AUG 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 191551 HAWAII
STATION 1001
LATITUDE 19 °30′ TO 20 °00′
LONGITUDE 155 °00′ TO 155 °30′
DIAGRAM NE 5-1,5 HAWAII

NOAA FORM 76-39
(12-70)
(FORMERLY C&GS FORM 529)

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

DESCRIPTION OF TRAVERSE STATION

NAME OF STATION: 11A (HGS)
STATE: Hawaii
COUNTY: Hawaii
NEAREST TOWN: Hilo
QUADRANGLE NO.:
CHIEF OF PARTY: L. A. Critchlow
YEAR: 1978
DESCRIBED BY: L.A.C.

NOTE.* HEIGHT OF TELESCOPE ABOVE STATION MARK 1 METERS,† HEIGHT OF LIGHT ABOVE STATION MARK 1 METERS.

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	DISTANCE METERS	DIRECTION‡ ° ′ ″

Detailed description:

The station is located between the divided northwest-southeast-bound lanes of State Highway 11, at the intersection of Mamaki Street, and is airline about 4-1/2 miles south-southeast of the center of Hilo.

To reach the station from the junction of State Highways 11 and 19 in the east part of Hilo go south and southeast on State Highway 11 for 4.55 miles to a crossroad (Mamaki Street) and the station on the left.

The station mark is a State of Hawaii survey mark disk stamped 11A 1978 set in the 12-inch-round top of a concrete monument flush with the ground. It is 78.3 feet southwest of power pole 23, 30.0 feet southwest of the centerline of the northwest-bound lanes of the highway, 8.8 feet northwest of the centerline of Mamaki Street, and 4.0 feet northwest of the northwest edge of the pavement.

*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.

☆ U. S. GOVERNMENT PRINTING OFFICE 1972: 760-619

NOAA FORM 76-31
(11-76)

ADJUSTED HORIZONTAL CONTROL DATA

ADJUSTMENT BY NGS

NAME OF STATION: 11 A HGS
OBS BY NGS
STATE: HAWAII
YEAR: 1978
FIRST ORDER
SOURCE: G-16241

GEODETIC LATITUDE:	19 39 52.67320	ELEVATION:	77.0 METERS
GEODETIC LONGITUDE:	155 03 42.31851		253 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ α ANGLE *
HI 1	5101	650,776.92	302,072.64	+ 0 °08 ′51 ″

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

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH * (From south)	CODE
AWA HGS	238 °07 ′41.5 ″	237 °58 ′51 ″	5101

THESE DATA OBTAINED FROM ADJUSTMENT OF JAN 1979

5M 165

AUG 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 191551 HAWAII STATION 1002
LATITUDE 19 °30 ' TO 20 °00 '
LONGITUDE 155 °00 ' TO 155 °30 '
DIAGRAM NE 5-1,5 HAWAII

NOAA FORM 76-39
(12-70)
(FORMERLY C&GS FORM 929)

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

DESCRIPTION OF TRAVERSE STATION

NAME OF STATION: 11B (HGS) STATE: Hawaii COUNTY: Hawaii
NEAREST TOWN: Hilo QUADRANGLE NO.:
CHIEF OF PARTY: L. A. Critchlow YEAR: 1978 DESCRIBED BY: L.A.C.

NOTE.* HEIGHT OF TELESCOPE ABOVE STATION MARK 1 METERS,† HEIGHT OF LIGHT ABOVE STATION MARK 1METERS

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	DISTANCE METERS	DIRECTION† ° ' "

Detailed description:

The station is located between the divided northwest-southeast-bound lanes of State Highway 11, at the intersection of Lama Street, and is airline about 4 miles south-southeast of the center of Hilo.

To reach the station from the junction of State Highways 11 and 19 in the east part of Hilo go south and southeast on State Highway 11 for 4.15 miles to a side road (Lama Street) and the station on the left.

The station mark is a State of Hawaii survey mark disk stamped 11B 1978 set in the 12-inch-round top of a concrete monument flush with the ground. It is 52.0 feet southwest of the centerline of the northwest-bound lanes of the highway, 38.6 feet southeast of the centerline of Lama Street, 34.3 feet south of a stop sign, and on top of a low mound.

*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.

☆ U. S. GOVERNMENT PRINTING OFFICE 1972: 760-819

ADJUSTED HORIZONTAL CONTROL DATA

ADJUSTMENT BY NGS

NAME OF STATION: 11 B HGS OBS BY NGS
STATE: HAWAII YEAR: 1978 FIRST ORDER

SOURCE: G-16241

GEODETIC LATITUDE:	19 °40 '07.58340	ELEVATION:	75.8 METERS
GEODETIC LONGITUDE:	155 °03 '52.54309		249 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	β OR Δ α ANGLE *
HI 1	5101	649,795.91	303,574.27	+ 0 °08 '48 "

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

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH * (From south)	CODE
11 A HGS	326 °59 '24.5	326 °50 '37 "	5101

THESE DATA OBTAINED FROM ADJUSTMENT OF JAN 1979

3M 166

AUG 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 191551 HAWAII
STATION 1003
LATITUDE 19 °30 ' TO 20 °00 '
LONGITUDE 155 °00 ' TO 155 °30 '
DIAGRAM NE 5-1,5 HAWAII

NOAA FORM 76-39
(12-70)
(FORMERLY C&GS FORM 9281)

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

DESCRIPTION OF TRAVERSE STATION

NAME OF STATION: 11C HGS
STATE: Hawaii
COUNTY: Hawaii
NEAREST TOWN: Hilo
QUADRANGLE NO.:
CHIEF OF PARTY: L. A. Critchlow
YEAR: 1978
DESCRIBED BY: L.A.C.

NOTE.* HEIGHT OF TELESCOPE ABOVE STATION MARK 1 METERS,† HEIGHT OF LIGHT ABOVE STATION MARK 1 METERS.

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	DISTANCE METERS	DIRECTION† ° ' "

Detailed description:

The station is located near the center of a traffic island in a short road connection between State Highway 11 and Kilauea Avenue and is airline about 3-3/4 miles south-southeast of the center of Hilo.

To reach the station from the junction of State Highways 11 and 19 in the east part of Hilo go south on State Highway 11 for 3.7 miles to a side road and the station on the right.

The station mark is a State of Hawaii survey mark disk stamped 11C 1978 set in the 12-inch-round top of a concrete monument flush with the ground. It is 59.0 feet northwest of power pole 86, 27.5 feet west of the east end of the traffic island, and 3.5 feet north of a curb.

*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.

☆ U.S. GOVERNMENT PRINTING OFFICE 1972: 760-619

NOAA FORM 76-31
(11-76)

ADJUSTED HORIZONTAL CONTROL DATA

ADJUSTMENT BY NGS

NAME OF STATION: 11 C HGS
OBS BY NGS
STATE: HAWAII
YEAR: 1978
FIRST ORDER
SOURCE: G-16241

GEODETIC LATITUDE: 19 40 27.92902 GEODETIC LONGITUDE: 155 04 02.39085	ELEVATION	65.8 METERS 216 FEET	

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	φ IOR Δ φ ANGLE *
HI 1	5101	648,849.57	305,624.32	+ 0°08'44"

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

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH * (From south)	CODE
11 B HGS	335 °22 '00.0	335 °13 '16 "	5101

THESE DATA OBTAINED FROM ADJUSTMENT OF JAN 1979

3M 167

AUG 1 174

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 191551 HAWAII STATION 1004
LATITUDE 19 °30 ' TO 20 °00 '
LONGITUDE 155 °00 ' TO 155 °30 '
DIAGRAM NE 5-1,5 HAWAII

NO TEXT

ADJUSTED HORIZONTAL CONTROL DATA

ADJUSTMENT BY NGS

NAME OF STATION: 77-506 USGS — OBS BY NGS
STATE: HAWAII — YEAR: 1977 — SECOND ORDER

SOURCE: G-16241
NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE: 19 31 '59.28775 GEODETIC LONGITUDE: 155 27 59.94097	ELEVATION:	3076.6 10094	METERS FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	β IOR Δ α ANGLE *
HI 1	5101	511,483.12	254,126.25	+ 0°00'40"

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

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

THESE DATA OBTAINED FROM ADJUSTMENT OF JAN 1979

3M 174

AUG 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 191551 HAWAII
STATION 1005
LATITUDE 19 °30 ′ TO 20 °00 ′
LONGITUDE 155 °00 ′ TO 155 °30 ′
DIAGRAM NE 5-1,5 HAWAII

DESCRIPTION
[redacted], TRIANGULATION STATION

NAME OF STATION: 51209
ESTABLISHED BY: L.A. Critchlow YEAR: 1977 STATE: Hawaii COUNTY: Hawaii BENCH MARK ALSO ☐
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: 28 miles northwest of Hilo.
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 FEET	DISTANCE METERS	DIRECTION
KALOALOA HGS 1949				° 00 00 00.0
KEA comp. dist.	S	343.63	104.740	86 22 18.0
KEA RM A trav. dist.	S	(271.78)	82.8371	89 42 25.3
HAUNA KEA UNIV OF HAWAII OBS DOME	SW	299.09	91.163	109 23 43.7
51209 RM 1 trav. dist.	SW	(208.04)	63.4106	114 29 58.9
LURE CALIBRATION PT (Pt B) trav. dist.	SW	(284.92)	86.8452	114 57 21.9
WOLEOLE HGS 1976		about 80 miles		225 36 19.3
KEA to KEA RM A trav. dist.		(74.03)	22.5637	
KEA RM A to 51209 RM 1 trav. dist.		(120.34)	36.6789	
51209 RM 1 to LURE CALIBRATION PT trav. dist.		(76.93)	23.4494	

Station is located near the summit of Hauna Kea Mountain and about 280 feet northeast of the entrance to the University of Hawaii Observatory.

To reach the station from the post office in Hilo, go westerly on State Highway 20 for 27.3 miles to a paved side road right. Turn right and go northerly on the paved road (which turns into gravel at about the 9000 foot level) to the summit, University of Hawaii Observatory and the station as described.

The station marks are standard disks stamped 51209 1977. The surface disk is set in a square concrete post flush with the ground surface and the underground disk is set in an irregular mass of concrete about 36 inches below the ground surface. They are about 280 feet northeast of the entrance to the observatory, 71 feet south-southwest of a small metal dome building, 45 feet west-northwest of center of a graveled road and 5 feet east-southeast of the northwest edge of the hill. (Note 1a,7a)

Reference mark 1, stamped 51209 NO 1 1977, is a standard disk cemented in a drill hole in the southeast corner of a 24 by 30 foot slab of concrete which is flush with the ground surface. It is 103 feet north-northeast of the entrance to the observatory, 64 feet north of the north edge of the observatory and 16 feet west of a concrete foundation which is about 6 by 6 feet in size. (Note desc.)

Reference mark A, stamped KEA RM A 1977, are standard reference mark disks. The surface disk is set in a round concrete post flush with the ground surface and the underground disk is set in an irregular mass of concrete about 36 inches below the ground surface. They are 110 feet northeast of the southeast corner of the observatory, 62 feet east of the entrance to the observatory and 23 feet west of the west edge of the hill. (Note 11b, desc.)

LURE CALIBRATION PT, is the center of a reflector which is mounted in a wooden box that is 0.25 by 0.27 meters in size and is fastened to the north wall of the observatory and is about 9.546 meters above the ground surface. (Note desc.)

NOAA FORM 76-31
(11-76)

ADJUSTED HORIZONTAL CONTROL DATA

ADJUSTMENT BY NGS

NAME OF STATION: 51209 OBS BY NGS
STATE: HAWAII YEAR: 1977 SECOND ORDER
SOURCE: G-18241

GEODETIC LATITUDE:	19 49 36.45531	ELEVATION:	4198.0 METERS 13773 FEET
GEODETIC LONGITUDE:	155 28 18.68331		

STATE COORDINATES (Feet)

STATE & ZONE	CODE	X	Y	θ OR Δ α ANGLE *
HI 1	5101	509,672.85	360,770.24	+ 0 °00 ′34 ″

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

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH * (From south)	CODE
KALOALOA HGS	274 °28 ′39.9	274 °28 ′05 ″	5101

THESE DATA OBTAINED FROM ADJUSTMENT OF JAN 1979

3M 172

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

Q 191551 STATION 1006
HAWAII
LATITUDE 19 °30′ TO 20 °00′
LONGITUDE 155 °00′ TO 155 °30′
DIAGRAM NE 5-1,5 HAWAII

AAHUWELA (HGS)

(Hawaii Island, Hawaiian Government Survey, 1891).—In the northern part of Hawaii, on the summit of peak called Aahuwela, on the southeast slope of Mauna Kea. Station is on southwest side of crater. Marked by a buried copper triangle, over which is a concrete block 2½ feet long, set with its top level with the surface of the ground, and an iron bolt at its center.

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
FORM 526

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: Aahuwela (HGS) STATE: Hawaii COUNTY: Hawaii
ESTABLISHED BY: H.G.S. YEAR: 1891 LOCALITY: E. Hilo, Hawaii
RECOVERED BY: Chas. I. Murray YEAR: 1938

Detailed statement as to the fitness of the original description:

Location of Station: In the northern part of Hawaii on the southwest Crater rim of the hill called Ashuwela. This hill is on the southeast slope of Mauna Kea, is about 5 miles northeast of Puu Oo Ranch and about 1 mile above the Puu Oo-Keanakolo trail.

Old Station mark found: Iron bolt set in center of 8" square concrete monument and marked "Aahuwela H.G.S. 1891- E.D.B."

New Station mark: H.T.S. Type D monument (Triangular concrete monument 7 1/2ft on each side with 2 1/2" pipe 2-feet long set on steel legs over the old mark which is left exposed to view. A standard metal target is set in the 2-1/2" pipe.

DEPARTMENT OF COMMERCE
U.S. COAST AND GEODETIC SURVEY
FORM 526
(Rev. Feb. 1968)

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: AAHUWELA (HGS)
ESTABLISHED BY: H.G.S. YEAR: 1891 STATE: Hawaii
RECOVERED BY: C.T.Husemeyer YEAR: 1949 COUNTY: Hawaii

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

Station is located in the northern part of Hawaii on the southwest crater rim of the hill called Aahuwela. This hill is on the southeast slope of Mauna Kea, about 5 miles northeast of the Puu Oo-Ranch and about one mile above the Puu Oo-Keanakolo Trail.

