

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 1251
HAWAII
LATITUDE 21 ° 00' TO 21 ° 30'
LONGITUDE 157 ° 30' TO 158 ° 00'
DIAGRAM NF 4-11 OAHU

SEE STATION HAWAII ASTRO IGY

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: DANJON ASTROLABE

STATE: HAWAII

YEAR: 1957

THIRD

-ORDER

SOURCE: G-11857
NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE:	21 ° 20 ' 50.574	ELEVATION:	METERS
GEODETIC LONGITUDE:	157 55 08.238		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ IOR Δ RI ANGLE *
HI 3	5103	527,580.92	65,648.86	+ 0 ° 01 ' 46 "

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE θ IOR Δ RI FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH * (From south)	CODE
POSITION DETERMINED BY TRAVERSE FROM STATION HAWAII ASTR IGY			
QF 228			

QUAD 211573 STATION 1252
HAWAII
LATITUDE 21 ° 00' TO 21 ° 30'
LONGITUDE 157 ° 30' TO 158 ° 00'
DIAGRAM NF 4-11 OAHU

by the
National Ocean Survey
OLD HAWAIIAN DATUM

NO ORIGINAL TEXT

ADJUSTED HORIZONTAL CONTROL DATA

Form 528
(11-8-55)

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

NAME OF STATION: DE RUSSY
ESTABLISHED BY: L.G.S. YEAR: 1927 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 mark was recovered and found in good condition. No reference marks were established because the station is in a well-protected location in a restricted area on a military reservation. A complete description follows:

Station is located in the Waikiki District of Honolulu, in the south end of Fort De Russy Military Reservation; on the concrete roof of Battery Randolph, a large, concrete building that formerly held two coastal defense cannon.

Station mark is a standard disk stamped "DE RUSSY 1927", cemented in a drill hole in the concrete roof, 17.7 feet northeast of southwest edge of roof, 75.5 feet southwest from the top of the bevel of the northeast edge of the roof, 18 feet northwest of the center of the northeast cover (from the southeast end) of a row of five, 14.1 feet southeast of the center of the third manhole cover in the row, 9.4 feet southeast from the center-line of the battery, and opposite the battery observation post.

* 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.

Comp-DC 34-118

NAME OF STATION: DE RUSSY

STATE HAWAII

YEAR: 1927

THIRD

ORDER

SOURCE G- 558

GEODETIC LATITUDE: 21°16'55.269 GEODETIC LONGITUDE: 157 50 11.886	ELEVATION: 2 METERS SCALED FEET
--	------------------------------------

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ (OR Δ & ANGLE)
HI 3	5103	555,620.39	41,928.52	+ 0° 03' 34"

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

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

QF 001

QF 001

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

QUAD 211573 STATION 1253
HAWAII
LATITUDE 21 ° 00' TO 21 ° 30'
LONGITUDE 157 ° 30' TO 158 ° 00'
DIAGRAM NF 4-11 OAHU

NO ORIGINAL TEXT

DIAMOND HEAD LIGHTHOUSE (Hawaii, E.R.H., 1925; O.W.S., 1931)
--Locality - S.E. coast of Oahu.
Lighthouse is large white structure on S end of Diamond Head, plainly visible at sea. Station was not visited.

RECOVERY NOTE, TRIANGULATION STATION INTERSECTION

NAME OF STATION: Diamond Head Lighthouse
ESTABLISHED BY: E.R.H. YEAR: 1925 STATE: Hawaii BENCH MARK(S) ALSO ☐
RECOVERED BY: R.C. Munson YEAR: 1970 COUNTY: Honolulu
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN:
1-3/4 miles Southeast from downtown Waikiki.

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 a white pyramidal concrete tower with red dome roof and is 55 feet high. Located on bluff above sea at southwest side of Diamond Head at the U. S. Coast Guard Station. Light is 147 feet above sea level.

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: DIAMOND HEAD LIGHTHOUSE

STATE: HAWAII

YEAR: 1925

THIRD ORDER

SOURCE: G-SP156
NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE:	21 ° 15' 31.97	ELEVATION:	METERS
GEODETIC LONGITUDE:	157 48 44.25		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	ϕ OR Δ OR ANGLE *
HI 3	5103	563,918.50	33,532.97	+ 0 04' 05"

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

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

QUAD 211573 STATION 1255
HAWAII
LATITUDE 21 ° 00' TO 21 ° 30'
LONGITUDE 157 ° 30' TO 158 ° 00'
DIAGRAM NF 4-11 OAHU

Flat (Oahu Island, E. R. Hand, 1926).—On southeast coast of Oahu, on the flat coral islet that lies just off Alala Point. Station is on the most southerly point of this islet, the point closest to the mainland. It is 10 feet from the water, and is marked according to note 3.

Form 1
(11-8-
RECOVERY NOTE TRIANGULATION STATION

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: FLAT
ESTABLISHED BY: E.R.H. YEAR: 1926 STATE: Hawaii
RECOVERED BY: D.M. Whipp YEAR: 1965 COUNTY: Honolulu

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

Station was searched for but not found. The island is composed of very porous coral rock and it is believed that portions of the south end have been worn off due to wave action.

Sextant angles measured at point station was believed to have been located agree very closely with angles computed to adjacent triangulation stations. Station is believed destroyed.

* 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.

CONF-DC 34214

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: FLAT
STATE: HAWAII YEAR: 1926 THIRD

SOURCE: G-SP156

GEODETIC LATITUDE: 21°24'09.262 GEODETIC LONGITUDE: 157 43 22.394	ELEVATION: 1 SCALED METERS FEET
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STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	δ FOR Δ α \angle ANGLE
HI 3	5103	594,270.85	85,772.50	+ 0° 06' 04"

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE θ OR Δ 41 FORMULA NEGLECTING THE SECOND TERM.

PLANE AZIMUTH HAS BEEN COMPUTED BY THE \sin^2 OR Δ^2 FORMULA REJECTING THE SECOND TERM.			
TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH (From south)	CODE
	D	D	

Q1 434

QI 434

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 1256
HAWAII
LATITUDE 21 ° 00' TO 21 ° 30'
LONGITUDE 157 ° 30' TO 158 ° 00'
DIAGRAM NF 4-11 OAHU

Fort Armstrong Flagstaff (Hawaii, J.H.P., 1933) -- This flagstaff was located by intersection directions from Punchbowl, Rocky Hill, and Kaimuki. It is the flagstaff at Fort Armstrong in the city of Honolulu and is in the position shown on Chart No. 4109.

Form 528
(11-8-55)

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

NAME OF STATION: Fort Armstrong Flagstaff
ESTABLISHED BY: J.H.P. YEAR: 1933 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 recovered in good condition.

Located in City of Honolulu at Fort Armstrong, inside the fenced area enclosing the U.S. Public Health and Quarantine Station buildings, about 100 feet southwest of southernmost office building.

Station is a tapering, steel pole supported by a concrete foundation. It is 1 foot in diameter at the base, 85 feet high, and has a gold ball on top.

* 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.

CORR-DC 34314

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: FORT ARMSTRONG FLAGSTAFF

STATE: HAWAII

YEAR: 1933

THIRD

ORDER

SOURCE: G- 9849

GEODETIC LATITUDE:	21 ° 18' 05.630	ELEVATION:	METERS
GEODETIC LONGITUDE:	157 52 12.363		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	S OR Δ S' ANGLE *
HI 3	5103	544,220.52	49,017.28	+ 0 02 50 "

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

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

QF 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 1257
HAWAII
LATITUDE 21 ° 00' TO 21 ° 30'
LONGITUDE 157 ° 30' TO 158 ° 00'
DIAGRAM NF 4-11 OAHU

NO TEXT

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: FORT DE RUSSY FLAGPOLE

STATE: HAWAII

YEAR: 1927

THIRD

ORDER

SOURCE: G- 558

GEODETIC LATITUDE:	21 ° 17 ' 03.870	ELEVATION:	METERS
GEODETIC LONGITUDE:	157 50 12.574		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ OR α ANGLE *
HI - 3	5103	555,554.43	42,796.29	+ 0 ° 03 ' 33 "

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

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

QF 002

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

QUAD 211573 STATION 1259
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 526 (Rev. Feb. 1965) RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: FORT SHAFTER, flagstaff
ESTABLISHED BY: O. B. F. YEAR: 1909 STATE: Hawaii
RECOVERED BY: J. L. H. 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 is on OAHU Island, in the center of Fort SHAFTER at the North-East corner of the parade ground on Palm Circle Drive, across from RICHARDSON HALL (Headquarters, U.S. Army Pacific). It is in the center of a circular concrete section 52 feet in diameter. The flagstaff is in 2 sections; the lower section is octagonal concrete and steel, the upper section is steel pipe.

