

NO TEXT

by the
National Ocean Survey
OLD HAWAIIAN DATUM

ADJUSTED HORIZONTAL CONTROL DATA

ORDER

GEODETIC LATITUDE:	20 05 16.320	ELEVATION:	METERS
GEODETIC LONGITUDE:	155 29 21.892		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ OR ANGLE
HI 1	5101	503,632.25	455,583.62	+ 0°00'13"

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

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

QO 365

Q0 365

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

0 201552 STATION 1002
HAWAII
LATITUDE 20 ° 00' TO 20 ° 30'
LONGITUDE 155 ° 00' TO 155 ° 30'
DIAGRAM NE S-1,5 HAWAII

NO ORIGINAL TEXT

Au (Hawaii Island, Hawaiian Government Survey, 1877; K. T. Adams, 1928).— On the north coast of Hawaii, near Honokaa. Reached from Honokaa by going west along the Honokaa Sugar Co. railroad, and after crossing four bridges, continuing on along the railroad for approximately 1,000 feet to the first ridge reached just before coming to a deep cut in the railroad embankment. Follow up this ridge to a sugar-cane flume just above which will be found the station. A cane field is on the east side of the ridge, and a ditch runs down the ridge 10 feet west of the station. A wooden flume runs along the face of the hill 100 feet below the station. There are no trees on this ridge, but a ridge with ironwood trees on it is ¼ mile to the east. Honokaa stack bears S. 80° E. Station marked by a 3-inch gas pipe projecting 2 feet above the center of a concrete base which is 3 feet square and stands 1 foot above the ground.

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION AU

STATE HAWAII

YEAR 1877

THIRD

ORDER

SOURCE G-SP156

GEODETIC LATITUDE	20 06 06.200	ELEVATION	158	METERS
GEODETIC LONGITUDE	155 29 54.515	SCALED		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	# OR Δ B' ANGLE *
HI 1	5101	502,390.75	460,615.55	+ 0 00 09

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

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

QD 367

Q0 357

Q 201552 STATION 1004
HAWAII
LATITUDE 20 ° 30' TO 20 ° 30'
LONGITUDE 155 ° 00' TO 155 ° 30'
DIAGRAM NE 5-1.5 HAWAII

HORIZONTAL CONTROL DATA

Q 201552 STATION 1005
HAWAII
LATITUDE 20 °00' TO 20 °30'
LONGITUDE 155 °00' TO 155 °30'
DIAGRAM NE 5-15 HAWAII

DESCRIPTION OF TRIANGULATION STATION

CHIEF OF PARTY: L. O. WILDER YEAR: 1948

Described by: **O. J. HOEPEL**

NOTE.	HEIGHT OF TELESCOPE ABOVE STATION MARK		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		DIRECTION!		
				feet	meters			
This station was located by intersection.								

The station is located on the eastern side of the Honokaa Sugar Company Mill, about 1.0 mile north of Honokaa, about 0.5 mile southwest of Honokaa Landing and 25 feet west of a dirt road.

RECOVERY NOTE, TRIANGULATION STATION
INTERSECTION

NAME OF STATION: Honokaa Sugar Co. Mill, stack
ESTABLISHED BY: L.C. Wilder YEAR: 1948 STATE: Hawaii BENCH MARK(S) ALSO ☐
RECOVERED BY: D.M. Whipp YEAR: 1966 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:

Station was recovered. It is the tall black steel stack at the Honokaa Sugar Mill at Haina Village, about 1 mile north of Honokaa.

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: Honokaa Sugar Co. Mill, Stack
ESTABLISHED BY: L.C. Wilder YEAR: 1918 STATE: Hawaii BENCH MARK(S) ALSO ☐
RECOVERED BY: J.M. Collom YEAR: 1969 COUNTY: Hawaii
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN:

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

Station recovered as described in 1966.

NAME OF STATION: HONOKAA SUGAR CO MILL STACK

STATE: HAWAII

YEAR: 1966

THIRD

08068

SOURCE: G-13903

GEODETIC LATITUDE:	20° 05' 47.6544	ELEVATION:	METERS
GEODETIC LONGITUDE:	155 28 13.8910		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ (RAD) θ (ANGLE)
HI 1	5101	510,113.17	458,745.48	+ 0 00 37

