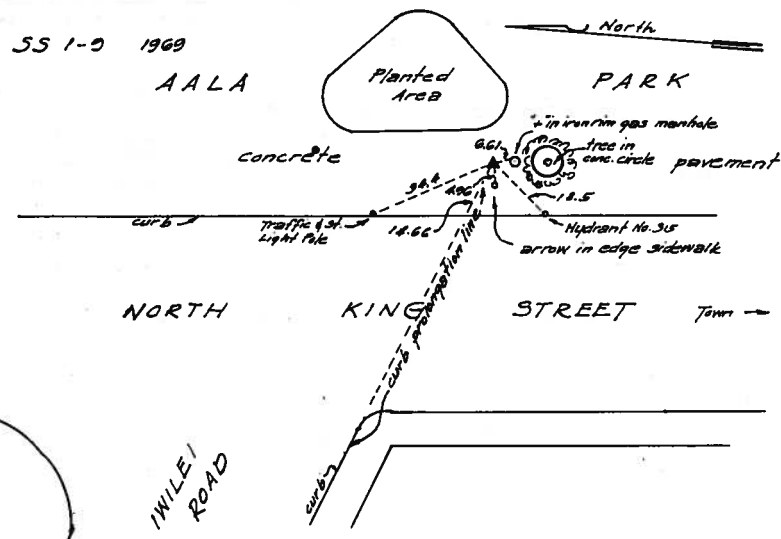
CHIEF OF PARTY: Carl A. Annis YEAR: 1969 STATE: Hawaii COUNTY: Honolulu

Description, including sketch of object:

Station is located in downtown Honolulu at the west side of Aala Park, the east side of North King Street, and placed 14.66 ft. from curb about on line with prolongation of the curb line on the south side of Wilei Road.

Station mark is a standard State Survey disk stamped "1-9 1969" cemented in drill hole in pebble-imbedded concrete pavement of the park. Ties from station are: W. 4.96 ft. to arrow in inner edge of sidewalk, SE 6.61 ft. to cross in iron rim of gas manhole, SW 18.5 to Hydrant No. 315 and NW 34.4 ft. to traffic and light pole.

Geodimeter connection was made between "PUNCHBOWL 1873 1928" and State Survey 1-9.



## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: STATE SURVEY 1-9

STATE: HAWAII YEAR: 1969 SECOND ORDER

SOURCE: G-14543

NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE:	21 19 04.37806	ELEVATION:	1 METERS
GEODETIC LONGITUDE:	157 52 00.60374	NO CHECK	FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	FOR Δ R: ANGLE *
HI 3	5103	545,327.49	54,945.83	+ 0 ° 02 ' 54 "

\* PLANE AZIMUTH HAS BEEN COMPUTED BY THE FOR Δ R: FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH * (From south)	CODE
PUNCHBOWL	280 ° 09 ' 35.6	280 ° 06 ' 41 "	5103

POSITION DETERMINED BY TRAVERSE FROM STATION PUNCHBOWL

QG 112

JUN 1978  
U. S. DEPARTMENT OF COMMERCE  
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION  
NATIONAL OCEAN SURVEY, NATIONAL GEODETIC SURVEY

# HORIZONTAL CONTROL DATA

by the  
National Ocean Survey  
OLD HAWAIIAN DATUM

QUAD 211573 STATION 1113  
HAWAII  
LATITUDE 21° 00' TO 21° 30'  
LONGITUDE 157° 30' TO 158° 00'  
DIAGRAM NF 4-11 OAHU

## DESCRIPTION OF TRIANGULATION INTERSECTION STATION

NAME OF STATION: STATE SURVEY 1-11

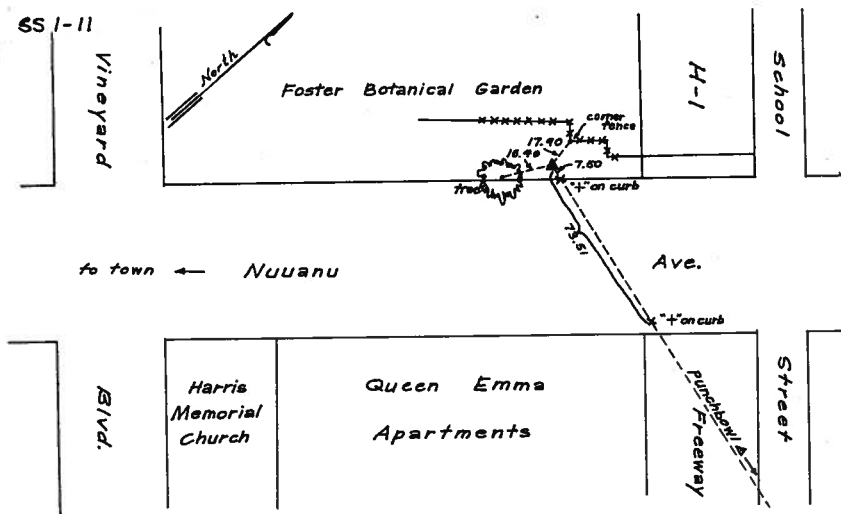
CHIEF OF PARTY: Carl A. Annis YEAR: 1969 STATE: Hawaii COUNTY: Honolulu

Description, including sketch of object:

Station is located northwest of and near, downtown Honolulu, on Nuuanu Avenue between Vineyard Boulevard and School Street.

Station mark is a State Survey disc stamped "1-11 1969" cemented in drill hole in concrete sidewalk on the northwest side of Nuuanu Avenue, near the northeast corner of the Foster Botanical Gardens and Lunalilo Freeway. Ties to station are: E 7.50 feet and 73.51 feet to "x's" in concrete curb on the northwest and southeast sides of Nuuanu Avenue, in line to "PUNCHBOWL 1873 1928", NE 17.90 feet to angle in fence of the Botanical Gardens and SW 16.4 feet to a tree.

Geodimeter connection was made between "PUNCHBOWL 1873 1928" to State Survey "1-11 1969".



## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: STATE SURVEY 1-11

STATE: HAWAII

YEAR: 1969

SECOND

-ORDER

G-14543

SOURCE: NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE:	21° 19' 09.18301	ELEVATION	11	METERS
GEODETIC LONGITUDE:	157 51 32.96734	NO CHECK		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	B OR Δ RI ANGLE °
HI 3	5103	547,940.11	55,432.62	+ 0° 03' 04"

\* PLANE AZIMUTH HAS BEEN COMPUTED BY THE B OR Δ RI FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH * (From south)	CODE
PUNCHBOWL	299° 24' 45.7	299° 21' 41"	5103

POSITION DETERMINED BY TRAVERSE FROM STATION PUNCHBOWL

QS 113

# HORIZONTAL CONTROL DATA

by the  
National Ocean Survey  
OLD HAWAIIAN DATUM

QUAD 211573 STATION 1114  
HAWAII  
LATITUDE 21° 00' TO 21° 30'  
LONGITUDE 157° 30' TO 158° 00'  
DIAGRAM NF 4-11 OAHU

## DESCRIPTION OF TRIANGULATION INTERSECTION STATION

NAME OF STATION: STATE SURVEY 2-1

CHIEF OF PARTY: Carl A. Annis YEAR: 1969 STATE: Hawaii COUNTY: Honolulu

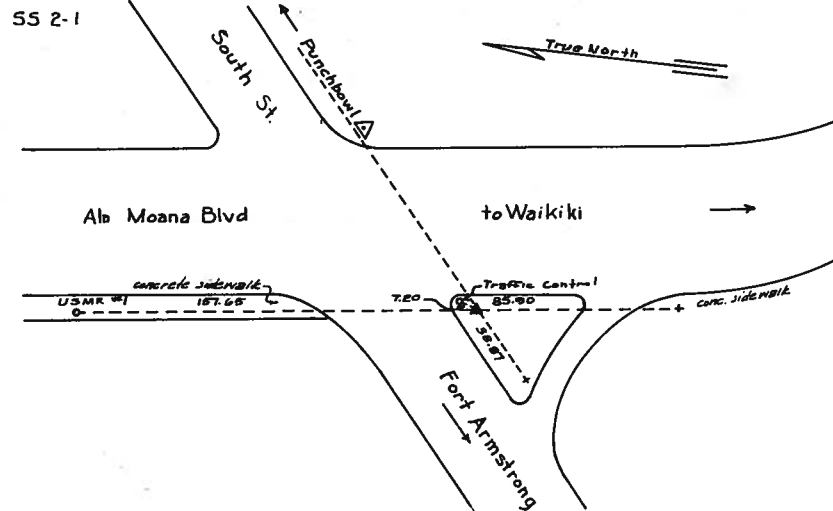
Description, including sketch of object:

Station is located in downtown Honolulu, at the waterfront area of Kakaako.

Station mark is a standard State Survey disk stamped "2-1 1969" cemented in drill hole in northwest corner of concrete "traffic island" at the intersection of Ala Moana Boulevard and South Street. The "traffic island" is on the south side of Ala Moana Boulevard at the entrance to Fort Armstrong and Pier 2. Ties from station mark are: 38.87 ft. to a cross in west corner of "traffic island", N 157.65 ft. to a disk stamped "USMR #1", in concrete sidewalk near entrance to U.S. Immigration Station, S 85.90 ft. to a cross in concrete sidewalk on southerly side of right exit lane from Fort Armstrong and Pier 2 and N 7.20 ft. to traffic control installation.

Geodimeter connection was made between "PUNCHBOWL 1873 1928" and "State Survey 2-1 1969"

This station is also Bench Mark 2-1 (SS) of the 1969 First Order Levels.



## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: STATE SURVEY 2-1

STATE: HAWAII

YEAR: 1969

SECOND

-ORDER

SOURCE: G-14543

NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE:	21° 18' 08.63325	ELEVATION:	1.15 METERS
GEODETIC LONGITUDE:	157 51 57.13247		3.8 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	$\theta$ OR $\Delta$ $\theta$ 1 ANGLE *
HI 3	5103	545,660.48	49,321.52	+ 0° 02' 55"

\* PLANE AZIMUTH HAS BEEN COMPUTED BY THE  $\theta$  OR  $\Delta$   $\theta$ 1 FORMULA NEGLECTING THE SECOND TERM

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH * (From south)	CODE
PUNCHBOWL	225° 18' 26.2	225° 15' 31"	5103

POSITION DETERMINED BY TRAVERSE FROM STATION PUNCHBOWL

06 114

# HORIZONTAL CONTROL DATA

by the  
National Ocean Survey  
OLD HAWAIIAN DATUM

QUAD 211573 STATION 1115  
HAWAII  
LATITUDE 21° 00' TO 21° 30'  
LONGITUDE 157° 30' TO 158° 00'  
DIAGRAM NF 4-11 OAHU

## DESCRIPTION OF TRIANGULATION INTERSECTION STATION

NAME OF STATION: STATE SURVEY 2-3

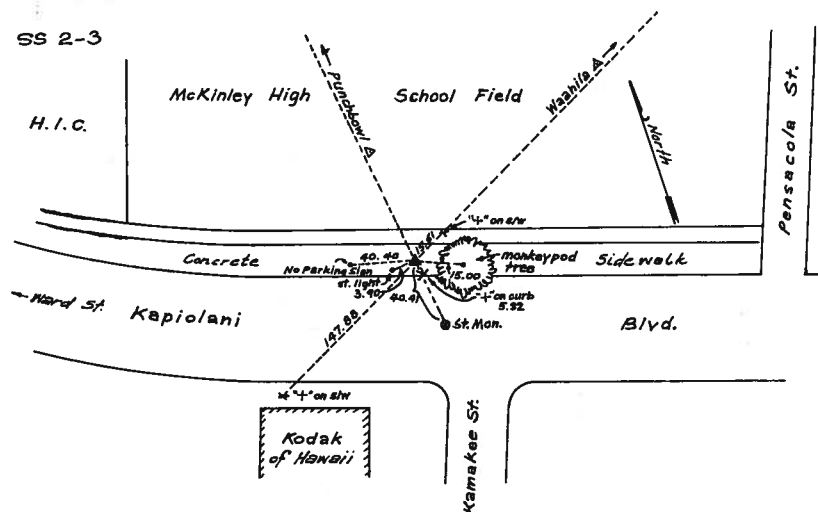
CHIEF OF PARTY: Carl A. Annis YEAR: 1969 STATE: Hawaii COUNTY: Honolulu

Description, including sketch of object:

Station is located on the southside of McKinley High School's Athletic Field, on sidewalk on the northside of Kapiolani Boulevard, between Pensacola Street and Honolulu International Center. The station is opposite the Kodak of Hawaii Building and Kamakee Street and 15.0 ft. NW of a monkey pod tree.

Station mark is a standard State Survey disk stamped "2-3 1969" cemented in drill hole in concrete sidewalk. Ties from station are: NE 15.61 ft. to cross in sidewalk on line to "WAAHILA 1928 1969", SW 147.88 ft. to cross in concrete sidewalk fronting Kodak of Hawaii and on the same line, S 5.32 ft. and 40.41 ft. to cross in curb and to City St. Survey Monument and on line with "PUNCHBOWL 1873 1928".

Geodimeter connection was made between "PUNCHBOWL 1873 1928" and "State Survey 2-3 1969"



## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: STATE SURVEY 2-3

STATE: HAWAII

YEAR: 1969

SECOND

-ORDER

SOURCE: G-14543

NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE:	21° 17' 58.83946	ELEVATION:	1	METERS
GEODETIC LONGITUDE:	157 51 09.72383	NO CHECK		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	S OR Δ OR ANGLE °
HI 3	5103	550,144.43	48,337.33	+ 0° 03' 13"

\* PLANE AZIMUTH HAS BEEN COMPUTED BY THE S OR Δ OR ANGLE ° FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH* (From south)	CODE
PUNCHBOWL	182° 48' 57.6	182° 45' 45"	5103

POSITION DETERMINED BY TRAVERSE FROM STATION PUNCHBOWL

QG 115

# HORIZONTAL CONTROL DATA

by the  
National Ocean Survey  
OLD HAWAIIAN DATUM

QUAD 211573 STATION 1116  
HAWAII  
LATITUDE 21° 00' TO 21° 30'  
LONGITUDE 157° 30' TO 158° 00'  
DIAGRAM NF 4-11 OAHU

## DESCRIPTION OF TRIANGULATION INTERSECTION STATION

NAME OF STATION: STATE SURVEY 2-4

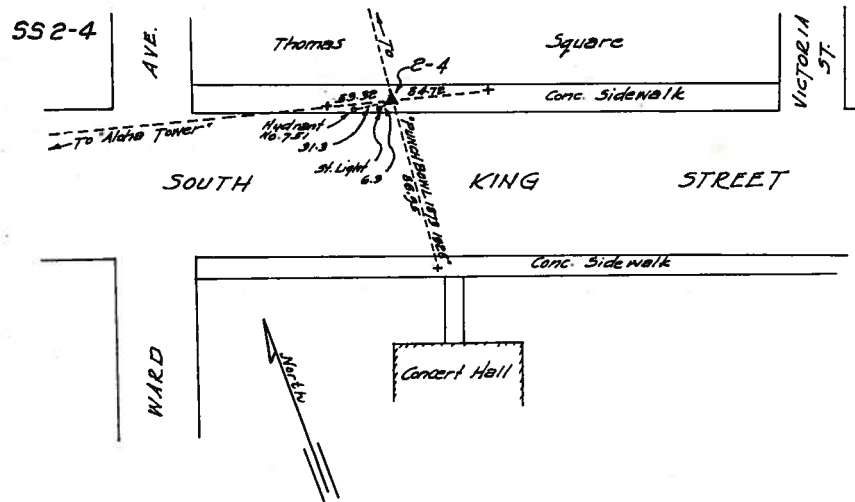
CHIEF OF PARTY: Carl A. Annis YEAR: 1969 STATE: Hawaii COUNTY: Honolulu

Description, including sketch of object:

Station is located in downtown Honolulu, on the southeast side of the intersection of South King and Ward Streets.

Station mark is a standard State Survey disk, stamped "2-4 1969", cemented in drill hole in concrete sidewalk, on the south side of Thomas Square, the north side of South King Street and opposite the Honolulu Concert Hall. Ties from the station mark are: 86.95 feet to a "+" in concrete sidewalk, near entrance to Honolulu Concert Hall, on the south side of South King Street, 53.32 feet to a "+" in concrete sidewalk on the west side, 84.72 feet to a "+" in concrete sidewalk on the east side and 31.3 feet to Fire Hydrant No. 751 on the west side.

Geodimeter connection was made between "PUNCHBOWL 1873-1928" and State Survey "2-4 1969".



## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: STATE SURVEY 2-4

STATE: HAWAII

YEAR: 1969

SECOND

ORDER

SOURCE: G-14543

NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE:	21° 18' 18.19582	ELEVATION:	3	METERS
GEODETIC LONGITUDE:	157° 51' 08.42988	NO CHECK		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	$\theta$ OR $\Delta$ $\theta$ ANGLE
HI 3	5103	550,264.96	50,290.48	+ 0° 03' 13"

\* PLANE AZIMUTH HAS BEEN COMPUTED BY THE  $\theta$  OR  $\Delta$   $\theta$  FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH (From south)	CODE
PUNCHBOWL	182° 24' 54.0	182° 21' 41"	5103

POSITION DETERMINED BY TRAVERSE FROM STATION PUNCHBOWL

JUN 1978  
U. S. DEPARTMENT OF COMMERCE  
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION  
NATIONAL OCEAN SURVEY, NATIONAL GEODETIC SURVEY

# HORIZONTAL CONTROL DATA

by the  
National Ocean Survey  
OLD HAWAIIAN DATUM

QUAD 211573 STATION 1117  
HAWAII  
LATITUDE 21° 00' TO 21° 30'  
LONGITUDE 157° 30' TO 158° 00'  
DIAGRAM NF 4-11 OAHU

NO ORIGINAL TEXT

ADJUSTED HORIZONTAL CONTROL DATA

DEPARTMENT OF COMMERCE  
U. S. COAST AND GEODETIC SURVEY  
PORTER 836  
RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: PAUOA  
ESTABLISHED BY: L.G.S. YEAR: 1927 STATE: Hawaii  
RECOVERED BY: L.G.S. YEAR: 1928 COUNTY: Honolulu

Detailed statement as to the fitness of the original description:

Old mark consisting of a 6-inch concrete post with cross on top was recovered, but found to be loose in the ground. It was replaced by a standard bronze disk (Territory Survey) set in concrete in a 5-inch cast iron pipe which was imbedded in the ground. A concrete shoulder was placed around the surface.

Azimuth  
PAUOA - McKinley High School, central tower 26° 42' 41"

DEPARTMENT OF COMMERCE  
U. S. COAST AND GEODETIC SURVEY  
PORTER 836  
(REV. Feb. 1965)  
RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: PAUOA  
ESTABLISHED BY: L.G.S. YEAR: 1927 STATE: Hawaii  
RECOVERED BY: S.L.H. YEAR: 1958 COUNTY: Honolulu

Detailed statement as to the fitness of the original description; including marks found, stampings, changes made, and other pertinent facts:

*Station is on Oahu Island, north of Honolulu, on the ridge behind Pacific Heights. To reach station go to the end of Pacific Heights Road, then continue along the ridge for approximately 1/2 mile. It is a type 'c' mark and is at the crest of the ridge.*

NAME OF STATION: PAUOA  
ESTABLISHED BY: L.G.S. YEAR: 1927 STATE: Hawaii  
RECOVERED BY: W.R. Porter YEAR: 1963 COUNTY: Honolulu

HEIGHT OF TELESCOPE ABOVE STATION MARK		1		METERS,		HEIGHT OF LIGHT ABOVE STATION MARK		METERS	
DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION									
OBJECT	BEARING	DISTANCE		DIRECTION					
		FEET	METERS						
PUNCHBOWL 1873-1928				00	00	00.0			
R.M. No. 1	N	8.613	2.625	133	41	20			
R.M. No. 2	S	13.297	4.053	313	41	13			

A "Type C", Hawaiian Territorial Survey signal was recovered in good condition. Station was previously described as being marked by a Hawaiian Territorial Survey bronze disk set in a 5-inch, cast-iron pipe, but this could not be checked because of the signal. The station is incorrectly spelled "PAUOA" on the G.P. list. Two new reference marks, numbers one and two, were established. A complete description follows:

Station is located about 2-3/4 miles airline northeast of the Federal Building in Honolulu and 1/2 mile northeast of the end of Pacific Heights Road, on a sharp-topped knoll of about 1194 feet elevation on the ridge along the southeast side of the Pali Highway.

To reach station from the intersection of Beretania Street and the Pali Highway in Honolulu, go northeast on the Pali Highway for 0.8 mile; angle right, onto Pacific Heights Road, and go 0.15 mile to traffic light at Pauoa Road. Continue ahead, winding uphill, for 2.75 mile to end of road at address 3300 Pacific Heights Road, the home of Mr. J. Neville, and end of truck travel. Walk northeast up steep, paved drive for about 125 yards to water reservoir. Get onto track road up behind reservoir and pack northeast about 1/4 mile to end of road at building. Continue, on trail along ridge for about 0.4 mile, following radio antenna part of the way, to station on second prominent knoll beyond last antenna pole.

(Continued on next page)

NAME OF STATION: PAUOA

STATE: HAWAII

YEAR: 1927

FIRST

ORDER

SOURCE: G-14543

GEODETIC LATITUDE:	21° 20' 15.26050	ELEVATION:	365.4 METERS
GEODETIC LONGITUDE:	157 49 54.89706		1199 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	± OR Δ ± ANGLE °
HI 3	5103	557,205.59	62,109.19	+ 0° 03' 40"

\* PLANE AZIMUTH HAS BEEN COMPUTED BY THE ± OR Δ ± FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH (From south)	CODE
PUNCHBOWL	40° 07' 00.5	40° 03' 20"	5103

THESE DATA OBTAINED FROM ADJUSTMENT OF NOV 1970

JUN 1978

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

## HORIZONTAL CONTROL DATA

by the

NATIONAL GEODETIC SURVEY  
OLD HAWAIIAN DATUM

QUAD 211573 STATION 1117

LATITUDE ° ' TO ° '  
LONGITUDE ° ' TO ° '  
DIAGRAM

PAUOA (continued)

Station is center of 2-1/2-inch, iron pipe that projects 2 feet from the center of a 5-foot-square, concrete platform flush with the ground. A red and white, metal target extends 10 feet above platform. Reference mark number one is a standard disk stamped "PAUOA NO 1 1927 1963", cemented in a drill hole in a bedrock outcrop that projects horizontally to the north from the sheer north edge of the ridge and is about flush with top of knoll, and is 1 foot lower than platform. Reference mark number two is a standard disk stamped "PAUOA NO 2 1927 1963", brazed to the top of a 1-1/2-inch iron pipe that is set in cement and projects 9 inches above ground. It is set on the brushy, flat top of the knoll at about same elevation as the platform.

## RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: PAUOA /  
ESTABLISHED BY: L.G.S. / YEAR: 1927 / STATE: Hawaii / BENCH MARK ALSO ☐  
RECOVERED BY: C.A. Annis / YEAR: 1969 / COUNTY: Honolulu /  
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: 2 3/4 miles northeast of Federal Buildings in Honolulu.  
HEIGHT OF TELESCOPE ABOVE STATION MARK 4 FEET. HEIGHT OF LIGHT ABOVE STATION MARK 4 FEET.

DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION				
OBJECT	BEARING	DISTANCE		DIRECTION
		FEET	METERS	
PUNCHBOWL 1872 1928 /	S /	(3 1/2 miles)		0 00' 00.0
Aloha Tower	N /	8.610	2.625	11 28' 09.0
R.M. NO 1 /	S /	13.295	4.054	133 42' 38
R.M. NO 2 /				314 38

Station mark and reference marks 1 and 2 were recovered and found in good condition. A new station mark was set in top of pipe that supported signal. A new and complete description follows.

Station is located about 2 3/4 miles northeast of the Federal Buildings in Honolulu and 1/2 mile northeast of the end of Pacific Heights Road, on a sharp-topped knoll, on ridge along southeast side of Pali Highway.

To reach the station from the intersection of Beretania Street and the Pali Highway in Honolulu, go northerly on Pali Highway for 0.75 mile to the Pacific Heights Road on the right, bear right on Pacific Heights Road for 0.2 mile to a signal light at the crossing of Pauoa Road. Continue ahead northerly uphill on Pacific Heights Road for 2.25 miles to the end of street and a three way fork at 3300 Pacific Heights Road, bear right on old bladed road with a small cable and sign Hawaiian Hills Neville, pass through cable and follow old road for 0.1 mile to a reverse fork, continue uphill for 0.15 mile to a concrete block building and the end of truck travel. From here pack up steep ridge for approximately 25 minutes to station.

Station mark is a standard disk stamped PAUOA 1927 1969, cemented in the middle of a 2 1/2 inch pipe which projects 2 inches above a 5 foot concrete platform, this pipe is in the approximate center of a 5 foot-square platform.

Reference mark 1 is a standard disk stamped PAUOA NO 1 1927 1963, cemented in a drill hole in a bedrock outcrop that projects horizontally to the north from the sheer north edge of the ridge and is about flush with the top of the knoll, and is about 1 foot lower than the platform.

Reference mark 2 is a standard disk stamped PAUOA NO 2 1927 1963, brazed to the top of a 1 1/2 inch iron pipe that is set in cement and projects 9 inches above the ground, and about the same elevation as the station.

No measurement between reference marks due to rough terrain.

\* Name of chief of party should be inserted here. The person who actually visited the station the end of the recovery note.



# HORIZONTAL CONTROL DATA

by the  
National Ocean Survey  
OLD HAWAIIAN DATUM

QUAD 211573 STATION 1118  
HAWAII  
LATITUDE 21° 00' TO 21° 30'  
LONGITUDE 157° 30' TO 158° 00'  
DIAGRAM NF 4-11 OAHU

## DESCRIPTION OF TRIANGULATION INTERSECTION STATION

NAME OF STATION: STATE SURVEY 1-5

CHIEF OF PARTY: Carl A. Amis YEAR: 1969 STATE: Hawaii COUNTY: Honolulu

Description, including sketch of object:

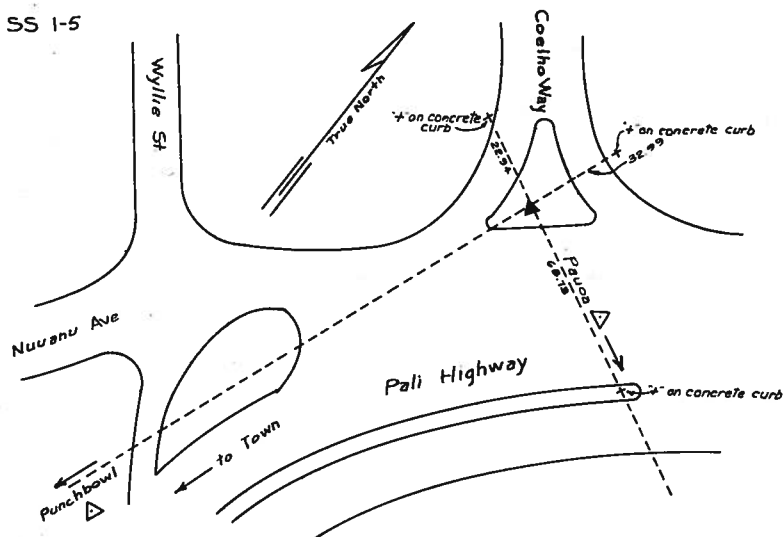
Station is located in Nuuanu Valley about 2 miles northerly from downtown Honolulu at the intersection of the Pali Highway and Coelho Way.

Station mark is a standard State survey disk stamped "1-5 1969" in concrete monument in "traffic island" at the westerly side of the Pali Highway and southeast end of Coelho Way. Ties from the station mark are: NW 25.94 ft. to "4" in concrete curb and SE 68.73 ft. to "4" in concrete curb, these points being on line with "PAUOA 1927 1969"; NE 32.99 ft. to "4" in concrete curb, this point being on line with "PUNCHBOWL 1873 1928".

Geodimeter connection was made between "PAUOA 1927 1969" and State Survey "1-5 1969".

This station is also Bench Mark 1-5 (SS) of the 1969 First Order Leveling.

SS 1-5



## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: STATE SURVEY 1-5

STATE: HAWAII

YEAR: 1969

SECOND

ORDER

SOURCE: G-14543

NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE:	21° 19' 55.53236	ELEVATION:	74.46 METERS
GEODETIC LONGITUDE:	157 50 53.86640		244.5 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	$\phi$ OR $\Delta$ $\phi$ ANGLE
HI 3	5103	551,632.62	60,112.97	+ 0° 03' 19"

\* PLANE AZIMUTH HAS BEEN COMPUTED BY THE  $\phi$  OR  $\Delta$   $\phi$  FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH (From south)	CODE
PAUOA	250° 20' 52.3	250° 17' 34"	5103

POSITION DETERMINED BY TRAVERSE FROM STATION PAUOA

QG 118

JUN 1978  
U.S. DEPARTMENT OF COMMERCE  
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION  
NATIONAL OCEAN SURVEY, NATIONAL GEODETIC SURVEY

## HORIZONTAL CONTROL DATA

by the  
National Ocean Survey  
OLD HAWAIIAN DATUM

QUAD 211573 STATION 1119  
HAWAII  
LATITUDE 21° 00' TO 21° 30'  
LONGITUDE 157° 30' TO 158° 00'  
DIAGRAM NF 4-11 OAHU

### DESCRIPTION OF TRIANGULATION INTERSECTION STATION

NAME OF STATION: STATE SURVEY 1-12

CHIEF OF PARTY: Carl A. Amis YEAR: 1969 STATE: Hawaii COUNTY: Honolulu

Description, including sketch of object:

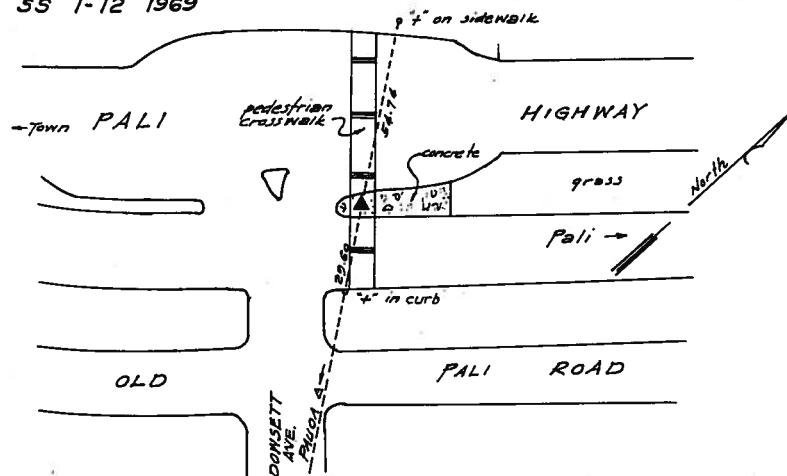
Station is located in Nuuanu Valley about 3 miles northerly from downtown Honolulu at the intersection of the Pali Highway and Dowsett Avenue.

Station mark is a standard State Survey disk stamped "1-12 1969" cemented in drill hole in concrete portion of medial strip of Pali Highway. The station is 8.75 ft. from end of a 42 foot concrete medial strip between the town and pali lanes of the Highway and is on the pali side of Dowsett Avenue access lane. A pedestrian cross walk runs over the station. Ties from the station are: NW 54.74 ft. to "4" in concrete sidewalk on northwest side of Pali Highway; SE 29.60 ft. to "4" in concrete curb of medial strip. These points being on line with "PAUOA 1927 1969".

Geodimeter connection was made between "PAUOA 1927 1969" and State Survey "1-12 1969".

This station is also Bench Mark 1-12 (SS) of the 1969 First Order Leveling.

SS 1-12 1969



### ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: STATE SURVEY 1-12

STATE: HAWAII

YEAR: 1969

SECOND

-ORDER

SOURCE: G-14543

NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE:	21° 20' 37.74466	ELEVATION:	151.16 METERS
GEODETIC LONGITUDE:	157 50 12.64569		450.3 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	$\phi$ OR $\Delta$ OR ANGLE
HI 3	5103	555,525.31	64,376.06	+ 0° 03' 34"

\* PLANE AZIMUTH HAS BEEN COMPUTED BY THE  $\phi$  OR  $\Delta$  OR FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH (From south)	CODE
PAUOA	323° 30' 44.2	323° 27' 10"	5103

POSITION DETERMINED BY TRAVERSE FROM STATION PAUOA

QG 119

JUN 1978  
U. S. DEPARTMENT OF COMMERCE  
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION  
NATIONAL OCEAN SURVEY, NATIONAL GEODETIC SURVEY

# HORIZONTAL CONTROL DATA

by the  
National Ocean Survey  
OLD HAWAIIAN DATUM

QUAD 211573 STATION 1120  
HAWAII  
LATITUDE 21° 00' TO 21° 30'  
LONGITUDE 157° 30' TO 158° 00'  
DIAGRAM NF 4-11 OAHU

NO ORIGINAL TEXT

ADJUSTED HORIZONTAL CONTROL DATA

DEPARTMENT OF COMMERCE  
N. O. GEODY AND GEODETIC SURVEY  
FOOTED 688  
RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: Waolani  
ESTABLISHED BY: L.G.S. YEAR: 1927 STATE: Hawaii  
RECOVERED BY: L.G.S. YEAR: 1928 COUNTY: Honolulu

Detailed statement as to the fitness of the original description:

Old mark consisting of a 2-inch pipe set in a mass of concrete imbedded in ground was recovered, but found to be somewhat loose. It was replaced by a standard bronze disk (Territory Survey) set in concrete in a 5-inch cast iron pipe which was imbedded in the ground. A concrete shoulder was placed around the pipe near the surface.

(6-897)

COAST AND GEODETIC SURVEY  
RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: WAOLANI  
ESTABLISHED BY: L.G.S. YEAR: 1927 STATE: Hawaii  
RECOVERED BY: W.R. Porter YEAR: 1963 COUNTY: Honolulu

HEIGHT OF TELESCOPE ABOVE STATION MARK METERS, HEIGHT OF LIGHT ABOVE STATION MARK METERS.  
DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION

OBJECT	BEARING	DISTANCE		DIRECTION
		FEET	METERS	
PAUOA 1928	NNW	8.572	2.613	00 00 00.0
R.M. No. 2	ENE	10.148	3.094	203 40 06
R.M. No. 1				291 16 04

A "Type C", Hawaiian Territorial Survey signal was recovered in good condition. A previous description describes the station mark as a Hawaiian Territorial Survey disk set in concrete in a 5-inch cast-iron pipe, however this could not be checked because of the signal. Two new reference marks, numbers one and two, were established. A complete description follows:

Station is located about 3-1/4 miles airline north-northeast of the Federal Building in Honolulu, on a small, pine-covered knoll of about 1414 feet elevation along the crest of the second ridge northwest from the Pali Highway, 1/2 mile north of the clubhouse of the Oahu Country Club and 1/2 mile northeast of the end of Alewa Drive.

To reach station from the intersection of Beretania Street and Nuuanu Ave. in Honolulu, go northeast on Nuuanu Ave. for 1.5 miles; turn left and go 0.7 mile on Wyllie Street; turn left and follow Alewa Drive, winding upgrade, for 2.1 miles to end of street at locked gate of reservoir, and end of truck travel. Pass through yard on right side of street and follow trail northeast along wire-mesh fence and then along ridge, for about 1/2 mile to station.

Station is center of 2-1/2-inch, iron pipe that projects 2 feet above the center of a 5-foot-square, concrete platform that is flush with the ground. A red and white metal target, set into the pipe, extends 10 feet above the floor. Station is 16 feet east of a 16-inch pine with a triangle blaze on it.

Reference mark number one is a standard disk, stamped "WAOLANI NO 1 1927 1963", cemented in a drill hole in a bedrock outcrop on the northeast edge of station knoll. It is at the point where the bedrock ledge angles from north to northwest and is 4 feet lower than station platform.

Reference mark number two is a standard disk, stamped "WAOLANI NO 2 1927 1963", cemented in a drill hole in bedrock outcrop on north edge of station knoll, and at the top of the ledge, which projects about 4 feet above ground at this point. It is about 4 feet lower than station platform.

(Continued on next page)

R

NAME OF STATION: WAOLANI

STATE: HAWAII

YEAR: 1927

FIRST

--ORDER

SOURCE: G-14543

GEODETIC LATITUDE: 21° 21' 04".81452	ELEVATION: 432.54 METERS
GEODETIC LONGITUDE: 157° 50' 30".35042	1419.1 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	SIDE Δ S1 ANGLE °
HI 3	5103	553,848.85	67,105.69	+ 0° 03' 27"

\* PLANE AZIMUTH HAS BEEN COMPUTED BY THE S1 OR Δ S1 FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH (From south)	CODE
KAHAU IKI	116° 58' 45".6	116° 55' 18"	5103

THESE DATA OBTAINED FROM ADJUSTMENT OF NOV 1970

QG 120

JUN 1978  
U.S. DEPARTMENT OF COMMERCE  
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION  
NATIONAL OCEAN SURVEY National Geodetic Survey

# HORIZONTAL CONTROL DATA

by the  
NATIONAL GEODETIC SURVEY  
OLD HAWAIIAN DATUM

QUAD 211573

STATION 1120

LATITUDE ° ' TO ° '  
LONGITUDE ° ' TO ° '  
DIAGRAM

WAOLANI(Continued)

## RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: WAOLANI  
ESTABLISHED BY: L.G.S. YEAR: 1927 STATE: Hawaii BENCH MARK(S) ALSO ☐  
RECOVERED BY: C.A. Annis YEAR: 1969 COUNTY: Honolulu  
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: 2 miles northeast of Honolulu.

Detailed statement as to the fitness of the original description; including marks found, stampings, changes made, and other pertinent facts:

The station and reference marks 1 and 2 were recovered and found in fair condition. When the station was occupied at this time, the station was the center of the 2 1/2 inch iron pipe which is part of the "Type C" Hawaii Territorial Survey Signal. Shortly following this occupation, it was reported by the Hawaii State Survey Office, that they had removed the 2 1/2 inch iron pipe and had set a standard survey disk in concrete about 6 inches below the surface of the concrete pad. The disk is reportedly stamped WAOLANI 1927 1969. Due to the reference marks being too close to focus upon, a check was not obtained in the direction to the marks. A difference was also noted in the distance to both of the reference marks. The distance to reach to the station is adequate. The 1969 observations follow.

OBJECT	BEARING	FEET	METERS	DIRECTION
KAHAUHIKI				0 00 00.0
RM 2	N	8.60	2.622	52 52 16
RM 1	E	10.19	3.106	140 20 15

# HORIZONTAL CONTROL DATA

by the  
National Ocean Survey  
OLD HAWAIIAN DATUM

QUAD 211573 STATION 1121  
HAWAII  
LATITUDE 21° 00' TO 21° 30'  
LONGITUDE 157° 30' TO 158° 00'  
DIAGRAM NF 4-11 OAHU

FORM 325  
(9-18-69)

U.S. DEPARTMENT OF COMMERCE  
COAST AND GEODETIC SURVEY

## DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: KAHAIKI STATE: Hawaii COUNTY: Honolulu  
CHIEF OF PARTY: C.A. Annis YEAR: 1969 DESCRIBED BY: B.W. Miller

NOTE	HEIGHT OF TELESCOPE ABOVE STATION MARK 5.4 METERS, 1	HEIGHT OF LIGHT ABOVE STATION MARK 5.1 METERS.	DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION			
			OBJECT	BEARING	DISTANCE	DIRECTION
					FEET	METERS
1b/			ROUND TOP		36.37	11.088
7a/			R.M. NO 2		36.50	11.127
11b/			R.M. NO 1			

The station is located about 4 miles north of the Federal Buildings in Honolulu, 5 miles east-southeast of Aiea, 1/2 mile northeast of the Likelike Highway and on land belonging to Fort Shafter Military Reservation.

To reach from the intersection of Likelike Highway and Lunalilo Freeway in Honolulu, go northwest on Lunalilo Freeway for 1 mile, thence bear right on Fort Shafter Exit and continue northwest for 0.3 mile to the entrance to Fort Shafter Military Reservation, on E Street (becoming Funston Road) for 0.4 mile. Turn right on Chamberlain Road for 0.1 mile to Macomb Road on the left, turn left and follow Macomb Road northerly for 0.5 mile to a reverse fork on the left, at a small building (numbered 1100) on the left. Turn sharp left on Radar Hill Road, a narrow winding road uphill for 1.2 mile to the end of old surfaced road at a turn-around. Continue ahead on track road for 0.15 mile to the top of a small saddle and station on the right, on top of cut bank.

Station mark is a standard disk stamped KAHAIKI 1969, set in the top of a round concrete monument, which projects 3 inches above the surface of the ground, it is 12 inches across the top of mark. It is 4 feet north of a tree, 8 feet south of a drop off to the north.

Reference mark 1 is a standard disk stamped KAHAIKI NO 1 1969, set in the top of a 12 inch round concrete monument, which projects 3 inches above the surface of the ground. It is 1 foot north of the edge of a group of trees, 4 feet south of a drop off on the north.

Reference mark 2 is a standard disk stamped KAHAIKI NO 2 1969, set in the top of a 12 inch round concrete monument, which projects 5 inches above the surface of the ground. It is 2 feet north of a group of trees, 10 feet south of edge of drop off on the north.

Note no measurement between reference marks due to rough terrain.

\*Refers to notes in manuals of triangulation and state publications of triangulation. †Direction-angle measured clockwise, referred to initial station  
†To nearest meter only, when no trigonometric leveling is being used.

USCOM-DC 27171-P

## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: KAHAIKI  
STATE: HAWAII YEAR: 1969 FIRST ORDER

SOURCE: G-14543

GEODETIC LATITUDE: 21° 21' 42.78137	ELEVATION: 340.5 METERS
GEODETIC LONGITUDE: 157° 51' 49.97329	1117 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	§ 10R Δ ± ANGLE °
HI 3	5103	546,318.79	70,929.50	+ 0° 02' 59"

\* PLANE AZIMUTH HAS BEEN COMPUTED BY THE § 10R Δ ± FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH (From south)	CODE
ROUND TOP	321° 30' 57.8	321° 27' 55"	5103

QG 121

JUN 1978  
U. S. DEPARTMENT OF COMMERCE  
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION  
NATIONAL OCEAN SURVEY, NATIONAL GEODETIC SURVEY

## HORIZONTAL CONTROL DATA

by the  
National Ocean Survey  
OLD HAWAIIAN DATUM

QUAD 211573 STATION 1122  
HAWAII  
LATITUDE 21° 00' TO 21° 30'  
LONGITUDE 157° 30' TO 158° 00'  
DIAGRAM NF 4-11 OAHU

### DESCRIPTION OF TRIANGULATION INTERSECTION STATION

NAME OF STATION: STATE SURVEY 1-14

CHIEF OF PARTY: Carl A. Annis YEAR: 1969 STATE: Hawaii COUNTY: Honolulu

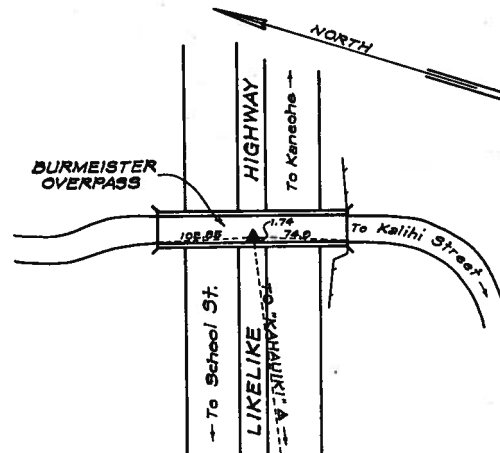
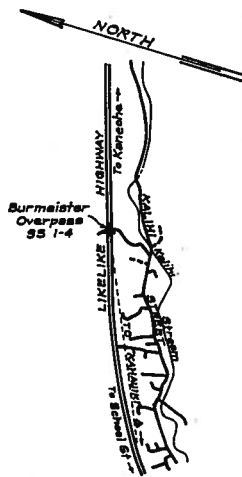
Description, including sketch of object:

Station is located in Kalihi Valley, on the Burnmeister Overpass across the Likelike Highway, 3.1 miles east of the intersection of School Street and Likelike Highway.