Form 526
(11-8-65)

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

R

NAME OF STATION: Fort Shafter, flagstaff
ESTABLISHED BY: O. B. F. YEAR: 1909 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 recovered. It is located in the Kalihi District of Honolulu, at Fort Shafter, in the northeast corner of Palm Circle Drive and set at the center of a circular, concrete base 52 feet in diameter. The flagstaff is in 2 sections; the base section is concrete and is octagon-shaped. The top section is steel pipe and is offset westward from the center of the base section. The entire flagstaff is painted white and is about 65 feet high. There are 4 guy-cables attached to the top of the first section.



* 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.
Name of station should be inserted here.

RECOVERY NOTE, TRIANGULATION STATION INTERSECTION

R

NAME OF STATION: FORT SHAFTER FLAGSTAFF
ESTABLISHED BY: O. B. F. YEAR: 1909 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.

NAME OF STATION: FORT SHAFTER FLAGSTAFF

STATE: HAWAII

YEAR: 1909

THIRD

-ORDER

SOURCE: G-SP156

GEODETIC LATITUDE:	21° 20' 58.234	ELEVATION:	METERS
GEODETIC LONGITUDE:	157° 53' 23.544		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ: ANGLE *
HI 3	5103	537,477.34	66,427.76	+ 0° 02' 24"

* 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

QI 367

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

QUAD 211573 STATION 1261
HAWAII
LATITUDE 21° 00' TO 21° 30'
LONGITUDE 157° 30' TO 158° 00'
DIAGRAM NF 4-11 OAHU

HawaiiIloa Hill (Oahu Island, E. R. Hand, 1926).—On the eastern coast of Oahu, in the western part of Mokapu Peninsula, on a steep, conical hill, which occupies a prominent position. For many years there has been a concrete monument on top of this hill; it is the mark sighted on. Identical with *Loa*, 1910.

HAWAIILOA HILL (Hawaii, E.R.H., 1926; H.A.P., 1932)
--Station re-marked in 1929 according to Note 14A.

FORM 526a
(9-18-69)

U.S. DEPARTMENT OF COMMERCE
COAST AND GEODETIC SURVEY

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: **HAWAIILOA HILL**
ESTABLISHED BY: **E.R.H.** YEAR: 1926 STATE: **Hawaii**
RECOVERED BY: **W.R. Porter** YEAR: 1964 COUNTY: **Honolulu**

OBJECT	BEARING	DISTANCE		DIRECTION
		FEET	METERS	
MOKAPU RESET 1962				00 00 00.0
PAPAA 2 1932				105 11 09.1
HEEIA 1872-1927				192 12 07.2

A "Type C", Hawaii Territory Survey signal was recovered in good condition. No record of its establishment could be found either at the Kaneohe Marine Corps Air Station's DPW office or at the Hawaii State Survey office. A check run was taken which proved that the station is at exact point of the original station. Considerable excavation and cutting was done on the hilltop in preparation for the construction of the Kansas Tower, but the point on which the station

was located was left alone and is at the south side of the Kansas Tower. The distance to HAWAIILOA HILL 2 1941 was checked and it is exactly the same as recorded in 1941. Both stations are on exactly the same line to MOKAPU RESET 1962. A complete description follows:

Station is located on the Kaneohe Marine Corps Air Station, on Puu HawaiiIloa, at the south side of the Kansas Tower, about level with the floor of the glass-enclosed observation room.

Station may be reached by obtaining permission and directions from the S-2 office in the Administration Building (Bldg. No. 215) on the Marine Base.

Station is center of iron pipe that projects 2 feet from the center of a 5-1/2-foot-square, concrete platform which sets on the top of a dirt-filled, 8 x 10-foot concrete box with sides about 6 feet high on the lower side and flush with hill on north side. There is a slight space between dirt and bottom of platform on the east side and the top of a 2-foot-square concrete block can be seen, which supports the platform and the pipe. Station is 5 feet south of edge of stairway and 5.55 meters from HAWAIILOA HILL 2, in azimuth 74° 56'.

An iron pipe, painted alternate red and white, is set into the 2-foot-high pipe and extends 8 feet above station platform.

(R.L.N., 1967)--Station recovered as previously described.

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

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

USCOMNA-DC 27172-P89

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: **HAWAIILOA HILL**
STATE: **HAWAII** YEAR: 1926 THIRD ORDER

SOURCE: **G-SP156**

GEODETIC LATITUDE: 21° 27' 04.107	ELEVATION: METERS
GEODETIC LONGITUDE: 157° 45' 34.551	FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ θ: ANGLE *
HI 3	5103	581,755.30	103,393.95	+ 0 05 17

* 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

QI 430

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

QUAD 211573 STATION 1262
HAWAII
LATITUDE 21 ° 00' TO 21 ° 30'
LONGITUDE 157 ° 30' TO 158 ° 00'
DIAGRAM NF 4-11 OAHU

HAWAIILOA HILL 2 (Hawaii, B.H.R., 1941)--New construction necessitated the removal of HawaiiIloa Hill and before the original station was disturbed a new disk, stamped "HAWAIILOA HILL 2 1941," was set in the concrete walk running around the new flight control tower built on the hill. The new station is on the SE corner of the walk and will see all around the horizon. A theodolite was set up over the old station and the mark (new) was placed directly on line with station MOKAPU and toward MOKAPU at a distance of 5.548 meters. The new and old station are on the same elevation. At the time this work was done it was thought impossible to save the old station. The local civilian engineer however preserved the location of the old station and has marked it with an iron pipe. For inshore objects this station is still usable and when work is finally completed in the area it can be re-marked with a standard disk.

Station mark (new) is a standard disk set in concrete.

(11-8-65)

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: HAWAIILOA HILL 2
ESTABLISHED BY: B.H.R. YEAR: 1941 STATE: Hawaii
RECOVERED BY: H.J. Seaborg YEAR: 1962 COUNTY: Honolulu

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

The station was recovered in good condition as described. It is a standard triangulation disk set in a drill hole at the southeast corner of the concrete walk around the Observation Tower known as Kansas Tower. The station is about 20 feet above the ground.

Form 528
(11-8-65)

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

R

NAME OF STATION: HAWAIILOA HILL 2
ESTABLISHED BY: B.H.R. YEAR: 1941 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 and found in good condition. A complete description follows:

Station is located on Puu HawaiiIloa, on the Kaneohe Marine Corps Air Station, on the catwalk at the southeast corner of the "Kansas Tower," a large, concrete, yellow-colored, observation building.

Station may be reached by obtaining permission and directions at the S-2 Office in the Base Administration Building (No. 215), on the Marine Base.

Station mark is a standard disk stamped "HAWAIILOA HILL 2 1941", cemented in a drill hole in the concrete catwalk. It is 2.25 feet south-southeast of the southeast corner of the building, 1.83 feet north of edge of catwalk, and 18.208 feet (5.550 meters) east-northeast of station HAWAIILOA HILL 1926.

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: HawaiiIloa Hill 2
ESTABLISHED BY: B.H.R. YEAR: 1941 STATE: Hawaii BENCH MARK(S) ALSO ☐
RECOVERED BY: R.L.N. YEAR: 1967 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:

Station was recovered as previously described.