To reach from the post office at Hilo: go westerly on the Saddle road toward Kona for 29.2 miles, turn right on a graded road as per sign HALEPOHAKU and go northerly past the Humuula Sheep Station for 2.3 miles, keep right fork and continue northwesterly on main road for 8.5 miles, turn left and go north on track road for 0.7 miles to a locked gate.(Key for this gate may be obtained from the Forestry Department) Continue ahead on track road for 1.35 miles. Here turn right and follow dim tracks across country to foot of hill then up steep slope to highest point and station.

Station is marked by a buried copper triangle over which is a concrete block 2 1/2 feet long set with its top level with the ground and a square topped iron bolt in the center. In 1938 the territory Survey department placed a type D monument over the station. A triangular concrete monument six feet on each side with a 2 1/2 inch pipe 2 feet long set on three steel legs over the mark. This in turn holds a metal target.

Reference mark No.1 is a standard disk stamped AAHUWELA NO 1 1949, set in a lava boulder projecting 3 inches above the ground and about the same elevation as the station.

Reference mark No.2 is a standard disk stamped AAHUWELA NO 2 1949, set in a lava boulder on the slope of the hill and projecting about 8 inches. It is about 3 feet lower than the station.

OBJECT		FEET	METERS	DIRECTION
ALALA H.G.S.				0 00 00.0
R.M. No.1	SE	29.836	9.094	55 36 51.5
R.M. No.2	NW	26.109	7.958	152 31 23.6

(continued on next page)

NOAA FORM 76-31
(11-76)

ADJUSTED HORIZONTAL CONTROL DATA

ADJUSTMENT BY NGS

NAME OF STATION: AAHUWELA HGS OBS BY CGS
STATE: HAWAII YEAR 1891 FIRST ORDER
SOURCE G- 9279

GEODETIC LATITUDE: 19 47 11.97500		ELEVATION: 2359.0 METERS	
GEODETIC LONGITUDE: 155 22 04.26200			7739 FEET

STATE COORDINATES (Fm)

STATE & ZONE	CODE	X	Y	ϕ OR Δ α ANGLE
HI	5101	545,430.83	346,212.17	+ 0 02 41 "

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

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH * (From south)	CODE
KALOALOA HGS	224 51 40.6	224 49 00 *	5101

THESE DATA ARE OBTAINED FROM ADJUSTMENT OF 1951

SM 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 191551 STATION 1006

LATITUDE ° ′ TO ° ′
LONGITUDE ° ′ TO ° ′
DIAGRAM

AAHUWELA (HGS) (continued)

FORM 526a (9-18-69)

U.S. DEPARTMENT OF COMMERCE
COAST AND GEODETIC SURVEY

R

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: AAHUWELA (HGS)
ESTABLISHED BY: HGS YEAR: 1891 STATE: Hawaii
RECOVERED BY:* D.M. Whipp YEAR: 1966 COUNTY: Hawaii
Island: Hawaii

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 FEET	DISTANCE METERS	DIRECTION
KALOALOA (HGS) --------1949 DISTANCE and		DIRECTION---------		° ′ ″
RM No. 1	SE	29.836	9.094	88 37 19
RM No. 2	NW	26.109	7.958	185 31 51
KALOALOA (HGS) 1949 ---1966 DISTANCE and		DIRECTION---------		00 00 00.0
RM No. 1	SE	29.825	9.091	88 36 25
RM No. 2	SW	26.113	7.959	185 34 31

Station was recovered and all marks found in good condition. A complete description follows:

Station is located about 18 miles west-northwest of Hilo and 8-1/2 miles northeast of Humuula Sheep Station, on the southeast slopes of Mauna Kea, on the summit of a prominent, bare hill of about 7739 feet elevation, called Aahuwela, that lies 1 mile northwest of Keanakolu Road.

To reach station from the post office in Hilo, go west on Waianuenue St. and the Saddle Road for 28.5 miles to sign "HUMUULA SHEEP STATION EST. 1876". Turn right and follow gravel road north for 2.2 miles, passing Humuula Sheep Station, to a fork. Take right fork and go 8.2 miles to a dim left fork by metal pole in rocks, just after crossing Wailuku River. Follow the dim road northerly for 0.7 mile to board gate. Pass through gate and continue for 1.1 miles to where road crosses rocky draw and goes back sharp right, east. Continue on the road for 0.2 mile to point on right where draw can be crossed. Leave road, cross draw, and go southeast cross-country to base of hill, a distance of 0.3 mile. Go up steep hill, then down across saddle in hill and on up other side to summit and station, total distance 0.35 mile. NOTE: A 4-wheel-drive vehicle is needed.

Station mark is a 1-inch-square bolt head projecting 2 inches from concrete. A triangular, concrete platform, 7 feet on each side, is built around the mark and extends 6 inches above ground. The station mark is in an 8-inch-square depression in the center of the platform. A 2-1/2-inch iron pipe 2 feet long is supported over the mark by 3 iron legs embedded in the concrete platform and holds a tall metal target.

Reference mark number one is a standard disk stamped "AAHUWELA HGS NO 1 1949", cemented in a drill hole in a 20-inch-diameter rock outcrop along summit of hill, 1 foot lower than station mark.

Reference mark number two is a standard disk stamped "AAHUWELA HGS NO 2 1949", cemented in a drill hole in the top of a 30-inch-diameter, sloping rock outcrop that projects 6 inches. It is on the south slope of the hill and about 2-1/2 feet 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.

USCOMM-DC 27179-P69

R

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: AAHUWELA HGS
ESTABLISHED BY: HGS YEAR: 1891 STATE: Hawaii BENCH MARK ALSO ☐
RECOVERED BY:* L.A. Critchlow YEAR: 1977 COUNTY: Hawaii
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: 18 miles west-northwest of Hilo.
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 FEET	DISTANCE METERS	DIRECTION
KALOALOA HGS 1949				° ′ ″
RM 1	SE	29.82	9.090	00 00 00.0
RM 2	SW	26.09	7.954	88 35 15
RM 1 to RM 2		41.95	12.785	185 33 49

The station mark and reference marks 1 and 2 were recovered in good condition and as described in the 1966 recovery note. The distance to reference mark 1 was found shorter by 0.001 meter and the direction was found smaller by 01 minute and 10 seconds. The distance to reference mark 2 was found shorter by 0.005 meter and the direction was found smaller by 42 seconds. The 1966 to reach and write up of station is good.

*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 (1-72) SUPERSEDES C&GS FORM 526A WHICH MAY BE USED

NOAA

U.S. GPO: 1976-665-661/1270 Region 6

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

Q 191551 STATION 1007
HAWAII
LATITUDE 19 °30′ TO 20 °00′
LONGITUDE 155 °00′ TO 155 °30′
DIAGRAM NE 5-1,5 HAWAII

NO ORIGINAL TEXT

ALALA (HGS)

(Hawaii Island, Hawaiian Government Survey, 1877; E. R. Hand, 1912).—On east coast of Hawaii, Hilo District, land of Makahanaloa, on the prominent sugar-loaf hill which rises abruptly and symmetrically from the comparatively smooth slope just behind Pepeekeo. There are two other hills of equal height about ½ mile to the south-southwest. There is a plantation camp, group of small white shacks and one large stable, at foot of hill on north side. Station may be identified by the following bearings: To Pepeekeo sugar mill stack, N. 61° E., long barn-like structure (station *School*) S. 80° W., Leleiwi Point, S. 56° W. Entire hill is covered with cane. Marked by United States Geological Survey copper mark set in concrete flush with the ground and surrounded by bowlders.

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
Form 536

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: Alala (HGS) STATE: Hawaii COUNTY: Hawaii
ESTABLISHED BY: Hawaiian Govt. YEAR: 1877 LOCALITY: Pepeekeo, South Hilo
RECOVERED BY: YEAR: 1930
Monumented by C.L. Murray

Detailed statement as to the fitness of the original description: A type B-1 monument has been erected over a U.S.G.S. bronze tablet set in the top of a concrete block, by Chas. L. Murray of the Hawaii Territory Survey.

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
Form 536

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: ALALA (HGS)
ESTABLISHED BY: Hawaiian Govt. YEAR: 1877 STATE: Hawaii
RECOVERED BY: C. T. Husemeyer YEAR: 1949 COUNTY: Hawaii

Detailed statement as to the fitness of the original description:

The station was recovered, as described by E. R. Hand in 1912, in good condition. A square block of concrete has been erected over the station disk since 1912. Two reference marks were established in 1949. A new description follows-

The station is located on the summit of a grassy knoll which lies about 8 miles north of Hilo, about 2 miles west southwest of Pepeekeo Point, about 0.5 mile west southwest of the village of Pepeekeo, about 0.3 mile west of the highway and about 0.2 mile south of a plantation camp. Two grassy knolls of a slightly higher elevation lie about 0.3 mile to the south.

To reach from the post office at Hilo; go north, on the road which leads toward Honokaa, for 8.7 to the Pepeekeo Hospital; continue north 0.4 mile to the Pepeekoe Post Office; continue north for 0.05 mile; turn left, onto a graded road, and go westerly for 0.65 mile to a plantation camp; take the left hand fork and go southwest for 0.3 mile; turn left and go south for 0.3 mile; turn left and go east for 0.3 mile to the end of the road and the end of truck travel. From this point pack southeast, up the slope, for about 0.2 mile to the summit and the station.

The station is a U. S. Geological Survey disk set in concrete.

Reference mark number 1 is a standard disk, stamped ALALA NO 1 1949, brazed to the top of a 2 1/2 inch pipe which projects about 6 inches and is about the same elevation as the station.

Reference mark number 2 is a standard disk, stamped ALALA NO 2 1949, brazed to the top of a 2 1/2 inch iron pipe which projects about 6 inches and is about 1 foot lower than the station.

The station used in this survey is the center of a 2 1/2 inch pipe which projects about 2 feet from the top of the square slab of concrete that has been erected over the U. S. Geological Survey Disk. Accuracy in centering this pipe over the disk, by the Territory Survey, is presumed correct.

NOTE	OBJECT	BEARING	FEET	METERS	DIRECTION
	KEAUKAHA				00 00 00
pipe	R. M. No. 2	ESE	20.974	6.393	95 12 04
	Pepeekoe Lighthouse	ENE	2 miles		289 23 09.4
pipe	R. M. No. 1	SW	18.425	5.616	342 58 10

(continued on next page)

ADJUSTED HORIZONTAL CONTROL DATA

ADJUSTMENT BY NGS

NAME OF STATION: ALALA HGS OBS BY CGS
STATE: HAWAII YEAR: 1877 FIRST ORDER
SOURCE: C- 9-79

GEODETIC LATITUDE:	19 50 18.79100	ELEVATION:	231.3 METERS
GEODETIC LONGITUDE:	155 06 42.65400		759 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	φ (OR Δ α) ANGLE *
HI 1	5101	633,397.68	365,192.56	+ 0°07′54″

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

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH * (From south)	CODE
KAWAINUI NEW USGS	15 °05 ′07.8	14 °57 ′14 ″	5101

THESE DATA ARE OBTAINED FROM ADJUSTMENT OF 1951

SM 002

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 191551 STATION 1007

LATITUDE ° ′ TO ° ′
LONGITUDE ° ′ TO ° ′
DIAGRAM

ALALA (HGS) (continued)

Form 526
(11-8-55)

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

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: ALALA (HGS)
ESTABLISHED BY: H.G.S. YEAR: 1877 STATE: Hawaii
RECOVERED BY:* H.J.S. YEAR: 1962 COUNTY: Hawaii

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

The station and both reference marks were recovered. The reference marks were found to be stamped ALALA NO 1 USGS 1949 and ALALA NO 2 USGS 1949 instead of as noted in the 1949 recovery note by C.T.H. There is a small short wave radio antenna and several small buildings on the hill which is clearly visible from the highway.

The station may be reached by road.

The 1949 description is adequate.

FORM 526a
(9-10-59)

U.S. DEPARTMENT OF COMMERCE
COAST AND GEODETIC SURVEY

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: ALALA (HGS)
ESTABLISHED BY: HGS YEAR: 1877 STATE: Hawaii
RECOVERED BY:* D.M. Whipp YEAR: 1966 COUNTY: Hawaii Island: Hawaii

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 FEET	DISTANCE METERS	DIRECTION °	′	″
----------1949 DISTANCE and DIRECTION----------						
KAIWIKI NEW (USGS)				00	00	00.0
RM No. 2	ESE	20.974	6.393	35	34	53
Pepeekeo Point Light	ENE	2 miles		229	45	58.3
RM No. 1	SW	18.425	5.616	283	20	59
----------1966 DISTANCE and DIRECTION----------						
KAIWIKI NEW (USGS) 1949				00	00	00.0
RM No. 2	SW	21.005	6.402	35	36	45
Pepeekeo Point Light	NE			229	45	57.7
RM No. 1	ESE	18.582	5.665	283	48	17

Station was recovered in good condition, however discrepancies were noted in the distance and direction to RM No. 1. The 1966 values were checked and are correct. A complete description follows:

Station is located about 8 miles north of Hilo, 2 miles west-southwest of Pepeekeo sugar mill, and 1/3-mile west of State Highway 19, on a grassy hill of about 758 feet elevation that has a tall steel radio mast and 2 wooden antenna poles on its summit. There are two hills of about same elevation about 1/3-mile south of station and a small plantation village about 350 yards north.

To reach station from the post office at Pepeekeo, go north on State Highway 19 for 0.75 mile to paved crossroad. Turn left and go 0.45 mile to fork in village, just before small bridge. Take left fork and go 0.35 mile; take left fork and go 0.2 mile; take side road left and go 0.25 mile; take left fork and go 0.1 mile to metal gate. Pass through gate and go 0.05 mile to station on top of hill.

Station mark is a U.S. Geological Survey disk, stamped "758", set in the top of a 7-inch-square, stone and mortar post projecting 2 inches above ground. A Type B-1 signal has been built over the mark. Station is 100 feet northeast of the radio antennas.

Reference mark number one is a standard disk stamped "ALALA USGS NO 1 1949", set in the top of an 8-inch-square, concrete monument that projects 3 inches above ground. It is about 2-1/2 feet lower than station.