Station mark is a standard State Survey disk stamped "1-4 1969" cemented in drill hole in concrete, towards the middle and west edge of concrete road-bed of overpass. Ties from station are: W. 1.74 ft. to inside edge of rail, N 102.85 ft. and S 74.90 ft. respectively to inside edges at ends of guard rails on the west side of overpass.

Geodimeter connection was made between "KAHAUIKI 1969" and "State Survey 1-4"

SS 1-14



### ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: STATE SURVEY 1-14

STATE: HAWAII

YEAR: 1969

SECOND ORDER

SOURCE: G-14543

NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE:	21° 22' 12.37981	ELEVATION:	200 METERS
GEODETIC LONGITUDE:	157 50 38.33493	NO CHECK	FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	$\phi$ OR $\Delta$ OR ANGLE
HI 3	5103	553,087.31	73,922.26	+ 0° 03' 25"

\* PLANE AZIMUTH HAS BEEN COMPUTED BY THE  $\phi$  OR  $\Delta$  OR FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH (From south)	CODE
KAHAUIKI	66° 12' 13.6	66° 08' 49"	5103

POSITION DETERMINED BY TRAVERSE FROM STATION KAHAUIKI

# HORIZONTAL CONTROL DATA

by the  
National Ocean Survey  
OLD HAWAIIAN DATUM

QUAD 211573 STATION 1123  
HAWAII  
LATITUDE 21° 00' TO 21° 30'  
LONGITUDE 157° 30' TO 158° 00'  
DIAGRAM NF 4-11 OAHU

NO ORIGINAL TEXT

## ADJUSTED HORIZONTAL CONTROL DATA

DEPARTMENT OF COMMERCE  
U. S. COAST AND GEODETIC SURVEY  
FORM 1123  
Rev. Oct., 1952

### RECOVERY

#### DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: KALAEPOHAKU

CHIEF OF PARTY: Earl O. Heaton

Surface-station mark, Note,\*

Underground-station mark, Note,\*

Reference mark, Note,\*

Reference mark, Note,\*

Azimuth mark, Note,\*

Witness mark, Note,\*

Height of light above station mark meters.

Height of telescope above station mark meters.

Detailed description:

This station is located on the lower slope of Alewa Heights, in an old cemetery, located on a small prominent knoll just east of School Street.

Station is marked by a Type "C" mark of the Hawaiian Territorial Survey.

DEPARTMENT OF COMMERCE  
U. S. COAST AND GEODETIC SURVEY  
FORM 1123  
(Rev. Feb. 1950)

### RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: KALAEPOHAKU

ESTABLISHED BY: L.G. S.

YEAR: 1927 STATE: Hawaii

RECOVERED BY: SLH

YEAR: 1956 COUNTY: Honolulu

Detailed statement as to the fitness of the original description; including marks found, stampings, changes made, and other pertinent facts:

Station recovered as described in good condition.

To get to station from intersection of School Street & Pohaku Street, proceed 0.2 miles on Pohaku Street to Hale Drive; turn right on Hale Drive for 0.25 miles to Kalapa Street; turn left on Kalapa Street and proceed to terminus at cemetery. Station is on ridge, seaward from cemetery approximately 50 ft. It is a type "C" mark.

Inst. Sta. - KALAEPOHAKU

Rz. sta. - American Factors Bldg. Dome

X to subpt. - 135° 02' (rt)

Dist. - 1950 (64 ft)

center of

sub pt 13/16" sq. 9 cu. in. hwt. 5-6 ft high.

\* Name of chief of party should be inserted here. The officer who actually visited the station should sign his name at the end of the recovery note.

U. S. GOVERNMENT PRINTING OFFICE

Notes.—One of these forms must be used for every station recovered.

16-58859-3

NAME OF STATION: KALAEPOHAKU

STATE: HAWAII

YEAR: 1927

FIRST

-ORDER

SOURCE: G-14543

GEODETIC LATITUDE:	21° 19' 58.97497	ELEVATION:	64.5 METERS
GEODETIC LONGITUDE:	157° 51' 52.61437		212 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ (OR Δ) & ANGLE *
HI 3	5103	546,078.16	60,455.26	+ 0° 32' 57"

\* PLANE AZIMUTH HAS BEEN COMPUTED BY THE θ (OR Δ) & FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH * (From south)	CODE
PAUOA	261° 35' 42.0	261° 32' 45"	5103

THESE DATA OBTAINED FROM ADJUSTMENT OF NOV 1970

QG 123

(Continued on next page)



# HORIZONTAL CONTROL DATA

by the  
NATIONAL GEODETIC SURVEY  
OLD HAWAIIAN DATUM

QUAD 211573 STATION 1123

LATITUDE ° ' TO ° '  
LONGITUDE ° ' TO ° '  
DIAGRAM

KALAEPOHAKU (Continued)

## RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: KALAEPOHAKU  
ESTABLISHED BY: L.G.S. YEAR: 1927 STATE: Hawaii  
RECOVERED BY: W.R. Porter YEAR: 1963 COUNTY: Honolulu

OBJECT	BEARING	DISTANCE		DIRECTION
		FEET	METERS	
PUNCHBOWL 1873-1928				00 00 00.0
R.M. No. 2	NW	19.275	5.876	160 31 04
R.M. No. 1	NE	34.462	10.505	241 55 42

Station was recovered and found in good condition. Two reference marks were established. A complete description follows:

Station is located about 1-1/2 miles airline north of the Federal Building in Honolulu, in the Kamehameha Heights District of Honolulu, about 100 yards northwest of the Maluhia Hospital, in a brushy area at the southwest end of an old cemetery.

To reach station from the intersection of S. Beretania Street and Pali Highway in Honolulu, go northeast on Pali Highway for 0.2 mile; turn left and go 0.6 mile on Vineyard Street; turn right and go 0.2 mile on Liliha Street; turn left and go 0.4 mile on School Street; turn right and go northeast 0.3 mile on Lanakila Avenue; turn left and go 0.15 mile on Laki Rd.; cross Hala Drive and continue ahead, on Kalepa Place, for 0.05 mile to chain gate at cemetery entrance. Walk westerly on trail for about 45 yards to station.

Station mark is center of a 2-1/2-inch, iron pipe which projects 12 inches from the top of a 5-foot-square, concrete platform which extends about 1-1/2 feet above ground, (this structure is a Hawaii Territorial Survey "Type C" signal). Station is 42 feet southwest of the southwest end of a low, concrete wall surrounding the Kapua family plot, and 130 feet west-southwest of the cemetery entrance.

Reference mark number one is a standard disk stamped "KALAEPOHAKU NO 1 1928", cemented in a drill hole in the top part of a sloping, 9-foot-diameter, black boulder that projects about 3 feet above ground. It is 10 feet southwest of the southwest end of the low concrete wall, 20 feet northwest of dim trail, and at same elevation as top of station pipe.

Reference mark number two is a standard disk stamped "KALAEPOHAKU NO 2 1928", cemented in a drill hole in a 5 x 7-foot bedrock outcrop that is flush with ground on its southeast side and projects 1 foot on the lower, northwest side. The mark is 1 foot in from the northwest edge of the rock, 14 feet southeast of a narrow cemetery plot, and about 4-1/2 feet lower than top of station pipe.

NOTE: There is no previous description for this station and it is not known how the station was originally marked. There is no access to a mark under a Type C signal so it could not be checked.

\*Name of chief of party should be inserted here. The officer who actually visited the station should sign his name at the end of the recovery note.

NOTE - One of these forms must be used for every station recovered.

USCOMMA-DC 27178-P68

## RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: KALAEPOHAKU  
ESTABLISHED BY: L.G.S. YEAR: 1927 STATE: Hawaii BENCH MARK ALSO ☐  
RECOVERED BY: C.A. Annis YEAR: 1969 COUNTY: Honolulu  
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: In Honolulu  
HEIGHT OF TELESCOPE ABOVE STATION MARK 6.2 FEET. HEIGHT OF LIGHT ABOVE STATION MARK 5.5 FEET.

OBJECT	BEARING	DISTANCE		DIRECTION
		FEET	METERS	
PAUOA 1927				0 00 00.00
HONOLULU PINEAPPLE CO. TANK 1928	SSW	( 1 mile )		132 50 06.4
R.M. # 2	NW	19.26	5.870	224 51 51
R.M. # 1	NE	34.45	10.501	306 17 36

Station mark, and reference marks 1 and 2 were recovered and in good condition as described in 1963. With the exception of a difference in the measurement to reference mark 2. However the original station which was the center of a 2 1/2-inch iron pipe, was removed and a standard disk was set. A complete description follows:

Station is located in the Kamehameha District of Honolulu. It is 1 1/2 miles north of the Federal Building, 100 yards northwest of the Maluhia, in a brushy area at the southwest end of a cemetery.

To reach the station from the intersection of Beretania Street and Nuuanu Avenue, in Honolulu. Go northeast on Nuuanu Avenue for 0.4 mile to School Street. Turn left, northwest, on School Street for 0.85 mile to Lanakila Avenue. Turn right, northeast, on Lanakila Avenue for 0.3 mile to Laki Road. Turn left, northwest, on Laki Road for 0.15 mile to Hala Drive and the end of Laki Road. Continue northwest, crossing Hala Drive, and entering Kalepa Place, for 0.05 mile to the cemetery and the station on the left.

Station mark, is a standard disk stamped KALAEPOHAKU 1927 1969. It is cemented in a drill hole in the concrete base of a "Type C" Hawaii Territorial Survey Signal which is centered over the mark. It is 130 feet west-southwest of the cemetery entrance and 42 feet southwest of the southwest end of a concrete wall which surrounds the Kapua Family Plot. The "Type C" signal is a concrete platform, 6-foot square and projects 20 inches above the ground surface.

Reference mark 1, is a standard disk stamped KALAEPOHAKU NO 1 1928. It is cemented in the top of a 7 X 7 foot boulder which projects about 4 feet above the ground surface. It is 20 feet northwest of the center of a track road, 10 feet southwest of the southwest end of a concrete wall and about the same elevation as the station.

Reference mark 2, is a standard disk stamped KALAEPOHAKU NO 2 1928. It is cemented in a drill hole in the top of a 4 by 6-foot boulder which is flush on the southeast side and projects 1 foot on the northwest side. It is 18.0 feet southeast of the southwest corner of a chain fence which surrounds a plot. About 3 feet lower than the station.

No measurement was made between the reference marks due to heavy brush on line.

No azimuth mark was established for this station.

\*Name of chief of party should be inserted here. The person who actually visited the station should sign his name at the end of the recovery note.

FORM CGS-556 (12-65)  
USCOMMA-DC 36251-P65

ESRA  
COAST AND GEODETIC SURVEY

# HORIZONTAL CONTROL DATA

by the  
National Ocean Survey  
OLD HAWAIIAN DATUM

QUAD 211573 STATION 1124  
HAWAII  
LATITUDE 21° 00' TO 21° 30'  
LONGITUDE 157° 30' TO 158° 00'  
DIAGRAM NF 4-11 OAHU

## DESCRIPTION OF TRIANGULATION INTERSECTION STATION

NAME OF STATION: STATE SURVEY 1-1

CHIEF OF PARTY: Carl A. Annis YEAR: 1969 STATE: Hawaii COUNTY: Honolulu

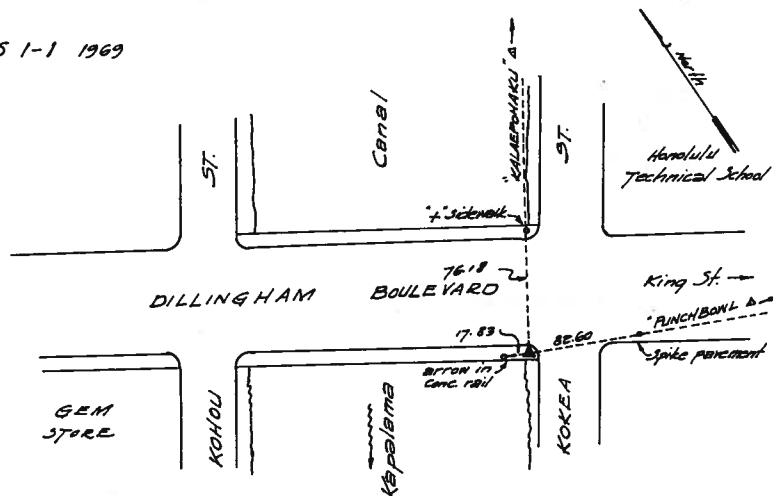
### Description, including sketch of object:

Station is located in Kapalama District, on the southwest side of Dillingham Boulevard, on bridge over the Kapalama Canal.

Station mark is a standard State Survey disk stamped "1-1 1969" cemented in drill hole in concrete sidewalk on seaward side of bridge, near the south bank of the Canal and Kokea Street. Ties from station are: NW 17.83 ft. to a cross in concrete rail of bridge, SE 82.60 ft. to spike in pavement of Dillingham Boulevard, both points being on line with "Punchbowl" Trig. Station, NE 76.18 ft. to a cross in concrete sidewalk across Dillingham Boulevard in line with "Kalaepohaku" Trig.

Geodimeter connection was made between "KALAEPONAHU 1927 1969" and State Survey 1-1 1969.

SS 1-1 1969



## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: STATE SURVEY 1-1

STATE: HAWAII

YEAR: 1969

SECOND

ORDER

SOURCE: G-14543

NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE:	21° 19' 30.24377	ELEVATION:	2	METERS
GEODETIC LONGITUDE:	157 52 32.94466	NO CHECK		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	$\theta$ (OR $\Delta$ $\phi$ ) ANGLE °
HI 3	5105	542,267.55	57,553.17	+ 0° 02' 43"

\* PLANE AZIMUTH HAS BEEN COMPUTED BY THE  $\theta$  (OR  $\Delta$   $\phi$ ) FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH* (From south)	CODE
KALAEPONAHU	232° 45' 10.1	232° 42' 27"	5103

POSITION DETERMINED BY TRAVERSE FROM STATION KALAEPONAHU

# HORIZONTAL CONTROL DATA

by the  
National Ocean Survey  
OLD HAWAIIAN DATUM

QUAD 211573 STATION 1125  
HAWAII  
LATITUDE 21° 00' TO 21° 30'  
LONGITUDE 157° 30' TO 158° 00'  
DIAGRAM NF 4-11 OAHU

## DESCRIPTION OF TRIANGULATION INTERSECTION STATION

NAME OF STATION: STATE SURVEY 1-3

CHIEF OF PARTY: Carl A. Annis YEAR: 1969 STATE: Hawaii COUNTY: Honolulu

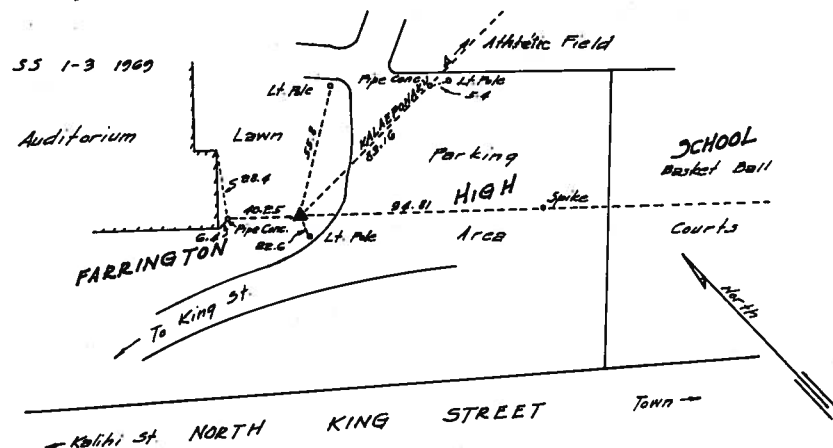
Description, including sketch of object:

Station is located in the Kalihi District at Wallace R. Farrington High School. To reach station from North King Street enter Auditorium entrance and turn right to parking area. Station is in lawn area between the rear south corner of Auditorium and curb of parking area. In order to conform with school regulations it is advisable to check in at the principal's office before occupying station.

Station mark is a standard State Survey disk stamped "1-3 1969" set in concrete monument flush with ground. Ties from station are: SW 22.60 ft. to light standard, NE 55.80 ft. to light standard, NW 40.25 ft. to pipe set in concrete and from said pipe 2.60 ft. to back wall of Auditorium, E 83.16 ft. to pipe set in concrete on line to "KALAEPOHAKU 1927 1969" and SE 94.81 ft. to a spike.

Sub-surface mark is identical with station mark, in concrete monument 3 feet below ground level and separated from top monument by a layer of sand.

Geodimeter connection was made between "KALAEPOHAKU 1927 1969" and State Survey "1-3 1969".



## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: STATE SURVEY 1-3

STATE: HAWAII

YEAR: 1969

SECOND

-ORDER

SOURCE: G-14543

NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE:	21° 19' 56.97113	ELEVATION:	13	METERS
GEODETIC LONGITUDE:	157 52 29.36500	NO CHECK		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	$\theta$ OR $\Delta$ OR ANGLE
HI 3	5103	542,603.86	60,250.20	+ 0° 02' 44"

\* PLANE AZIMUTH HAS BEEN COMPUTED BY THE  $\theta$  OR  $\Delta$  OR FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH (From south)	CODE
KALAEPOHAKU	266° 40' 03.9	266° 37' 20"	5103

POSITION DETERMINED BY TRAVERSE FROM STATION KALAEPOHAKU

JUN 1978  
U. S. DEPARTMENT OF COMMERCE  
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION  
NATIONAL OCEAN SURVEY, NATIONAL GEODETIC SURVEY

## HORIZONTAL CONTROL DATA

by the  
National Ocean Survey  
OLD HAWAIIAN DATUM

QUAD 211573 STATION 1126  
HAWAII  
LATITUDE 21 ° 00' TO 21 ° 30'  
LONGITUDE 157 ° 30' TO 158 ° 00'  
DIAGRAM NF 4-11 OAHU

### DESCRIPTION OF TRIANGULATION INTERSECTION STATION

NAME OF STATION: HONOLULU MALUHIA HOSP FLAGPOLE

CHIEF OF PARTY: Carl A. Annis YEAR: 1969 STATE: Hawaii COUNTY: Honolulu

Description, including sketch of object:

Located in the 1000 block of Hala Drive in Honolulu, about 150 yards east of triangulation station KALAEPOHAKU. The point intersected is the flagpole on top of the elevator shaft.

FORM C&GS-525b (12-68)  
USCOMMA-DC 36290-P68

Described by \_\_\_\_\_  
U.S. DEPARTMENT OF COMMERCE  
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION  
NATIONAL OCEAN SURVEY, NATIONAL GEODETIC SURVEY

### ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: HONOLULU MALUHIA HOSP FLAGPOLE

STATE: HAWAII

YEAR: 1969

THIRD

-ORDER

SOURCE: G-14543

GEODETIC LATITUDE:	21 ° 19 '56.52939	ELEVATION:	METERS
GEODETIC LONGITUDE:	157 51 50.19815		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	S FOR Δ S1 ANGLE *
HI 3	5103	546,306.77	60,249.06	+ 0 ° 02 '58 "

\* PLANE AZIMUTH HAS BEEN COMPUTED BY THE S FOR Δ S1 FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH * (From south)	CODE

QG 126

JUN 1978  
U.S. DEPARTMENT OF COMMERCE  
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION  
NATIONAL OCEAN SURVEY, NATIONAL GEODETIC SURVEY

# HORIZONTAL CONTROL DATA

by the  
National Ocean Survey  
OLD HAWAIIAN DATUM

QUAD 211573 STATION 1127  
HAWAII  
LATITUDE 21° 00' TO 21° 30'  
LONGITUDE 157° 30' TO 158° 00'  
DIAGRAM NF 4-11 OAHU

DEPARTMENT OF COMMERCE  
U.S. COAST AND GEODETIC SURVEY  
Form 532  
Rev. Aug. 1963

## DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: HAWAII ASTRO IGY STATE: Hawaii COUNTY: Honolulu

CHIEF OF PARTY: R. A. Taylor YEAR: 1957 Described by: R. A. Taylor  
HEIGHT OF TELESCOPE ABOVE STATION MARK 1.5 METERS. HEIGHT OF LIGHT ABOVE STATION MARK 3 METERS.

NOTE*	HEIGHT OF TELESCOPE ABOVE STATION MARK	HEIGHT OF LIGHT ABOVE STATION MARK	DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION			
			OBJECT	BEARING	DISTANCE	DIRECTION
1a	Surface-station mark					
7a	Underground-station mark					
			HAWAII BARREL			
			RM 1	S	91.52	27.895 0 00 00.0
11a			RM 2	W	80.60	24.568 160 34 06
deso.						258 04 31

The station is about 5 miles northeast of the center of Honolulu, 3.8 miles east northeast of the entrance to Pearl Harbor, 0.5 miles southwest of Salt Lake, about 150 yards southeast of the intersection of Salt Lake Blvd. and Radford Drive on property leased from the Navy by the Pearl Harbor Memorial Christian Church.

Station mark is a standard disk set in a concrete post stamped HAWAII ASTRO IGY 1957. It is located 157 feet south of a high mesh east-west fence running parallel with Salt Lake Blvd., 55 feet east of a sidewalk running between two Quonset Huts, 41 feet east of a power pole, 15 feet south of a small shade tree, 10 feet west of the edge of a bluff, and 6 feet west of a mesh north-south fence.

Reference Mark No. 1 is a standard disk set in a concrete post stamped HAWAII ASTRO IGY 1957 RM 1. It is 75 feet southeast of the southern end of a sidewalk, 66 feet east of the east edge of a driveway of a Quonset Hut, 47 feet north of a mesh east-west fence, 6 feet west of the edge of a bluff, and 2 feet west of a mesh north-south fence.