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: HAWAIILOA HILL 2

STATE: HAWAII

YEAR: 1941

THIRD

ORDER

SOURCE: G- 1372

NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE:	21 ° 27' 04.154	ELEVATION:	103	METERS
GEODETIC LONGITUDE:	157 45 34.365	SCALED		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	ϕ OR Δ OR ANGLE °
HI 3	5103	581,772.87	103,398.72	+ 0 ° 05' 17"

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

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

POSITION DETERMINED BY TRAVERSE FROM STATION HAWAIILOA HILL

QF 198

DEC 1979
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 1263
HAWAII
LATITUDE 21° 00' TO 21° 30'
LONGITUDE 157° 30' TO 158° 00'
DIAGRAM NF 4-11 OAHU

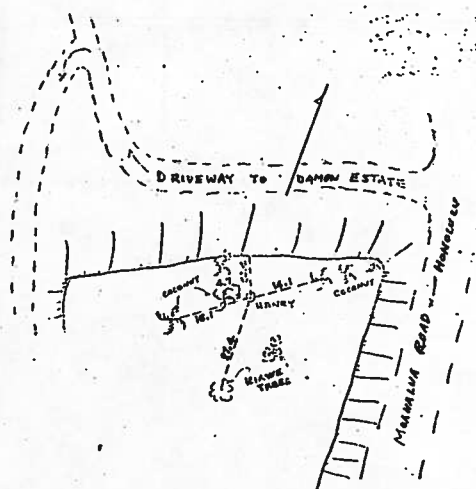
DESCRIPTION OF SURVEY MARK

NAME OF STATION: Henry STATE: Hawaii COUNTY: Honolulu
NEAREST TOWN: Honolulu
ESTABLISHED BY State of Hawaii, Highways Division DATE: 1971
DESCRIBED BY: James T. Ishihara SURFACE MARK: 3/4 Inch Pipe In Concrete

Station is located on the northeasterly side of the Henry Damon residence on the westerly side of Moanalua Road.

To reach station from the U.S. Army, Fort Shafter Simon Bolivar Buckner Gate, head 0.35 mile northwest along Kaula Street to the intersection at Moanalua Road, continue 0.75 mile northwest along Moanalua Road to a break in the medial strip, turn left in a westerly direction and head 0.15 mile along driveway to old gate to Damon Estate, pass through gate and proceed 0.25 mile along driveway passing the new gate to the Henry Damon residence driveway, turn left and head about 300 ft. in a northerly direction to the end of the driveway and walk about 500 ft. in a northerly direction to station.

Station mark is a 3/4" pipe set in concrete and level with the ground. Ties to station are: NE 16.1 ft. from a coconut tree, S 23.4 ft. from the edge of cut, WSW 14.1 ft. from a coconut tree and northerly 27.4 ft. from a Kiawe (Algaroba) tree.



ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: HENRY OBS BY WIDT
STATE: HAWAII YEAR: 1971 THIRD ORDER

SOURCE: 6-15752

GEODETIC LATITUDE:	21° 21' 26.18438	HEIGHT	49
GEODETIC LONGITUDE:	157° 53' 59.21252	SCALED	METERS FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ 10R Δ 01 ANGLE *
HI 3	5103	534,103.77	69,245.69	+ 0° 02' 11"

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

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH * (From south)	CODE
SALT LAKE	131° 33' 27.9	131° 31' 16"	5103

THESE DATA OBTAINED FROM ADJUSTMENT OF SEP 1979

RL 143

QUAD 211573 STATION 1264
HAWAII
LATITUDE 21 ° 00' TO 21 ° 30'
LONGITUDE 157 ° 30' TO 158 ° 00'
DIAGRAM NF 4-11 OAHU

NO TEXT

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: HONOLULU

STATE: HAWAII

YEAR: 1887

SECOND - ORDER

SOURCE: G-SP156

GEODETIC LATITUDE: 21°18'28.06 GEODETIC LONGITUDE: 157 51 44.71	ELEVATION: 3 SCALED METERS FEET
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STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ HOR Δ θ : ANGLE °
HI 3	5103	546,833.46	51,282.66	+ 0° 03' 00

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

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE \sin OR Δ \sin FORMULA NEGLECTING THE SECOND TERM.			
TO STATION OR OBJECT	GEODETIC AZIMUTH (From south) D ° ' "	PLANE AZIMUTH * (From south) D ° ' "	CODE

QD 399

QD 399

QUAD 211573 STATION 1265
HAWAII
LATITUDE 21 ° 00' TO 21 ° 30'
LONGITUDE 157 ° 30' TO 158 ° 00'
DIAGRAM NF 4-11 OAHU

NO ORIGINAL TEXT

Form 526
(11-8-65)

U.S. DEPARTMENT OF COMMERCE - COAST AND GEODETIC SURVEY

RECOVERY NOTE, TRIANGULATION STATION
INTERSECTION

NAME OF STATION: Honolulu Harbor Channel, rear range light

ESTABLISHED BY: J.H. Peters YEAR: 1935 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 recovered in good condition. Located in downtown Honolulu, at intersection of King and Bethel Streets, on top of the 5-story McCandless Building.

Station is a short, 3-legged, tapering, skeleton-steel tower, painted white. A white, rectangular daymark, with red stripe is mounted on the southwest side of the tower. A flashing red light is mounted on top of tower.

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

Com-DC 24314

by the
National Ocean Survey
OLD HAWAIIAN DATUM

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: HONOLULU HARBOR CHAN R RNG LT

STATE: HAWAII

1935

THIRD

—PAGE—

SOURCE: G- 9849

GEODETTIC LATITUDE:	21° 18' 46." 281	ELEVATION:	METERS
GEODETTIC LONGITUDE:	157 51 56.639		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ FOR Δ S. ANGLE $^\circ$
HI 3	5103	545,703.91	53,120.17	+ 0° 02' 56"

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

AZIMUTH HAS BEEN COMPUTED BY THE $\sin 10^\circ$ FORMULA NEGLECTING THE SECOND TERM.			
TO STATION OR OBJECT	GEODETIC AZIMUTH (From south) 0 1 2	PLANE AZIMUTH (From south) 0 1 2	CODE

QF 148

QF 148

QF 437

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

QUAD 211573 STATION 1268
HAWAII
LATITUDE 21 ° 00' TO 21 ° 30'
LONGITUDE 157 ° 30' TO 158 ° 00'
DIAGRAM NF 4-11 OAHU

Honolulu longitude monument (Oahu Island, Edwin Smith, 1903).—In the grounds of the United States Navy station, 88.97 meters (291.9 feet) north and 505.97 meters (1,660.0 feet) east of harbor light. Station marked by a concrete pier 14 by 26 inches in cross section, and 3 feet high, resting on a concrete foundation 3 by 4 feet in cross section, which in turn rests upon coral rock 2½ feet below surface of ground. North of the center of the pier, and 3.435 meters (11.27 feet) therefrom is a galvanized iron pipe 2½ feet long set in cement, with its center marked by a copper bolt.

HONOLULU LONGITUDE MONUMENT (Hawaii, E.S., 1903; G.A.N., 1952). --This station is in a built-up part of the city and is presumed to be gone.

11-8-85)

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: HONOLULU LONGITUDE MONUMENT
ESTABLISHED BY: E.S. YEAR: 1903 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:

Searched for but not found. Station was located on property that has been a military reservation for many years. There is a large barracks very near where the station was. Station was probably destroyed by construction.