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

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

QF 455

QF 495

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

Q 201552 STATION 1006
HAWAII
LATITUDE 20 ° 00' TO 20 ° 30'
LONGITUDE 155 ° 00' TO 155 ° 30'
DIAGRAM NE 5-1.5 HAWAII

NO ORIGINAL TEXT

Humuula (Hawaii Island, Hawaiian Government Survey, 1877; E. R. Hand, 1913).—On northeast coast of Hawaii, in East Hamakua, land of Humuula, on the northwest side of Kaaawalii Gulch, about 1,350 meters above the government road, on a conspicuous round-topped, cane-covered hill called Puu Lanai. It appears to be the highest point on the northwest side of gulch when viewed from the cliff edge or road. It is reached by following one of the trails leading from the government road up the hill on the northwest side of the gulch. Marked by a copper triangle underground, over which is a concrete post 1 foot in diameter with a copper plate of the United States Geological Survey in top.

RECOVERY NOTE, TRIANGULATION STATION

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

NAME OF STATION: **Humuula** State: **Hawaii** County: **Hawaii**
ESTABLISHED BY: **Hawaiian Govt** Year: **1877** LOCALITY: **Humuula, North Hilo, Hawaii.**
Recovered By: **C.L. Murray** Year: **1929**

Detailed statement as to the fitness of the original description: The mark found at this station was a U.S.G.S. Bronze tablet set in concrete on the top of cylindrical concrete block set firmly in the ground and marked on the top with the letters A.B.L. This station has been remonumented with a Type B-1 concrete monument by Chas. L. Murray of the Hawaii Territory Survey in Sept., 1930. Humuula Trig is situated on the northeast coast of Hawaii, North Hilo, land of Humuula, on the northwest side of Kaaawalii Gulch, about 4000 feet above the main government road, on a conspicuous round-topped hill covered with cane and called Puu Lanai. It appears to be the highest hill on the northwest side of Kaaawalii Gulch. The best approach to this station is along a plantation road about 1/3 mile east of Ookala Village. This road goes up along the west side of a small gulch about 1/3 mile crossing it and going along the east side another 1/3 mile and then turns to the left (east) reaching a gulch at about 2000 feet. Cross the gulch and follow up the east side of this gulch along a plantation trail about 1/3 of a mile to a point opposite the high hill upon which the station is situated. Ascend the hill along one of the cane furrows.

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

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: **HUMUULA** STATE: **Hawaii** COUNTY: **Hawaii**
ESTABLISHED BY: **H.G.S.** Year: **1877** LOCALITY: **North Hilo**
Recovered By: **C.T. Husemeyer** Year: **1949**

Detailed statement as to the fitness of the original description:

Located on the northeast coast of Hawaii, in North Hilo district, land of Humuula, on the northwest side of Kaaawalii Gulch, about 1,350 meters above the government road, on a conspicuous round topped, cane covered hill called Puu Lanai. It appears to be the highest point on the northwest side of the gulch when viewed from the cliff edge or road.

The original station was marked by the Hawaiian Government Survey. In 1911 the station was recovered by W.H. Barringer and remarked by a bronze Geological Survey tablet centered over old mark, in top of concrete post one foot in diameter. Old mark is a buried copper triangle. In 1938 the Hawaii Territory Survey placed a type B monument over the station. A six foot square concrete platform projecting one foot above the ground. A two inch pipe with a metal target is centered over the mark. The center of this pipe was used as the station.

From the post office at Hilo: go north on the coast highway for 26.5 miles to the Laupahoehoe post office. Continue ahead on main highway for 5.6 miles. Here turn left on paved cane road and go southerly for 0.6 mile, take left fork and go 0.9 mile, turn right on road up hill and on left side of a wash and go 0.5 mile and bear left to ETT. Pack east, toward ocean, down level topped ridge through a cane field for about 350 feet to station.

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

(continued on next page)

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: **HUMUULA**

STATE: **HAWAII**

YEAR: **1877**

SECOND

ORDER

SOURCE: **G- 9279**

GEODETIC LATITUDE:	20 ° 00' 05.515	ELEVATION:	330.9 METERS
GEODETIC LONGITUDE:	155 16 47.981		1086 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	± 10R Δ ± 1 ANGLE *
HI 1	5101	575,532.38	424,278.61	+ 0 ° 04' 31"

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

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

QE 126

HORIZONTAL CONTROL DATA

by the
NATIONAL GEODETIC SURVEY
OLD HAWAIIAN DATUM

QUAD 201552 STATION 1006

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

HUMUULA (continued)

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: HUMUULA
ESTABLISHED BY: H.G.S. YEAR: 1877 STATE: Hawaii BENCH MARK(S) ALSO ☐
RECOVERED BY: D.M. Whipp YEAR: 1966 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:

Station was recovered in good condition. There is now a tall micro-wave relay tower on the hill near the station. A complete description follows:

Station is located about 1-1/4 miles south-southeast of Ookala and 3/4-mile south-southwest of State Highway 19, on a rounded hill in cane fields on southeast side of Kaohacha Gulch, at about 1086 feet elevation.