Reference Mark No. 2 is a standard disk set in a drilled hole in the sidewalk and is stamped HAWAII ASTRO IGY 1957 RM 2. It is 51 feet south of the entrance to a Quonset Hut, 51 feet north of the south end of the sidewalk, 9 feet southwest of a 12 inch tree, and 4 inches from the easterly edge of the sidewalk.

## RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: HAWAII ASTRO IGY  
ESTABLISHED BY: E.A. Taylor YEAR: 1957 STATE: Hawaii  
RECOVERED BY: W.R. Porter YEAR: 1963 COUNTY: Honolulu

HEIGHT OF TELESCOPE ABOVE STATION MARK 1.5 METERS. HEIGHT OF LIGHT ABOVE STATION MARK METERS.  
DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION

OBJECT	BEARING	DISTANCE		DIRECTION
		FEET	METERS	
PUNCHBOWL 1873-1928				00 00 00.0
R.M. No. 1	SSW	91.488	27.885	73 20 48
R.M. No. 2	WNW	80.648	24.582	170 53 33

Station was recovered and all marks found in good condition. The old quonsets are gone, but the foundations remain. A new church building was built near the station in late 1963. The new building sets over the point occupied by the Markowitz Moom Telescope. A search was made at the point occupied by the Danjon Astrolabe but no mark could be found. A complete description follows:

Station is located about 5 miles airline northwest of the center of Honolulu, 0.3 mile west of the southwest corner of Salt Lake, along the southwest side of Salt Lake Blvd., about 400 feet southeast of its junction with Radford Drive, on a rise on west side of Aliamau School and

above the northeast corner of the Navy-Marine Golf Course, on property of the Pearl Harbor Memorial Christian Church.

(Continued on next page)

## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: HAWAII ASTRO IGY

STATE: HAWAII YEAR: 1957 FIRST ORDER

SOURCE: G-14543

GEODETIC LATITUDE	21° 20' 45.80994	ELEVATION:	28.1 METERS
GEODETIC LONGITUDE	157 55 08.23382		92 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	± 10R Δ 01 ANGLE
HI 3	5103	527,581.35	65,571.77	+ 0° 01' 46"

\* PLANE AZIMUTH HAS BEEN COMPUTED BY THE ± 10R Δ 01 FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH (From south)	CODE
KAHAUHIKI	254° 04' 20.4	254° 02' 34"	5103

THESE DATA OBTAINED FROM ADJUSTMENT OF NOV 1970

# HORIZONTAL CONTROL DATA

by the  
NATIONAL GEODETIC SURVEY  
OLD HAWAIIAN DATUM

QUAD 211573 STATION 1127

LATITUDE ° ' TO ° '  
LONGITUDE ° ' TO ° '  
DIAGRAM

HAWAII ASTRO IGY (Continued)

## RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: HAWAII ASTRO IGY  
ESTABLISHED BY: E.A. Taylor YEAR: 1957 STATE: Hawaii BENCH MARK ALSO ☐  
RECOVERED BY: C.A. Annis YEAR: 1969 COUNTY: Honolulu  
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: At the west edge of Honolulu  
HEIGHT OF TELESCOPE ABOVE STATION MARK 5 FEET. HEIGHT OF LIGHT ABOVE STATION MARK 4 FEET.

DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION				
OBJECT	BEARING	DISTANCE		DIRECTION
		FEET	METERS	
KAHAUHI				0 00 00.00
FORT SHAFER FLAGSTAFF 1909	E	(3 1/2 miles)	11 00	09.6
R.M.# 1	SSW	91.46	27.875	116 10 25
R.M.# 2	WNW	80.83	24.637	213 38 49

Station mark, reference marks 1 and 2 were recovered in good condition as described. With the exception of a slight difference in the measurement to reference mark 2. A complete description follows.

Station is located 5 miles northwest of the center of Honolulu, 0.3 mile west of the southwest corner of Salt Lake. Along the southwest side of Salt Lake Boulevard. On a rise on the west side of Aliamanu School. Just above the northeast corner of the Navy-Marine Golf Course. On property of the Pearl Harbor Memorial Christian Church.

To reach the station from the junction of Kamehameha Highway and Peltier Road, at the entrance to the U.S. Naval Reserve. Go westerly on Kamehameha Highway for 0.55 mile. Turn right, north, on Salt Lake Boulevard for 0.75 mile to the top of the rise and the junction of Radford Drive. Turn left, south on Radford Drive for 0.05 mile, to a side road on the left. Turn left on paved road, which leads to the church parking lot, for 0.05 mile to the parking lot and the station just ahead in the parsonage yard.

Station mark is a standard disk stamped HAWAII ASTRO IGY 1957. Set in the top of a 6-inch concrete cylinder which is 2 inches below the ground surface. It is 400 feet southeast of the junction of Radford Drive and Salt Lake Boulevard. 53.0 feet southeast of the northwest corner of the parsonage. 15.5 feet south of the southwest corner of the parsonage, and 9.0 feet northwest of a wire mesh fence.

Reference mark 1 is a standard disk stamped HAWAII ASTRO IGY RM 1 1957. Set in the top of a 6-inch concrete cylinder which projects 1 inch above the ground surface. It is 50 feet north of the southeast corner of the parsonage yard fence and 2.0 feet west of a wire mesh fence.

Reference mark 2 is a standard disk stamped HAWAII ASTRO IGY RM 2 1957. Cemented in a drill hole in the top of a concrete sidewalk. It is 49.0 feet north of the south end of the sidewalk. 39.0 feet west of the northwest corner of the parsonage and 36.5 feet south of the north end of the sidewalk.

No measurement was made between reference marks due to their location.

To reach station mark from the junction of Kamehameha Highway and Peltier Road at the entrance to the U.S. Naval Reserve, go westerly on the highway for 0.55 mile; turn right and follow Salt Lake Blvd. for 0.75 mile to top of rise and station in churchyard on left.

Station mark is a standard disk stamped "HAWAII ASTRO IGY 1957", set in the top of a 6-inch-diameter, concrete post about 1 inch below ground surface, in a lawn area. It is 45.7 feet northeast of old power pole, 35.4 feet north-northeast of a pipe swing frame, 10 feet west-northwest of wire-mesh fence, 178 feet south of north boundary fence of the churchyard, and 92.3 feet, in azimuth 186° 16', from the southeast corner of the church building.

Reference mark number one is a standard disk stamped "HAWAII ASTRO IGY RM 1 1957", set in the top of a 6-inch-diameter, concrete post flush with ground. It is in weeds, 2 feet west of fence, 50 feet north of fence corner, and about 2 feet lower than station mark.

Reference mark number two is a standard disk stamped "HAWAII ASTRO IGY RM 2 1957", cemented in a drill hole in the northeast edge of old sidewalk, 49.2 feet northwest from a hedge at end of sidewalk and about 3 feet higher than station mark.

\*Name of chief of party should be inserted here. The officer who actually visited the station should sign his name at the end of the recovery note.

NOTE - One of these forms must be used for every station recovered.

USCOMMA-DC 3717a-P88

# HORIZONTAL CONTROL DATA

by the  
National Ocean Survey  
OLD HAWAIIAN DATUM

QUAD 211573 STATION 1128  
HAWAII  
LATITUDE 21° 00' TO 21° 30'  
LONGITUDE 157° 30' TO 158° 00'  
DIAGRAM NF 4-11 OAHU

## NO ORIGINAL TEXT

**SALT LAKE** (Hawaii, Hawaiian Government Survey, 1873; J.H.P., 1928)--In the S part of Oahu, about 1/3 mile S of the main Honolulu-Schofield road, on the NE and highest part of the crater of Aliamau (Leilono), and a short distance W of the Heiau of Leilono. It is about 2 miles NW of Fort Shafter. The hill is easily recognized by a prominent scar or rock-slide seen on its E face from vicinity of Honolulu.

Station was marked originally by a granite post with cross in top, around which was later placed a concrete pier 6 feet square, extending 1 foot above ground, with 2-inch pipe set vertically in center over station. Re-marked in 1929 with Type A signal.

Reference marks were set in 1927. They are standard disk reference marks with arrows pointing toward station, wedged in drill holes in outcropping bedrock, are at the following distances and azimuths from station: No. 1, 13.874 meters (44.86 feet), 198°03'. No. 2, 21.533 meters (70.65 feet), 277°24'.

(C.K.G., 1932)--On the SW side of the top of a brush-covered conical hill 485 feet high, 1/2 mile N of Salt Lake, about 4-1/2 miles NW of Honolulu, 1/4 mile S of the highway to Aiea, just NE of Leilono Crater. The hill is the most conspicuous in the vicinity and the station is easily seen from the road. The hill is the property of the Government.

The station is marked according to Note 14A.

(B.H.R., 1942)--Station was destroyed by a construction gang of the U.S.E.D. The station was visited as soon as this office was informed and the monument, mark, and concrete platform had been smashed to pieces and were lying in a tangled mass. As soon as construction was completed a new mark (standard bronze disk) stamped "SALT LAKE" was established. Distances from both reference marks were taped and checked. In addition azimuths were computed treating RM<sub>2</sub> as an eccentric station. A theodolite was set up on RM<sub>2</sub> and station SALT LAKE was lined in.

Further description of the station at this time is not considered advisable due to war conditions. U.S.E.D., Territorial Surveyor's Office, and the U.S.C. & G.S. representatives are familiar with present location.

FORM 526a  
(9-5-56)

U. S. DEPARTMENT OF COMMERCE - COAST AND GEODETIC SURVEY  
RECOVERY NOTE, TRIANGULATION STATION

Name of Station: **SALT LAKE**  
Established By: H.G.S. Year: 1873 State: Hawaii  
Recovered By: W.R.P. Year: 1960 County: Honolulu

Detailed statement as to the fitness of the original description; including marks found, stampings, changes made, and other pertinent facts:

The station mark was recovered. Following is a new and complete description. The station is about 3 1/2 miles east and 3 miles north of the Pearl Harbor entrance, 3/4 mile north of Salt Lake. In the Aliamau Military Reservation, on Aliamau Crater summit, it is a 485 foot hill and is easily identified by a scar on the southeast slope.

To reach from the Tripler Army Hospital entrance, go northerly on State Highway 72 for 0.8 mile to a side road left and sign on the left "ALIAMAU MILITARY RESERVATION", turn left for 0.25 mile to gate and office, directions and keys to locked gates enroute to the station may be obtained.

(Continued on next page)

## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: **SALT LAKE**

STATE: **HAWAII**

YEAR: **1873**

FIRST

-ORDER

SOURCE: **G-14543**

GEODETIC LATITUDE:	21° 21' 55.34878	ELEVATION:	148.1 METERS
GEODETIC LONGITUDE:	157 54 39.14845		486 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ (OR Δ) ANGLE
HI 3	5103	530,326.88	72,589.69	+ 0 01' 57"

\* PLANE AZIMUTH HAS BEEN COMPUTED BY THE θ (OR Δ) FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH (From south)	CODE
214 USN KAHAUICI	74° 14' 24.1 275 57 33.8	74° 12' 27" 275 55 37	5103 5103

THESE DATA OBTAINED FROM ADJUSTMENT OF NOV 1970

QG 128



# HORIZONTAL CONTROL DATA

by the  
NATIONAL GEODETIC SURVEY  
OLD HAWAIIAN DATUM

QUAD 211573 STATION 1128  
LATITUDE ° ' TO ° '  
LONGITUDE ° ' TO ° '  
DIAGRAM

## SALT LAKE (Continued)

## RECOVERY NOTE, TRIANGULATION STATION

R

Station mark is a standard disk, stamped SALT LAKE 1873 1942, cemented in a drill hole in the top of Ammunition Bunker number 121. It is 13 feet south of the center of the door to the bunker.

Reference mark 3 is a standard disk, stamped SALT LAKE NO 3 1873 1942, cemented in a drill hole in outcropping bedrock. It is 47 feet southeast of the center of the door.

Reference mark 4 is a standard disk, stamped SALT LAKE NO 4 1873 1942, cemented in a drill hole in the west corner of the bunker. It is 22 feet west-southwest of the center of the door.

NAME OF STATION: SALT LAKE  
ESTABLISHED BY: H.G.S. YEAR: 1873 STATE: Hawaii BENCH MARK ALSO ☐  
RECOVERED BY: C. A. Annis YEAR: 1969 COUNTY: Honolulu  
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: 3/4 mile west of Tripler Hospital.  
HEIGHT OF TELESCOPE ABOVE STATION MARK 4.5 FEET. HEIGHT OF LIGHT ABOVE STATION MARK 4.0 FEET.

1960	OBJECT	BEARING	DISTANCE feet meters	DIRECTION 0 00 00.0
	246 Pearl Harbor, Ford Island, Control Tower, 1957	WSW	Approx. 3 miles	15 02 10.7
	RM 4	W	26.56 8.095	19 10 46
	RM 3	ESE	37.36 11.387	209 30 19

R

NAME OF STATION: SALT LAKE  
ESTABLISHED BY: HGS YEAR: 1873 STATE: Hawaii  
RECOVERED BY: W.R. Porter YEAR: 1963 COUNTY: Honolulu

HEIGHT OF TELESCOPE ABOVE STATION MARK 1.65 METERS. HEIGHT OF LIGHT ABOVE STATION MARK METERS.

DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION				
OBJECT	BEARING	DISTANCE		DIRECTION
		FEET	METERS	
HALAWA BARREL 1927				00 00 00.0
R.M. No. 2	E	70.645	21.533	62 25 05
R.M. No. 3	E	37.344	11.383	66 25 19
R.M. No. 4	W	26.518	8.084	236 02 50

Station mark and reference marks two, three, and four were recovered in good condition. Reference mark one apparently destroyed during construction on the hill. Although described in 1942 as marked with a standard disk, a conflicting report was found in the files at the Hawaii State Survey office, written by personnel who assisted in re-setting the station; following is a quote from it: "Type A monument built over station mark was destroyed by contractors. A temporary mark replaced by Lieut. Cdr. Riggs, USCGS, over roof of a concrete pillbox. A cross cut in concrete with roofing nail in center". This coincides with the 1952 recovery description which states that a cross was recovered. There is no definite report as to

when the station disk and reference marks three and four were established. A complete description follows:

Station is located on the north rim of Aliamanu Crater, about 1/2 mile north of Salt Lake, on the Aliamanu Military Reservation.

To reach station from Tripler Army Hospital entrance, go north on State Highway 72 for 0.8 mile to sign on left "ALIAMANU MILITARY RESERVATION", turn left and follow paved side road for 0.25 mile to guard gate. Permission and directions for reaching station may be obtained here.

Station mark is a standard disk stamped "SALT LAKE 1873 1942", cemented in a drill hole in the roof of a concrete pillbox; 11 feet northwest of a wooden antenna pole, 15.5 feet north-northwest of the southeast corner of the roof, and about 5 inches beneath dirt cover on roof.

Reference mark number two is a standard disk stamped "SALT LAKE NO 2", cemented in a drill hole in bedrock outcrop along ridge top, 2.7 feet north of power pole and 0.56 foot higher than station mark.

Reference mark number three is a standard disk stamped "SALT LAKE NO 3 1873 1942", cemented in a drill hole in bedrock flush with ground; 1 foot northwest of an iron pin, 29.3 feet southeast of the wooden antenna pole and 1 foot higher than station mark.

Reference mark number four is a standard disk stamped "SALT LAKE NO 4 1873 1942", cemented in a drill hole in the pillbox roof; 30 inches east-southeast of roof corner and 0.3 foot lower than station mark.

DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION				
OBJECT	BEARING	DISTANCE		DIRECTION
		FEET	METERS	
214 (USN) 1960				00 00 00.0
R.M. 4	W	26.53	8.089	16 47 27
R.M. 2	E	70.64	21.533	203 09 52
R.M. 3	E	37.35	11.382	207 10 03
Honolulu HNL Vortac	SW	( 8 1/2 miles )		357 09 44.1

Station mark, reference marks 2, 3 and 4 were recovered and found in good condition. Following is a new and complete description:

Station is located on the north rim of Aliamanu Crater, 3/4 mile west of the U.S. Army Tripler Hospital, 1/2 mile north of Salt Lake and on the Aliamanu Military Reservation.

To reach from the intersection of the entrance to Tripler Hospital and State Highway 72, go north on State Highway 72 for 0.8 mile to a sign on the left "Aliamanu Military Reservation". ( To get clearance and key to the station, turn left and follow paved road westerly for 0.25 mile to guard gate.) Continue on the highway for 0.35 mile to a side road and parking area on the left side of the highway, turn left, crossing the south bound lane of traffic and follow paved road around the north side of the parking area for 0.15 mile to a locked gate, pass through the gate and uphill on the narrow road for 0.35 mile to the end of the road just below the station and a concrete stairway leading to the top of the hill and the station.

Station mark is a standard disk, stamped SALT LAKE 1873 1942, cemented in a drill hole in the roof of a concrete pillbox. It is 27.0 feet east-northeast of the southwest corner of the pillbox, 15.5 feet north-northwest of the southeast corner of the pillbox and 11.0 feet northwest of a large antenna pole.

Reference mark 2 is a standard disk, stamped SALT LAKE NO 2, cemented in a drill hole in an outcrop which projects about 4 inches above the ground surface. It is 3.0 feet north of a light pole.

Reference mark 3 is a standard disk, stamped SALT LAKE NO 3 1873 1942, cemented in a drill hole in an outcrop which is flush with the ground surface. It is 30.0 feet west of a light pole and 29.0 feet east of the antenna pole.

Reference mark 4 is a standard disk, stamped SALT LAKE NO 4 1873 1942, cemented in a drill hole in the southwest corner of the roof of the concrete pillbox. It is 2.5 feet east-southeast of the southwest corner of the pillbox and about the same elevation as the station.

No measurement between reference marks due to location.

\* Name of chief of party should be inserted here. The person who actually visited the station should sign his name at the end of the recovery note.

FORM CGCS-326a (11-68)  
USCOMM-OC 30291-PSS

NOAA  
COAST AND GEODETIC SURVEY

(continued on next page)

JUN 1978  
 U.S. DEPARTMENT OF COMMERCE  
 NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION  
 NATIONAL OCEAN SURVEY, NATIONAL GEODETIC SURVEY

SALT LAKE (continued)

# HORIZONTAL CONTROL DATA

by the  
 NATIONAL GEODETIC SURVEY  
 OLD HAWAIIAN DATUM

QUAD 211573

STATION 1128

LATITUDE ° ' TO ° '  
 LONGITUDE ° ' TO ° '  
 DIAGRAM

## RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: SALT LAKE  
 ESTABLISHED BY: H.G.S. YEAR: 1873, STATE: Hawaii BENCH MARK ALSO ☐  
 RECOVERED BY: J.L. Cook YEAR: 1973 COUNTY: Honolulu  
 AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: 3/4 mile west of Tripler Hospital  
 HEIGHT OF TELESCOPE ABOVE STATION MARK 5.6 FEET. HEIGHT OF LIGHT ABOVE STATION MARK 5.2 FEET.

DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION				
OBJECT	BEARING	DISTANCE		DIRECTION
		FEET	METERS	
SAT				0 00 00.0"
R.M. 4	W	26.53	8.086	158 54 50
R.M. 3	E	37.35	11.385	349 17 49

The station mark, reference marks 3 and 4 were recovered in good condition and as described in the 1969 Recovery Note by C.A.A. The distances and directions to reference marks 3 and 4 checked favorably. Reference mark 2 has been lost. The 1969 route to the station is adequate, however, there is extensive road construction in the immediate area of the station hill and upon completion a new route to the station will be required. The station is on a hill locally known as Red Hill.

\* Name of chief of party should be inserted here. The person who actually visited the station should sign his name at the end of the recovery note.

NOAA FORM 75-96 SUPERSEDES CGS FORM 528A WHICH MAY BE USED.  
 (11-72)

U.S. DEPARTMENT OF COMMERCE  
 NOAA  
 ☆ U. S. GOVERNMENT PRINTING OFFICE 1972: 760-439

# HORIZONTAL CONTROL DATA

by the  
National Ocean Survey  
OLD HAWAIIAN DATUM

QUAD 211573 STATION 1129  
HAWAII  
LATITUDE 21 ° 00' TO 21 ° 30'  
LONGITUDE 157 ° 30' TO 158 ° 00'  
DIAGRAM NF 4-11 OAHU

## DESCRIPTION OF TRIANGULATION INTERSECTION STATION

NAME OF STATION: STATE SURVEY 1-2

CHIEF OF PARTY: Carl A. Annis YEAR: 1969 STATE: Hawaii COUNTY: Honolulu

Description, including sketch of object:

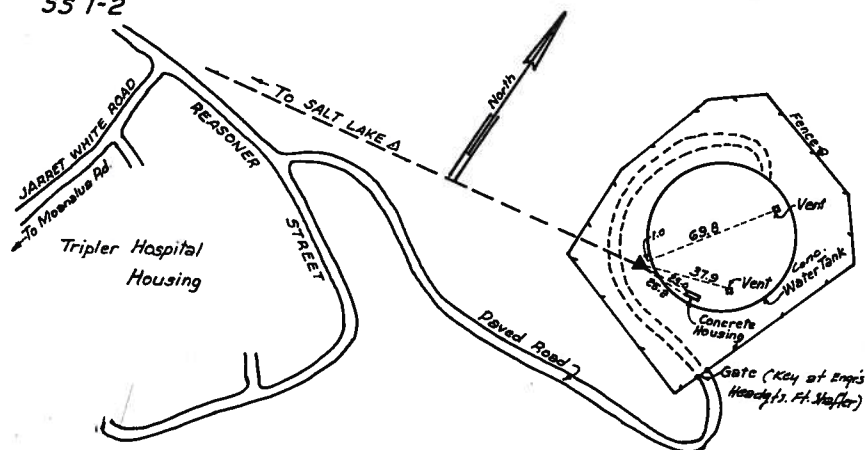
Station is located in Moanalua, above staff housing of U.S. Army Tripler Hospital, at ground level water tank.

To reach station from entrance to hospital at Moanalua Road, follow Jarrett White Road for 1.2 miles to Reasoner Street, turn right on Reasoner for 0.10 mile and left on paved road for 0.20 mile to locked gate of tank site area. Permission and key to enter area may be obtained from Engr. Headquarters at Ft. Shafter. Drive to southwest side of tank and station on right of road.