Reference mark number two is a standard disk stamped "ALALA USGS NO 2 1949", set in the top of an 8-inch-square, concrete monument that projects 4 inches above ground. It is about 1-1/2 feet lower than station.

NOAA FORM 76-31A
(11-74)

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: ALALA HGS
ESTABLISHED BY: HGS YEAR: 1877 STATE: Hawaii BENCH MARK ALSO ☐
RECOVERED BY:* L. A. Critchlow YEAR: 1977 COUNTY: Hawaii
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: 8 miles north of Hilo
HEIGHT OF TELESCOPE ABOVE STATION MARK FEET. HEIGHT OF LIGHT ABOVE STATION MARK 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 FEET	DISTANCE METERS	DIRECTION °	′	″
KAIWIKI NEW USGS 1949				00	00	00.0
RM 2	SW	21.00	6.402	35	35	24
RM 1	SE	18.59	5.665	283	48	49
HILO HARBOR COMMISSIONERS WATER TANK 1951	SSE	About 9	miles	319	06	34.3
RM 1 to RM 2		32.81	10.002			

The station mark and reference marks 1 and 2 were recovered in good condition and the distances and directions from the station mark to the reference marks measured on this date compared favorably with the 1966 measurements. The previous descriptions are adequate.

* 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 (1-72) SUPERSEDES C&GS FORM 526A WHICH MAY BE USED.

U.S. DEPARTMENT OF COMMERCE
NOAA

U.S. GPO: 1976-665-661/1270 Region 6

USCOMM-NOAA-ASHEVILLE

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

Q 191551 STATION 1008
HAWAII
LATITUDE 19 °30′ TO 20 °00′
LONGITUDE 155 °00′ TO 155 °30′
DIAGRAM NE 5-1,5 HAWAII

NO TEXT

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION ALIA LIGHTHOUSE PEPEEKEO POINT

STATE HAWAII YEAR 1900 THIRD ORDER

SOURCE G-SP15e

GEODETIC LATITUDE GEODETIC LONGITUDE	19 °51′ 01.886 155 05 06.728	ELEVATION: METERS / FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	x	y	β OR Δ α ANGLE *
HI 1	5101	642,544.69	369,562.83	+ 0 °08′ 27″

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

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

QQ 349

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

Q 191551 STATION 1009
HAWAII
LATITUDE 19 °30′ TO 20 °00′
LONGITUDE 155 °00′ TO 155 °30′
DIAGRAM NE 5-1,5 HAWAII

NO TEXT

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: ALIA POINT LIGHT PEPEEKEO PT

STATE: HAWAII YEAR: 1912 THIRD ORDER

SOURCE: G-92184

GEODETIC LATITUDE: 19 51 01.029 GEODETIC LONGITUDE: 155 05 07.389	ELEVATION:	METERS FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ α ANGLE *
HI 1	5101	642,481.80	369,476.22	+ 0 06 27

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

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

QF 074

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

Q 191551 STATION 1010
HAWAII
LATITUDE 19 °30′ TO 20 °00′
LONGITUDE 155 °00′ TO 155 °30′
DIAGRAM NE 5-1,5 HAWAII

Apakuie (Hawaii Island, Hawaiian Government Survey, 1877).—In northern part of Hawaii, on the northeastern slope of Mauna Kea, on the western summit of peak called Apakuie. Marked by a tin can buried at the intersection of three rows of stones sunk in the ground. A triangle cut in the rock on Holuokawai Cave bears 115° 20′ (magnetic), distant 910 feet.

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: APAKUIE

STATE: HAWAII YEAR: 1877 THIRD ORDER

SOURCE: G-SP15c

GEODETIC LATITUDE: 19 °56 ′08.″825 GEODETIC LONGITUDE: 155 25 58.205	ELEVATION: SCALED	1784	METERS FEET

STATE COORDINATES (First)				
STATE & ZONE	CODE	X	Y	θ (OR Δ α) ANGLE *
HI 1	5101	523,068.75	400,356.17	+ 0 °01 ′22 ″

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

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

QO 394

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

Q 191551 STATION 1011
HAWAII
LATITUDE 19 °30′ TO 20 °00′
LONGITUDE 155 °00′ TO 155 °30′
DIAGRAM NE 5-1,5 HAWAII

NO TEXT

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION AT

STATE HAWAII YEAR 1900 THIRD ORDER

SOURCE G-SP156
NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE GEODETIC LONGITUDE	19 °44′ 56.″94 155 05 34.12	ELEVATION	METERS FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ α ANGLE
HI 1	5101	640,018.50	332,740.44	+ 0 08 15

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

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

QD 338

AUG 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 191551 HAWAII
STATION 1012
LATITUDE 19 °30 ' TO 20 °00 '
LONGITUDE 155 °00 ' TO 155 °30 '
DIAGRAM NE 5-1,5 HAWAII

DESCRIPTION
RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: AWA (HGS)
ESTABLISHED BY: L.A. Critchlow ' YEAR 1977 ' STATE Hawaii '
COUNTY: Hawaii '
BENCH MARK ALSO ☐
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: 4 miles southeast of Hilo '
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 FEET	DISTANCE METERS	DIRECTION
KULANI HGS 1891 '				00 00 00
RM 2 '	W	69.00	21.032	25 41 31
RM 1 '	SE	56.35	17.177	259 15 25
RM 1 to RM 2		112.08	34.162	

The station is located about 4 miles southeast of Hilo and 1/2 mile east of State Highway 11. It is in the center of the intersection of Mamaki Street and Awa Street.

To reach the station from the junction of State Highways 11 and 19 in Hilo go southeast on Highway 11 for 4.3 miles to a crossroad. Turn left and go easterly on Mamaki Street 0.45 mile to the station site at the intersection of Awa Street.

The station mark is the center of a 1 inch brass plug 0.6 foot below the level of the street covered by a steel street monument cover.

Reference mark 1, stamped 1, is a railroad spike with a punch hole marking the center, cemented in a drill hole in a lava rock ledge, 42 feet east of a mailbox, 20 feet east of the centerline of Awa Street, 1 foot east of the edge of the ledge and 2 1/2 feet higher than the station mark.

Reference mark 2, stamped 2, is a railroad spike with a punch hole marking the center, cemented in a drill hole in solid rock, 31 feet north of the centerline of Mamaki Street, 18 feet north of the north edge of the road, 9 1/2 feet southwest of a fire hydrant, 2 1/2 feet southwest of a powerpole and level with the road.

* 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 (1-72) SUPERSEDES C&GS FORM 526A WHICH MAY BE USED.

U.S. DEPARTMENT OF COMMERCE NOAA

* U.S. GPO: 1976-665-661/1220 Region 6

NOAA FORM 76-31 (11-76)

ADJUSTED HORIZONTAL CONTROL DATA
ADJUSTMENT BY NGS

NAME OF STATION AWA HGS
OBS BY NGS
STATE HAWAII
YEAR 1977
FIRST ORDER
SOURCE G-10241

GEODETIC LATITUDE	19 40 04.50032	ELEVATION:	63.5 METERS
GEODETIC LONGITUDE	155 03 22.22071		208 FEET

STATE COORDINATES (Feet)

STATE & ZONE	CODE	X	Y	ϕ OR Δ α ANGLE *
HI 1	5101	652,693.80	303,271.33	+ 0 08 58 "

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

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH * (From south)	CODE
KULANI HGS	58 °13 '12.5	58 °04 '15 "	5101

THESE DATA OBTAINED FROM ADJUSTMENT OF JAN 1979

3M 008

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

Q 191551 STATION 1013
HAWAII
LATITUDE 19 °30′ TO 20 °00′
LONGITUDE 155 °00′ TO 155 °30′
DIAGRAM NE 5-1,5 HAWAII

NO TEXT

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION BAN

STATE HAWAII YEAR 1900 THIRD ORDER

SOURCE G-SP156

GEODETIC LATITUDE: 19 °44′08.818		ELEVATION:	METERS
GEODETIC LONGITUDE: 155 03 11.155			FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ α ANGLE *
HI 1	5101	653,687.28	327,920.27	+ 0 09 03

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

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

QJ 323

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

Q 191551 STATION 1014
HAWAII
LATITUDE 19 °30′ TO 20 °00′
LONGITUDE 155 °00′ TO 155 °30′
DIAGRAM NE 5-1,5 HAWAII

Barnard (Hawaii Island, E. R. Hand, 1913).—On northeast coast of Hawaii, on north side of gulch at Laupahoehoe, on highest point overlooking the town. Station is on extreme edge, above railroad, and is seen on range with the flagstaff of the store and post office when one stands just inside the turnstile at the gate of Barnards Hotel. The bearing of this line is S. 76° W. From below the station appears to be on a slight mound in the bluff line. Also from the station the flagstaff of the Japanese temple and a point on the ridgepole of the store and post office about 2 feet north of flagpole are on range. Reached by taking the main road up toward Ookala, and when at top of cliffs and turning into first gulch, a camp (Waipunalei) with flagpole will be seen on left side of road; here take a trail that goes through the cane east or back toward Laupahoehoe; trail crosses railroad and later reaches railroad cut; turn to right or south along edge of bluff until on the range mentioned. Marked by a ¾-inch galvanized iron pipe, slightly inclining to the north, and protruding 7 inches from a mass of concrete 1.5 feet in diameter and extending 2.5 feet into ground.

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: BARNARD
ESTABLISHED BY: E.R. Hand YEAR: 1913 STATE: Hawaii BENCH MARK(S) ALSO ☐
RECOVERED BY: D.M. Whipp YEAR: 1967 COUNTY: Hawaii
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: Island: Hawaii

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

The 3/4-inch iron pipe marking the station was recovered. Three segments of the 1.5-foot-diameter mass of concrete were found nearby; when put together they comprised 3/4 of the original mass, and had inscribed in them "U S Survey". It is believed that the missing piece had the letter "G" on it. The station is now completely blocked by ironwood trees.

Station is located about 1 mile west-northwest of the Laupahoehoe post office, on the rim above the northwest side of Laupahoehoe Gulch and above the last curve of the highway as it reaches the top of the canyon. It is about 1/4-mile south of a plantation village and in the brushy strip between the southeast side of a canefield and the dense ironwoods along edge of canyon rim and is 450 feet northeast of the southwest end of the ironwood grove.

To reach station from the post office in Laupahoehoe, go west 0.05 mile to junction with State Highway 19. Turn left and continue westerly, on the highway, 1.8 miles to side road left, opposite plantation village. Turn left and go 0.05 mile to fork by green tank. Turn left and follow field road upgrade 0.35 mile to end of truck travel at a flat area. Walk easterly across canefield about 100 yards to station.

Station was recovered by inverse computation from a 1964 U.S. Geological Survey mark, 8-125A, in the vicinity, however it was found that the measured azimuth differed from the computed by 20' 43". A check on the USGS station was made from station PAPAALOA (HGS) and another USGS station and their data appears to be correct.

It is believed that the position of station BARNARD is doubtful and should be used with caution.

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: BARNARD
STATE: HAWAII YEAR: 1913 THIRD ORDER
SOURCE: G-92184

GEODETIC LATITUDE	19 59 33.681	ELEVATION:	162 METERS
GEODETIC LONGITUDE	155 15 02.974	SCALED	FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	β OR Δ α ANGLE
HI 1	5101	585,551.39	421,081.17	+ 0 05 07

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

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

QF 094

AUG 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 191551 HAWAII STATION 1015
LATITUDE 19 °30 ' TO 20 °00 '
LONGITUDE 155 °00 ' TO 155 °30 '
DIAGRAM NE 5-1,5 HAWAII

NOAA FORM 76-39
(12-70)
(FORMERLY C&GS FORM 526)

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

DESCRIPTION OF TRAVERSE STATION

NAME OF STATION: BM 5.79 USGS
NEAREST TOWN: Hilo
CHIEF OF PARTY: L.A. Critchlow
STATE: Hawaii
QUADRANGLE NO.:
YEAR: 1977
COUNTY: Hawaii
DESCRIBED BY: L.A.C.

NOTE.*	HEIGHT OF TELESCOPE ABOVE STATION MARK 1 METERS.† HEIGHT OF LIGHT ABOVE STATION MARK 1 METERS.				
	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	DISTANCE METERS	DIRECTION‡ ° ' "

Detailed description:

The station is located in Hilo, about one mile east of the center of town, 1/10 mile north of the entrance to the small boat harbor at the mouth of the Wailoa River, and at the edge of the water near an old wharf.

To reach the station from the junction of State Highways 11 and 19 in the east part of Hilo go east on Kamehameha Avenue (State Highway 19) 0.4 mile to an intersection. Turn right onto Lihiwai Street and go north 0.2 mile to an old wharf and the station on the left.

The station mark is a USGS disk stamped 5.79 1910 cemented in a drill hole in the top of a stone and mortar pier which is about 3.5 feet in diameter and 5 feet high and is the southwest one of four similar piers about 25 feet apart. It is 80.0 feet north-northwest of a light pole and 59.0 feet northeast of the northeast end of a wharf.

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

☆ U.S. GOVERNMENT PRINTING OFFICE 1972: 780-819

ADJUSTED HORIZONTAL CONTROL DATA

ADJUSTMENT BY NGS

NAME OF STATION: BM 5.79 USGS
STATE: HAWAII
YEAR: 1977
OBS BY NGS
SECOND ORDER

SOURCE: G-16241

GEODETIC LATITUDE	19 43 44.32976	ELEVATION	1.72 METERS
GEODETIC LONGITUDE	155 04 26.10205		5.6 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ α ANGLE*
HI 1	5101	646,533.95	325,431.47	+ 0 °08 '38 "

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

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH* (From south)	CODE
HALAI 2 HGS	68 °51 '44.5	68 °43 '07 "	5101

THESE DATA OBTAINED FROM ADJUSTMENT OF JAN 1979

LEVELING BY NGS

5M 017

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

Q 191551 STATION 1016
HAWAII
LATITUDE 19 °30′ TO 20 °00′
LONGITUDE 155 °00′ TO 155 °30′
DIAGRAM NE 5-1,5 HAWAII

NO TEXT

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: BILL

STATE: HAWAII YEAR 1900 THIRD ORDER

SOURCE: G-SP156

GEODETIC LATITUDE: 19 °44′08.″925 GEODETIC LONGITUDE: 155 05 29.200		ELEVATION	METERS FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	φ OR △ OF ANGLE *
HI 1	5101	640,500.12	327,897.82	+ 0 °08′17″

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

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

QQ 335

AUG 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 191551 HAWAII STATION 1017
LATITUDE 19 °30′ TO 20 °00′
LONGITUDE 155 °00′ TO 155 °30′
DIAGRAM NE 5-1,5 HAWAII

DESCRIPTION OF TRIANGULATION INTERSECTION STATION

NAME OF STATION: CAMP INC CABLE TV MAST

CHIEF OF PARTY: L.A.Critchlow YEAR: 1977 STATE: Hawaii COUNTY: Hawaii

Description, including sketch of object: The station is the top and center of the southeast one of two towers located on the summit of Kulani Cone and is airline about 20 miles southwest of Hilo, 12 miles west of Mountain View, 2 miles south of Kulani Honor Camp, and about 31 yards southwest of triangulation station KULANI HGS 1891.