* 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: HONOLULU LONGITUDE MON

STATE: HAWAII

YEAR: 1903

THIRD

-ORDER

SOURCE: G-SP156

GEODETIC LATITUDE	21 ° 18' 23.719	ELEVATION	2	METERS
GEODETIC LONGITUDE	157 51 55.441	SCALED		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ HOR Δ DI ANGLE *
HI 3	5103	545,819.13	50,843.79	+ 0 ° 02' 56"

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE θ HOR Δ DI FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH * (From south)	CODE
	0 ° ' "	0 ° ' "	

QI 340

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

QUAD 211573 STATION 1270
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
(11-8-55)

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

R

NAME OF STATION: Honolulu, Radio Station KHVH Tower
ESTABLISHED BY: H.O.F. YEAR: 1957 STATE: Hawaii
RECOVERED BY: H.J.S. YEAR: 1961 COUNTY: Honolulu

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

It is the tall structural steel radio mast painted in alternate red and white sections located at Waikiki Beach and just west of the Hilton Hawaiian Village Hotel.

Form 526
(11-8-55)

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

R

NAME OF STATION: Honolulu, Radio Station KHVH, Tower
ESTABLISHED BY: H.O.F. YEAR: 1957 STATE: Hawaii
RECOVERED BY: D.M. Whipp YEAR: 1965 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. It is a slender, 3-legged, skeleton steel structure, about 279 feet tall and painted alternate red and white. Located in the Waikiki District, on grounds of the Hilton Hawaiian Village Hotel parking lot.

NAME OF STATION: HONOLULU RADIO STA KHVH TOWER
STATE: HAWAII YEAR: 1957

OBS BY HTS

THIRD ORDER

SOURCE: G-11968

GEODETIC LATITUDE: 21 ° 17' 11.899	ELEVATION: METERS
GEODETIC LONGITUDE: 157 50 24.291	FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ OR ANGLE *
HI 3	5103	554,445.45	43,605.27	+ 0° 03' 29"

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

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

* 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.

NOV-DC 34314

QF 213

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

QUAD 211573 STATION 1271
HAWAII
LATITUDE 21 ° 00' TO 21 ° 30'
LONGITUDE 157 ° 30' TO 158 ° 00'
DIAGRAM NF 4-11 OAHU

HONOLULU ST. ANDREWS CATHEDRAL HI TOWER

(Oahu Island, E. R. Hand, 1925).—In southeastern Oahu, on southwestern slope of Punchbowl, tower of heavy design, square, yellow, each corner built out cylindrically, with one raised higher than the other three.

Form 526
(11-8-65)

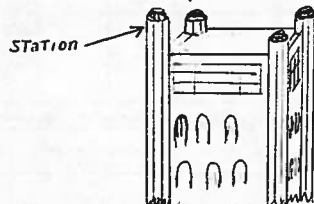
RECOVERY NOTE, TRIANGULATION STATION INTERSECTION

Honolulu
NAME OF STATION: St. Andrews Cathedral, highest tower
ESTABLISHED BY: E.R.H. YEAR: 1925 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 at station PUNCHBOWL and recovered.

Located in Honolulu along Queen Emma Street, at Queen Emma Square, on the tower of the St. Andrews Cathedral. The tower is a tan, stone structure about 100 feet high, with each of its 4 corners built out in octagonal shape and extending above the top of the tower. One corner extends further above the tower top than the others and this one is the station..



RECOVERY NOTE, TRIANGULATION STATION
HONOLULU
NAME OF STATION: ST ANDREWS CATH HIGHEST TOWER
ESTABLISHED BY: E. R. H. YEAR: 1925 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 by D. G. Rushford in 1964.

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: HONOLULU ST ANDREW CATH HI TWR

STATE: HAWAII

YEAR: 1925

THIRD

ORDER

SOURCE: G-SP156

GEODETIC LATITUDE:	21 ° 18 ' 47.329	ELEVATION:	METERS
GEODETIC LONGITUDE:	157 51 35.850		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	§ 10R Δ 01 ANGLE °
HI 3	5103	547,669.51	53,227.63	+ 0 ° 03 ' 03 "

* 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

Q1 331

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

QUAD 211573 STATION 1272
HAWAII
LATITUDE 21 ° 00' TO 21 ° 30'
LONGITUDE 157 ° 30' TO 158 ° 00'
DIAGRAM NF 4-11 OAHU

NO ORIGINAL TEXT

Form 555
(11-8-55)

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

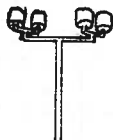
R

NAME OF STATION: Honolulu, Tripler Hospital, Twin Lights
ESTABLISHED BY: HTS 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:

The station was recovered. It is located about 4 miles airline northwest from the center of Honolulu, on top of Tripler Army Hospital, on the southwest edge of the small square roof that is the highest part of the hospital building.

Although called twin lights, there are actually 4 lights in the group, but so arranged that appear as twins from a distance. The lights are mounted on a horizontal bracket on top of a single pipe extending about 3 feet above the roof.



INTERSECTION RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: HONOLULU TRIPLER HOSP TWIN LIGHTS
ESTABLISHED BY: H. T. S. 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 by D. G. Rushford in 1964.

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: HONOLULU TRIPLER HOSP TWIN LTS

STATE: HAWAII

YEAR: 1957

THIRD

ORDER

SOURCE: G-11968

GEODETIC LATITUDE:	21 ° 21' 46.206	ELEVATION:	METERS
GEODETIC LONGITUDE:	157 53 34.881		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ (OR Δ θ) ANGLE °
HI 3	5103	536,402.36	71,267.38	+ 0 ° 02' 20"

* 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

QF 654

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 1273
HAWAII
LATITUDE $21^{\circ} 00'$ TO $21^{\circ} 30'$
LONGITUDE $157^{\circ} 30'$ TO $158^{\circ} 00'$
DIAGRAM NF 4-11 OAHU

DESCRIPTION OF TRIANGULATION INTERSECTION STATION

NAME OF STATION: HONOLULU UNIV OF HAWAII FLAGPOLE

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

Description, including sketch of object:

The station is the ball on the top of the flagpole, located at the south side of the university grounds at the corner of Dole street and University Avenue and is about 60 feet high.

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: HONOLULU UNIV HAWAII FLAGPOLE

STATE: HAWAII

YEAR: 1969

THIRD -ORDER

SOURCE: G-14543

GEODETIC LATITUDE:	21 18 01.63888	ELEVATION:	METERS
GEODETIC LONGITUDE:	157 49 23.12315		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	ϕ OR Δ ϕ ANGLE *
HI 3	5103	560,224.60	48,630.15	+ 0 03 51

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

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

FORM C&GS-525b (12-68)

Described by _____
U.S. DEPARTMENT OF COMMERCE
NOAA
COAST AND GEODETIC 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 1274
HAWAII
LATITUDE 21 ° 00' TO 21 ° 30'
LONGITUDE 157 ° 30' TO 158 ° 00'
DIAGRAM NF 4-11 OAHU

SEE STATION KALIHI 2

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: HYDRANT 4859
STATE: HAWAII YEAR: 1964 THIRD ORDER

SOURCE: G-12664
NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE:	21 ° 19' 28.349	ELEVATION:	2	METERS
GEODETIC LONGITUDE:	157 53 40.016	SCALED		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ FOR Δ & Δ ANGLE *
HI 3	5103	535,926.31	57,357.36	+ 0 ° 02' 18 "

* 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 south)	CODE

POSITION DETERMINED BY TRAVERSE FROM STATION KALIHI 2

QF 562

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 1275
HAWAII
LATITUDE 21° 00' TO 21° 30'
LONGITUDE 157° 30' TO 158° 00'
DIAGRAM NF 4-11 OAHU

KAHALA (Hawaii, L.G.S., 1928)--A standard bronze disk (Territory Survey) set in concrete pier located on grounds of Kahala Public Park near beach, W of golf course entrance. The mark is a few yards NW of bathhouse.