Station mark is a standard State Survey disk stamped "1-2 1969" in concrete monument flush with ground level and 1-foot from southwest side of circular concrete water tank. The tank is sunken in ground, its top side being about the same elevation as station. Ties from station are: NE 69.8 ft. to middle of north tank vent, 37.9 ft. to nearest corner of northeast tank vent, 25.0 ft. and 25.2 ft, respectively to nearest corners of concrete housing with metal cover.

Sub-surface mark is identical with station mark, in concrete monument, 2.2 ft. below ground level and separated from top monument by a layer of sand. Geodimeter connection was made between "SALT LAKE 1873 1942" and State Survey "1-2 1969"

55 1-2



## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: STATE SURVEY 1-2

STATE: HAWAII

YEAR: 1969

SECOND

-ORDER

SOURCE: G-14543

NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE:	21 ° 22' 07.19571	ELEVATION:	241	METERS
GEODETIC LONGITUDE:	157 52 58.28307	NO CHECK		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ θ: ANGLE °
HI 3	5103	539,860.10	73,387.70	+ 0° 02' 34"

\* PLANE AZIMUTH HAS BEEN COMPUTED BY THE θ OR Δ θ: FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH* (From south)	CODE
SALT LAKE	85° 15' 27.8"	85° 12' 54"	5103

POSITION DETERMINED BY TRAVERSE FROM STATION SALT LAKE

# HORIZONTAL CONTROL DATA

by the  
National Ocean Survey  
OLD HAWAIIAN DATUM

QUAD 211573 STATION 1130  
HAWAII  
LATITUDE 21 ° 00' TO 21 ° 30'  
LONGITUDE 157 ° 30' TO 158 ° 00'  
DIAGRAM NF 4-11 OAHU

## DESCRIPTION OF TRIANGULATION INTERSECTION STATION

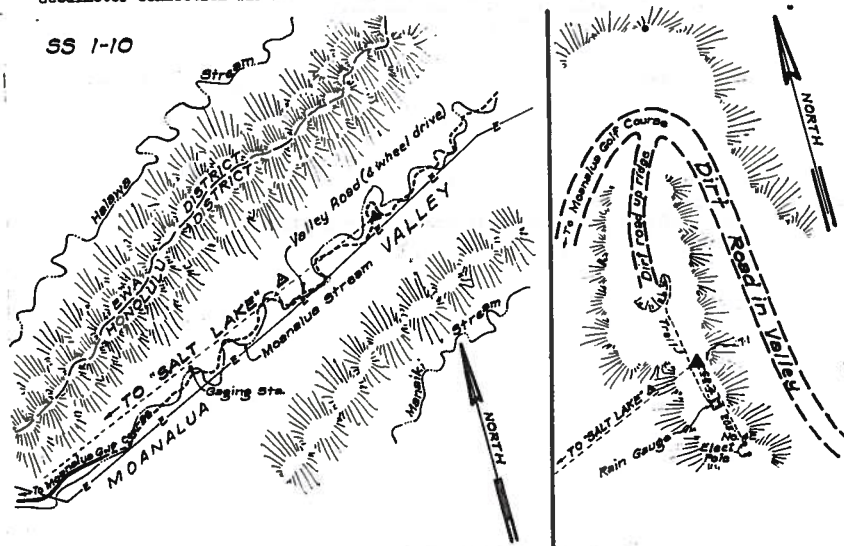
NAME OF STATION: STATE SURVEY 1-10 GUAVA

CHIEF OF PARTY: Carl A. Annis YEAR: 1969 STATE: Hawaii COUNTY: Honolulu

### Description, including sketch of object:

Station is located in upper Moanalua Valley, on ridge at southeast side of valley road and stream. To reach station from the intersection of Moanalua Road and the entrance road to Tripler Hospital, go northwest along Moanalua Road for 0.53 mile and turn right into Ala Aolani and go northeast along the Moanalua Golf Course on the left and continue thru residential subdivision to upper limits and locked gate. Arrange for entrance with Damon Estate caretaker in Moanalua. Follow valley track road, which is very rough and requires a four-wheel drive vehicle, for 2.1 miles and turn right up spur ridge track road a short distance to end. Pack a short distance up ridge and along trail to station on left and below rain-gauge shed.

Station mark is a standard State Survey disk stamped "1-10 1969" in concrete monument. The mark was placed in the center of a three-fourths inch pipe in concrete, marking the State Highways Division station "Guava" and reinforced with concrete. 1-foot square and projecting about 6-inches above ground level. Station is 7-feet southwest from northeast edge of ridge and 62.8 feet from corner of rain-gauge shed and 205 feet from Elect. Pole 42, both being on higher part of ridge. Geodimeter connection was made between "SALT LAKE 1873 1942" and State Survey 1-10 1969.



## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: STATE SURVEY 1-10 GUAVA

STATE: HAWAII

YEAR: 1969

SECOND

ORDER

SOURCE: G-14543

GEODETIC LATITUDE:	21 ° 23 ' 11.28780	ELEVATION:	188	METERS
GEODETIC LONGITUDE:	157 51 38.70359	NO CHECK		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	B OR Δ or ANGLE °
HI 3	5103	547,376.13	79,860.72	+ 0 05 03

\* PLANE AZIMUTH HAS BEEN COMPUTED BY THE B OR Δ or FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH (From south)	CODE
SALT LAKE	66 ° 57 ' 13.9	66 ° 54 ' 11	5103

POSITION DETERMINED BY TRAVERSE FROM STATION SALT LAKE

AND CHECKED BY ADDITIONAL OBSERVATIONS

# HORIZONTAL CONTROL DATA

by the  
National Ocean Survey  
OLD HAWAIIAN DATUM

QUAD 211573 STATION 1131  
HAWAII  
LATITUDE 21° 00' TO 21° 30'  
LONGITUDE 157° 30' TO 158° 00'  
DIAGRAM NF 4-11 OAHU

## DESCRIPTION OF TRIANGULATION INTERSECTION STATION

NAME OF STATION: STATE SURVEY 9-23

CHIEF OF PARTY: Carl A. Annis YEAR: 1969 STATE: Hawaii COUNTY: Honolulu

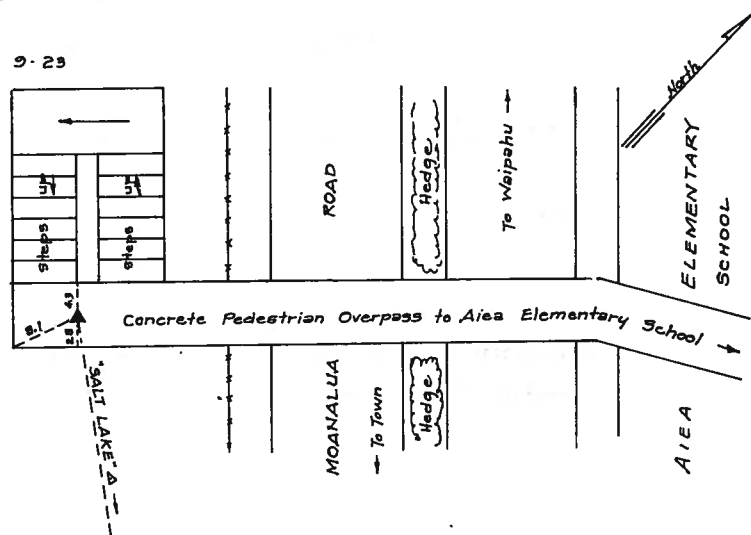
Description, including sketch of object:

Station is located in the District of Aiea, on road overpass adjacent to Aiea Elementary School.

Station mark is standard State Survey disk stamped "9-23 1969" cemented in drill hole in middle of walkway, at the westerly end of concrete pedestrian overpass across Moanalua Road. Ties from station are: SE 2.8 ftl to edge of walkway, S 8.1 ft. to SW corner of overpass and NW 4.3 to corner of landing and steps leading to ground.

Geodimeter connection was made between "SALT LAKE 1873 1942" and State Survey 9-23.

55 9-23



## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: STATE SURVEY 9-23

STATE: HAWAII

YEAR: 1969

SECOND

-ORDER

G-14543

SOURCE: NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE:	21° 22' 41.87124	ELEVATION:	27	METERS
GEODETIC LONGITUDE:	157 55 54.18891	NO CHECK		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	$\theta$ OR $\Delta$ OR ANGLE*
HI 3	5103	523,232.20	76,876.65	+ 0° 01' 30"

\* PLANE AZIMUTH HAS BEEN COMPUTED BY THE  $\theta$  OR  $\Delta$  OR  $\theta$  FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH* (From south)	CODE
SALT LAKE	301° 10' 02.2"	301° 08' 33"	5103

POSITION DETERMINED BY TRAVERSE FROM STATION SALT LAKE

QG 131

JUN 1978  
U. S. DEPARTMENT OF COMMERCE  
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION  
NATIONAL OCEAN SURVEY, NATIONAL GEODETIC SURVEY

# HORIZONTAL CONTROL DATA

by the  
National Ocean Survey  
OLD HAWAIIAN DATUM

QUAD 211573 STATION 1132  
HAWAII  
LATITUDE 21 ° 00' TO 21 ° 30'  
LONGITUDE 157 ° 30' TO 158 ° 00'  
DIAGRAM NF 4-11 OAHU

See Station SALT LAKE

## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: STATE SURVEY 9-24

STATE: HAWAII

YEAR: 1969

SECOND

ORDER

SOURCE: G-14543  
NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE:	21 ° 22 ' 19 . 98488	ELEVATION:	59	METERS
GEODETIC LONGITUDE:	157 54 52.98220	NO CHECK		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	$\theta$ OR $\Delta$ OR ANGLE °
HI 3	5103	529,018.19	74,671.14	+ 0 ° 01' 52"

\* PLANE AZIMUTH HAS BEEN COMPUTED BY THE  $\theta$  OR  $\Delta$  OR FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH * (From south)	CODE
SALT LAKE	327 ° 52 ' 18 . 6	327 ° 50 ' 27 "	5103

POSITION DETERMINED BY TRAVERSE FROM STATION SALT LAKE

QG 132

# HORIZONTAL CONTROL DATA

by the  
National Ocean Survey  
OLD HAWAIIAN DATUM

QUAD 211573 STATION 1133  
HAWAII  
LATITUDE 21° 00' TO 21° 30'  
LONGITUDE 157° 30' TO 158° 00'  
DIAGRAM NF 4-11 OAHU

**Halawa barrel (Oahu Island, L. G. Simmons, 1927).**—In southern Oahu, 2½ miles east-northeast of Aiea, at upper end of first ridge southeast of and running parallel to North Halawa Gulch. Station can be approached within ¼ mile by truck. The road which leads up this ridge turns north off the main road just below the junction of the north and south Halawa Gulches where the combined gulch intersects the road. Marked according to note 6a, standard disk station mark in concrete in tile. Reference marks, note 13a, standard reference disks in concrete in tiles, were set at the following distances and azimuths from the station: No. 1, 4.389 meters (14.40 feet), 148° 38'; No. 2, 8.399 meters (27.56 feet), 48° 09'. Re-marked according to note 14A in 1929.

NAME OF STATION: **HALAWA BARREL**  
ESTABLISHED BY: **L.G.S.** YEAR: 1927 STATE: **Hawaii**  
RECOVERED BY: **E.A.T.** YEAR: 1958 COUNTY: **Honolulu**

Detailed statement as to the fitness of the original description, including marks found, stampings, changes made, and other pertinent facts:

Station recovered as described.

To reach the station from the intersection of Kam Highway and Puuloa Road located between the city of Honolulu and Pearl Harbor, go northerly on Puuloa Road for 1.0 mile to a T intersection and North King Street. Turn left, and go westerly on North King Street for 2.2 miles to a side road right. Turn right, temporarily doubling back on main traveled paved road for 1.3 miles to the Clark Halawa Rock Co. Ltd. Continue through the company grounds and head northeasterly on a gravel road to the company borrow pit. A Jeep trail begins at the borrow pit and ends at the station site. The trail is badly washed out in two places should not be traveled without a four-wheel drive vehicle.

NAME OF STATION: **HALAWA BARREL**  
ESTABLISHED BY: **L.G.S.** YEAR: 1927 STATE: **Hawaii**  
RECOVERED BY: **W.R. Porter** YEAR: 1963 COUNTY: **Honolulu**

HEIGHT OF TELESCOPE ABOVE STATION MARK **2.6** METERS. HEIGHT OF LIGHT ABOVE STATION MARK METERS.  
DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION

OBJECT	BEARING	DISTANCE		DIRECTION
		FEET	METERS	
PUNCHBOWL 1873-1928	—1927	DISTANCES AND DIRECTIONS		00 00' 00.0"
SALT LAKE 1873-1927				60 40 01.3 "
R.M. No. 2		27.56	8.399	73 49 32 "
R.M. No. 1		14.40	4.389	172 16 32 "
		—1963		
SALT LAKE 1873-1928		DISTANCES AND DIRECTIONS		60 40 02 "
R.M. No. 2	SW	27.771	8.466	74 10 00 "
R.M. No. 1	NW	14.275	4.352	172 15 39 "

Station was recovered in good condition. The differences in distances to the reference marks were noted and were double checked in the field; the 1963 distances are correct. Reference mark number two projects from the ground excessively and leans slightly, which might be the reason for the difference in azimuth and distance. The arrow on this mark points about 45 degrees east of station mark. A complete description follows:

Station is located, airline, 2-1/2 miles east-northeast of Aiea, 2 miles north of Tripler Army Hospital, and 1-1/2 miles northeast of the Pacific Cement & Aggregates Co. quarry, on a knoll of 1157 feet elevation covered with 35-foot-high, eucalyptus trees, along the ridge at the southeast side of North Halawa Stream, at end of a track road and start of Halawa Trail, and about 1/4 mile northeast of 2 large, high-tension lines that cross the ridge in a northwest-southeast direction.

To reach station from the First National Bank in Aiea, go easterly on Moanalua Rd. for 1.3 miles; turn left at sign "HALAWA VALLEY POWDER MAGAZINE", and go 0.5 mile to quarry office on left. Continue ahead 50 yards to side road left, just after passing through gate. Turn left and follow main road through plant for 0.6 mile to fork about 150 yards west of silver, water tank. Turn left and go upgrade for 0.25 mile; turn sharp right and follow main track road upgrade and then along top of ridge for 1.6 miles to the northerly 1 of the 2 high-tension lines. Continue on dim track road for 0.15 mile to station at end of road. (NOTE: 4-wheel-drive vehicle required for last 0.15 mile).

(Continued on next page)

## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: **HALAWA BARREL**

STATE: **HAWAII**

YEAR: **1927**

FIRST

—ORDER

SOURCE: **G-14543**

GEODETIC LATITUDE: <b>21° 23' 32.98496</b>	ELEVATION: <b>352</b> METERS
GEODETIC LONGITUDE: <b>157 53 29.17652</b>	NO CHECK

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	SIDE OR ANGLE
HI 3	5103	536,934.12	82,041.73	+ 0° 02' 23"

\* PLANE AZIMUTH HAS BEEN COMPUTED BY THE SINE FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH (From south)	CODE
SALT LAKE	34° 59' 39.1	34° 57' 16"	5103

THESE DATA OBTAINED FROM ADJUSTMENT OF NOV 1970  
POSITION DETERMINED BY TRAVERSE FROM STATION SALT LAKE  
AND CHECKED BY ADDITIONAL OBSERVATIONS

QG 133

JUN 1978  
U.S. DEPARTMENT OF COMMERCE  
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION  
NATIONAL OCEAN SURVEY National Geodetic Survey

## HORIZONTAL CONTROL DATA

by the  
NATIONAL GEODETIC SURVEY  
OLD HAWAIIAN DATUM

QUAD 211573 STATION 1133

LATITUDE ° ' TO ° '  
LONGITUDE ° ' TO ° '  
DIAGRAM

### HALAWA BARREL (Continued)

Station mark is a standard disk stamped "HALAWA BARREL 1927", set in the top of a 5-inch, iron pipe filled with cement and projecting 5 inches. It is 9 feet southeast of 2 Forest Service sign-boards, 5.8 feet north of a lone, metal post and 3-1/2 feet northeast of the end post of an old wire fence line. A "Type A", Hawaiian Territorial Survey signal is centered over the mark.

Reference mark number one is a standard disk stamped "HALAWA BARREL NO 1", set in the top of a 5-inch, iron pipe filled with cement and projecting 4 inches. It is 3 feet southeast of a 2-foot tree, 16 feet southwest of a trail, under old fence line, and about 1-1/2 feet lower than station mark.

Reference mark number two is a standard disk stamped "HALAWA BARREL NO 2", set in the top of a 5-inch, iron pipe that is filled with cement and projects 18 inches. It is 4 feet northwest of edge of road, 6 feet southeast of fence line, and 2 feet lower than station mark.

### RECOVERY NOTE, TRIANGULATION STATION TRAVERSE

R

NAME OF STATION: HALAWA BARREL  
ESTABLISHED BY: L.G.S. / YEAR: 1927 / STATE: Hawaii / BENCH MARK(S) ALSO ☐  
RECOVERED BY: C.A.A. / YEAR: 1969 / COUNTY: Honolulu  
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: 2 1/2 miles east-northeast of Aiea

Detailed statement as to the fitness of the original description; including marks found, stampings, changes made, and other pertinent facts:

The station mark and reference marks 1 and 2 were recovered as described, and in good condition.

The distance and direction to reference marks 1 and 2 were not checked at the present time.

A Geodimeter Traverse was made between HALAWA BARREL 1927 and SALT LAKE 1873 1942.

Geodimeter distance 3515.099 meters or (11,532.34 ft.)



# HORIZONTAL CONTROL DATA

by the  
National Ocean Survey  
OLD HAWAIIAN DATUM

QUAD 211573 STATION 1134  
HAWAII  
LATITUDE 21° 00' TO 21° 30'  
LONGITUDE 157° 30' TO 158° 00'  
DIAGRAM NF 4-11 OAHU

FORM 525  
(8-18-69)

U.S. DEPARTMENT OF COMMERCE  
COAST AND GEODETIC SURVEY

## DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: LIKINI STATE: Hawaii COUNTY: Honolulu  
CHIEF OF PARTY: C.A. Annis YEAR: 1969 DESCRIBED BY: L.B. Gittings

NOTE*	HEIGHT OF TELESCOPE ABOVE STATION MARK 1.6 METERS.†	HEIGHT OF LIGHT ABOVE STATION MARK 1.4 METERS.	DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION			
			BEARING	DISTANCE		DIRECTION‡
DESC	SURFACE-STATION MARK	UNDERGROUND-STATION MARK		FEET	METERS	
	AIRPORT					0 00 00.0
desc	R.M. 1		W	20.16	6.144	121 22 28
desc	R.M. 2		N	20.33	6.196	198 03 01
	HONOLULU INTNL ARP BN (NEW)		SSE	(2 miles)		342 40 42.5
	R.M. 1 to R.M. 2	1964		25.12	7.655	

Detailed description:  
The station is located about 5 miles northwest of the Aloha Tower in Honolulu, 2 miles north of Honolulu International Airport and 1-1/4 miles west of Salt Lake on the top of a concrete water reservoir. To reach the station from the junction of State Highway 99 and Salt Lake Boulevard near Honolulu International Airport, go northerly on Salt Lake Boulevard for 0.3 mile to a "T" road. Turn left, following Salt Lake Boulevard, for 1.35 miles to Maluna Street. Turn right on Maluna Street for 0.1 mile to Likini Street. Turn right on Likini Street for 0.05 mile to a drive way on the right and gate leading to a concrete water reservoir and the station on the top of the reservoir. The station mark is a standard disk, stamped LIKINI 1969, cemented in a drill hole in the concrete top of the reservoir. It is 73.9 feet south of the top of the ladder, 35.4 feet southwest of the center of a door leading into a cupola, 8 feet east of the edge of the reservoir and 1 inch below the tarred surface of the reservoir top. Reference mark 1 is a standard disk, stamped LIKINI NO 1 1969, cemented in a drill hole in the southwest edge of the reservoir and projects 2 feet above the tarred surface of the top. Reference mark 2 is a standard disk, stamped LIKINI NO 2 1969, cemented in a drill hole in the top of the southern one of five air vents, and projects 1.4 feet above the tarred surface. No azimuth mark was established for this station.

## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: LIKINI  
STATE: HAWAII YEAR: 1969 FIRST ORDER

SOURCE: G-14543

GEODETIC LATITUDE:	21° 21' 14.41419	ELEVATION:	55.6 METERS
GEODETIC LONGITUDE:	157 55 38.22103		182 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	§ OR Δ §1 ANGLE °
HI 3	5103	524,745.44	68,052.54	+ 0° 01' 35"

\* PLANE AZIMUTH HAS BEEN COMPUTED BY THE § OR Δ §1 FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH* (From south)	CODE
AIRPORT	4° 04' 35.7	4° 03' 00"	5103

QG 134

\*Refers to notes in manuals of triangulation and state publications of triangulation. †Direction-angle measured clockwise, ref. .0 initial station.  
‡To nearest meter only, when no trigonometric leveling is being done.