The mast is a steel structure about 168 feet high that is painted green and is owned by Camp Incorporated Cable TV.

To reach the station from the junction of State Highways 11 and 19 in Hilo go south on State Highway 11 for 4.0 miles to a crossroad and a sign "KULANI 19". Turn right onto Stainback Road and go westerly 13.8 miles to an iron gate across the road. Pass through the gate and continue westerly 3.2 miles to a second iron gate at the entrance to Kulani Honor Camp. Pass through the gate and go west 0.05 mile to a crossroad. Turn left and go southeast and south on a dirt road 0.15 mile to some large buildings on the right. Continue south on the dirt road 1.5 miles to a fork. Take the right fork and go southerly 0.85 mile to the top of the hill and the station site.

Described by _____
U. S. DEPARTMENT OF COMMERCE
NOAA

NOAA FORM 76-81
(10-71)

★ U.S. GPO: 1975-665-081/1178 Region 6

ADJUSTED HORIZONTAL CONTROL DATA

ADJUSTMENT BY NGS

NAME OF STATION: CAMP INC CABLE TV MAST OBS BY NGS

STATE: HAWAII YEAR: 1977 THIRD ORDER

SOURCE: 6-16241

GEODETIC LATITUDE: 19 51 25.92711 GEODETIC LONGITUDE: 155 13 96.93596	ELEVATION:	METERS FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	φ (OR Δ α) ANGLE *
HI 1	5101	568,205.67	250,597.51	+ 0°03′58″

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

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

THESE DATA OBTAINED FROM ADJUSTMENT OF JAN 1979

5M 019

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

Q 191551 STATION 1018
HAWAII
LATITUDE 19 °30′ TO 20 °00′
LONGITUDE 155 °00′ TO 155 °30′
DIAGRAM NE 5-1,5 HAWAII

NO TEXT

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: CATHOLIC CHURCH NORTHWEST TWR

STATE: HAWAII YEAR: 1900 THIRD ORDER

SOURCE: G-SP156

GEODETIC LATITUDE:	19 ″43 ′43.″756	ELEVATION:	METERS
GEODETIC LONGITUDE:	155 05 26.350		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	φ OR Δ α ANGLE *
HI 1	5101	640,778.50	325,359.42	+ 0 08 18

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

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

QD 334

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

Q 191551 STATION 1019
HAWAII
LATITUDE 19 °30' TO 20 °00'
LONGITUDE 155 °00' TO 155 °30'
DIAGRAM NE 5-1,5 HAWAII

NO TEXT

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION CHURCH SPIRE

STATE HAWAII YEAR 1901 THIRD ORDER

SOURCE G-SP156

GEODETIC LATITUDE: 19 56 20.260 GEODETIC LONGITUDE: 155 10 47.024	ELEVATION:	METERS FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	β OR Δ α ANGLE ° ' "
HI 1	5101	609,999.33	401,609.97	+ 0 06 33

° PLANE AZIMUTH HAS BEEN COMPUTED BY THE β OR Δ α FORMULA NEGLECTING THE SECOND TERM.

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

QQ 360

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

Q 191551 STATION 1020
HAWAII
LATITUDE 19 °30′ TO 20 °00′
LONGITUDE 155 °00′ TO 155 °30′
DIAGRAM NE 5-1,5 HAWAII

NO TEXT

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION. CHURCH SQUARE TOWER

STATE. HAWAII YEAR 1900 THIRD ORDER

SOURCE. G-SP15o

GEODETIC LATITUDE	19 °43′32.638	ELEVATION	METERS
GEODETIC LONGITUDE	155 05 30.383		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	φ OR Δ α ANGLE
HI 1	5101	640,395.92	324,236.91	+ 0 °06′16″

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

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

QO 333

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

Q 191551 STATION 1021
HAWAII
LATITUDE 19 °30' TO 20 °00'
LONGITUDE 155 °00' TO 155 °30'
DIAGRAM NE 5-1,5 HAWAII

NO TEXT

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: CHURCH WHITE SPIRE AND CROSS

STATE: HAWAII YEAR: 1900 THIRD ORDER

SOURCE: G-SP156

GEODETIC LATITUDE: 19 48 12.907 GEODETIC LONGITUDE: 155 05 44.434	ELEVATION:	METERS FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ α ANGLE *
HI 1	5101	638,986.11	352,507.32	+ 0 08 13

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

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

QD 343

AUG 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 191551 HAWAII
STATION 1022
LATITUDE 19 °30 ' TO 20 °00 '
LONGITUDE 155 °00 ' TO 155 °30 '
DIAGRAM NE 5-1,5 HAWAII

DESCRIPTION OF TRIANGULATION INTERSECTION STATION

NAME OF STATION: Cocoanut Point Light

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

Description, including sketch of object:

Location of station in the city of Hilo, on the eastern shore of Hilo Bay, about 100 meters west of Kamehameha Hwy. The station is a white pyramidal concrete tower about 9½ meters in height. The position of the station is the center of the tower. Designated as # 3674 in the publication 'Light List, Vol. 3, Pacific Coast and Pacific Islands, 1976.'

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: COCOANUT POINT LIGHT
ESTABLISHED BY: C. K. TOWNSEND YEAR: 1976 STATE: HAWAII BENCH MARK(S) ALSO ☐
RECOVERED BY: R. B. MELBY YEAR: 1978 COUNTY: Hawaii
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: AT HILO

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 IN 1976.

NOAA FORM 76-165
(12-72)
(OLD C&GS 526)

U. S. GOVERNMENT PRINTING OFFICE: 1976--665661/1138 REGION NO. 6

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

ADJUSTED HORIZONTAL CONTROL DATA

ADJUSTMENT BY NGS

NAME OF STATION: COCOANUT POINT LIGHT OBS BY NGS
STATE: HAWAII YEAR: 1976 THIRD ORDER
SOURCE: 5-16, 41

GEODETIC LATITUDE:	19 43 47.76998	ELEVATION:	10.1 METERS 33 FEET
GEODETIC LONGITUDE:	155 05 20.20301		

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	φ FOR Δ α1 ANGLE *
HI 1	5101	641,364.28	325,765.77	+ 0 °08 '20 "

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE φ FOR Δ α1 FORMULA NEGLECTING THE SECOND TERM.

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

THESE DATA OBTAINED FROM ADJUSTMENT OF JAN 1979

SM 020

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

Q 191551 STATION 1023
HAWAII
LATITUDE 19 °30′ TO 20 °00′
LONGITUDE 155 °00′ TO 155 °30′
DIAGRAM NE 5-1,5 HAWAII

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
Form 525
Rev. Aug. 1948

DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: COOK (H.G.S.) STATE: Hawaii COUNTY: Hawaii

CHIEF OF PARTY: C.T.Husemeyer YEAR: 1949 Described by: G.B.G.

NOTE.*	HEIGHT OF TELESCOPE ABOVE STATION MARK	METERS.†	HEIGHT OF LIGHT ABOVE STATION MARK	METERS.
1(a)				

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	DISTANCE meters	DIRECTION‡ ° ′ ″
HAIKU H.G.S.				0 00 00
R.M. No.1	E	29.736	9.064	84 36 53.8
R.M. No.2	SSW	24.717	7.534	189 15 04.8
TOLEDO	W	333.178	110.553	249 47 27.1

Detailed description

Located on the eastern side of Hawaii, North Hilo District, about 15 miles , airline, northwest of Hilo and about 2.5 miles inshore from the coast, on the land of Piha. On a prominent low hump in open pasture land about 0.25 miles above the cane fields, on the south bank of Waikaumalo stream.

Original station established by the Hawaiian Government Survey was a three inch iron pipe set in a concrete block. This was remarked in 1949 with a standard disk set in a square topped concrete post that projects six inches above the ground. Stamped COOK H G S 1949.

Reference mark No.1 is east of the station and about 3 feet lower in elevation. A standard disk set in a square topped concrete post that projects six inches above the ground. Stamped COOK H G S NO 1 1949.

Reference mark No.2 is south southwest of the station and about the same elevation. A standard disk set in a square topped concrete post that projects six inches above the ground. Stamped COOK H G S NO 2 1949.

To reach from the Post Office in Hilo: go northerly on coast highway for 18.3 miles to the Honohina Plantation Store, continue ahead for 1.1 miles to two small shacks on right. Turn left through a deep cut and follow cane road up steep hill for 1.6 miles to a T intersection. Turn right and go northwesterly for about 0.3 miles to a dim track road on left . From here pack southwesterly through cane field to top of ridge, about 0.3 miles, and station.

*Refer 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.

16—66882-1 U. S. GOVERNMENT PRINTING OFFICE

(continued on next page)

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION COOK HGS

STATE HAWAII YEAR 1949 THIRD ORDER

SOURCE G- 9279

GEODETIC LATITUDE	19 55 01.764	ELEVATION	438.5 METERS
GEODETIC LONGITUDE	155 11 20.195		1439 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	φ FOR Δ α ANGLE
HI 1	5101	606,849.29	393,685.24	+ 0 06 22

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

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH* (From south)	CODE
HAIKU	214 23 22.1	214 17 00	5101

POSITION DETERMINED BY TRAVERSE FROM STATION TOLEDO

AND CHECKED BY ADDITIONAL OBSERVATIONS

QE 194

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 191551 STATION 1023

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

COOK (HGS) (continued)

FORM 526a
(6-18-69)

U.S. DEPARTMENT OF COMMERCE
COAST AND GEODETIC SURVEY

R

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: COOK (HGS)
ESTABLISHED BY: C.T. Husemeyer YEAR: 1949 STATE: Hawaii
RECOVERED BY: D.M. Whipp YEAR: 1966 COUNTY: Hawaii
Island: Hawaii

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 FEET	DISTANCE METERS	DIRECTION °	'	"
HAIKU (HGS) 1877----------1949 DISTANCE and DIRECTION-------				00	00	00.0
RM No. 1	E	29.736	9.064	84	36	53.8
RM No. 2	SSW	24.717	7.534	189	15	04.8
TOLEDO	W	333.178	110.553	249	47	27.1
HAIKU (HGS) 1877----------1966 DISTANCE and DIRECTION-------				00	00	00.0
RM No. 1	ESE	29.705	9.055	84	36	38
RM No. 2	SW	24.702	7.530	189	17	06

Station was recovered and all marks found in good condition. A complete description follows:

Station is located about 4 miles west-northwest of Hakalau and 2 miles west-southwest of Honohina Village, along the south side of Waikaumalo Stream, on a knoll in open , grassy pasture land at 1439 feet elevation. It is about 200 yards southwest of a row of large eucalyptus trees and 1/4-mile west-northwest of a radio mast which sets in the first cane field across gulch east of station.

To reach station from the post office at Ninole, go northwest on the highway for 0.05 mile; turn left into deep cut and follow cane road up steep hill for 0.5 mile to paved crossroad. Keep ahead for 0.15 mile to station HAIKU on left; continue ahead for 0.05 mile to fork. Take right fork and go 0.25 mile to crossroad. Continue ahead for 0.65 mile to T-intersection. Turn left and go 0.4 mile to dim side road right, just after winding up out of a gulch crossing. Turn sharp right and go 0.05 mile to locked board gate. Pass through gate and continue on track road for 0.4 mile to end of road at second locked gate, at the large tree row. Pack southwest about 200 yards to station, crossing 2 fence lines on the way. NOTE: Key for locked gate was obtained at the Ninole store. A 4-wheel-drive vehicle is needed for last 0.4 mile.

Station mark is a standard disk stamped "COOK HGS 1949", set in the top of an 8-inch-square, concrete monument that projects 4 inches. It is 98 feet northeast of a 20-foot lehua tree which has a huge, gnarled base and to which a fence line is fastened, and 125 feet southwest of another fence line. Station TOLEDO 1949 is across Waikaumalo Gulch from station.

Reference mark number one is a standard disk stamped "COOK HGS NO 1 1949", set in the top of an 8-inch-square, concrete monument that projects 2 inches. It is directly on line with the radio tower and about 2 feet lower than station mark.

Reference mark number two is a standard disk stamped "COOK HGS NO 2 1949", set in the top of an 8-inch-square, concrete monument that projects 2 inches. It is 73 feet northeast of a fence line and about 1 foot higher than station mark.

party should be inserted here. The officer who actually visited the station should sign n
-y note.

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

COMM-DC 27173-P69

USCOMM-NOAA-ASHEVILLE

AUG 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 191551 HAWAII STATION 1024
LATITUDE 19 °30 ′ TO 20 °00 ′
LONGITUDE 155 °00 ′ TO 155 °30 ′
DIAGRAM NE 5-1,5 HAWAII

DESCRIPTION
~~RECOVERY~~ NOTE, TRIANGULATION STATION

NAME OF STATION: CRACK (HGS)
ESTABLISHED BY: L.A. Critchlow YEAR: 1977 STATE: Hawaii
COUNTY: Hawaii BENCH MARK ALSO ☐
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: 4 miles south of Hilo
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 FEET	DISTANCE METERS	DIRECTION
WAIAKEA MAUKA USGS 1949				00 00 00"
RM 2	SE	14.81	4.516	205 06 47
RM 1	SW	29.67	9,040	311 58 45
RM 1 to RM 2		36.71	11,192	

The station is located about 4 miles south of Hilo, 3 1/2 miles northwest of Keaau, 1 1/2 miles west of State Highway 11 and 1/2 mile northwest of the Stainback Highway. The station is located on a low hill inside of a fence about 72 feet west of the centerline of a road.