ADJUSTED HORIZONTAL CONTROL DATA

FORM 526a
(10-15-60)

U.S. DEPARTMENT OF COMMERCE
COAST AND GEODETIC SURVEY

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: KAHALA
ESTABLISHED BY: L.G.S. YEAR: 1928 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	
WAIALAE 1927				00 00 00.0
R.M. No. 1	NNE	173.70	(52.944)	13 46 15
NW Corner of Bath-house	ENE	64.8		71 24 27
R.M. No. 2	W	71.510	21.797	271 32 36
Water Faucet	NW	12.95		299 25 39
Traverse Mark	NNW	435.308	(132.682)	343 30 29

Station mark was recovered and found in good condition, although it was about 20 inches below ground surface. The mark was left in place as an underground mark, and a new surface mark was plumbed over it. Two reference marks were established. A complete description follows:

Station is located, airline, about 6 miles east-southeast of the Federal Building in Honolulu and 2-1/4 miles east-northeast of Diamond Head, in the south corner of Waialae Beach Park, about 0.1 mile southwest of the clubhouse of the Waialae Golf Club.

To reach station from the Waikiki Fire Station, at intersection of Ala Wai Blvd and Kapahulu Ave, go south on Paki Ave for 1.0 mile; continue ahead, on Diamond Head Road, for 1.5 miles to fork. Continue ahead, on right fork (Kahala Ave), for 1.6 miles to the park on right. Go south-east, along right side of park, for about 125 yards to station.

Station mark is a standard disk stamped "KAHALA 1928 1963", set in the top of a 12-inch-square, concrete monument flush with the ground. It is 45.9 feet northeast of cement-block wall, 150.1 feet southwest of south-west end of foot-bridge over canal, 15 feet southeast of a 30-inch banyan tree, and about 23 yards northwest from mean high water line.

Underground mark is an unstamped, Hawaii Territory Survey, bronze disk set in the top of a mass of concrete about 20 inches under ground.

Reference mark number one is a standard disk stamped "KAHALA NO 1 1928 1963", cemented in a drill hole in the concrete wall along the south-west side of a canal. It is 64.7 feet northwest of edge of foot-bridge.

Reference mark number two is a standard disk stamped "KAHALA NO 2 1928 1963", set in the top of an 11-inch-square, concrete monument flush with the ground. It is 18 inches north from the junction of the cement block wall and a board wall, and opposite the end of the property line running southwest from the park boundary.

Traverse mark is a 4-inch, chiseled cross in the concrete walk on the southeast side of the concrete bridge on Kahala Ave. The cross is 8 inches southwest from the northeast end of the walk.

NAME OF STATION: KAHALA

STATE: HAWAII

YEAR: 1928

SECOND

ORDER

SOURCE: G- 7448

GEODETIC LATITUDE:	21° 16' 20.058	ELEVATION:	2	METERS
GEODETIC LONGITUDE:	157° 46' 49.439	SCALED		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	φ OR Δ φ' ANGLE *
HI 3	5103	574,771.65	38,398.99	+ 0 04 47 *

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE φ OR Δ φ' FORMULA NEGLECTING THE SECOND TERM

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH * (From south)	CODE
WAIALAE	184° 25' 53.8	184° 21' 07 *	5103

QE 014

*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.

USCOMM-DC 27172-P28

QF 539

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

QUAD 211573 STATION 1277
HAWAII
LATITUDE 21° 00' TO 21° 30'
LONGITUDE 157° 30' TO 158° 00'
DIAGRAM NF 4-11 OAHU

KALIHI (Hawaii, L.G.S., 1928) -- A standard bronze disk (Territory Survey) set in concrete pier on coral at the makai end of Pineapple Road in Kalihi, about 25 yards S of road between road and Auiki pond.

KALIHI (Hawaii, L.G.S., 1928; G.A.N., 1952) -- J.M. Dunn, Territorial Surveyor, stated: Station is in an area used during World War II for warehouses and filled in. It was said to have been shielded by a form built around the station when fill was made. It was searched for and not found. Should be considered lost for practical purposes.

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: KALIHI
ESTABLISHED BY: L.G.S. YEAR: 1928 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	
SALT LAKE 1873-1927				00 00 00.0
R.M. No. 1	NE	21.153	6.446	64 01 30
R.M. No. 2	SE	65.304	19.906	173 37 06

Station was recovered and found in good condition, although it has been re-marked with a disk that appears to be a U.S. Corps of Engineers mark. No information or records could be found to indicate who re-marked the station. It is located in an area that was filled in during World War II, and was probably re-marked to bring it up to ground level. Two new reference marks were established. A complete description follows:

Station is located about 2 miles airline west-northwest of the Federal Building in Honolulu, just outside the west boundary of the Kapalama Military Reservation, in the south end of the storage yard of State Tile Co.

To reach station from entrance of Kapalama Military Reservation, at junction of Waiakamilo St. and Nimitz Highway, go northwest on Nimitz Highway for 0.7 mile; turn left on Sand Island Access road and go 0.5 mile; turn left on Auiki St. and go 0.1 mile; turn right, into entrance of State Tile Company, and go 0.1 mile to end of yard; turn left and go about 50 yards to station.

Station mark is a bronze disk, with no pre-cast lettering on it, but stamped "TERR. OF HAWAII TRIG STA KALIHI RESET OCT 1945", set in concrete in a 6-inch iron pipe that projects 4 inches above ground and has an 18-inch-square, concrete shoulder around it, flush with top of pipe. The mark is 4 inches below top of pipe. A 7-inch, iron, hand-hole cover, with "WATER" embossed on it, is on top of the pipe. The mark is 46.2 feet north of south fence line, 21.4 feet south-southwest of a fence-corner post where an extension of the yard runs eastward, and 111.9 feet west-southwest of the northeast corner of the extension.

Reference mark number one is a standard disk stamped "KALIHI NO 1 1928 1963", cemented in a drill hole in the concrete base of the fence corner post, about 1 inch above ground.

Reference mark number two is a standard disk stamped "KALIHI NO 2 1928 1963", set in the top of an 11-inch-square, concrete monument flush with ground. It is 1 foot north of the south fence line of the yard and 68 feet west of the southeast corner of the yard.

(continued on next page)

*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.

USCOMS-DC 27175-P88

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: KALIHI

STATE: HAWAII

YEAR: 1928

SECOND

ORDER

SOURCE: G- 7448

GEODETIC LATITUDE: 21° 19' 27.087	ELEVATION: 1 METERS
GEODETIC LONGITUDE: 157° 53' 34.843	SCALED FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	± HOR Δ ± ANGLE °
HI 3	5103	536,415.49	57,230.36	+ 0° 02' 20"

* 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
SALT LAKE	158 24 54.1	158 22 34	5103

QE 001

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 1277

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

KALIHI (continued)

Form 528
(11-8-68)

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

R

NAME OF STATION: KALIHI
ESTABLISHED BY: L.G.S. YEAR: 1928 STATE: Hawaii
RECOVERED BY: D.G. Rushford YEAR: 1964 COUNTY: Honolulu

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

Station mark and reference mark number two were recovered in good condition. Reference mark number one was found destroyed.

The Army has terminated the leases of several small industries on U.S. Government property in the vicinity and plans to use the land. When State Tile Company vacated the property on which the station is located the reference mark was destroyed by bulldozer during the cleanup of the area.

Since the station is liable to be destroyed or badly obstructed to the extent of uselessness when the army occupies the property, a new station, KALIHI 2, was established. See description for that 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. COM-DC 343 14

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

QUAD 211573 STATION 1278
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 535
Rev. Aug. 1964

DESCRIPTION OF TRIANGULATION STATION

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

CHIEF OF PARTY: D.G. Rushford YEAR: 1964 Described by: R.F. Hanson

NOTE*	HEIGHT OF TELESCOPE 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	HEIGHT OF LIGHT ABOVE STATION MARK METERS.
1b	Surface-station mark		
7a	Underground-station mark		
	OBJECT	BEARING	DISTANCE feet meters
	PUNCHBOWL 1873-1928	SE	155.650 (47.442)
	Street Marker, Spike	SE	0.55 mile
	Cross on concrete post (Azimuth Mark)	SSE	104.290 (31.788)
	R.M. No. 1	SSE	107.550 (32.781)
	Hydrant No. 4859	SW	8.301 2.531
	Property Corner Marker, pipe	WSW	12.303 3.751
11b	R.M. No. 2		153 17 32
	Honolulu, Int. Airport Beacon, New	WNW	188 15 38.0

Station is located about 2 miles west-northwest of center of Honolulu, along the southwest side of Sand Island Road, 1/2 mile northwest of Sand Island Bridge, and at the northeast corner of the high, corrugated iron fence surrounding the Keesi Drydock Company yard.