To reach station from the post office in Laupahoehoe, go northwest for 0.1 mile; turn left and continue northwest, on State Highway 19, for 4.2 miles to fork at Ookala; continue ahead on the highway for 0.55 mile to diagonal, paved crossroad at power pole No. 86. Turn left and go 0.3 mile to crossroad. Turn left, through long cut, and go 0.15 mile to landing strip; continue ahead, along landing strip, for 0.3 mile to side road right, 25 yards beyond end of the strip and on southeast side of gulch. Turn right and go up steep cane road along left side of gulch for 0.5 mile to diagonal crossroad. Turn left and go northeast, down slight grade, for 0.1 mile to micro-wave tower on right. Continue ahead on cane road for 135 feet to station on left in cane field.

Station mark is a U.S. Geological Survey disk, faintly stamped "1085", set in the top of a 12-inch-diameter, concrete monument about 1-1/2 feet above field level. A type B-1 signal is centered over the mark, with the 6-foot-square, concrete platform extending 2 feet above ground. The station mark is at the bottom of a rectangular depression 8 x 30 inches and about 8 inches deep. It is 18 feet northwest of center line of cane road, 135 feet north-northeast of the micro-wave tower, and 49 feet northeast of the north 1 of 2 60-foot-tall, wooden, antenna poles with a transformer pole between them and an 8-foot-square, green, metal shack by them.

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

0 201552 STATION 1008
HAWAII
LATITUDE 20 °00' TO 20 °30'
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. 1965

DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: IKI 2

STATE: Hawaii

COUNTY: Hawaii

CHIEF OF PARTY: D.M. Whipp

YEAR: 1966

Described by: R.F. Hanson

NOTE.	HEIGHT OF TELESCOPE ABOVE STATION MARK		1.45 METERS.		HEIGHT OF LIGHT ABOVE STATION MARK		METERS	
1b	Surface-station mark,		DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION					
	Underground-station mark							
	OBJECT		BEARING	DISTANCE		DIRECTION		
				feet	meters			
	KUILEI (HGS) 1877					00	00	00.0
12a	Honokaa, Honokaa Sugar Co.		W			20	33	50.6
	Mill, stack, 1948							
	RM No. 1		NE	18.720	5.706	130	18	54
	Paauihau, Paauihau Sugar Co.,		ESE			202	16	09.3
	stack, 1913							
desc.	RM No. 2		SSE	13.932	4.247	261	27	14

Station is located about 1-1/4 miles northeast of Honokaa and 3/4 mile east of the Honokaa Sugar Mill at Haina, at about 506 feet elevation, along the east edge of a low ridge that is planted in sugar cane, just above the old railroad grade (now a track road). There are scattered ironwood trees along the east slope of the ridge.

To reach station from the post office in Honokaa, go southeast on the main street for 0.4 mile; turn left on Ohelo Street and go downhill for 0.35 mile to fork where macadam road curves right. Continue ahead on field road downhill for 0.2 mile to paved crossroad. Continue downhill for 0.3 mile to second paved crossroad. Turn left and go 0.1 mile

to paved, diagonal crossroad. Turn sharp right and go 0.05 mile; turn left on field road and go down grade along east side of ridge for 0.15 mile; turn left up steep, grassy track road and go 30 yards to top of ridge; turn right and go 0.25 mile to end of ridge and station on right.

Station mark is a standard disk stamped "IKI 2 1966", set in the top of a 12-inch-diameter, concrete monument that projects 4 inches. It is located in grassy area along east side of cane field; 14 feet east of edge of field road, 13 feet north-northwest of a 12-inch ironwood tree, 2-1/2 feet south of a white witness post, 8 feet west of where hill breaks sharply down to east, and 60 feet south from point where ridge end drops steeply down to north.

Reference mark number one is a standard disk stamped "IKI 2 NO 1 1966" cemented in a drill hole in a 16-inch-square bedrock ledge outcrop, projecting 2 feet on lower side. It is 12 feet east of a clump of small ironwood trees and 4 feet lower than station mark.