To reach the station from the junction of State Highways 11 and 19 in the east part of Hilo, go south on Highway 11 for 3.1 miles to East Palai Street. Turn right and go west on East Palai Street 0.1 mile to Kilauea Street. Turn left and go south on Kilauea Street 0.4 mile to Haihai Street. Turn right and go west on Haihai Street 1.7 miles to Ainaola Street. Turn left and go south on Ainaola Street 0.3 mile to Ainaola Drive. Take left fork and go southeasterly on Ainaola Drive 1.6 miles to road intersection. Turn left and go northerly 0.3 mile to the station site on a low hill on the left side of the road, about 72 feet west of the centerline of the road.

The station mark is a State of Hawaii survey disk, stamped CRACK 1977, cemented in a drill hole in bedrock. It is 72 feet west of the centerline of a gravel road, 40 feet west of a fence post with '18' on it, on the highest point of a low hill and about 10 feet higher than the road.

Reference mark 1, stamped A, is a railroad spike with a cross marking the center, cemented in a drill hole in bedrock, 2 feet west of a small tree on a ridgetop and 2 feet lower than the station mark.

Reference mark 2, stamped B, is a railroad spike with a cross marking the center, cemented in a drill hole in bedrock, 58 feet west of the centerline of a gravel road, 26 feet west of a fence and about 1 foot lower than the station mark.

* 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 (1-72) SUPERSEDES C&GS FORM 526A WHICH MAY BE USED. U.S. DEPARTMENT OF COMMERCE NOAA

* U.S. GPO: 1976-665-661/1220 Region 6

ADJUSTED HORIZONTAL CONTROL DATA
~~ADJUSTMENT BY NGS~~

NAME OF STATION: CRACK HGS OBS BY NGS
STATE: HAWAII YEAR: 1977 SECOND ORDER
SOURCE: G-16241

GEODETIC LATITUDE:	19 39 28.70471	ELEVATION:	170.7 METERS
GEODETIC LONGITUDE:	155 05 15.08523		560 FEET

STATE COORDINATES (Feet)

STATE & ZONE	CODE	X	Y	ϕ OR Δ α ANGLE *
HI 1	5101	641,917.06	299,632.56	+ 0 08 20 "

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

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH * (From south)	CODE
WAIAKEA MAUKA USGS	79 07 32.3	78 59 13 "	5101

THESE DATA OBTAINED FROM ADJUSTMENT OF JAN 1979

3M 021

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

Q 191551 STATION 1025
HAWAII
LATITUDE 19 °30′ TO 20 °00′
LONGITUDE 155 °00′ TO 155 °30′
DIAGRAM NE 5-1,5 HAWAII

NO TEXT

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION CUPOLA

STATE HAWAII YEAR 1900 THIRD ORDER

SOURCE G-SP156

GEODETIC LATITUDE GEODETIC LONGITUDE	19 °43′32.″861 155 05 03.454	ELEVATION:	METERS FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	φ OR △ α ANGLE
HI 1	5101	642,968.49	324,265.65	+ 0 °08′25″

° PLANE AZIMUTH HAS BEEN COMPUTED BY THE φ OR △ α FORMULA NEGLECTING THE SECOND TERM.

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

QQ 331

AUG 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 19155I HAWAII
STATION 1026
LATITUDE 19 °50 ' TO 20 °00 '
LONGITUDE 155 °00 ' TO 155 °30 '
DIAGRAM NE 5-1,5 HAWAII

DESCRIPTION [redacted] NOTE, TRIANGULATION STATION

NAME OF STATION: DELUZ (HGS)
ESTABLISHED BY: L.A. Critchlow YEAR: 1977 STATE: Hawaii
COUNTY: Hawaii BENCH MARK ALSO ☐
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: 5 1/2 miles southwest of Hilo
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 FEET	DISTANCE METERS	DIRECTION ° ' "
HALAI 2 HGS				00 00 00.0
RM 2	WSW	25.93	7.903	237 53 08
RM 1	SE	23.67	7.216	349 54 16

The station is located about 5 1/2 miles southwest of Hilo, 4 1/2 miles west of the junction of State Highway 11 and East Kawailani Street, and 1000 feet north of the junction of Halaai Road and Ainaola Drive and on the east shoulder of the road right of way.

To reach the station from the intersection of State Highways 11 and 19 in the east part of Hilo, go south on Highway 11 for 2.55 miles to a crossroad. Turn right and go west on East Kawailani Street 0.9 mile to a fire station on the left. Continue west on Kawailani Street for 0.15 mile to a fork at a crossroad. Turn left, bear right and go southwest on Ainaola Road 2.5 miles to a fork. Keep to the left fork and continue southwest on Ainaola Road 1.35 miles to a T-road. Turn right and go north 1000 feet across the first box culvert to the station site on the east shoulder of the road.

The station marks are State of Hawaii survey disks stamped, DELUZ 1977. The underground mark is set in an irregular concrete mass about 3 feet below the ground. The surface mark is set in a 15 inch by 15 inch concrete slab 0.1 foot below the ground, 33 feet south-southeast of a utility pole, 12 feet east of the centerline of the road and 2 feet from the east edge of the pavement.

Reference mark 1, stamped 1, is a railroad spike with a punch hole marking the center, cemented in a round concrete post about 9 inches in diameter. The mark is 61 feet east of a utility pole, 29 feet southwest of a guardrail, 3 feet east of the east edge of the pavement, and 0.1 foot below the ground.

Reference mark 2, stamped 2, is a railroad spike with a punch hole marking the center, cemented in a round concrete post about 9 inches in diameter. The mark is 92 feet south of a utility pole, 5 feet west of the west edge of the pavement, 2 feet northwest of a guardrail, and 0.2 foot below the ground.

* 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 (1-72) SUPERSEDES C&GS FORM 526A WHICH MAY BE USED.

U.S. DEPARTMENT OF COMMERCE NOAA

* U.S. GPO: 1976-665-661/1220 Region 6

ADJUSTED HORIZONTAL CONTROL DATA

ADJUSTMENT BY NGS

NAME OF STATION: DELUZ HGS
OBS BY NGS
STATE: HAWAII YEAR 1977
SECOND ORDER
SOURCE: [illegible]

GEODETIC LATITUDE:	19 39 11.98117	ELEVATION:	314.5 METERS
GEODETIC LONGITUDE:	155 07 27.62932		1032 FEET

STATE COORDINATES (Feet)

STATE & ZONE	CODE	X	Y	ϕ OR Δ α ANGLE *
HI 1	5101	629,253.06	297,916.20	+ 0°07'35"

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

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH * (From south)	CODE
HALAI 2 HGS	199 °39 '00.2	199 °31 '25 "	5101

THESE DATA OBTAINED FROM ADJUSTMENT OF JAN 1979

3M 022

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

Q 191551 STATION 1027
HAWAII
LATITUDE 19 °30′ TO 20 °00′
LONGITUDE 155 °00′ TO 155 °30′
DIAGRAM NE 5-1,5 HAWAII

NO TEXT

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION DER

STATE HAWAII YEAR 1900 THIRD ORDER

SOURCE G-SP15e
NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE	19 46 56.01	ELEVATION	METERS
GEODETIC LONGITUDE	155 05 31.83		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR $\Delta\alpha$ ANGLE *
HI 1	5101	640,208.32	344,752.79	+ 0 08 17

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

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

QD 342

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

Q 191551 STATION 1028
HAWAII
LATITUDE 19 °30′ TO 20 °00′
LONGITUDE 155 °00′ TO 155 °30′
DIAGRAM NE 5-1,5 HAWAII

SEE STATION PUU ULAULA 2

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: DISK NR PUU ULAULA 2

STATE HAWAII YEAR 1949 SECOND ORDER

SOURCE G- 9279
NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE:	19 °31′59.″119	ELEVATION:	3076.6 METERS
GEODETIC LONGITUDE:	155 27 59.733		10094 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	x	y	ϕ OR Δ α ANGLE *
HI 1	5101	511,503.01	254,109.24	+ 0 00′40″

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

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

POSITION DETERMINED BY TRAVERSE FROM STATION PUU ULAULA 2

QE 270

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

Q 191551 STATION 1029
HAWAII
LATITUDE 19 °30′ TO 20 °00′
LONGITUDE 155 °00′ TO 155 °30′
DIAGRAM NE 5-1,5 HAWAII

NO TEXT

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: DOCK
STATE: HAWAII YEAR: 1900 THIRD ORDER

SOURCE: G-SP156
NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE: 19 °43′42.″88 GEODETIC LONGITUDE: 155 04 26.41	ELEVATION:	METERS FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	φ FOR Δ α ANGLE *
HI 1	5101	646,504.90	325,285.14	+ 0 08 38

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

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

QJ 327

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

NO TEXT_

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

Q 191551 STATION 1030
HAWAII
LATITUDE 19 °30′ TO 20 °00′
LONGITUDE 155 °00′ TO 155 °30′
DIAGRAM NE 5-1,5 HAWAII

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: EAST OF 2 STACKS

STATE: HAWAII YEAR: 1900 THIRD ORDER

SOURCE: G-SP156

GEODETIC LATITUDE: 19 °50 ′44.″846 GEODETIC LONGITUDE: 155 05 18.309	ELEVATION	METERS FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	x	y	β (OR Δ α) ANGLE
HI 1	5101	641,443.37	367,841.10	+ 0 08 23

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

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

QD 347

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

Q 191551 STATION 1031
HAWAII
LATITUDE 19 °30' TO 20 °00'
LONGITUDE 155 °00' TO 155 °30'
DIAGRAM NE 5-1,5 HAWAII

NO TEXT

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: FOREIGN CHURCH

STATE: HAWAII YEAR: 1900 THIRD ORDER

SOURCE: G-SP156

GEODETIC LATITUDE: 19 43 35.446 GEODETIC LONGITUDE: 155 05 27.024		ELEVATION:	METERS FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR $\Delta\alpha$ ANGLE *
HI 1	5101	640,716.13	324,520.96	+ 0 08 17

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

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

QD 332

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

Q 191551 STATION 1032
HAWAII
LATITUDE 19 °30′ TO 20 °00′
LONGITUDE 155 °00′ TO 155 °30′
DIAGRAM NE 5-1,5 HAWAII

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
Form 8255 b

DESCRIPTION OF TRIANGULATION [redacted] STATION

NAME OF STATION: GENERAL LYMAN FIELD AP A YEAR: 1962 STATE: Hawaii COUNTY: Hawaii
CHIEF OF PARTY: H. J. Seaborg

Description, including sketch of object:

The station is set on the north side of Runway 8-26, at the west end of the runway, at the edge of the asphalt parking area on the north side of the runway, 52 feet north of the edge of the runway, and 50 feet north of the row of runway lights along the north side of the runway.
It is a standard topographic disk stamped AP STA A 1962 set in top of an irregular mass of concrete which is flush with the ground and the asphalt paving.

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: GENERAL LYMAN FIELD AP A
ESTABLISHED BY: H. J. Seaborg YEAR: 1962 STATE: Hawaii BENCH MARK(S) ALSO ☐
RECOVERED BY: R. B. Melby YEAR: 1975 COUNTY: Hawaii
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: at Hilo

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 in 1962. The mark is set flush and grass has grown over it. Permission to visit the station site must be obtained from the airport manager.

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: GENERAL LYMAN FIELD AP A
ESTABLISHED BY: H.J. Seaborg YEAR: 1962 STATE: Hawaii BENCH MARK ALSO ☐
RECOVERED BY: L.A. Critchlow YEAR: 1977 COUNTY: Hawaii
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: North side of runway 8-26 in Hilo
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 FEET	DISTANCE METERS	DIRECTION ° ′ ″

The station was found as described in 1962. The station mark was found to be in good condition.

NOAA FORM 76-31
(11-76)

ADJUSTED HORIZONTAL CONTROL DATA

ADJUSTMENT BY NGS

NAME OF STATION: GEN LYMAN FLD AP A OBS BY CGS
STATE: HAWAII YEAR: 1962 SECOND ORDER
SOURCE: C-12975

GEODETIC LATITUDE:	19 43 29.34800	ELEVATION:	7.0 METERS
GEODETIC LONGITUDE:	155 03 51.87300		23 FEET

STATE COORDINATES (First)

STATE & ZONE	CODE	X	Y	θ OR Δ α ANGLE *
HI 1	5101	649,807.80	323,928.41	+ 0 °08 ′49 ″

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

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH * (From south)	CODE
LYMAN	263 °26 ′51.7	263 °18 ′02 ″	5101

THESE DATA ARE OBTAINED FROM ADJUSTMENT OF 1967

3M 024

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

Q 191551 STATION 1033
HAWAII
LATITUDE 19 °30' TO 20 °00'
LONGITUDE 155 °00' TO 155 °30'
DIAGRAM NE 5-1,5 HAWAII

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
Form 525 b

DESCRIPTION OF TRIANGULATION [redacted] STATION

NAME OF STATION: GENERAL LYMAN FIELD AP B YEAR: 1962 STATE: Hawaii COUNTY: Hawaii
CHIEF OF PARTY: H. J. Seaborg

Description, including sketch of object:

The station is set on the north side of Runway 8-20, at the east end of the runway, 7 feet east of the end of the asphalt covered area on the north side, 21 feet west of the center of the abandoned road which crossesthe runway, 52 feet north of the north side of the runway, and 50 feet north of the line of runway lights along the north side of the of the runway.

It is a standard topographic disk stamped AP STA B 1962 set in top of a circular concrete monument which is flush with the surface of the ground.

Form 526
(11-8-55)

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

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: GENERAL LYMAN FIELD AP B
ESTABLISHED BY: H.J. Seaborg YEAR: 1962 STATE: Hawaii
RECOVERED BY: D.M. Whipp YEAR: 1966 COUNTY: Island:Hawaii

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 and is believed to have been destroyed when the runway was lengthened.

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: GENERAL LYMAN FIELD AP B
ESTABLISHED BY: HJS YEAR: 1962 STATE: Hawaii BENCH MARK(S) ALSO ☐
RECOVERED BY: C.K. Townsend YEAR: 1976 COUNTY: Hawaii
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN:

At Hilo Airport

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. Due to construction on the runway station might be destroyed or covered.