To reach station from the entrance of Kapalama Military Reservation, at junction of Waiakamilo St. and Nimitz Highway, go northwest on Nimitz Highway for 0.7 mile; turn left on Sand Island Road and go 0.6 mile to station on right.

Station mark is a standard disk stamped "KALIHI 2 1964", set in the top of a

12-inch-diameter, concrete monument, about 1 inch below ground level. It is 20 feet west of edge of road, 3.7 feet northeast of power pole No. 18, and on opposite side of the power pole from two water company junction boxes.

Underground mark is a standard disk stamped "KALIHI 2 1964", set in a mass of concrete about 3 feet below ground level.

Reference mark number one is a standard disk stamped "KALIHI 2 NO 1 1964", cemented in a drill hole in the north side of the semi-circular, concrete curbing around hydrant No. 4859. It is at about same elevation as station.

Reference mark number two is a standard disk stamped "KALIHI 2 NO 2 1964", set in the top of a 12-inch-diameter, concrete monument that projects 3 inches above ground. It is 5 feet west of the property corner marker, 1.9 feet north of fence, and about same elevation as station.

Cross on concrete post (Azimuth Mark) is a 2-inch cross in the top of a post that is the 4th one of 6 (from bridge) in the guard-rail on northeast side of the road. It is 18 feet north-northwest of a traffic light.

Property corner marker is a 3/8-inch iron rod cemented in a 3/4-inch pipe, set at corner of fence, flush with ground.

Street Marker Spike is large, round-head spike driven into road surface, flush, on center-line of road at south end of long curve. It has a white circle surrounding it.

* Refer to notes in manuals of triangulation and to publications of triangulation. † To nearest meter only, when no trigonometric leveling is being done. ‡ Direction-angle measured clockwise, referred to initial station. 10-50000-1 U. S. GOVERNMENT PRINTING OFFICE

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: KALIHI 2

STATE: HAWAII

YEAR: 1964

SECOND

ORDER

SOURCE: G-12664

GEODETIC LATITUDE	21° 19' 29.367	ELEVATION	2	MEYERS
GEODETIC LONGITUDE	157° 53' 40.353	SCALED		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	∠ OR ∠ Δ
HI 3	5103	535,854.38	57,460.06	+ 0° 02' 18"

* 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
AZIMUTH MARK	332° 49' 04.6"	332° 46' 46"	5103

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

QF 534

QF 440

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 211575 STATION 1280
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
PAPER 538 D

DESCRIPTION OF TRIANGULATION INTERSECTION STATION

NAME OF STATION: Kalihi Channel, Year: 1964 STATE: Hawaii COUNTY: Honolulu
Green light 5
CHIEF OF PARTY: R.C. Munson

Description, including sketch of object: Station is the green light mounted on a pipe atop a black box on a dolphin. Center of light is 5 feet above top of box and is 15 feet above water. A large white "5" is painted on 3 sides of the box.

Located about 1250 yards west of the south tip of Sand Island, on the west side of Kalihi Channel.

U. S. GOVERNMENT PRINTING OFFICE 16-58281-1

Described by _____

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: KALIHI CHANNEL GREEN LIGHT 5

STATE: HAWAII

YEAR: 1964

THIRD

-ORDER

SOURCE: G-13544

GEODETIC LATITUDE:	21 ° 18 ' 09.719	ELEVATION:	METERS
GEODETIC LONGITUDE:	157 53 59.797		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	ϕ OR Δ OR ANGLE °
HI 3	5103	534,061.11	49,422.45	+ 0 ° 02 ' 11 "

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

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH * (From south)	CODE
	0 ° 00 ' 00 "	0 ° 00 ' 00 "	

QF 451

QUAD 211573 STATION 1281
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 535 b

DESCRIPTION OF TRIANGULATION INTERSECTION STATION

NAME OF STATION: Kalihi Channel, YEAR: 1964 STATE: Hawaii COUNTY: Honolulu
Green light 9
CHIEF OF PARTY: R.C. Munson

Description, including sketch of object: Station is the green light mounted on a pipe atop a black box on a dolphin. Center of light is 5 feet above top of box and is 15 feet above water. A large white number "9" is painted on 3 sides of the box.

Located about 490 yards south of Harris Island, on the west side of Kalihi Channel.

NAME OF STATION: KALIHI CHANNEL GREEN LIGHT 9

STATE HAWAII

YEAR: 1964

THIRD

ORDER

SOURCE: G-13544

GEODETTIC LATITUDE: 21°18'28.623		ELEVATION:	METERS
GEODETTIC LONGITUDE: 157 53 57.262			FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ FOR Δ & ANGLE
HI 3	5103	534,259.60	51,330.00	+ 0° 02' 12"

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

* 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
	θ θ' θ''	θ θ' θ''	

QF 448

QF 448

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 1282
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 585 D

DESCRIPTION OF TRIANGULATION INTERSECTION STATION

NAME OF STATION: Kalihi Channel, Year: 1964 STATE: Hawaii COUNTY: Honolulu
Green light 13

CHIEF OF PARTY: R.C. Munson

Description, including sketch of object: Station is the green light mounted on a pipe atop a black box on a dolphin. Center of light is 5 feet above top of box and is 15 feet above water. A large white "13" is painted on 3 sides of the box.

Located about 45 yards offshore from the east edge of Harris Island, on the west side of Kalihi Channel, 50 yards east of the Kalihi Channel Front Range Light.

U. S. GOVERNMENT PRINTING OFFICE 16-62891-1

Described by

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: KALIHI CHANNEL GREEN LIGHT 13

STATE: HAWAII

YEAR: 1964

THIRD

-ORDER

SOURCE: G-13544

GEODETIC LATITUDE:	21 ° 18' 43.987	ELEVATION:	METERS
GEODETIC LONGITUDE:	157 53 51.235		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ OR \angle ANGLE °
HI 3	5103	534,868.50	52,880.58	+ 0° 02' 14"

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

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH (From south)	CODE
	0 ° ' "	0 ° ' "	

QF 442

QUAD 211573 STATION 1284
HAWAII
LATITUDE 21 ° 00' TO 21 ° 30'
LONGITUDE 157 ° 30' TO 158 ° 00'
DIAGRAM NF 4-11 OAHU

by the
National Ocean Survey
OLD HAWAIIAN DATUM

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
Form 335 b

DESCRIPTION OF TRIANGULATION INTERSECTION STATION

NAME OF STATION: Kalihi Channel, YEAR: 1964 STATE: Hawaii COUNTY: Honolulu
Green light 19
 CHIEF OF PARTY: R.C. Munson

Description, including sketch of object: Station is the green light mounted on a pipe atop a black box on a dolphin. Center of light is 5 feet above top of box and is 15 feet above water. A large white "19" is painted on 3 sides of the box.

Located about 100 feet south, offshore, from the southernmost tip of land at the State of Hawaii Keehi Marina, on northwest side of Kalihi Channel.