# HORIZONTAL CONTROL DATA

by the  
National Ocean Survey  
OLD HAWAIIAN DATUM

QUAD 211573 STATION 1135  
HAWAII  
LATITUDE 21° 00' TO 21° 30'  
LONGITUDE 157° 30' TO 158° 00'  
DIAGRAM NF 4-11 OAHU

## DESCRIPTION OF TRIANGULATION INTERSECTION STATION

NAME OF STATION: STATE SURVEY 9-25

CHIEF OF PARTY: Carl A. Annis YEAR: 1969 STATE: Hawaii COUNTY: Honolulu

Description, including sketch of object:

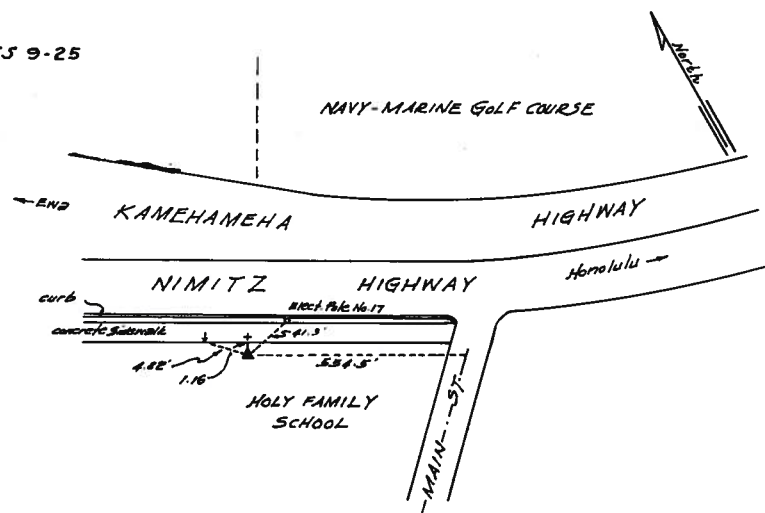
Station is located on the southside of Nimitz Highway, about 0.80 mile west from the northwest entrance of Honolulu International Airport, 554 ft. west of the centerline of Main Street and on the north side of the Holy Family School.

Station mark is a standard State Survey disk stamped "9-25 1969" set in concrete monument flush with ground and 0.80 ft. south from south edge of concrete sidewalk. Ties from station are: N. 1.16 ft. to cross in sidewalk, W. 4.82 ft. to arrow in south edge of sidewalk and NE 41.3 ft. to face of Elect. Pole No. 17.

Underground mark is identical, set in concrete monument, 2.2 ft. below ground level and separated from surface monument by a layer of sand.

Geodimeter connection was made between LIKINI 1969 and State Survey 9-25.

SS 9-25



## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: STATE SURVEY 9-25

STATE: HAWAII

YEAR: 1969

SECOND

-ORDER

G-14543

NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE:	21° 20' 34.67916	ELEVATION:	7.54 METERS
GEODETIC LONGITUDE:	157° 55' 58.05633		24.7 FEET

STATE COORDINATES (First)				
STATE & ZONE	CODE	X	Y	$\phi$ OR $\Delta$ OR ANGLE *
HI 3	5103	522,872.16	64,042.87	+ 0° 01' 28"

\* PLANE AZIMUTH HAS BEEN COMPUTED BY THE  $\phi$  OR  $\Delta$  OR  $\phi$  FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH * (From south)	CODE
LIKINI	205° 03' 49.7	205° 02' 22"	5103

POSITION DETERMINED BY TRAVERSE FROM STATION LIKINI

QG 135

# HORIZONTAL CONTROL DATA

by the  
National Ocean Survey  
OLD HAWAIIAN DATUM

QUAD 211573 STATION 1136  
HAWAII  
LATITUDE 21° 00' TO 21° 30'  
LONGITUDE 157° 30' TO 158° 00'  
DIAGRAM NF 4-11 OAHU

NO ORIGINAL TEXT

Form 525  
(11-6-65)

U. S. DEPARTMENT OF COMMERCE - COAST AND GEODETIC SURVEY  
RECOVERY NOTE, TRIANGULATION STATION  
INTERSECTION

NAME OF STATION: Honolulu, Moanalua Water Tank  
ESTABLISHED BY: Ter. of Haw. YEAR: 1957 STATE: Hawaii  
RECOVERED BY: D.G. Rushford YEAR: 1964 COUNTY: Honolulu

Detailed statement as to the fitness of the original description; including marks found, stampings, changes made, and other pertinent facts:

Station was identified by angle check from station EWA CHURCH, and recovered. Located about 5 miles northwest of center of Honolulu and 1 mile west of Salt Lake; along the southwest side of Salt Lake Blvd. and in the south angle of the intersection of Maluna Street and Salt Lake Blvd., on a prominent rise. Station is a modernistic, elevated, water tank, 70 feet high and painted dark green. It is southwest across the Boulevard from a large, tan, concrete, water reservoir.



\* Name of ship at survey should be inserted here. The officer who actually visited the station should sign his name at the end of the statement.

INTERSECTION  
RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: HONOLULU MOANALUA WATER TANK  
ESTABLISHED BY: Ter. of Haw. YEAR: 1957 STATE: Hawaii BENCH MARK(S) ALSO ☐  
RECOVERED BY: Carl A. Annis YEAR: 1969 COUNTY: Honolulu  
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN:

Detailed statement as to the fitness of the original description; including marks found, stampings, changes made, and other pertinent facts:

Intersection station recovered in good condition as described.

FORM 525-525 (11-6-65)  
USCOMM-DC 26496-P66

U. S. DEPARTMENT OF COMMERCE  
ENVIRONMENTAL SCIENCE SERVICES ADMINISTRATION  
COAST AND GEODETIC SURVEY

## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: HONOLULU MOANALUA WATER TANK  
STATE: HAWAII YEAR: 1957 THIRD ORDER

SOURCE: Q-14543

GEODETIC LATITUDE: 21° 21' 13.39609	ELEVATION: METERS
GEODETIC LONGITUDE: 157° 55' 40.53512	FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	$\phi$ OR $\Delta$ OR ANGLE
HI 3	5103	524,526.74	67,950.11	+ 0° 01' 35"

\* PLANE AZIMUTH HAS BEEN COMPUTED BY THE  $\phi$  OR  $\Delta$  OR FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH (From south)	CODE

THESE DATA OBTAINED FROM ADJUSTMENT OF OCT 1971

QG 136

JUN 1978  
U. S. DEPARTMENT OF COMMERCE  
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION  
NATIONAL OCEAN SURVEY, NATIONAL GEODETIC SURVEY

# HORIZONTAL CONTROL DATA

by the  
National Ocean Survey  
OLD HAWAIIAN DATUM

QUAD 211573 STATION 1137  
HAWAII  
LATITUDE 21° 00' TO 21° 30'  
LONGITUDE 157° 30' TO 158° 00'  
DIAGRAM NF 4-11 OAHU

## DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: AIRPORT STATE Hawaii COUNTY: Honolulu  
CHIEF OF PARTY: G. A. Annis YEAR: 1969 DESCRIBED BY: G. D. Banks

NOTE:	HEIGHT OF TELESCOPE ABOVE STATION MARK	HEIGHT OF LIGHT ABOVE STATION MARK	METERS.	DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION
1b	SURFACE-STATION MARK			
7a	UNDERGROUND-STATION MARK			
	OBJECT	BEARING	DISTANCE FEET METERS	DIRECTION
11b	EWA BEACH	NW	87.69 26.730	0 00 00.0
	R.M. 1			51 18 24
	Honolulu Intl Arp Control Tower			
	BN (New) 1964	NNE	(3/4 mile)	129 04 26.2
	desc. ARP 1956 (R.M. 2) Trav. Dist.	ENE	(79.48)	24.226 163 40 41.5
	desc. Bench Mark F 10 (Azimuth Mark)	SW	(1,673.44)	510.067 314 11 10.7
	Geod. Trav.		138.95 (42.352)	
	R.M. 1 to ARP 1956 (R.M. 2)			

Station is located about 4 1/2 miles west-northwest of Honolulu, 4.0 miles south of Aiea, on the Honolulu International Airport and about 3/4 mile south-southwest and across the east-west runway from the terminal building of the airport.

To reach from the intersection of Nimitz Highway and State Highway 66, (which is Puuloa Road on the north side of Nimitz Highway and Lagoon Drive on the south side of Nimitz Highway) go southwest and northwest on Lagoon Drive for 3.6 miles to a guard gate at the entrance to Hickam Air Force Base and Bench Mark F 10 on the left, turn right just before reaching the guard gate and go northerly on a paved road for 0.25 mile to Fire House No. 3 on the right and where the paved road makes a sharp bend to the left, continue straight across the paved road and follow a track road east for 0.15 mile to the station on the right.

Station mark is a standard disk, stamped AIRPORT 1969, set in the top of a round concrete post which projects about 3 inches above the ground surface. It is about 0.15 mile east of Fire House No. 3, 105 yards north-west of the northwest corner of a small fenced in area and 49.0 feet south of a dim track road.

Reference mark 1 is a standard disk, stamped AIRPORT NO 1 1969, set in the top of a round concrete post which projects about 1 inch above the ground surface. It is in an oil covered area between two track roads and is 24.5 feet northwest of a dim track road, 24.0 feet southeast of a dim track road and about the same elevation as the station.

Reference mark 2 is a standard Topographic Survey disk, stamped ARP 1956, set in the top of a 6-inch metal pipe filled with concrete which projects about 3 inches above the ground surface. It is about the same elevation as the station and is 24.5 feet south of a dim track road.

Bench Mark F 10 (Azimuth Mark) is a standard Bench Mark disk, stamped F 10 1966, cemented in a drill hole in the west end of the north concrete bridge abutment. The abutment projects about 18 inches above the road. It is 109.0 feet west of the guard shack and 38.5 feet north of the center of a paved road. (This mark is not visible from the ground at the station site.)

\*Refers to notes in manuals of triangulation and state publications of triangulation. †Direction-angle measured clockwise, referred to initial station  
‡To nearest meter only, when no trigonometric leveling is being done.

USCMM-DC 27171-P88

## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: AIRPORT  
STATE: HAWAII YEAR: 1969 FIRST ORDER

SOURCE: G-14543

GEODETIC LATITUDE:	21° 19' 29.85401	ELEVATION:	2.47 METERS
GEODETIC LONGITUDE:	157° 55' 46.17374		8.1 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ θ1 ANGLE *
HI 3	5103	523,998.41	57,502.55	+ 0° 01' 32"

\* PLANE AZIMUTH HAS BEEN COMPUTED BY THE θ OR Δ θ1 FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH (From south)	CODE
EWA BEACH	83° 18' 49.0	83° 17' 17"	5103

Q6 137

(continued on next page)

JUN 1978  
U.S. DEPARTMENT OF COMMERCE  
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION  
NATIONAL OCEAN SURVEY, NATIONAL GEODETIC SURVEY

# HORIZONTAL CONTROL DATA

by the  
NATIONAL GEODETIC SURVEY  
OLD HAWAIIAN DATUM

QUAD 211573 STATION 1137

LATITUDE ° ' TO ° '  
LONGITUDE ° ' TO ° '  
DIAGRAM

AIRPORT (continued)

## RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: AIRPORT  
ESTABLISHED BY: C.A.A. YEAR: 1969 STATE: Hawaii BENCH MARK ALSO ☐  
RECOVERED BY: J.L. Cook YEAR: 1973 COUNTY: Honolulu  
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: At Honolulu International Airport  
HEIGHT OF TELESCOPE ABOVE STATION MARK 5.5 FEET. HEIGHT OF LIGHT ABOVE STATION MARK 4.1 FEET.

OBJECT	BEARING	DISTANCE		DIRECTION
		FEET	METERS	
SALT LAKE 1873 1942				0 00 00.0 "
Honolulu Intl Arp Control Tower				
Bn (New) 1964	NNE	3/4 mile		09 36 23.2 '
ARP 1956 (R.M. 2)	ENE	79.48	24.227	44 13 17.5 '
R.M. 1	NW	87.70	26.731	291 50 28 '
R.M. 1 to ARP 1956 (R.M. 2)		#138.95	#(42.352)	

The station mark, reference mark 1 and ARP 1956 (R.M. 2) were recovered in good condition and as described in 1969 description by C.A.A. Bench mark F 10 (Azimuth mark) was not recovered but is presumed to be in good condition. The 1969 description stated that the bench mark (F 10) was not visible from the ground at the station site. The route to the station is adequate.

# 1969 measurement. A large ridge of dirt and gravel has been temporarily stacked between the two reference marks so the distance could not be checked at this time.

The distances and directions to the reference marks checked.

## RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: AIRPORT  
ESTABLISHED BY: C. A. ANIIS YEAR: 1969 STATE: HAWAII BENCH MARK(S) ALSO ☐  
RECOVERED BY: P.D.C. YEAR: 1973 COUNTY: HONOLULU  
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN:

Detailed statement as to the fitness of the original description; including marks found, stampings, changes made, and other pertinent facts:

The station and all marks were recovered as described and in good condition.

\* Name of chief of party should be inserted here. The person who actually visited the station should sign his name at the end of the recovery note.

NOAA FORM 76-96 SUPERSEDES CGS FORM 828A WHICH MAY BE USED.  
(1-72)

U.S. DEPARTMENT OF COMMERCE  
NOAA  
★ U. S. GOVERNMENT PRINTING OFFICE 1972: 790-439

JUN 1978  
U. S. DEPARTMENT OF COMMERCE  
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION  
NATIONAL OCEAN SURVEY, NATIONAL GEODETIC SURVEY

# HORIZONTAL CONTROL DATA

by the  
National Ocean Survey  
OLD HAWAIIAN DATUM

QUAD 211573 STATION 1138  
HAWAII  
LATITUDE 21 ° 00' TO 21 ° 30'  
LONGITUDE 157 ° 30' TO 158 ° 00'  
DIAGRAM NF 4-11 OAHU

See Station AIRPORT

## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: BENCH MARK F 10  
STATE: HAWAII YEAR: 1969 SECOND -ORDER

Source G-14543  
NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE:	21 ° 19' 16.69523	ELEVATION:	2.89 METERS
GEODETIC LONGITUDE:	157 55 56.94889		9.5 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	Bearing Angle *
HI 3	5103	522,980.23	56,174.40	+ 0 ° 01' 28 "

\* PLANE AZIMUTH HAS BEEN COMPUTED BY THE BEARING FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH *	CODE
AIRPORT	217 ° 29' 56.1	217 ° 28' 28 "	5103

POSITION DETERMINED BY TRAVERSE FROM STATION AIRPORT

QG 138

QG 139

JUN 1978  
U. S. DEPARTMENT OF COMMERCE  
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION  
NATIONAL OCEAN SURVEY, NATIONAL GEODETIC SURVEY

# HORIZONTAL CONTROL DATA

by the  
National Ocean Survey  
OLD HAWAIIAN DATUM

QUAD 211573 STATION 1140  
HAWAII  
LATITUDE 21° 00' TO 21° 30'  
LONGITUDE 157° 30' TO 158° 00'  
DIAGRAM NF 4-11 OAHU

## DESCRIPTION OF TRIANGULATION INTERSECTION STATION

NAME OF STATION: STATE SURVEY 1-13

CHIEF OF PARTY: Carl A. Annis YEAR: 1969 STATE: Hawaii COUNTY: Honolulu

Description, including sketch of object:

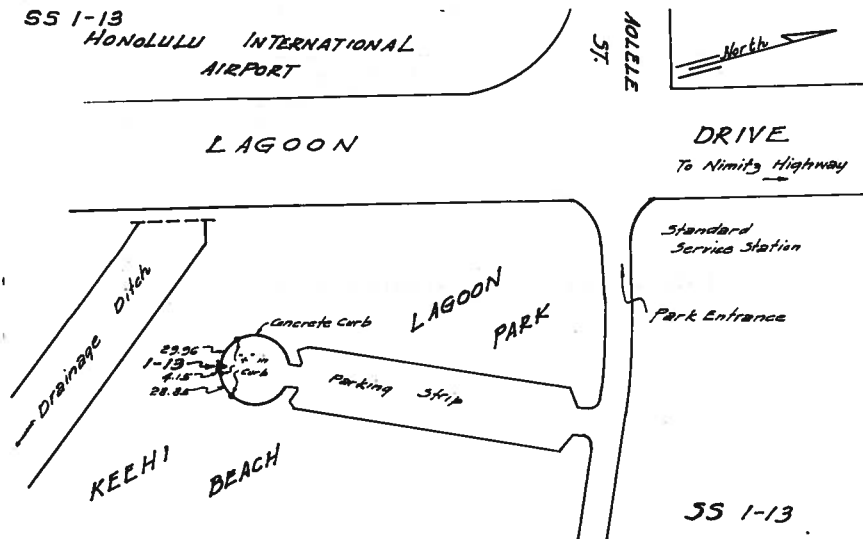
Station is located in the Keehi Lagoon Park, adjacent to the northeast side of Honolulu International Airport.

To reach the station from the intersection of Nimitz and Lagoon Drive, go south along Lagoon Drive for 0.9 mile to Aolele Street, turn left into the Beach Park then right into parking strip. Go to end of strip to circular turn around and station on curb.

Station mark is a standard State Survey disk stamped "1-13 1969" centered in drill hole in concrete curb at end of parking strip, 3 1/2 ft. east of gap in curb for foot passage. Ties from station are to crosses in concrete curbs: NE 28.85 ft. E 4.15 ft. and NW 29.96 ft.

Geodimeter connection was made between "AIRPORT 1969" to "STATE SURVEY 1-13"

SS 1-13  
HONOLULU INTERNATIONAL  
AIRPORT



## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: STATE SURVEY 1-13

STATE: HAWAII

YEAR: 1969

SECOND

ORDER

G-14543

SOURCE: NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE:	21° 20' 02.05038	ELEVATION:	2	METERS
GEODETIC LONGITUDE:	157° 54' 15.42330	NO CHECK		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	§ 10R Δ #1 ANGLE °
HI 5	5103	532,576.59	60,755.67	+ 0° 02' 05"

\* PLANE AZIMUTH HAS BEEN COMPUTED BY THE § 10R Δ #1 FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH (From south)	CODE
AIRPORT	69° 15' 59.5"	69° 13' 54"	5103

POSITION DETERMINED BY TRAVERSE FROM STATION AIRPORT

QG 140



JUN 1978  
U. S. DEPARTMENT OF COMMERCE  
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION  
NATIONAL OCEAN SURVEY, NATIONAL GEODETIC SURVEY

## HORIZONTAL CONTROL DATA

by the  
National Ocean Survey  
OLD HAWAIIAN DATUM

QUAD 211573 STATION 1141  
HAWAII  
LATITUDE 21° 00' TO 21° 30'  
LONGITUDE 157° 30' TO 158° 00'  
DIAGRAM NF 4-11 OAHU

### DESCRIPTION OF TRIANGULATION INTERSECTION STATION

Honolulu International  
NAME OF STATION: Airport, Control tower beacon  
YEAR: 1964 STATE: Hawaii COUNTY: Honolulu  
CHIEF OF PARTY: D.G. Rushford

Description, including sketch of object: Station is the standard F.A.A. airport beacon, with rotating green and white light, mounted above the center of the roof of the control tower, which is a tall, enclosed structure rising above the roof of the airport terminal building. The light is 124 feet above ground.

Located about 4-1/2 miles west-northwest of Honolulu at the Honolulu International Airport.

### RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: HONOLULU INTERNATIONAL AIRPORT CONTROL TOWER BEACON

ESTABLISHED BY: D. G. RUSHFORD YEAR: 1964 STATE: HAWAII BENCH MARK(S) ALSO ☐

RECOVERED BY: P.D.C. YEAR: 1978 COUNTY: HONOLULU

AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN:

Detailed statement as to the fitness of the original description, including marks found, stampings, changes made, and other pertinent facts:  
THE STATION WAS RECOVERED AS DESCRIBED AND IN GOOD CONDITION.

R

### ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: HONOLULU INTL APT CONT TWR BCN

STATE: HAWAII

YEAR: 1964

THIRD

-ORDER

SOURCE: G-14543

GEODETIC LATITUDE:	21° 20' 06.71992	ELEVATION:	METERS
GEODETIC LONGITUDE:	157 55 21.21593		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	$\theta$ FOR $\Delta$ BY ANGLE *
HI 3	5103	526,356.26	61,223.40	+ 0° 01' 41"

\* PLANE AZIMUTH HAS BEEN COMPUTED BY THE  $\theta$  FOR  $\Delta$  BY FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH * (From south)	CODE

THESE DATA OBTAINED FROM ADJUSTMENT OF OCT 1971

NOAA FORM 76-165  
(12-72)  
GOLD CAGE 8261

U. S. G.P.O. 1973-769-566/563 REG. #6

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

QG 141

JUN 1978  
U.S. DEPARTMENT OF COMMERCE  
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION  
NATIONAL OCEAN SURVEY, NATIONAL GEODETIC SURVEY

# HORIZONTAL CONTROL DATA

by the  
National Ocean Survey  
OLD HAWAIIAN DATUM

QUAD 211573 STATION 1142  
HAWAII  
LATITUDE 21° 00' TO 21° 30'  
LONGITUDE 157° 30' TO 158° 00'  
DIAGRAM NF 4-11 OAHU

FORM 525  
(9-18-69)

U.S. DEPARTMENT OF COMMERCE  
COAST AND GEODETIC SURVEY  
DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: AIEA STATE: Hawaii COUNTY: Honolulu  
CHIEF OF PARTY: C.A. Annis YEAR: 1969 DESCRIBED BY: B.W. Miller

NOTE*	1b 7a	HEIGHT OF TELESCOPE ABOVE STATION MARK SURFACE-STATION MARK UNDERGROUND-STATION MARK	1 HEIGHT OF LIGHT ABOVE STATION MARK DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION	BEARING	DISTANCE		DIRECTION†
					FEET	METERS	
			SALT LAKE 1873 1942 Pearl Harbor Ford Island Control Tower 1957 R.M. NO 2 R.M. NO 1	SW W ENE	( 3 miles ) 35.48 38.60	10.816 11.765	76 58 22.5 117 09 04 268 41 24

The station is located about 2 1/4 miles east of Pearl City, 1 1/4 miles north-northwest of Aiea, 1 mile north-northeast of State Highway 90, along the east side of Kaonohi Street and across the street from a concrete reservoir, at the northeast corner of a golf course.  
To reach the station from the intersection of Waimano Home Road and State Highway 90 in Pearl City, go east on State Highway 90 for 1.7 miles to a signal light and Kaonohi Street on the left. Turn left and go northerly on Kaonohi Street for 0.15 mile to a stop sign and a drive-in theater on the left, continue ahead on Kaonohi Street for 0.85 mile to a reservoir on the left and station on the right.  
Station mark is a standard disk stamped AIEA 1969, set in the top of a 12 inch round concrete monument, which is 2 inches below the surface of the ground. It is 108 feet southwest of a power line pole number H-40010, 39 feet southeast of the center of street, 3 feet southeast of the center of side walk.  
Reference mark 1 is a standard disk stamped AIEA NO 1 1969, cemented in a drill hole set in curb of street, which projects 6 inches above the surface of the street. It is 70 feet west of power line pole H-400, 33 feet south of the center of street, 3 feet north of the center of side walk.  
Reference mark 2 is a standard disk stamped AIEA NO 2 1969, cemented in a drill hole set in curb of street, which projects 6 inches above the surface of the street. It is 68.5 feet east of power line pole H-40010, 33 feet south of the center of street, 6 feet north of the center of side walk.  
No measurement between marks because of construction in the area.