FORM C&GS-526 (5-60)
USCOMM-DC 56496-P66

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

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION GENERAL LYMAN FIELD AP B
STATE HAWAII YEAR 1962 THIRD ORDER

SOURCE G-12975

GEODETIC LATITUDE	19 °43 '29.°343	ELEVATION	9.3 METERS
GEODETIC LONGITUDE	155 02 43.840		31 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	β (or Δ α) ANGLE *
HI 1	5101	656,307.29	323,944.94	+ 0 °05 '12 "

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE β (or Δ α) FORMULA NEGLECTING THE SECOND TERM.

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

QF 478

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

Q 191551 STATION 1034
HAWAII
LATITUDE 19 °30' TO 20 °00'
LONGITUDE 155 °00' TO 155 °30'
DIAGRAM NE 5-1,5 HAWAII

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
Form 588 b

DESCRIPTION OF TRIANGULATION [redacted] STATION

NAME OF STATION: GENERAL LYMAN FIELD ARP YEAR: 1962 STATE: Hawaii COUNTY: Hawaii
CHIEF OF PARTY: H. J. Seaborg

Description, including sketch of object:

The station is at the east edge of the grass strip on the east side of Runway 3-21, 90 feet south of the south side of the taxiway on the south side of Runway 8-26, 10 feet west of the center of an abandoned road, and 130 feet west of the center of the cover of an airvent to an underground shelter.

It is a standard topographic disk set in an irregular mass of concrete which is flush with the ground stamped ARP, 1962.

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: GENERAL LYMAN FIELD ARP
ESTABLISHED BY: H.J.S. YEAR: 1962 STATE: Hawaii BENCH MARK(S) ALSO ☐
RECOVERED BY: C.K. Townsend YEAR: 1976 COUNTY: Hawaii
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN:
At Hilo Airport

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 may have been grown over with grass or covered when repaving of the runway took place.

FORM C&GS-526 (9-66)
USCOMM-DC 36496-P66

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

NOAA FORM 76-31
(11-76)

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: GENERAL LYMAN FIELD ARP
STATE: HAWAII YEAR: 1962 THIRD ORDER
SOURCE: G-12975

GEODETIC LATITUDE	19 °43 '22.361	ELEVATION	9.1 METERS
GEODETIC LONGITUDE	155 03 27.484		30 FEET

STATE COORDINATES (Feet)

STATE & ZONE	CODE	X	Y	β OR Δ α ANGLE
HI 1	5101	652,139.62	323,229.58	+ 0 08 57

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

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

QF 475

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

0 191551 STATION 1035
HAWAII
LATITUDE 19 °30' TO 20 °00'
LONGITUDE 155 °00' TO 155 °30'
DIAGRAM NE 5-1,5 HAWAII

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
Form 525 b

DESCRIPTION OF TRIANGULATION INTERSECTION STATION

NAME OF STATION: GENERAL LYMAN FLD CONT TWR BCN YEAR: 1962 STATE: Hawaii COUNTY: Hawaii
CHIEF OF PARTY: H. J. Seaborg

Description, including sketch of object:

The station is located atop the Control Tower at the terminal at Hilo Airport. It is a standard white and gseen revolving beacon in the center of the control tower. There is a small platform holding antennae and annemometers over the light.

Form 526
(11-8-55)

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

RECOVERY NOTE, TRIANGULATION STATION INTERSECTION

R

NAME OF STATION: GENERAL LYMAN FLD CONT TWR BCN
ESTABLISHED BY: H.J. Seaborg YEAR: 1962 STATE: Hawaii
RECOVERED BY:* D.M. Whipp YEAR: 1966 COUNTY: Hawaii
Island: Hawaii

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

This station was established by an airport survey party in 1962. Station was recovered. It is the revolving, green and white light mounted atop the control tower which is on the terminal building at Lyman Field.

[redacted] OF TRIANGULATION INTERSECTION STATION

RECOVERY NOTE

NAME OF STATION: GENERAL LYMAN FIELD CONTROL TWR BCN 1962

CHIEF OF PARTY: L.A. Critchlow YEAR: 1977 STATE: Hawaii COUNTY: Hawaii

Description, including sketch of object:

The station was recovered in good condition as described in a 1966 recovery note. The terminal building is now used as a shipping terminal as a new passenger terminal has been built on another part of the airport.

Described by _____ U. S. DEPARTMENT OF COMMERCE NOAA

NOAA FORM 76-81
(10-71)

* U.S. GPO: 1975-665-081/1178 Region 6

ADJUSTED HORIZONTAL CONTROL DATA

ADJUSTMENT BY NGS

NAME OF STATION: GENERAL LYMAN FLD CONT TWR BCN OBS BY CGS
STATE: HAWAII YEAR: 1962 THIRD ORDER

SOURCE: G-16241

GEODETIC LATITUDE: 19 43 16.79.31 GEODETIC LONGITUDE: 155 03 45.07502	ELEVATION:	METERS FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ α ANGLE *
HI 1	5201	650,460.50	322,663.26	+ 0°08'52"

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

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

THESE DATA OBTAINED FROM ADJUSTMENT OF JAN 1979

3M 026

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

Q 191551 STATION 1036
HAWAII
LATITUDE 19 °30′ TO 20 °00′
LONGITUDE 155 °00′ TO 155 °30′
DIAGRAM NE 5-1,5 HAWAII

NO TEXT

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION GREEN LIGHT

STATE HAWAII YEAR 1900 THIRD ORDER

SOURCE G-SP156

GEODETIC LATITUDE	19 45 55.603	ELEVATION	METERS
GEODETIC LONGITUDE	155 05 33.163		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR $\Delta\alpha$ ANGLE *
HI 1	5101	640,095.68	338,658.60	+ 0 08 16

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

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

QQ 340

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

Q 191551 STATION 1037
HAWAII
LATITUDE 19 °30' TO 20 °00'
LONGITUDE 155 °00' TO 155 °30'
DIAGRAM NE 5-1,5 HAWAII

NO TEXT

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION GROVE

STATE HAWAII YEAR 1900 THIRD ORDER

SOURCE G-SP156

GEODETIC LATITUDE: 19 ° 43 ' 50.155		ELEVATION:	METERS
GEODETIC LONGITUDE: 155 03 44.287			FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ α ANGLE *
HI 1	5101	650,527.11	326,029.29	+ 0 08 52

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

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

QD 324

JUN 1976
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

Q 191551 STATION 1038
HAWAII
LATITUDE 19 °30' TO 20 °00'
LONGITUDE 155 °00' TO 155 °30'
DIAGRAM NE 5-1,5 HAWAII

NO ORIGINAL TEXT

Haaheo (Hawaii Island, Hawaiian Government Survey, 1878; E. R. Hand, 1912).—On east shore of Hawaii, just north of Hilo, in edge of town, and near edge of cliffs. Station is 15 feet inshore from top of railroad cut which parallels seacoast; it is between railroad cut and government road and about 300 feet east of latter, on the first prominent rise north of Wainaku sugar mill; cliff face and railroad cut give hill appearance, from seaward, of having been sliced away. To reach station start at railroad crossing at Wainaku sugar mill and go north along track 700 meters, then climb to top of rise on west side of cut. Station marked by a concrete base from which rises a galvanized iron pipe, terminating in a galvanized iron drum, the drum and upper part of pipe being demountable so that an instrument may be set over station.

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
Form 526
(Rev. Feb. 1948)

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: HAAHEO
ESTABLISHED BY: H.G.S. YEAR: 1878 STATE: Hawaii
RECOVERED BY:* C.T.Husemeyer YEAR: 1949 COUNTY: Hawaii

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

Station recovered as described; On the east shore of Hawaii, just north of Hilo, in edge of town and near edge of cliffs. Station is 15 feet inshore from top of railroad cut which parallels seacoast; it is between railroad cut and government road and about 300 feet east of latter, on the first prominent rise north of Wainaku sugar mill.

Station marked by a concrete base from which rises a galvanized iron pipe, terminating in a galvanized iron drum.

The station was destroyed by the new highway in 1949. Two reference marks were set previous to this.

Reference mark No.1 is west of the station. A standard disk set in the top of a square topped concrete post, stamped HAAHEO NO 1 1949

Reference mark No.2 is northwest of the station and four feet south of a fence line. A standard disk set the top of a square topped concrete post, stamped HAAHEO NO 2 1949.

OBJECT	DISTANCE	DIRECTION
KEOKEA 2		0 00 00.00
MOKUOLA	2 miles	25 10 14.6
R.M. No.1	100.00 Ft.	79 59 50.6
R.M. No.2	118.11 Ft.	205 10 14.0

To reach from the Post Office at Hilo: go northerly on the coast highway for 1.4 miles to the Haaheo School road on left. Continue ahead for about 75 feet then turn right into open grassy field and go east about 300 feet to station.

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: HAAHEO
STATE: HAWAII YEAR: 1878 THIRD ORDER
SOURCE: G-SP156

GEODETIC LATITUDE	GEODETIC LONGITUDE	ELEVATION
19 44 50.166	155 05 35.091	34 METERS SCALED

STATE COORDINATES (Feet)

STATE & ZONE	CODE	X	Y	θ OR Δ α ANGLE*
HI 1	5101	639,927.39	332,056.86	+ 0 08 15

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

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

QD 317

NOAA FORM 76-31
(11-76)

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

Q 191551 STATION 1039
HAWAII
LATITUDE 19 °30′ TO 20 °00′
LONGITUDE 155 °00′ TO 155 °30′
DIAGRAM NE 5-1,5 HAWAII

NO TEXT

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: HAAHEO CHURCH

STATE: HAWAII YEAR: 1903 THIRD ORDER

SOURCE: G-SP156

GEODETIC LATITUDE: 19 °44′52.″630 GEODETIC LONGITUDE: 155 °05′43.″475		ELEVATION	METERS FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ α ANGLE *
HI 1	5101	639,125.95	332,303.51	+ 0 °08′12″

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

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

QO 337

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

Q 19i55i STATION 1040
HAWAII
LATITUDE 19 °30′ TO 20 °00′
LONGITUDE 155 °00′ TO 155 °30′
DIAGRAM NE 5-1,5 HAWAII

NO TEXT

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: HACK

STATE: HAWAII YEAR: 1900 THIRD ORDER

SOURCE: G-SP156

GEODETIC LATITUDE: 19 °43 ′35.320	ELEVATION:	METERS
GEODETIC LONGITUDE: 155 04 55.415		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	φ (OR Δ α) ANGLE *
HI 1	5101	643,735.87	324,515.60	+ 0 08 ′28 ″

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE φ (OR Δ α) FORMULA NEGLECTING THE SECOND TERM

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

QO 325

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

Q 191551 STATION 1041
HAWAII
LATITUDE 19 °30' TO 20 °00'
LONGITUDE 155 °00' TO 155 °30'
DIAGRAM NE 5-1,5 HAWAII

NO ORIGINAL TEXT

Haiku (Hawaii Island, Hawaiian Government Survey, 1877; E. R. Hand, 1913).—On northeast coast of Hawaii, in the land of Haiku, directly inshore from the village of Haiku, which is just east of the railroad station of Ninole. Station is 980 meters from the government road. A trail leads from Haiku to the station. Marked by a copper tablet of the United States Geological Survey set in a concrete cylinder.

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
FORM 526

RECOVERY NOTE, TRIANGULATION STATION **R**

NAME OF STATION: HAIKU
ESTABLISHED BY: H.G.S. YEAR: 1877 STATE: Hawaii
RECOVERED BY: C.T.Husemeyer YEAR: 1949 COUNTY: Hawaii

Detailed statement as to the fitness of the original description: Original station was described as a sumac post with copper triangle under it three feet below the surface. In 1899 the station was remarked with a 12 inch concrete cylinder marked with a cross and dot and set in stone and concrete. In 1912 station was remarked by the U.S.Geological Survey with a bronze disk set in a concrete post 12 inches in diameter. In 1928 the Hawaii Territory Survey placed a six foot square concrete platform, with four foot mason work suports, over the station. Station is plumbed to through a three inch pipe in center of floor.

Station is located on the northeast coast of Hawaii, in North Hilo district in the land of Haiku. About 980 meters above the government road, on a low grass covered knoll in cane land, about 250 feet east of a wash and about 150 feet north of a cane road.

To reach from the post office in Hilo: go northerly on the coast highway for 20.1 miles to Ninole post office, continue ahead about 100 yards then turn left through a deep cut and follow plantation road up hill and through a small village for for 0.7 mile to end of road at a wash. From here pack across wash then left to station.

Form 526
(11-8-55)

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

RECOVERY NOTE, TRIANGULATION STATION **R**

NAME OF STATION: HAIKU
ESTABLISHED BY: H.G.S. YEAR: 1877 STATE: Hawaii
RECOVERED BY:* D.M. Whipp YEAR: 1966 COUNTY: Hawaii
Island: Hawaii

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. A complete description follows:

Station is located about 1-1/4 miles northwest of Honohina village and 0.6 mile southwest of the Ninole post office, on a low knoll in cane field, at southeast side of a small gulch.

To reach station from the post office at Ninole, go northwest on State Highway 19 for 0.05 mile; turn left, into deep cut, and follow cane road uphill for 0.5 mile to paved crossroad; continue ahead for 0.15 mile to station on left; take dim left fork, around head of shallow gulch, for 0.05 mile to end of truck travel. Walk northeast through cane field for 40 yards to station.

Station mark is a U.S. Geological Survey disk stamped "683", set in the top of a 12-inch-diameter, concrete monument that projects 2 inches above ground. A Type A signal is centered over the mark, with the 6-foot-square, concrete platform 4 feet above ground. Sugar cane is planted up to the station on all sides.

* 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.—Use of these forms must be used for every station recovered. COMM-DC 34314

NOAA FORM 76-31
(11-72)

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: HAIKU
STATE: HAWAII YEAR: 1877 SECOND ORDER

SOURCE: G- 9279

GEODETIC LATITUDE	19 °56 '03.244 "	ELEVATION	208.6 METERS
GEODETIC LONGITUDE	155 10 35.700		684 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	# OR △ α ANGLE *
HI 1	5101	611,083.01	399,895.44	+ 0 06 37

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE # OR △ α FORMULA NEGLECTING THE SECOND TERM.