U. S. GOVERNMENT PRINTING OFFICE 16-66391-1

Described by _____

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: KALIHI CHANNEL GREEN LIGHT 19

STATE HAWAII

YEAR 1964

THIRD

-ORDER-

SOURCE: G-13544

GEODETTIC LATITUDE:	21°19'02.216	ELEVATION:	METERS
GEODETTIC LONGITUDE:	157 53 36.143		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ OR \angle
HI 3	5103	536,294.27	54,720.61	+ 0° 02' 20"

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

THE FOLLOWING HAVE BEEN COMPUTED BY THE USE OF A FORMULA REFLECTING THE SECOND TERM.			
TO STATION OR OBJECT	GEODETIC AZIMUTH (From south) ° ' "	PLANE AZIMUTH * (From south) ° ' "	CODE

QF 444

QF 444

QF 443

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 1287
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
PAPER 556 D

DESCRIPTION OF TRIANGULATION INTERSECTION STATION

NAME OF STATION: Kalihi Channel, Year: 1964 STATE: Hawaii COUNTY: Honolulu
Red light 8
CHIEF OF PARTY: R.C. Munson

Description, including sketch of object: Station is the red light mounted on a pipe atop a red box on a dolphin. Center of light is 5 feet above top of box and is 15 feet above water. Large white number "8" is painted on 3 sides of the box.
Located about 570 yards southwest of Mokauea Island, on the east side of Kalihi Channel

U. S. GOVERNMENT PRINTING OFFICE (10-56281)-5

Described by _____

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: KALIHI CHANNEL RED LIGHT 8
STATE: HAWAII YEAR: 1964 THIRD ORDER

SOURCE: G-13544

GEODETIC LATITUDE:	21° 18' 27.462	ELEVATION:	METERS
GEODETIC LONGITUDE:	157 53 52.402		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	B FOR Δ RI ANGLE *
HI 3	5103	534,759.23	51,213.15	+ 0° 02' 14"

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

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

QF 449

QF 44i

QF 447

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 1290
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 525 D

DESCRIPTION OF TRIANGULATION INTERSECTION STATION

NAME OF STATION: Kalihi Channel, YEAR: 1964 STATE: Hawaii COUNTY: Honolulu
Red light 20
CHIEF OF PARTY: R.C. Munson

Description, including sketch of object: Station is the red light mounted on a pipe atop a red box on a dolphin. Center of light is 5 feet above top of box and is 15 feet above water. A large white "20" is painted on 3 sides of the box.

Located about 100 feet offshore from the west end of Sand Island, on the southeast side of Kalihi Channel.

U. S. GOVERNMENT PRINTING OFFICE 16-68281-1

Described by _____

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: KALIHI CHANNEL RED LIGHT 20

STATE: HAWAII

YEAR: 1964

THIRD

ORDER

SOURCE: G-13544

GEODETIC LATITUDE:	21 ° 18' 57.406	ELEVATION:	METERS
GEODETIC LONGITUDE:	157 53 33.140		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ OR ANGLE *
HI 3	5103	536,578.54	54,235.68	+ 0 ° 02' 21"

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

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

QF 446

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

QUAD 211573 STATION 1291
HAWAII
LATITUDE 21° 00' TO 21° 30'
LONGITUDE 157° 30' TO 158° 00'
DIAGRAM NF 4-11 OAHU

Kalihi fire station (Oahu Island, E. R. Hand, 1925).—On southern shore of Oahu, about 2 miles northwest of Honolulu, the tower of the Kalihi fire station, a tall slender square yellow tower with red pyramidal roof. It shows up well inland between Honolulu and Ahua Point, and is distinguishable from a similar tower nearer town, by the fact that it has iron balconies, one on each side immediately below windows.

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
FORM 528
(REV. FEB. 1965)

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: KALIHI FIRE STATION
ESTABLISHED BY: E.R.H. YEAR: 1925 STATE: Hawaii
RECOVERED BY: D.L.H. 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 is on OAHU Island about 2 miles Northwest of Honolulu, west of the intersection of KALIHI Street and North King Street. The station is the tower of the Kalihi fire station which is square, white stucco, with red tile roof and iron balconies, one on each side below windows.



General shape
plus view.

Form 528
(11-9-65)

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: Kalihi Fire Station
ESTABLISHED BY: E.R.H. YEAR: 1925 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 re-covered. It is a tan colored tower about 10 feet square, with red tile pyramidal roof, on northeast side of Kalihi Fire Station. Top of tower is about 50 feet above ground and there are double, round-topped windows near the top on all 4 sides of tower, with small, iron balconies beneath them. Station is located about 2 miles northwest of center of Honolulu, 1 block northwest of the intersection of Kalihi and King Streets, on the northeast side of King Street, opposite the junction of Self Ln.

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: KALIHI FIRE STATION

STATE: HAWAII

YEAR: 1925

THIRD

ORDER

SOURCE: G-SP156

GEODETIC LATITUDE:	21° 20' 04.657	ELEVATION:	METERS
GEODETIC LONGITUDE:	157 52 43.277		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	§ 108 Δ § 11 ANGLE *
HI 3	5103	541,287.95	61,024.67	+ 0° 02' 39"

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE § 108 Δ § 11 FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH * (From south)	CODE
	0 / °	0 / °	

QI 365

* 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.

COGN-DC 34314

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 1292
HAWAII
LATITUDE 21° 00' TO 21° 30'
LONGITUDE 157° 30' TO 158° 00'
DIAGRAM NF 4-11 OAHU

KAM (Hawaii, L.G.S., 1927) -- A standard station-mark disk.

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
FORM 528
(REV. FEB. 1965)

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: KAM

ESTABLISHED BY: LGS

RECOVERED BY: SLN

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:

Station was searched for but not found. Presumed destroyed.

Form 528
(11-8-65)

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

NAME OF STATION: KAM

ESTABLISHED BY: L.G.S.

RECOVERED BY: D.G. Rushford

YEAR: 1927 STATE: Hawaii

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 searched for but not found. It's location is on the top of Battery Closson, an old Coast Artillery emplacement, once classified as secret, so it was not adequately described.

An attempt at recovery was made by inverse from a trial point nearby, established by triangulation. This indicated that the station was at the center of the battery. A sketch obtained from the Corps of Engineers shows that the battery has about 15 feet of dirt cover on top of the concrete structure. Considerable digging was done but the mark was not found. No information could be obtained from the Corps of Engineers as to whether the mark may have been set on the concrete structure before the dirt cover was put on.

* 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 34514

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: KAM

STATE: HAWAII

YEAR: 1927

THIRD

-ORDER

SOURCE: G- 558

GEODETIC LATITUDE:	21° 19' 19.840	ELEVATION:	6	METERS
GEODETIC LONGITUDE:	157 56 12.142	SCALED		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	§ 10R Δ § 1 ANGLE *
HI 3	5103	521,543.61	56,491.10	+ 0° 01' 25"

* 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

QF 006

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

QUAD 211573 STATION 1295
HAWAII
LATITUDE 21° 00' TO 21° 30'
LONGITUDE 157° 30' TO 158° 00'
DIAGRAM NF 4-11 OAHU

NO ORIGINAL TEXT

Form 525
(11-8-65)

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

R

NAME OF STATION: Kaneohe Bay, MCAS, Radio Beam
ESTABLISHED BY: H.O.F. YEAR: 1957 STATE: Hawaii
RECOVERED BY: W.R. Porter 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 from

surrounding station.

Located about 2-1/2 miles northeast of Kaneohe, at west end of the Kaneohe Marine Corps Air Station, near southwest end of the runway, on roof of the control tower, which is located on the northwest corner of the roof of building No. 105.

Station is a grey, capsule-shaped cylinder about 1 foot in diameter and 3 feet long, mounted vertically on top of a 12-foot pipe on the northeast side of the control tower roof. It is a receiving antenna for UHF direction-finding equipment.

* 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. COMR-DC 343 14

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: KANEOHE BAY MCAS RADIO BEAM

OBS BY HTS

STATE: HAWAII

YEAR: 1957

THIRD ORDER

SOURCE: G-11968

GEODETIC LATITUDE:	21° 26' 51.876	ELEVATION:	METERS
GEODETIC LONGITUDE:	157° 46' 31.428		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ OR ANGLE *
HI 3	5103	576,384.12	102,151.85	+ 0 04' 56"

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

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

QF 205

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
Old Hawaiian Datum

QUAD 211573 STATION 1296
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: Kaneohe MCAS, Windsock

CHIEF OF PARTY: C. K. Townsend YEAR: 1976 STATE: Hawaii COUNTY: Honolulu

Description, including sketch of object:

Located about 2 1/4 miles northeast of the town of Kaneohe, at the Kaneohe Marine Corps Air Station, near the northwest corner of the southwest end of the main runway and about 4 meters east of the shoreline of Kaneohe Bay.
The windsock is attached to a vertical pipe that is hinged to two similar, 8 foot high vertical pipes that rise above a rectangular, concrete base. The point intersected was the single pipe where it joins the two pipes. The overall height of the windsock is about 16 feet. Its base is about 5 feet above sea level.