\*Refers to notes in manuals of triangulation and state publications of triangulation. †Direction-angle measured clockwise, referred to initial station.  
†To nearest meter only, when no trigonometric leveling is being done.

USCOMM-DC 27171-P88

## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: AIEA  
STATE: HAWAII YEAR: 1969 FIRST ORDER

SOURCE: G-14543

GEODETIC LATITUDE:	21° 23' 47.79783	ELEVATION:	81.2 METERS
GEODETIC LONGITUDE:	157° 56' 18.94386		266 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	§ 10R Δ §1 ANGLE °
HI 3	5103	520,889.95	83,527.66	+ 0 01 21

\* PLANE AZIMUTH HAS BEEN COMPUTED BY THE § 10R Δ §1 FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH* (From south)	CODE
SALT LAKE	319° 14' 08.8	319° 12' 48"	5103

QG 142

JUN 1978  
U.S. DEPARTMENT OF COMMERCE  
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION  
NATIONAL OCEAN SURVEY, NATIONAL GEODETIC SURVEY

# HORIZONTAL CONTROL DATA

by the  
National Ocean Survey  
OLD HAWAIIAN DATUM

QUAD 211573 STATION 1143  
HAWAII  
LATITUDE 21° 00' TO 21° 30'  
LONGITUDE 157° 30' TO 158° 00'  
DIAGRAM NF 4-11 OAHU

## DESCRIPTION OF TRIANGULATION INTERSECTION STATION

NAME OF STATION: STATE SURVEY 9-22

CHIEF OF PARTY: Carl A. Annis YEAR: 1969 STATE: Hawaii COUNTY: Honolulu

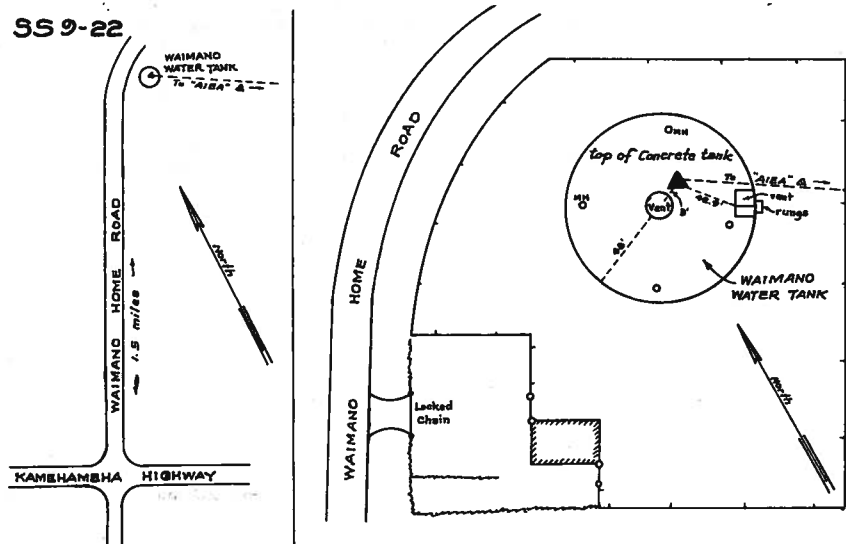
### Description, including sketch of object:

Station is located in Ewa District, in Waimano, on water tank on the south-east side of Waimano Home Road, 1.5 miles northeast from intersection of Kamehameha Highway and Waimano Home Road at Pearl City.

Station mark is a standard State Survey disk stamped "9-22 1969" cemented in drill hole in top of circular concrete water tank with ladder on east side. The area is fenced and key to gate may be obtained from City and County Board of Water Supply. The station is 3.0 ft. northeast from northeast side of vent in middle of tank and 42.9 ft. northwest from southwest corner of vent near top of ladder.

Geodimeter connection was made between "AIEA 1969" and State Survey "9-22 1969"

SS 9-22



## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: STATE SURVEY 9-22

STATE: HAWAII

YEAR: 1969

SECOND ORDER

SOURCE: G-14543

GEODETIC LATITUDE:	21° 25' 01.00456	ELEVATION:	121.3 METERS
GEODETIC LONGITUDE:	157 57 50.22488		358 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	$\phi$ OR $\Delta$ $\phi$ ANGLE °
HI 3	5103	512,262.13	90,911.59	+ 0° 00' 47"

\* PLANE AZIMUTH HAS BEEN COMPUTED BY THE  $\phi$  OR  $\Delta$   $\phi$  FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH * (From south)	CODE
AIEA	310° 34' 15.6	310° 33' 28"	5103

POSITION DETERMINED BY TRAVERSE FROM STATION AIEA  
AND CHECKED BY ADDITIONAL OBSERVATIONS

QG 143

JUN 1978  
U.S. DEPARTMENT OF COMMERCE  
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION  
NATIONAL OCEAN SURVEY, NATIONAL GEODETIC SURVEY

## HORIZONTAL CONTROL DATA

by the  
National Ocean Survey  
OLD HAWAIIAN DATUM

QUAD 211573 STATION 1144  
HAWAII  
LATITUDE 21° 00' TO 21° 30'  
LONGITUDE 157° 30' TO 158° 00'  
DIAGRAM NF 4-11 OAHU

### NO ORIGINAL TEXT

PUULOA (Ter. of Hawaii, Hawaiian Government Survey, 1873;  
L.G.S., 1927)--See description of Puuloa 2.

DEPARTMENT OF COMMERCE  
U. S. COAST AND GEODETIC SURVEY  
FORM 536  
(Rev. Feb. 1966)

#### RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: PUULOA  
ESTABLISHED BY: HGS  
RECOVERED BY: JLN

YEAR: 1873 STATE: Hawaii  
YEAR: 1956 COUNTY: Honolulu

Detailed statement as to the fitness of the original description; including marks found, stampings, changes made, and other pertinent facts:

*On south shore of Oahu I. on west side of entrance to Pearl Harbor, about midway between Iroquois Pt and Keahi Pt.*

*Station is best approached from waters edge on west side of P.H. entrance. Follow along Naval Property fence from a concrete pier 4" thick by 8 ft long by 4 ft high at waters edge, for 177 ft. to a 2" pipe projecting 1 ft. Station is 30 ft south of (and at rt angles to) the fence line. It is a chiseled cross in a concrete pier 1 foot underground.*

*This station is on Naval Property in restricted area. Key for entrance must be obtained from Marine Guard Room at Marine Base on Point.*

FORM 536  
(11-6-66)

#### RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: PUULOA

ESTABLISHED BY: HGS

RECOVERED BY: W.R. Porter

YEAR: 1873 STATE: Hawaii  
YEAR: 1963 COUNTY: Honolulu

Detailed statement as to the fitness of the original description; including marks found, stampings, changes made, and other pertinent facts:

Station mark was recovered in good condition. A complete description follows:

Station is located about 2 miles east of Ewa Beach, on Hammer Point, at the west side of the entrance to Pearl Harbor; in grove of large keawe at east edge of Capehart Housing and at south side of sewage disposal plant.

To reach station from the Bank of Hawaii in Ewa Beach, go east on State Highway 76 for 0.25 mile to sign "CAPEHART HOUSING". Turn left and go 2.4 miles to entrance of housing area. Continue, on main drive around right side of housing, for 1.4 miles to sewage plant on right, just outside housing area fence. From here pack southeast along outside of sewage plant fence for about 150 yards to station.

Station is an 8-inch-square, rough-topped, granite post, with a 2-inch cross chiseled in the top. It is 16 inches below ground surface, 29.9 feet southeast of a Navy Boundary Marker (2-1/2-inch pipe set in concrete), 16-1/2 feet northeast of a nail in the base of a 20-inch keawe, 63.8 feet east-southeast of southernmost corner of sewage plant fence corner, and 6.38 feet northeast of station PUULOA 2 1927 (azimuth 215° 29' 31").

\* Name of chief of party should be inserted here. The officer who actually visited the station should sign his name.  
Note.—One of these forms must be used for every station recovered.

Co

#### ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: PUULOA

STATE: HAWAII

YEAR: 1873

SECOND

ORDER

SOURCE: G-14543

GEODETIC LATITUDE:	21° 19' 37.51007	ELEVATION:	2	METERS
GEODETIC LONGITUDE:	157° 58' 25.55546	SCALED		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	§ 10R Δ § 1 ANGLE "
HI 3	5103	508,925.50	58,270.41	+ 0° 03' 34"

\* PLANE AZIMUTH HAS BEEN COMPUTED BY THE § 10R Δ § 1 FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH * (From south)	CODE

THESE DATA OBTAINED FROM ADJUSTMENT OF OCT 1971

POSITION DETERMINED BY TRAVERSE FROM STATION PUULOA 2

AND CHECKED BY ADDITIONAL OBSERVATIONS

QC 144

# HORIZONTAL CONTROL DATA

by the  
National Ocean Survey  
OLD HAWAIIAN DATUM

QUAD 211573 STATION 1145  
HAWAII  
LATITUDE 21° 00' TO 21° 30'  
LONGITUDE 157° 30' TO 158° 00'  
DIAGRAM NF 4-11 OAHU

PUULO 2 ( Hawaii, L.G.S., 1927) -- On S shore of Oahu, about 3/4 mile SW of Watertown, on W side of entrance to Pearl Harbor, under old windmill tower. There are two marks in this vicinity, practically the same, one directly under the old tower, and the other about 7 feet distant from the first. The one directly under the old tower was used in 1927 under the belief that it was the old Territorial Survey station. The difference was later discovered and the 1927 station marked with standard station disk, set in the top of a square post of concrete and stamped "PUULO 2." The old Hawaiian Government (Territorial) Survey mark, a granite pier, is 1.948 meters (6.39 feet) from station in azimuth 150°13'; while old brick latitude pier is N. 5°W. 47.2 feet from the Territorial Survey station.

Three reference marks were set as follows: No. 1 in concrete base of beacon light is 48.023 meters (157.56 feet) from station in azimuth 61°03'. Nos. 2 and 3 were standard reference disks with arrows pointing toward station, set in center of top of square block or post of concrete, at the following distances and azimuths from the station: 22.080 meters (72.34 feet), 122°42'; 31.732 meters (104.11 feet), 200°25'.

## RECOVERY NOTE, TRIANGULATION STATION

U. S. DEPARTMENT OF COMMERCE - COAST AND GEODETIC SURVEY  
Form 536  
(Rev. Feb. 1965)

NAME OF STATION: PUULO 2

ESTABLISHED BY: LGS

RECOVERED BY: SLH

YEAR: 1927 STATE: Hawaii

YEAR: 1956 COUNTY: Honolulu

Detailed statement as to the fitness of the original description; including marks found, stampings, changes made, and other pertinent facts:

See description of PUULO. STATION PUULO 2  
is standard disk stamped PUULO 2, 4 in. below surface,  
and is 6.4 ft. SW of station PUULO.

FORM 536  
(11-6-65)

## RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: PUULO 2

ESTABLISHED BY: L.G.S.

RECOVERED BY: USGS

YEAR: 1927 STATE: Hawaii

YEAR: 1959 COUNTY: Honolulu

Detailed statement as to the fitness of the original description; including marks found, stampings, changes made, and other pertinent facts:

Station mark recovered in good condition.

PUULO recovered in good condition. Mark is chiseled cross on a granite boulder.

PUULO LATITUDE STATION: Searched for but not found.

Reference marks 1, 2, and 3 searched for but not found.

Revised description: Station on south shore of Oahu, on the west shore of the entrance channel to Pearl Harbor. To reach from the Naval Housing area at Iriquois Point proceed along Loop Drive in Iriquois Point to the sewage plant on the Makai side of loop drive. Leave vehicle and proceed around the south side of the galvanized wire fence around in the sewage plant, to the station. About 500 ft. from Loop Drive. Station mark is about 87 ft. east of the shore line. The southernmost corner of the fence around the sewage plant is 53 ft. from the station mark in approximate azimuth 50°. The entrance of an old underground shelter is 36 ft. from the station mark in approximate azimuth 340°. It is 9 ft. from a 15" Kea tree and is surrounded by 6 galvanized pipes standing about 3 ft. high. Both PUULO and PUULO 2 are about 0.5 ft. below normal ground level.

\* Name of chief of party should be inserted here. \* The officer who actually visited the station should also sign his name at the end of the recovery note.

(Continued on next page)

## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: PUULO 2

STATE: HAWAII

YEAR: 1927

FIRST

-ORDER

SOURCE: G-14543

GEODETIC LATITUDE:	21° 19' 37.45867	ELEVATION:	1.8 METERS
GEODETIC LONGITUDE:	157° 58' 25.63409		6 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	± HOR Δ ± ANGLE °
HI 3	5103	508,921.75	58,265.23	+ 0° 00' 34"

\* PLANE AZIMUTH HAS BEEN COMPUTED BY THE ± HOR Δ ± FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH* (From south)	CODE
EWA BEACH	72° 51' 57.3	72° 51' 25"	5103

THESE DATA OBTAINED FROM ADJUSTMENT OF NOV 1970

QG 145

# HORIZONTAL CONTROL DATA

by the  
NATIONAL GEODETIC SURVEY  
OLD HAWAIIAN DATUM

QUAD 211573 STATION 1145  
LATITUDE ° ' TO ° '  
LONGITUDE ° ' TO ° '  
DIAGRAM

PUULO A 2 (Continued)

FORM 526a  
(2-10-65)

U.S. DEPARTMENT OF COMMERCE  
COAST AND GEODETIC SURVEY  
RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: PUULO A 2  
ESTABLISHED BY: L.G.S. YEAR: 1927 STATE: Hawaii  
RECOVERED BY: W.R. Porter YEAR: 1963 COUNTY: Honolulu

OBJECT	BEARING	DISTANCE		DIRECTION
		FEET	METERS	
SALT LAKE 1873-1927	WNW	61.474	18.736	00 00 00.0
R.M. No. 4	NW	32.280	9.840	233 43 48
Navy Boundary Marker	NNE	104.117	(31.755)	275 45 14
R.M. No. 3	NE	6.380	1.945	324 12 29
PUULO A 1873-1927				339 18 30

Station mark and reference mark number three were recovered in good condition. Reference mark number one was found destroyed, the concrete base it is set in has been pushed from its original position. Reference mark number two falls within the boundary of a sewage plant and was not recovered. Some of the azimuths and distances given in previous descriptions are erroneous. A new reference mark, number four, was established. A complete description follows:

Station is located about 2 miles east of Ewa Beach, on Hammer Point, at the west side of the entrance to Pearl Harbor; in grove of large keaweas at east edge of Capehart Housing and at south side of sewage disposal plant. To reach station from the Bank of Hawaii in Ewa Beach, go east on State Highway 76 for 0.25 mile to sign "CAPEHART HOUSING". Turn left and go 2.4 miles to entrance to housing area. Continue, on main drive around right side of housing, for 1.4 miles to sewage plant on right, just outside the area fence. From here pack southeast along outside of sewage plant fence for about 150 yards to station.

Station mark is a standard disk stamped "PUULO A 2", set in the top of a 12-inch-square, concrete monument about 1 foot below ground. It is 61.8 feet east-southeast from the southernmost corner of the plant fence, 36 feet north-northwest of entrance to underground shelter, 10.0 feet north-east from a nail in base of 20-inch keawe, 56.1 feet southeast of fence and about 90 feet west of shoreline.

Reference mark number three is a standard disk stamped "PUULO A 2 NO 3", set in the top of a 12-inch-square, concrete monument 1.5 feet below ground. It is 124.7 feet southwest from the easternmost corner of the plant fence, 13 feet southeast of the fence, opposite the 11th fence post southwest from small gate in east fence-corner, and 2.1 feet lower than station mark.

Reference mark number four is a standard disk stamped "PUULO A 2 NO 4 1927 1963", cemented in a drill hole in the concrete base of the south fence corner post.

Navy Boundary Marker is a 2-1/2-inch, iron pipe, set in concrete and projecting 12 inches above ground. It is 25 feet southeast of plant fence, 45 feet east of south fence corner, and 1.5 feet higher than station mark.

\*Name of chief of party should be inserted here. The officer who actually visited the station should sign his name at the end of the recovery note.

NOTE - One of these forms must be used for every station recovered.

USCGM-DC 27178-P88

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: PUULO A 2  
ESTABLISHED BY: L.G.S. YEAR: 1927 STATE: Hawaii BENCH MARK ALSO ☐  
RECOVERED BY: W.R. Porter YEAR: 1963 COUNTY: Honolulu  
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: 2 1/2 miles east of Ewa Beach.  
HEIGHT OF TELESCOPE ABOVE STATION MARK 64.0 FEET. HEIGHT OF LIGHT ABOVE STATION MARK 74.0 FEET.

OBJECT	BEARING	DISTANCE		DIRECTION
		FEET	METERS	
EWA BEACH	W	61.45	18.726	00 00 00.0
R.M. 4	NE	104.20	(31.761)	37 04 49
R.M. 3	NE	( 2.0 miles )		127 34 20
Hickam AFB Water Tower 1957	NE	6.38	1.944	130 48 55.8
PUULO A 1873				142 41 54

Station mark, reference marks 3 and 4 and PUULO A 1873 were recovered and found in good condition. The Navy Boundary Marker was found tilted and was not measured or observed. A new description follows:

Station is located about 2 1/2 miles east of Ewa Beach, on the west side of the entrance to Pearl Harbor, in a grove of Keawe Trees, at the east edge of a Navy Housing project and south of a sewage disposal plant.

To reach from the Bank of Hawaii in Ewa Beach, go southeast on State Highway 76 (Fort Weaver Road) for 0.3 mile to the intersection of North Road, turn left and follow North Road, northeast, for 1.7 miles to a side road right, turn right and go south on paved road for 0.65 miles to the entrance to Iroquois Housing, continue on Iroquois Avenue for 1.2 miles to Erni Avenue on the left, continue on Iroquois Avenue for 0.1 mile to the entrance to a sewage disposal plant on the right, turn right for about 100 feet to a walk through gate on the right and the end of truck travel. Pass through the gate and follow fence along the west side of the disposal plant to the station just south of the plant. About a 100 yard pack.

Station mark is a standard disk, stamped PUULO A 2, set in the top of a 12-inch square concrete post which is about 6 inches below the ground surface. It is about 75 feet west of a beach, 61.7 feet east of a fence corner and 59.0 feet southwest of a fence.

Reference mark 3 is a standard disk, stamped PUULO A 2 NO 3, set in the top of a 12-inch concrete post which is about 1 foot below the surface of the ground. It is 12.0 feet southwest of the fence.

Reference mark 4 is a standard disk, stamped PUULO A 2 NO 4 1927 1963, cemented in a drill hole in the concrete base of the southwest corner post of the disposal plant.

PUULO A 1873 1927 is a chiseled cross in the top of boulder which is about 1 foot below the ground surface. It is about 75 feet west of the beach, 63.5 feet east of a fence corner and 56.0 feet southwest of the fence.

No measurement between reference marks due to trees.

\*Name of chief of party should be inserted here. The person who actually visited the station should sign his name at the end of the recovery note.

FORM CGS-526a (12-65)  
USCGM-DC 26251-P88

COAST AND GEODETIC SURVEY

# HORIZONTAL CONTROL DATA

by the  
National Ocean Survey  
OLD HAWAIIAN DATUM

QUAD 211573 STATION 1146  
HAWAII  
LATITUDE 21° 00' TO 21° 30'  
LONGITUDE 157° 30' TO 158° 00'  
DIAGRAM NF 4-11 OAHU

## NO ORIGINAL TEXT

Ewa church (Oahu Island, Hawaiian Government Survey, 1873; L. G. Simmons, 1927).—In the southern part of Oahu, on a hill north of Pearl Harbor, north of Manana Peninsula, just north of Middle Loch, about 1/4 mile northwest of Pearl City Junction on the railroad, and about 1/4 mile north of the nearest point to railroad to Ewa and Waianae, on a low rise, in the southwest corner of grounds of the old church (no longer in existence), now a graveyard, at Waiawa. There is a considerable grove of algeroba trees at this place. Station is 5 meters southeast of one tree, 5 meters east of west fence of grounds, along which is a hedge with cane fields beyond. About 1 mile before reaching Waipahu, on the main road from Honolulu, is found an easy bend marked by whitewashed stones; from this point a private road runs directly to the station, which is on a bluff to the northwest of this road. Station marked by a deep cross cut in a concrete post projecting 1 foot above the ground. In 1927 this mark was found and added to by digging down some 18 inches and pouring concrete over and around old mark. A standard bronze disk, note 1a, was then placed in center of cross. For reference marks, two concrete posts about 5 inches on side, and centered with cross in top, were set as follows: No. 1, 3.420 meters (11.22 feet) from station, in azimuth 45° 35'; No. 2, across the graveyard to the north, 82.680 meters (271.26 feet) from station in azimuth 195° 17'. Re-marked according to note 14A in 1929.

EWA CHURCH ( Hawaii, Hawaiian Government Survey, 1873; G.K.G., 1932) —In the S part of Oahu, on a low rise N of Pearl Harbor, NW of Manana Peninsula, 1/4 mile NE of the most N part of the shore of Middle Loch, halfway between the railroad and the highway, in the SW corner of an old graveyard, at Waiawa. With the exception of graveyard and the S slope, the low hill is covered with sugar cane. The hill is about 100 feet high and is not conspicuous. When approaching from Honolulu on the main highway to Waipahu, the private road leading to the station is on the S side of the highway and 0.8 mile W of Pearl City Junction. About 0.4 mile W of this private road, the main highway branches; one leads to Schofield and the other to Waipahu. The station is 1/4 mile S of the main highway. In 1927 two concrete post reference marks (each post about 5 inches on side and centered with cross in top) were set as follows: No. 1, 3.420 meters (11.22 feet) from station in azimuth 45° 35'; No. 2, across the graveyard to the N, 82.680 meters (271.26 feet) from station in azimuth 195° 17'. The station is marked according to Note 14A.