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

QE 176

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

Q 191551 STATION 1042
HAWAII
LATITUDE 19 °30' TO 20 °00'
LONGITUDE 155 °00' TO 155 °30'
DIAGRAM NE 5-1,5 HAWAII

NO ORIGINAL TEXT

HALAI (HGS)

(Hawaii Island, Hawaiian Government Survey, 1877; E. R. Hand, 1912).—On the eastern coast of Hawaii, on the summit of a hill of the same name behind Hilo, and but a short distance out. Hill is a symmetrical sugar-loaf and is generally cane covered. It may be identified as follows: When standing at the circular pavilion in the public park on the beach at Hilo, one looks up a street running at right angles to the beach, the hill is seen at the head of this street. Station originally marked by granite block, but in 1912 mark described as block of cement, about 6 feet square, placed on highest point of hill; in center of block is galvanized iron pipe about 9 feet tall, at the top of which is a galvanized iron drum about 16 inches in diameter. The pipe is jointed so that the upper section with drum may be removed permitting the placing of an instrument over the lower part.

DEPARTMENT OF COMMERCE — U. S. COAST AND GEODETIC SURVEY — Form 536 — RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: HALAI (HGS)
ESTABLISHED BY: Hawaiian Govt. YEAR: 1877 STATE: Hawaii
RECOVERED BY: C. T. Husemeye YEAR: 1949 COUNTY: Hawaii

Detailed statement as to the fitness of the original description:

The original station consisting of a granite block set nearly flush with the ground was established in 1877. In 1911 this mark was replaced by a concrete base and can signal. In 1912 E. R. Hand recovered this station and described the mark as being a block of concrete about 6 feet square. In 1930 the Territory Survey Department recovered this station and reported the mark as being a 1 1/2 inch iron pipe set in concrete. Also in 1930 the Territory Survey Department built a stone and cement platform over this pipe, leaving it open to view. A new description follows--

The station is located on the summit of Halai Hill in the city of Hilo on property belonging to the Territory Survey Department. It lies about 1 mile west of Hilo Bay and about 0.4 mile southwest of The Hilo High School.

The station is the center of a 1 1/2 inch iron pipe which projects about 3 inches from the top of a square concrete slab. Over this mark has been erected a stone platform which is about 6 feet high and 6 feet square.

The latitude station is a brick pier about 3 foot high with a center mark drilled in its center.

Reference mark number 1 is a standard disk, stamped HALAI HGS NO 1 1949, set into a square concrete post which projects about 6 inches and is 2.9 feet lower than the station.

Reference mark number 2 is a standard disk, stamped HALAI HGS NO 2 1949, set into a square concrete post which projects about 6 inches and is 0.78 feet lower than the station.

NOTE	OBJECT	BEARING	FEET	METERS	DIRECTION
	KAIWIKI NEW (USGS)				
11a	R. M. No. 1	NNW	29.183	8.895	00 00 00
	Hilo, Stack (HiloSugar Co.)	NNE	1 1/2 miles		17 48 48
	Airport Beacon (Lyman Field)	E	3 miles		56 32 06.9
	Latitude Station	SW	9.819	2.993	129 40 48.6
11a	R. M. No. 2	W	32.671	9.958	271 03 43.9
	Hilo, Radio mast (KIPA)	WNW	4 miles		299 54 04
	Army Control Tower (Lyman Field)	E	2.5 miles		333 20 53.5
					126 22 05.4

(continued on next page)

NOAA FORM 76-31
(11-76)

ADJUSTED HORIZONTAL CONTROL DATA

ADJUSTMENT BY NGS

NAME OF STATION HALAI HGS — OBS BY CGS
STATE HAWAII — YEAR 1877 — SECOND ORDER
SOURCE U- 9-79

GEODETIC LATITUDE:	19 43 10.83200	ELEVATION	105.4 METERS
GEODETIC LONGITUDE:	155 05 57.57200		346 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	ϕ OR △ G1 ANGLE
HI 1	5101	637,803.65	322,030.94	+ 0°08'07"

° PLANE AZIMUTH HAS BEEN COMPUTED BY THE ϕ OR △ G1 FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH ° (From south)	CODE
KAIWIKI NEW	139 45 58.8	139 37 52	5101

THESE DATA ARE OBTAINED FROM ADJUSTMENT OF 1951

ASTRO OBSERVATIONS PERFORMED AT THIS STATION

3M 031

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 191551 STATION 1042

LATITUDE ° ′ TO ° ′
LONGITUDE ° ′ TO ° ′
DIAGRAM

HALAI (HGS) (continued)

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
FORM 526
(Rev. Feb. 1968)

RECOVERY NOTE, TRIANGULATION STATION **R**

NAME OF STATION: HALAI (HGS)
ESTABLISHED BY: H.G.S. YEAR: 1877 STATE: Hawaii
RECOVERED BY:* H.O.F. YEAR: 1958 COUNTY: Hawaii

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

The station, the old latitude station, and the two R. Ms. were recovered as described in 1949; all in good condition. Station is 1.0 mile S.W. from the post office building in Hilo, at the foot of Haili St.

FORM 526
(11-8-55)

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

RECOVERY NOTE, TRIANGULATION STATION **R**

NAME OF STATION: HALAI (HGS)
ESTABLISHED BY: H.G.S. YEAR: 1877 STATE: Hawaii
RECOVERED BY:* H.J.S. YEAR: 1962 COUNTY: Hawaii

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

The station, both reference marks and the latitude station were recovered in good condition as described in the recovery notes of 1949 and 1958. A truck can be driven to the station.

FORM 526a
(9-18-59)

U.S. DEPARTMENT OF COMMERCE
COAST AND GEODETIC SURVEY

R

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: HALAI (HGS)
ESTABLISHED BY: HGS YEAR: 1877 STATE: Hawaii
RECOVERED BY:* D.M. Whipp YEAR: 1966 COUNTY: Hawaii
Island: Hawaii

HEIGHT OF TELESCOPE ABOVE STATION MARK 2.83 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 FEET	DISTANCE METERS	DIRECTION ° ′ ″
KAIWIKI NEW (USGS)-----1949 Distance and Direction------				00 00 00.0
RM No. 1	NNW	29.183	8.895	17 48 48
Hilo, Hilo Sugar Co. Stack	NNE	1-1/2	miles	56 32 06.9
RM No. 2	W	32.671	9.958	299 54 04
----------1966 Distance and Direction------				
RM No. 1	NW	29.203	8.901	17 47 37
Hilo, Hilo Sugar Co. Stack 1949	NNE			56 32 11.3
RM No. 2	WSW	32.681	9.961	299 53 51

Station was recovered as described in 1949 and all marks found in good condition. A complete description follows:

Station is located on Halai Hill, at the southwest edge of Hilo, at 348 feet elevation, overlooking the southwest end of Haili Street.

To reach station from the post office in Hilo, go southeast on Kinoole Street for 0.15 mile; turn right and go southwest on Haili Street for 0.6 mile to fork. Take left fork, Halai Street, and go 0.05 mile; take T-road right, Hina Street, and go 0.05 mile; take paved T-road left and go upgrade 0.1 mile to end of street. Continue, on dim track road through high grass, for 0.05 mile to end of road and station on left.

Station mark is a cement-filled, 1-1/2-inch, iron pipe that projects 2 inches from the center of a 6 x 6-foot concrete slab extending 1 foot above ground. A Hawaii Territorial Survey Type A signal is centered over the mark, with the 6-foot-square concrete platform 6 feet above ground and a red and white metal target extending 8 feet above the platform.

Reference mark number one is a standard disk stamped "HALAI HGS NO 1 1949", set in the top of an 8-inch-square, concrete monument that projects 6 inches. It is 3.4 feet lower than station mark and hidden by tall grass.

Reference mark number two is a standard disk stamped "HALAI HGS NO 2 1949", set in the top of an 8-inch-square, concrete monument that projects 6 inches. It is 1.37 feet lower than station mark.

HILO LATITUDE STATION (HGS) 1887 is 9.819 feet southwest of station. It is a brick pier, 18 x 32 inches, and 30 inches high. There is a slight depression at the center of the pier, 1/4-inch in diameter.

RECOVERY NOTE, TRIANGULATION STATION **R**

NAME OF STATION: HALAI (HGS)
ESTABLISHED BY: Hawaiian Govt. YEAR: 1877 STATE: Hawaii BENCH MARK(S) ALSO ☐
RECOVERED BY: J.V. Teater YEAR: 1973 COUNTY: Hawaii
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: In the city of Hilo.

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

The existing station mark and reference mark 1 were recovered. A 14-foot square building has been built over the original mark and the door kept locked. The existing mark is located on the top of the top of the 12-foot high building. It is a concrete pier, about 2 1/2 feet high with a 2-inch iron pipe marking the station. There is a 6-foot section of pipe with steel banners used as a permanent target for the station, which can be removed for making an instrument set up.

The latitude station was believed to have been destroyed when the building was built. Reference mark 2 has been destroyed also.

RECOVERY NOTE, TRIANGULATION STATION **R**

NAME OF STATION: HALAI (HGS)
ESTABLISHED BY: H.G.S. YEAR: 1877 STATE: Hawaii BENCH MARK(S) ALSO ☐
RECOVERED BY: R. B. Melby YEAR: 1975 COUNTY: Hawaii
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: at Hilo

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 in 1973. Access to the roof of the small, locked building is by a permanently attached, outside ladder.

RECOVERY NOTE, TRIANGULATION STATION **R**

NAME OF STATION: HALAI HGS
ESTABLISHED BY: HGS YEAR: 1877 STATE: Hawaii BENCH MARK ALSO ☐
RECOVERED BY:* L.A. Critchlow YEAR: 1977 COUNTY: Hawaii
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: In Hilo
HEIGHT OF TELESCOPE ABOVE STATION MARK FEET. HEIGHT OF LIGHT ABOVE STATION MARK FEET.

The station mark was recovered in good condition, but was now inside a 11 by 13 foot building that is owned by the Hawaiian Telephone Company but is on state property. No observations could be made from this point, but station HALAI 2 HGS which was set directly above the station on top of the 12 foot high building was used. The center of the pipe marking station HALAI 2 HGS was found to differ in position from station HALAI HGS 1877 by 0.006 of a meter, in azimuth 279 degrees. Reference mark 1 was found destroyed and at this time reference marks 3 and 4 was set and were tied to station HALAI 2 HGS. See station HALAI 2 HGS for the description to the station.

The station mark is a C&GS disk stamped HALAI 1877 1970, attached to the top of a 4-inch pipe and inside a 4-inch pipe, 0.3 of a foot below the floor and metal cover. It is 4.8 feet south-southwest of the center of the doorway and 2.1 feet northwest of the southeast inside corner of the building.

(R.B.M.,1978)--The station was recovered as described.

NOAA FORM 76-31A
(11-74)

USCOMM-NOAA-ASHEVILLE

AUG 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 191551 HAWAII
STATION 1043
LATITUDE 19 °30 ′ TO 20 °00 ′
LONGITUDE 155 °00 ′ TO 155 °30 ′
DIAGRAM NE 5-1,5 HAWAII

DESCRIPTION RECOVERY, TRIANGULATION STATION

NAME OF STATION: HALAI 2 HGS
ESTABLISHED BY: L.A. Critchlow YEAR: 1977 STATE: Hawaii
COUNTY: Hawaii
BENCH MARK ALSO ☐
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: In Hilo
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 FEET	DISTANCE METERS	DIRECTION °	′	″
WAIAKEA MAUKA USGS 1949				00	00	00.0
RM 4	S	17.97	5.477	06	05	33
BM 5.79 USGS Geodetic Distance	ENE	(9369.28)	2855.761	227	47	31.76
HILO VOR ITO	E	about 5-1/2 miles		245	37	35.1
RM 3	SE	17.22	5.250	274	45	05
RM 3 to RM 4		25.16	7.670			

The station is located in the southwest part of Hilo, on state property and on top of a 11 by 13 foot building that is about 12 feet high that belongs to the Hawaiian Telephone Company. The station is set over station HALAI that is now inside of the building.

To reach the station from the post office in Hilo, go west on State Highway 20, Waianuenue Avenue, for 0.6 mile to a side street left. Turn left and go south on Halai Street for 0.15 mile to a T-street. Turn right and go northwest uphill on Hina Street for 0.05 mile to a side street on the left. Turn left and go south uphill for 0.15 mile to the top of the hill and the station. A locked chain gate is near the top of the hill and a key can by obtained from the Hawaiian Telephone Company.

Station mark is the center of a 2-1/2 inch iron pipe that is set in a tapering concrete post that projects about 2 feet above the surface of the roof. It is set in the southeast corner of the roof of the building and has a 6 foot high metal target projecting from its center, that can be removed when necessary. Note Desc.

Reference mark 3 is a NGS disk stamped HALAI HGS NO 3 1977. It is set in the top of an irregular mass of concrete that is 2 feet in diameter and flush with the ground surface. It is 14 feet southeast of of the southeast corner of the building, 25 feet east-southeast of the southwest corner of the building and 5 feet south of the edge of the track road. Note 11c.