Reference mark number two is a standard disk stamped "IKI 2 NO 2 1966" set in the top of a concrete-filled, 4-inch, iron pipe that is set in concrete and projects 4 inches. It is 18 feet east of edge of road, 4 feet southwest of the 12-inch ironwood tree, and about 1 foot lower than station mark.

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: IKI 2

ESTABLISHED BY: D.M. Whipp

YEAR: 1966

STATE: Hawaii

BENCH MARK(S) ALSO ☐

RECOVERED BY: J.M. Collom

YEAR: 1969

COUNTY: Hawaii

AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN:

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

Station recovered in good condition. 1966 description adequate.

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: IKI 2

STATE: HAWAII

YEAR: 1966

THIRD

ORDER

SOURCE G-13503

GEODETIC LATITUDE	20 05 40.7771	ELEVATION	154	METERS
GEODETIC LONGITUDE	155 27 34.2467	SCALED		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	RIGHT ANGLE
HI 1	5101	513,851.82	458,052.47	+ 0°00'50"

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

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH (From south)	CODE
KUILEI HGS	79 50 33.8	79 49 44	5101

POSITION DETERMINED BY TRAVERSE FROM STATION IKI

AND CHECKED BY ADDITIONAL OBSERVATIONS

QF 454

NO TEXT

by the
National Ocean Survey
OLD HAWAIIAN DATUM

ADJUSTED HORIZONTAL CONTROL DATA

-ORDER

GEODETIC LATITUDE:	20 05 41.643	ELEVATION:	METERS
GEODETIC LONGITUDE:	155 27 34.425		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ OR ANGLE°
HI 1	5101	513,874.80	458,139.82	+ 0° 00' 50"

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

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

QD 368

Q0 368

QD 364

HORIZONTAL CONTROL DATA

by the
NATIONAL GEODETIC SURVEY
OLD HAWAIIAN DATUM

QUAD 201552 STATION 1011

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

KAHOLO (continued)

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: KAHOLO
ESTABLISHED BY: HGS YEAR: 1877 STATE: Hawaii BENCH MARK(S) ALSO ☐
RECOVERED BY: D.M. Whipp YEAR: 1966 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:

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

Station is located about 1-1/2 miles west of Ookala and 700 feet south of State Highway 19, at about 955 feet elevation, on a flat rise in cane field, 250 feet east of the main cane-field road that runs upgrade between Keehia and Kaholo Gulches, and 350 feet north-northeast of a crossroad.

To reach station from the post office at Laupahoehoe, go northwest 0.1 mile; turn left and continue northwest, on State Highway 19, for 6.7 miles to macadam side road left, on curve of highway. Turn left and go southerly upgrade for 0.15 mile to end of truck travel about 75 yards before crossroad. Walk east 250 feet to high point and station.

Station mark is an unstamped Hawaii Territory Survey disk, set in the top of an 8-inch-diameter, concrete monument that projects 3 inches from the top of a stone and concrete cairn about 2-1/2 feet high and 4 feet across at the base. A Type A signal is centered over the mark, with the 6-foot-square, concrete platform 4 feet above ground. A red and white metal target extends about 8 feet above the platform.

No reference marks established as cane is planted up to edge of the signal.

FORM CGS-526 (5-66)
USCOMM-DC 18509-P66

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

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: KAHOLO
ESTABLISHED BY: HGS YEAR: 1977 STATE: Hawaii BENCH MARK(S) ALSO ☐
RECOVERED BY: J.M. Collom YEAR: 1969 COUNTY: Hawaii
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN:

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

Station recovered in good condition. 1966 description adequate.

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

Q 201552 STATION 1012
HAWAII
LATITUDE 20 °00' TO 20 °30'
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. 1963

DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: KAU

STATE: Hawaii

COUNTY: Hawaii

Island: Hawaii

Described by: R.F. Hanson

CHIEF OF PARTY: D.M. Whipp

YEAR: 1967

NOTE	HEIGHT OF TELESCOPE ABOVE STATION MARK	HEIGHT OF LIGHT ABOVE STATION MARK	DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION			
1b	Surface-station mark					
7a	Underground-station mark					
	OBJECT	BEARING	DISTANCE		DIRECTION	
			feet	meters		
12c	KOHOLAILELE (HGS) 1877				00 00 00.0	
12c	RM No. 2	W	4.282	1.306	126 31 56	
12c	RM No. 1	NE	8.904	2.714	267 29 45	
	Paauilo, Stack, 1948	ESE			329 26 49.1	

Station is located in the northern part of the island, about 2 miles northwest of Paauilo, 3/4-mile northeast of State Highway and 1/4-mile southwest of the sea, at about 400 feet elevation, between Kaunamano and Kaunamano Gulches, on a small grassy and rocky knoll on the southwest and higher end of a brushy rim overlooking next cane field to northwest, which is about 40 feet lower.