Name of Station: EWA CHURCH  
Established By: H.G.S. Year: 1873 State: Hawaii  
Recovered By: W.R.P. Year: 1960 county: Honolulu

Detailed statement as to the fitness of the original description; including marks found, stampings, changes made, and other pertinent facts:

Station was recovered as previously described. Reference marks 3 and 4 were established by this party. Following is a new routing to the station and description of the reference marks.

To reach from the junction of State Highways 90 and 99 in the north edge of Pearl City, go westerly on State Highway 90 for 0.2 mile to a U-turn on the left, turn sharp left, easterly on State Highway 90 for 0.1 mile to a fork, take the right fork macadam road for 0.05 mile to a side road right, turn right, westerly on graded road for 0.3 mile to a fork, take the left fork for 0.1 mile to the end of the road and station on the left.

Reference mark 3 is a standard disk, stamped EWA CHURCH NO 3 1927, set in the top of an 11 inch square concrete post flush with the ground surface. It is 23 feet southeast of the center of the end of the road.

Reference mark 4 is a standard disk, stamped EWA CHURCH NO 4 1927, set in the top of an 11 inch square concrete post flush with the ground surface. It is 35 feet east of the center of the road.

1960 note	OBJECT	BEARING	DISTANCE feet meters	DIRECTION 0 00 00.0
11a	KAFUAI NEW 1927	NE	16.33 4.977	129 37 39
11a	RM 4	SSW	22.38 6.822	296 11 06
11a	RM 3			

(Continued on next page)

## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: EWA CHURCH

STATE: HAWAII

YEAR: 1873

FIRST

-ORDER

SOURCE: G-14543

GEODETIC LATITUDE:	21° 23' 42.34997	ELEVATION:	26.5 METERS
GEODETIC LONGITUDE:	157° 58' 58.82931		87 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ ±1 ANGLE
HI 3	5105	505,780.73	82,974.20	+ 0° 00' 22"

\* PLANE AZIMUTH HAS BEEN COMPUTED BY THE θ OR Δ ±1 FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH (From south)	CODE
EWA BEACH	19° 25' 28.7	19° 25' 06"	5103

THESE DATA OBTAINED FROM ADJUSTMENT OF NOV 1970

QG 146



EWA CHURCH (Continued)

# HORIZONTAL CONTROL DATA

by the  
NATIONAL GEODETIC SURVEY  
OLD HAWAIIAN DATUM

QUAD 211573 STATION 1146

LATITUDE ° ' TO ° '  
LONGITUDE ° ' TO ° '  
DIAGRAM

FORM 526a  
(1-10-69)

U.S. DEPARTMENT OF COMMERCE  
COAST AND GEODETIC SURVEY

## RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: EWA CHURCH  
ESTABLISHED BY: HGS YEAR: 1873 STATE: Hawaii  
RECOVERED BY: W.R. Porter YEAR: 1963 COUNTY: Honolulu

OBJECT	BEARING	DISTANCE		DIRECTION
		FEET	METERS	
KAPUAI NEW 1927 -----1960 DISTANCES AND DIRECTIONS -----				00 00 00.0
RM 4	NE	16.33	4.977	129 37 39
RM 3	SSW	22.38	6.822	296 11 06
-----1963 DISTANCES AND DIRECTIONS-----				
R.M. No. 4	NE	16.300	4.968	129 36 38
R.M. No. 3	SSW	22.369	6.819	296 13 33

Station mark and reference marks No. 3 and No. 4 were recovered in good condition. These two reference marks were established in 1960. The original reference marks have been destroyed. A piece of iron pipe was found driven into the ground at the distance and angle of R.M. No. 1. The northeast side of the station bluff has been cut off to within a short distance of the station, and R.M. No. 2 was probably destroyed at that time. A complete description follows:

Station is located about 3/4 mile west of Pearl City, at the southeast corner of a sugar cane field, at about 86 feet elevation, along the northeast side of an old, track road, on a bluff that is covered with a dense growth of koa and also has a few large keawe trees just northwest of the station.

To reach station from the traffic light at intersection of Lehua Ave. and State Highway 90 in Pearl City, go westerly on State Highway 90 for 0.8 mile; turn left, crossing over onto eastbound lanes of State Highway 90, and go east 0.15 mile; take right fork and follow Waiawa Street around base of bluff for 0.55 mile; turn sharp right onto cane field road and go upgrade for 0.1 mile to side road right, at southeast corner of field. Turn sharp right and go 0.05 mile to station on left.

Station mark is a standard disk, stamped "EWA CHURCH 1927", set in the top of a 12-inch-square, concrete monument that projects 6 inches. It is 6 feet west of old, railroad-tie fence line, 23 feet southeast of center line of track road, 42 feet northwest of edge of cutbank, and about 80 yards southeast of corner of cane field. A "Type A" Hawaiian Territorial Survey signal is centered over the station mark, the concrete floor being 4 feet above ground. A red and white, metal target extends 8 feet above the floor.

Reference mark number three is a standard disk, stamped "EWA CHURCH NO 3 1927", set in the top of a 10-inch-square, concrete monument flush with ground. It is 20 feet southeast of present end of track road, in center of the brush-covered continuation of the road, and about 4 feet lower than station mark.

Reference mark number four is a standard disk, stamped "EWA CHURCH NO 4 1927", set in the top of a 10-inch-square, concrete monument that is 1 inch below ground level, and 35 feet southeast of center line of road.

\*Name of chief of party should be inserted here. The officer who actually visited the station should sign his name at the end of the recovery note.

NOTE - One of these forms must be used for every station recovered.

## RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: EWA CHURCH  
ESTABLISHED BY: H.G.S. YEAR: 1873 STATE: Hawaii  
RECOVERED BY: C.A. Annis YEAR: 1969 COUNTY: Honolulu  
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: 3/4 mile west of Pearl City.  
HEIGHT OF TELESCOPE ABOVE STATION MARK 10.0 FEET. HEIGHT OF LIGHT ABOVE STATION MARK 9.5 FEET.

OBJECT	BEARING	DISTANCE		DIRECTION
		FEET	METERS	
EWA BEACH				0 00 00.0
R.M. 5	SW	19.73	6.012	7 15 18
Waipau Mill Stack 1925	W	( 2.0 miles )		58 06 13.1
R.M. 4	NE	16.33	4.977	190 01 34

Station mark and reference mark 4 were recovered and found in good condition. Reference mark 3 has been destroyed and a new reference mark 5 was established at this time. Following is a new and complete description:

Station is located about 3/4 mile west of Pearl City and on the southeast point of a low ridge and near the southeast corner of a sugar cane field.

To reach from the intersection of Waimano Home Road and State Highway 90 in the north edge of Pearl City, go westerly on State Highway 90 for 0.8 mile to fork in the highway, keep left and continue westerly on the highway for 0.15 mile to a road leading to the east bound lane of the highway, go east on the highway for 0.15 mile to Waiawa Street on the right, turn right and go southerly on Waiawa Street for 0.1 mile then right crossing construction area for 0.1 mile to a track road leading up cutbank, follow track road southwesterly for 0.15 mile to the southeast edge of a sugar cane field and the station on the left.

NOTE: This description's to reach will be inadequate in the near future due to the road construction in the area.

Station mark is a standard disk, stamped EWA CHURCH 1927, set in the top of a 12-inch concrete monument which projects about 8 inches above the ground surface. A Type A Hawaiian Territorial Signal is centered over the mark and the concrete floor of the signal projects about 4 feet above the ground surface. It is 40.0 feet southwest of a cutbank and 27.0 feet east of the center of a track road.

Reference mark 4 is a standard disk, stamped EWA CHURCH NO 4 1927, set in the top of a 10-inch concrete monument which is flush with the ground surface. It is 37.0 feet east of the center of the track road and 31.0 feet west of the cutbank.

Reference mark 5 is a standard disk, stamped EWA CHURCH 1873 1927 NO 5 1969, set in the top of a 12-inch round concrete monument which projects about 4 inches above the ground surface. It is 46.0 feet southwest of the cutbank and 10.0 feet east of the center of the track road.

No measurement between reference marks due to vegetation and the location of the marks.

\*Name of chief of party should be inserted here. The person who actually visited the station should sign his name at the end of the recovery note.

FORM CGS-526a (12-65)  
USC&M-DC 20291-P49

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



JUN 1978  
U.S. DEPARTMENT OF COMMERCE  
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION  
NATIONAL OCEAN SURVEY, NATIONAL GEODETIC SURVEY

# HORIZONTAL CONTROL DATA

by the  
National Ocean Survey  
OLD HAWAIIAN DATUM

QUAD 211573 STATION 1147  
HAWAII  
LATITUDE 21° 00' TO 21° 30'  
LONGITUDE 157° 30' TO 158° 00'  
DIAGRAM NF 4-11 OAHU

## ADJUSTED HORIZONTAL CONTROL DATA

DEPARTMENT OF COMMERCE  
U. S. COAST AND GEODETIC SURVEY  
Form 682  
Rev. Aug. 1968

### DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: 214 (USN) STATE: Hawaii COUNTY: Honolulu

CHIEF OF PARTY: W.R. Porter YEAR: 1960 Described by: D.R. Tomlinson

NOTE: HEIGHT OF TELESCOPE ABOVE STATION MARK 1 METERS.1 HEIGHT OF LIGHT ABOVE STATION MARK METERS.

Desc.	OBJECT	BEARING	DISTANCE		DIRECTION
			feet	METERS	
Desc.	SALT LAKE 1873 1927				0 00 00.0
RM 1		SE	20.13	6.134	29 30 09
RM 2		SW	46.85	14.280	145 00 20

Station is located on the roof of the northwest wing of building 214, in the Pearl Harbor Shipyard.

The station mark is a United States Navy bronze disk, stamped 214, cemented in the top of a 6 inch square concrete post projecting 1 inch. It is near the north corner of the building.

Reference mark 1 is a standard disk, stamped 214 USN NO 1 1960, cemented in a drill hole in a concrete ledge at the northeast edge of the building projecting 1 foot.

Reference mark 2 is a standard disk, stamped 214 USN NO 2 1960, cemented in a drill hole in the concrete ledge along the northwest edge of the building.

### RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: 214 (USN) YEAR: 1960 STATE: Hawaii BENCH MARK ALSO ☐

ESTABLISHED BY: W.R.P. YEAR: 1969 COUNTY: Honolulu

RECOVERED BY: C.A. Annis YEAR: 1969

AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: 3 miles west of Honolulu

HEIGHT OF TELESCOPE ABOVE STATION MARK 4 FEET. HEIGHT OF LIGHT ABOVE STATION MARK 4 FEET.

DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION				
OBJECT	BEARING	DISTANCE		DIRECTION
		FEET	METERS	
SALT LAKE 1873 1942				0 00 00.0
RM 1	E	20.09	6.124	29 28 32
RM 3	SW	28.88	8.803	193 44 54
EWA AIR FORCE CALIB TOWER	NW			234 02 01.5

The station mark and reference mark 1 were recovered as described, reference mark 2 was covered by a metal strip in the process of constructing an addition to the building and was not recovered. A reference mark 3 was established at this time, on the new addition. Due to insufficient space, a standard reference disk was not set.

A new description follows.

The station is located on the northwest wing of building 214 on the Pearl Harbor Naval Shipyard.

The station mark is a United States Navy bronze disk, stamped 214, set in the top of a 6 inch square concrete projection projecting 1 inch above the roof. It is 22.5 feet west of the main wall of the building which extends about 10 feet higher in elevation than the station mark.

Reference mark 1 is a standard disk stamped 214 NO 1 1960, set in a drill hole in the concrete ledge of the building wing. It is 3 feet west of the main wall of the building and about 9 inches higher in elevation than the station mark.

(Continued on next page)

NAME OF STATION: 214 USN

STATE: HAWAII

YEAR: 1960

FIRST

-ORDER

SOURCE: G-14543

GEODETIC LATITUDE: 21° 21' 08.83878	ELEVATION: 13.4 METERS
GEODETIC LONGITUDE: 157° 57' 50.07151	44 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ (OR Δ) ANGLE
HI 3	5103	512,282.01	67,486.08	+ 0° 00' 47"

\* PLANE AZIMUTH HAS BEEN COMPUTED BY THE θ (OR Δ) FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH (From south)	CODE
SALT LAKE	254° 13' 14.5	254° 12' 27"	5103

THESE DATA OBTAINED FROM ADJUSTMENT OF NOV 1970

QG 147

JUN 1978  
U.S. DEPARTMENT OF COMMERCE  
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION  
NATIONAL OCEAN SURVEY National Geodetic Survey

## HORIZONTAL CONTROL DATA

by the  
NATIONAL GEODETIC SURVEY  
OLD HAWAIIAN DATUM

QUAD 211573 STATION 1147  
LATITUDE ° ' TO ° '  
LONGITUDE ° ' TO ° '  
DIAGRAM

214 USN (Continued)

Reference mark 3 is an X filed in the head of a 1/2 inch brass screw, cemented in a drill hole in the concrete ledge of the new addition to the building. It is 46 feet west of the main wall of the building, 17.9 feet west of where the new addition joins the original wing, 1/2 inch north of a electrical conduit pipe and about 9 inches higher in elevation than the station mark.

The distance between Reference Mark 1 and Reference Mark 3 is 48.52 feet or 14.790 meters.

# HORIZONTAL CONTROL DATA

by the  
National Ocean Survey  
OLD HAWAIIAN DATUM

QUAD 211573 STATION 1148  
HAWAII  
LATITUDE 21° 00' TO 21° 30'  
LONGITUDE 157° 30' TO 158° 00'  
DIAGRAM NF 4-11 OAHU

FORM 525  
(9-18-68)

U.S. DEPARTMENT OF COMMERCE  
COAST AND GEODETIC SURVEY

## DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: WAIMANO STATE: Hawaii COUNTY: Honolulu  
CHIEF OF PARTY: C.A. Annis YEAR: 1969 DESCRIBED BY: H. Ellwanger

NOTE: * HEIGHT OF TELESCOPE ABOVE STATION MARK 1.5 METERS,† HEIGHT OF LIGHT ABOVE STATION MARK 1.5 METERS.					
0680 SURFACE-STATION MARK, UNDERGROUND-STATION MARK		DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION			
OBJECT		BEARING		DISTANCE	
				FEET	METERS
EWA CHURCH 1873 1927		SW			0 00 00.0
WAIPAHU MILL CHIMNEY 1925		W		32.01	9.757
desc RM 2		S		33.16	10.107
desc RM 1				48.08	14.655
desc RM 1 to RM 2					

The station is located about 6 1/2 miles southeast of Wahiawa, 4 miles north-northwest of Aiea, 2 3/4 miles north-northeast of Pearl City and on top of a green colored water reservoir.

To reach the station from the intersection of Kamehameha Highway and Waimano Home Road in Pearl City, go northerly on Waimano Home Road for 1.25 miles to the intersection with Komo Mai Drive, turn left and continue northwest and north on Komo Mai Drive for 1.9 miles to a tan colored water reservoir on the left, continue straight ahead on Komo Mai Drive for 0.75 mile to a green colored water reservoir and a locked gate on the left. Pass through the gate and continue about 50 feet to the reservoir and the station as described.

The station mark is a standard disk stamped WAIMANO 1969, set in a drill hole in the approximate center of the concrete reservoir.

Reference mark 1 is a standard disk stamped WAIMANO NO 1 1969, set in a drill hole near the south edge of the reservoir. It is 12.8 feet north of the south edge of the reservoir and 7.9 feet north of a square manhole.

Reference mark 2 is a standard disk stamped WAIMANO NO 2 1969, set in a drill hole near the west side of the reservoir. It is 60.5 feet southwest of a round manhole and 16.2 feet east of the west edge of the reservoir.

No azimuth mark was set for this station.

The key to the locked gate was obtained from the Honolulu City and County Land Division.

## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: WAIMANO

STATE: HAWAII

YEAR: 1969

FIRST

-ORDER

SOURCE: G-14543

GEODETIC LATITUDE:	21° 25' 59.31445	ELEVATION:	264.4 METERS
GEODETIC LONGITUDE:	157° 56' 53.23494		867 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	§ 10R Δ §1 ANGLE *
HI 3	5103	517,045.03	96,796.54	+ 0° 01' 08"

\* PLANE AZIMUTH HAS BEEN COMPUTED BY THE § 10R Δ §1 FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH * (From south)	CODE
EWA CHURCH	40° 39' 35.4	40° 38' 27"	5103

\* Refers to notes in manuals of triangulation and state publication.  
† To nearest meter only, when no trigonometric leveling is being

Direction-angle measured clockwise, referred to station.

USCGM-DC 27171-P88

JUN 1978  
U.S. DEPARTMENT OF COMMERCE  
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION  
NATIONAL OCEAN SURVEY, NATIONAL GEODETIC SURVEY

## HORIZONTAL CONTROL DATA

by the  
National Ocean Survey  
OLD HAWAIIAN DATUM

QUAD 211573 STATION 1149  
HAWAII  
LATITUDE 21 ° 00' TO 21 ° 30'  
LONGITUDE 157 ° 30' TO 158 ° 00'  
DIAGRAM NF 4-11 OAHU

### DESCRIPTION OF BENCH MARK STATE SURVEY 9-19

Designation	State Hawaii	County Honolulu
Nearest town Pearl City	County Honolulu	Chief of party C. Symms
Distance and direction from nearest town 1.55 miles west		Leveling date July 1969
Character of mark S survey disk		Stamping 9-19 1969
Established by State of Hawaii		
Detailed description	Section .T	.R

0.6 mile northwest along State Highway 90 from the intersection of Waimano Home Road at Pearl City, thence 0.95 mile west along State Highway 99, about 0.25 mile northwest of bench mark Q 13, in the top of the southwest end of the southeast concrete abutment of an overpass over the interstate highway, 16.5 feet southwest of the center line of the southeast bound lanes of the state highway, 2.3 feet northeast of the concrete and metal guardrail, 7.7 feet northeast of a metal guardrail, and about level with the highway.

FORM C&G-638  
(8-68)  
USCOM-DC 6329-P68

U.S. DEPARTMENT OF COMMERCE  
COAST AND GEODETIC SURVEY

### ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: STATE SURVEY 9-19

STATE: HAWAII

YEAR: 1969

SECOND

ORDER

SOURCE: G-14543

NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE:	21 ° 24' 01.72710	ELEVATION:	35.14 METERS
GEODETIC LONGITUDE:	157 59 39.45053		115.3 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ FOR Δ & Δ' ANGLE *
HI 3	5103	501,941.88	84,929.08	+ 0 ° 00' 08 "

\* PLANE AZIMUTH HAS BEEN COMPUTED BY THE θ FOR Δ & Δ' FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH (From north)	CODE
MAKAKILO	65 ° 01' 54.0	65 ° 01' 47 "	5103

POSITION DETERMINED BY TRAVERSE FROM STATION MAKAKILO

QG 149

# HORIZONTAL CONTROL DATA

by the  
National Ocean Survey  
OLD HAWAIIAN DATUM

QUAD 211573 STATION 1150  
HAWAII  
LATITUDE 21 ° 00' TO 21 ° 30'  
LONGITUDE 157 ° 30' TO 158 ° 00'  
DIAGRAM NF 4-11 OAHU

NO ORIGINAL TEXT

## ADJUSTED HORIZONTAL CONTROL DATA

Form 526  
(11-8-65)

### U. S. DEPARTMENT OF COMMERCE - COAST AND GEODETIC SURVEY RECOVERY NOTE, TRIANGULATION STATION INTERSECTION

NAME OF STATION: KANEHOE BAY, HAWAIILOA HILL, BEACON  
ESTABLISHED BY: YEAR: 1952 STATE: Hawaii  
RECOVERED BY: W.R. Porter YEAR: 1963 COUNTY: Honolulu

Detailed statement as to the fitness of the original description; including marks found, stampings, changes made, and other pertinent facts:

Station was recovered in good condition. It is the rotating, airport beacon light (white and green lights) mounted on the center of the roof of the "Kansas Tower" observation tower on Hawaiioloa Hill on the Kaneohe Marine Corps Air Station at Kaneohe.

### RECOVERY NOTE DESCRIPTION OF TRIANGULATION INTERSECTION STATION

NAME OF STATION: KANEHOE BAY, HAWAIILOA HILL, BEACON  
Established By: YEAR: 1952 STATE: Hawaii COUNTY: Honolulu  
Recovered By: C.A. Annis YEAR: 1969  
Description, including sketch of object:

The station is the beacon atop the control tower on Hawaiioloa Hill at the Marine Air Station at Kaneohe.

### RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: KANEHOE BAY HAWAIILOA HILL BEACON  
ESTABLISHED BY: YEAR: 1952 STATE: Hawaii BENCH MARK(S) ALSO ☐  
RECOVERED BY: C.K. Townsend YEAR: 1976 COUNTY: Honolulu  
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN:  
At Kaneohe Marine Corps Air Station.

Detailed statement as to the fitness of the original description; including marks found, stampings, changes made, and other pertinent facts:  
Station was recovered as described in 1963.

FORM CG-526 (9-66)  
JSCOMM-DC 38496-PSS

U.S. DEPARTMENT OF COMMERCE  
ENVIRONMENTAL SCIENCE SERVICES ADMINISTRATION  
COAST AND GEODETIC SURVEY

R

NAME OF STATION: KANEHOE BAY HAWAIILOA HILL BCN

STATE: HAWAII

YEAR: 1952

THIRD

ORDER

SOURCE: G-14543

GEODETIC LATITUDE:	21 ° 27' 04.39602	ELEVATION:	METERS
GEODETIC LONGITUDE:	157 45 34.42812		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	9 FOR Δ 41 ANGLE *
HI 3	5103	581,766.87	103,423.13	+ 0 05' 17"

\* PLANE AZIMUTH HAS BEEN COMPUTED BY THE 9 FOR Δ 41 FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH * (From south)	CODE

THESE DATA OBTAINED FROM ADJUSTMENT OF OCT 1971