FORM C&GS-525b (12-68)

Described by
U.S. DEPARTMENT OF COMMERCE
COAST AND GEODETIC SURVEY

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: KANEOHE MCAS WINDSOCK

OBS BY NGS

STATE: HAWAII

YEAR: 1976

THIRD

ORDER

SOURCE: G-15809

GEODETIC LATITUDE:	21° 26' 50.17385	ELEVATION:	METERS
GEODETIC LONGITUDE:	157 46 48.24347		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	S 10R Δ 41 ANGLE *
HI 3	5103	574,795.83	101,977.85	+ 0° 04' 50"

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE S 10R 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 AUG 1979

K9 021

NOV 1979
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 1297
HAWAII
LATITUDE 21° 00' TO 21° 30'
LONGITUDE 157° 30' TO 158° 00'
DIAGRAM NF 4-11 OAHU

SEE STATION KANEHOE MCAS WINDSOCK

ADJUSTED HORIZONTAL CONTROL DATA ADJUSTMENT BY NGS

NAME OF STATION: KANEHOE MCAS WINDSOCK ECC OBS BY NGS
STATE: HAWAII YEAR: 1976 THIRD ORDER

SOURCE: G-15809
NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE:	21°26'50.18580	ELEVATION:	2	METERS
GEODETIC LONGITUDE:	157 46 48.29733	SCALED		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ OR ANGLE *
HI 3	5103	574,790.74	101,979.05	+ 0° 04' 50"

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

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH * (From south)	CODE
PAPAA 2	318° 32' 08".4	318° 27' 19"	5103

THESE DATA OBTAINED FROM ADJUSTMENT OF AUG 1979

K9 022

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

QUAD 211573 STATION 1298
HAWAII
LATITUDE 21° 00' TO 21° 30'
LONGITUDE 157° 30' TO 158° 00'
DIAGRAM NF 4-11 OAHU

NO ORIGINAL TEXT

FORM 526a
(9-15-63)

U.S. DEPARTMENT OF COMMERCE
COAST AND GEODETIC SURVEY

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: KANEHOE NEW
ESTABLISHED BY: HTS
RECOVERED BY: W.R. Porter
YEAR: 1957
STATE: Hawaii
YEAR: 1964
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	
HEEIA 1872-1927				00 00 00.0
HAWAIILOA HILL 1926	NE			77 22 43.6
MOKAPU RESET 1962	NE			92 09 47.8
R.M. No. 1	N	11.200	3.415	34 58 36
R.M. No. 2	E	10.512	3.205	134 36 38

An iron pipe set concrete was recovered. Check angle observations proved it to be the station. Two new reference marks were established. A complete description follows:

Station is located about 1-1/2 miles east-southeast of Kaneohe, along the northwest side of Kaneohe Bay Drive, on the summit of a small, brushy hill of about 140 feet elevation that has a lone, wooden antenna pole about 40 feet high on it.

To reach station from the post office in Kaneohe, go southerly on State Highway 83 for 1.2 miles; turn left and go east on Kaneohe Bay Drive for 1.35 miles to hill on left, by a Latter Day Saints church

school. Pack northwest about 140 yards to top of hill and station. Station mark is the center of a 1-1/2-inch, iron pipe that is set in an 18-inch-diameter concrete monument that is flush with the ground, and has "KANEHOE 2" inscribed in it. The pipe projects 4 inches above the concrete and is 7.2 feet west-northwest of the center of the wooden antenna pole.

Reference mark number one is a standard disk stamped "KANEHOE NEW NO 1 1957 1964", brazed to the top of a 1-1/2-inch iron pipe that is set in concrete and projects 6 inches. It is 4 feet south of the northwest guy-wire of the antenna pole and about 6 inches lower than station mark.

Reference mark number two is a standard disk stamped "KANEHOE NEW NO 2 1957 1964", brazed to the top of a 1-1/2-inch iron pipe that is set in concrete and projects 6 inches. It is 4 feet northeast of the antenna pole and about 6 inches lower 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.

USCOMA-OC 2717b-P88

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: KANEHOE NEW

OBS BY HTS

STATE: HAWAII

YEAR: 1957

THIRD

ORDER

SOURCE: G-11968

GEODETIC LATITUDE:	21° 24' 42.533	ELEVATION:	METERS
GEODETIC LONGITUDE:	157° 47' 05.970		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ θ' ANGLE *
HI 3	5103	573,138.89	89,096.46	+ 0° 04' 43"

* 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
HEEIA	133° 46' 43.8	133° 42' 01"	5103

QF 209

NOV 1979
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 1299
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: Kaneohe Passage Range Front Light

CHIEF OF PARTY: C. K. Townsend YEAR: 1976 STATE: Hawaii COUNTY: Honolulu

Description, including sketch of object:

The station is located about 2 miles north of the town of Kaneohe, at the town of Heeia, on the west shore of Kaneohe Bay and on a low dike that surrounds the east side of Heeia Pond.

The station is the short, vertical spindle that supports a green, directional light on a concrete pole. A red and white daymark is displayed from the top of the pole. Designated as No. 3747 in the publication Light List, 1976. The light is about 38 feet above sea level.

FORM C&GS-325b (11-68)

Described by U.S. DEPARTMENT OF COMMERCE
COAST AND GEODETIC SURVEY

ADJUSTED HORIZONTAL CONTROL DATA

ADJUSTMENT BY NGS

NAME OF STATION: KANEOHE PASSAGE RNG FRONT LT

OBS BY NGS

STATE: HAWAII

YEAR: 1976

THIRD

-ORDER

SOURCE: G-15809

GEODETIC LATITUDE:	21° 26' 16.54873	ELEVATION:	METERS
GEODETIC LONGITUDE:	157 48 28.00195		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ FOR Δ θ ANGLE *
HI 3	5103	565,375.96	98,572.65	+ 0° 04' 13"

* 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
THESE DATA OBTAINED FROM ADJUSTMENT OF AUG 1979			
K9 023			

NOV 1979
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 1300
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: Kaneohe Passage Range Rear Light

CHIEF OF PARTY: C. K. Townsend YEAR: 1976 STATE: Hawaii COUNTY: Honolulu

Description, including sketch of object:

The station is located about 2 miles north of the town of Kaneohe, at the town of Heeia, on the west shore of Kaneohe Bay and on the inshore (west) side of Heeia Pond and in the back yard of a private residence.

The station is the short, vertical spindle that supports a green, directional light on a skeleton tower. A red and white daymark is also displayed from the top of the tower and it is designated as No. 3748 in the publication 'Light List' 1976. The light is about 80 feet above sea level.

FORM C&GS-525b (12-68)

Described by U.S. DEPARTMENT OF COMMERCE
COAST AND GEODETIC SURVEY

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: KANEOHE PASSAGE RNG REAR LT

OBS BY NGS

STATE: HAWAII

YEAR: 1976

THIRD

-ORDER

SOURCE: G-15809

GEODETIC LATITUDE:	21° 26' 05.13337	ELEVATION:	METERS
GEODETIC LONGITUDE:	157 48 37.28319		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ IOR Δ θ ANGLE °
HI 3	5103	564,500.51	97,419.76	+ 0° 04' 10"

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE θ IOR Δ θ FORMULA NEGLECTING THE SECOND TERM.

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

THESE DATA OBTAINED FROM ADJUSTMENT OF AUG 1979

K9 024

QI 419