Reference mark 4 is a NGS disk stamped HALAI HGS NO 4 1977. It is set in the top of a 12-inch round concrete post that is flush with the ground surface. It is 18 feet south of the southeast corner of the building, 12 southeast of the southwest corner of the building and 3 feet south of the track road. Note 11a

* 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 (1-72) SUPERSEDES C&GS FORM 526A WHICH MAY BE USED.
U.S. DEPARTMENT OF COMMERCE NOAA
* U.S. GPO: 1976-665-661/1220 Region 6

ADJUSTED HORIZONTAL CONTROL DATA

ADJUSTMENT BY NGS

NAME OF STATION: HALAI 2 HGS
OBS BY NGS
STATE: HAWAII
YEAR: 1977
FIRST ORDER
SOURCE: G-16241

GEODETIC LATITUDE:	19 43 10.83192	ELEVATION:	109.8 METERS
GEODETIC LONGITUDE:	155 05 57.57179		360 FEET

STATE COORDINATES (Feet)

STATE & ZONE	CODE	X	Y	φ OR Δ α ANGLE *
HI 1	5101	687,803.67	322,030.93	+ 0 °08 ′07 ″

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

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH * (From south)	CODE
WAIAKEA MAUKA USGS	21 °03 ′40.6	20 °55 ′34 ″	5101

THESE DATA OBTAINED FROM ADJUSTMENT OF JAN 1979

ASTRO OBSERVATIONS PERFORMED AT THIS STATION

3M 032

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

Q 191551 STATION 1044
HAWAII
LATITUDE 19 °30' TO 20 °00'
LONGITUDE 155 °00' TO 155 °30'
DIAGRAM NE 5-1,5 HAWAII

NO TEXT

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION HAOLE

STATE HAWAII YEAR 1902 THIRD ORDER

SOURCE G-SP156

GEODETIC LATITUDE GEODETIC LONGITUDE	19 57 51.204 155 12 20.023	ELEVATION	METERS FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	β OR Δ α ANGLE *
HI 1	5101	601,110.64	410,768.31	+ 0 06 02

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

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

QO 358

AUG 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 191551
HAWAII

STATION 1045

LATITUDE 19 °30 ' TO 20 °00 '
LONGITUDE 155 °00 ' TO 155 °30 '
DIAGRAM NE 5-1,5 HAWAII

DESCRIPTION OF TRIANGULATION ~~INTERSECTION~~ STATION
TRAVERSE

NAME OF STATION: HAWAIIAN TELEPHONE CO TOWER

CHIEF OF PARTY: L.A.Critchlow YEAR: 1977 STATE: Hawaii COUNTY: Hawaii

Description, including sketch of object: The station is the northwest and tallest one of two towers located on the summit of Kulani Cone and is airline about 20 miles southwest of Hilo, 12 miles west of Mountain View, 2 miles south of Kulani Honor Camp, and about 48 yards west-northwest of triangulation station KULANI HGS 1891.

The tower is a 4-legged steel structure about 175 feet high that is painted orange and white and is owned by the Hawaiian Telephone Company.

To reach the station from the junction of State Highways 11 and 19 in Hilo go south on State Highway 11 for 4.0 miles to a crossroad and a sign "KULANI 19". Turn right onto Stainback Road and go westerly 13.8 miles to an iron gate across the road. Pass through the gate and continue westerly 3.2 miles to a second iron gate at the entrance to Kulani Honor Camp. Pass through the gate and go west 0.05 mile to a crossroad. Turn left and go southeast and south on a dirt road 0.15 mile to some large buildings on the right. Continue south on the dirt road 1.5 miles to a fork. Take the right fork and go southerly 0.85 mile to the top of the hill and the station site.

NOAA FORM 76-81
(10-71)

Described by _____
U. S. DEPARTMENT OF COMMERCE
NOAA

* U.S. GPO: 1975-665-081/1178 Region 6

ADJUSTED HORIZONTAL CONTROL DATA

ADJUSTMENT BY NGS

NAME OF STATION: HAWAIIAN TELEPHONE CO TOWER OBS BY NGS

STATE: HAWAII YEAR: 1977 THIRD ORDER

SOURCE: G-1b241

GEODETIC LATITUDE:	19 31 25.11096	ELEVATION	METERS
GEODETIC LONGITUDE:	155 18 07.64260		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	ϕ OR Δ α ANGLE *
HI 1	5101	569,137.94	250,716.85	+ 0°03'58"

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

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

THESE DATA OBTAINED FROM ADJUSTMENT OF JAN 1979

3M 035

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

Q 191551 STATION 1046
HAWAII
LATITUDE 19 °30′ TO 20 °00′
LONGITUDE 155 °00′ TO 155 °30′
DIAGRAM NE 5-1,5 HAWAII

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
Form 533
Rev. Aug. 1948

DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: HI STATE: Hawaii COUNTY: Hawaii

CHIEF OF PARTY: R.C. Munson YEAR: 1968 Described by: R.F. Hanson

NOTE.*	HEIGHT OF TELESCOPE ABOVE STATION MARK 1.53 METERS.†	HEIGHT OF LIGHT ABOVE STATION MARK METERS.

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	DISTANCE meters	DIRECTION†
LELEIWI (USGS) 1912	NNE	198.773	(60.586)	

Detailed description:

Station is located about 5-1/2 miles east of Hilo, on Leleiwi Point, about 400 feet northeast of an old house at end of a track road, and 200 feet south-southeast from sea bluff, on a brushy, flat knoll.

To reach station from the highway junction at entrance to the Hilo Port, go left, east, on Kalanianaole St. for 3.0 miles to end of paved street. Continue ahead on gravel road for 0.2 mile to fork. Take right fork and go 75 yards to a side road right leading to a micro-wave tower; continue ahead and follow gravel road 0.3 mile to track side road left. Turn left and go 0.15 mile to end of road at old house. Pack northeast down trail toward sea, then bear left on open lava strip and follow up onto brushy rise, marked by blaze marks on hala trees, a total distance of about 100 yards.

Station is marked by a railroad spike, stamped "HI", cemented in a drill hole in rock.

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

16—30050-1 U. S. GOVERNMENT PRINTING OFFICE

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION HI
STATE HAWAII YEAR 1968 SECOND ORDER

SOURCE G-12664
NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE:	19 °44 ′20.″15566	ELEVATION:	2 METERS
GEODETIC LONGITUDE:	155 00 24.04772	SCALED	FEET

STATE COORDINATES (Feet)

STATE & ZONE	CODE	X	Y	β OR Δ α ANGLE*
HI 1	5101	669,647.42	329,108.25	+ 0 °10 ′00 ″

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

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

POSITION DETERMINED BY TRAVERSE FROM STATION LELEIWI

QF 632

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

Q 191551 STATION 1047
HAWAII
LATITUDE 19 °30′ TO 20 °00′
LONGITUDE 155 °00′ TO 155 °30′
DIAGRAM NE 5-1,5 HAWAII

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
Form 533 b

DESCRIPTION OF TRIANGULATION INTERSECTION STATION

NAME OF STATION: HILO, BULK SUGAR BINS, WEST LIGHT YEAR: 1949 STATE: Hawaii COUNTY: Hawaii
CHIEF OF PARTY: C. T. Husemeyer

Description, including sketch of object: The station is the red light on the west end of the roof of the bulk sugar storage bins.

The storage bins are four steel tanks about 100 feet high covered by a metal roof and constitute the most prominent building in the harbor area. The height to the top of the red light is 121 feet.

The building lies about 0.2 mile south of the Hilo Breakwater and about 150 yards east of the loading dock.

Form 526
(11-8-55)

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

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: HILO, BULK SUGAR BINS, WEST LIGHT
ESTABLISHED BY: C.T.H. YEAR: 1949 STATE: Hawaii
RECOVERED BY:* H.J.S. YEAR: 1962 COUNTY: Hawaii

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 in 1949. The description is adequate with the addition that there is a similar obstruction light on the easterly end of the building.

Form 526
(11-8-55)

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

RECOVERY NOTE, TRIANGULATION STATION INTERSECTION

R

NAME OF STATION: Hilo, Bulk Sugar Bins, West Light
ESTABLISHED BY: C.T.Husemeyer YEAR: 1949 STATE: Hawaii
RECOVERED BY:* D.M. Whipp YEAR: 1966 COUNTY: Hawaii
Island:Hawaii

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 the red obstruction light mounted on the west end of the large rectangular building which houses the 4 sugar storage tanks at the Hilo dock complex; this building is the highest and most prominent in the vicinity, and has a red and white checkered roof. Located about 2-1/4 miles east of Hilo and 400 feet east of the south end of Pier 1.

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: Hilo, Bulk Sugar Bins, West Light
ESTABLISHED BY: CTH YEAR: 1949 STATE: Hawaii BENCH MARK(S) ALSO ☐
RECOVERED BY: C.K. Townsend YEAR: 1976 COUNTY: Hawaii
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN:
In Hilo

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

Recovered as described in 1966.

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION HILO BULK SUGAR BINS W LIGHT
STATE HAWAII YEAR 1949 THIRD ORDER
SOURCE G- 9279

GEODETIC LATITUDE	19 43 57.629	ELEVATION	METERS
GEODETIC LONGITUDE	155 03 19.623		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	φ OR Δ α ANGLE *
HI 1	5101	652,881.31	326,789.39	+ 0 09 00

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

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

QE 232

AUG 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 191551 HAWAII STATION 1048
LATITUDE 19 °30 ' TO 20 °00 '
LONGITUDE 155 °00 ' TO 155 °30 '
DIAGRAM NE 5-1,5 HAWAII

DESCRIPTION OF TRIANGULATION INTERSECTION STATION

NAME OF STATION: HILO COMTEC MAST

CHIEF OF PARTY: L.A. Critchlow YEAR: 1977 STATE: Hawaii COUNTY: Hawaii

Description, including sketch of object: Station is the top center of a mast owned by the Comtec Company. It is painted red and white, has two receiving dishes on it near the top, is 80 feet high and mounted on a building which is 20 feet high.

The station is located in Hilo, at the Hilo Shopping Center, just east of the intersection of Kilauea Avenue and Kekuanaoa Street and on top of the building which houses the Comtec Office, 74 Kekuanaoa Street, Hilo, Hawaii. Phone number 935-2995.

Described by _____
U. S. DEPARTMENT OF COMMERCE
NOAA

NOAA FORM 76-81
(10-71)

* U.S. GPO: 1975-665-081/1178 Region 6

ADJUSTED HORIZONTAL CONTROL DATA

ADJUSTMENT BY NGS

NAME OF STATION: HILO COMTEC MAST

OBS BY NGS

STATE: HAWAII YEAR: 1977

THIRD ORDER

SOURCE: G-16241

GEODETIC LATITUDE: 19 42 51.06699 GEODETIC LONGITUDE: 155 04 42.84836		ELEVATION:	METERS FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR $\Delta\alpha$ ANGLE *
HI 1	5101	644,947.48	320,054.33	+ 0 °08 '32 "

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

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

THESE DATA OBTAINED FROM ADJUSTMENT OF JAN 1979

3M 039

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

Q 191551 STATION 1049
HAWAII
LATITUDE 19 °30′ TO 20 °00′
LONGITUDE 155 °00′ TO 155 °30′
DIAGRAM NE 5-1,5 HAWAII

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
Form 525 b

DESCRIPTION OF TRIANGULATION INTERSECTION STATION

NAME OF STATION: Hilo, Harbor Commissioners Tank YEAR: 1951 STATE: Hawaii COUNTY: Hawaii

CHIEF OF PARTY: C. A. George

Description, including sketch of object:

The elevated water tank of the Board of Harbor Commissioners. The tank is 183 feet high.

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: Hilo, Harbor Commissioners, Water Tank
ESTABLISHED BY: C. A. George YEAR: 1951 STATE: Hawaii BENCH MARK(S) ALSO ☐
RECOVERED BY: R. B. Melby YEAR: 1975 COUNTY: Hawaii
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: at Hilo

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. It is a cylindrical, flat-topped tank (elevated), painted in a red and white checkered pattern.

RECOVERY NOTE ~~DESCRIPTION~~ OF TRIANGULATION INTERSECTION STATION

NAME OF STATION: HILO HARBOR COMMISSIONERS WATER TANK 1951

CHIEF OF PARTY: L.A.Critchlow YEAR: 1977 STATE: Hawaii COUNTY: Hawaii

Description, including sketch of object: The station was recovered in good condition and is the top and center of an orange and white-checkered water tank located near the docks at the east end of Kuhio Bay in the east section of Hilo. The tank is mounted on six legs, is about 180 feet high, has a red light on top, and is now owned by the Hawaii State Transportation Department, Harbors Division.

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: HILO, HARBOR COMMISSIONER'S WATER TANK
ESTABLISHED BY: C.A.G. YEAR: 1951 STATE: HAWAII BENCH MARK(S) ALSO ☐
RECOVERED BY: R.B.M. YEAR: 1978 COUNTY: HAWAII
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: AT HILO

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

NOAA FORM 76-165
(12-72)
(OLD C&GS 526)

#U. S. GOVERNMENT PRINTING OFFICE: 1976--665661/1138 REGION NO. 6

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

NOAA FORM 76-31
11-76)

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION HILO HARBOR COMMISSIONERS TANK

STATE HAWAII YEAR 1951 THIRD ORDER

SOURCE G- 9823

GEODETIC LATITUDE	19 °43 ′54.″526	ELEVATION	METERS
GEODETIC LONGITUDE	155 °03 ′26.″463		FEET

STATE COORDINATES (Feet)

STATE & ZONE	CODE	X	Y	ϕ OR △ α ANGLE
HI 1	5101	652,228.70	326,474.65	+ 0 °08 ′58 ″

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE ϕ OR △ α FORMULA NEGLECTING THE SECOND TERM

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

QF 473

AUG 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 191551 HAWAII STATION 1050
LATITUDE 19 °30' TO 20 °00'
LONGITUDE 155 °00' TO 155 °30'
DIAGRAM NE 5-1,5 HAWAII

DESCRIPTION OF TRIANGULATION INTERSECTION STATION

NAME OF STATION: HILO HAWAIIAN TELEPHONE CO TOWER

CHIEF OF PARTY: L.A.Critchlow YEAR: 1977 STATE: Hawaii COUNTY: Hawaii

Description, including sketch of object: The station is located about 5 miles east of the center of Hilo and 1/2 mile west-southwest of Leleiwi Point, and is the top and center of a 3-legged steel tower that is about 120 feet high, is painted orange and white, and has three disks and two flat reflectors mounted on it. The tower is owned by the Hawaiian Telephone Company.

To reach the station from the junction of State Highways 11 and 19 in the east part of Hilo go east on Kalanianaole Street 3.6 miles to the end of the paved road. Continue east and southeast on a graveled road 0.1 mile to a side road on the right. Turn right and go south 0.1 mile to the station site.

Described by U. S. DEPARTMENT OF COMMERCE NOAA

NOAA FORM 76-81 (10-71)

* U.S. GPO: 1975-665-081/1178 Region 6

ADJUSTED HORIZONTAL CONTROL DATA

ADJUSTMENT BY NGS

NAME OF STATION: HILO HAWAIIAN TELEPHONE CO TWR OBS BY NGS

STATE: HAWAII YEAR: 1977 THIRD ORDER

SOURCE: G-16241

GEODETIC LATITUDE: 19 44 09.56838 GEODETIC LONGITUDE: 155 00 47.05670	ELEVATION:	METERS FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ α ANGLE *
HI 1	5101	667,452.51	328,033.85	+ 0 09 52

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

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

THESE DATA OBTAINED FROM ADJUSTMENT OF JAN 1979

3M 040