To reach station from the post office at Paauilo, go northwest on State Highway 19 for 1.8 miles to crossroad. Turn right and go 0.15 mile to T-junction; turn left and go 0.05 mile; turn right, opposite a cemetery, and go downgrade 0.7 mile to T-junction. Turn left and go 0.35 mile to side road right, just after crossing concrete bridge. Turn right

and follow cane road 0.1 mile, then go left 0.05 mile on cane road to end of road and station.

Station mark is a standard disk stamped "KAU 1967", set in the top of a 2-foot-diameter mass of concrete flush with surrounding rocks. It is on southeast slope of the knoll, on small, flat area among rocks, 20 feet northeast of, and about 5 feet lower, than highest point of knoll, and is 3 feet southwest of a white witness post.

Reference mark number one is a standard disk stamped "KAU NO 1 1967", cemented in a drill hole in a 3-foot boulder that projects 2-1/2 feet above ground. It is 0.4 foot higher than station mark.

Reference mark number two is a standard disk stamped "KAU NO 2 1967", cemented in a drill hole in the northeast tip of a large rock that projects about 4 feet higher than station mark. It is about 15 feet north-easteast from high point of knoll.

NOTE: Underground station mark is a standard disk stamped "KAU 1967", set in concrete about 3 feet beneath ground level.

NOTE: This station is about 125 yards northeast of point where station KAUMOALI 2 1948 was located, and was established to replace it since it was destroyed.

* 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.

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: KAU

STATE: HAWAII

YEAR: 1967

SECOND

ORDER

SOURCE: G-13903

GEODETIC LATITUDE:	20 04 00.9460	ELEVATION:	122	METERS
GEODETIC LONGITUDE:	155 25 46.9843	SCALED		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	φ OR Δ or ANGLE *
HI 1	5101	535,558.57	447,990.66	+ 0 02 08

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

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH * (From south)	CODE
KOHOLAILELE	322 38 44.3	322 36 36	5101

QF 493

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

Q 201552 STATION 1013
HAWAII
LATITUDE 20° 00' TO 20° 30'
LONGITUDE 155° 00' TO 155° 30'
DIAGRAM NE 5-1,5 HAWAII

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
Form 502
Rev. Aug. 1965

DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION:	KAUMOALI 2	STATE:	HAWAII	COUNTY:	HAWAII
CHIEF OF PARTY:	L. C. Wilder	YEAR:	1948	Described by:	C. L. Murray
NOTE:	HEIGHT OF TELESCOPE ABOVE STATION MARK Surface-station mark, Underground-station mark	METERS:	HEIGHT OF LIGHT ABOVE STATION MARK METERS:		
	OBJECT	BEARING	DISTANCE feet meters	DIRECTION: ° ' "	
	MAHAKUOLO 2			0 00 00	
	R.M. No. 1 N		41.20 12.558	59 05 36.4	
	R.M. No. 2 S		52.06 15.868	236 53 59.0	

Established by the U.S.C. & G.S. in 1948. The station is located at Hamakua District in the northern part of the island of Hawaii 1.8 miles west of Paauilo Village, 0.35 mile inland from the coast.

The station is marked by a standard disk set in a concrete block about 18 inches square imbedded in the ground and extending above the ground about 8 inches. It is located on the west side of Kaumoali Gulch on a fairly prominent flat rise of land overlooking the coastal area.

The old H.T.S. station "Kaumoali" is located several hundred feet away and was not searched for or tied in due to intervening high cane.

The two reference marks are cemented in drill holes in solid out-cropping boulders on the gulch bank.

To reach the station proceed west from Paauilo Village along the main road to Honokaa a distance of about 1.8 miles then continue downward toward the sea on a plantation gravel road about 0.7 mile and turn left on the plantation main lower road for a distance of about 0.3 mile at which point is an old wooden bridge crossing Kaumoali Gulch. Follow down the west bank of Kaumoali Gulch about 150 feet to the station.

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
Form 505
(Rev. Feb. 1965)

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: KAUMOALI 2
ESTABLISHED BY: L.C. Wilder YEAR: 1948 State: Hawaii
RECOVERED BY: Chas. L. Murray YEAR: 1950 County: Hawaii

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

The triangulation was reported as disturbed by the Hamakua Mill Company.

The station was reestablished within 0.01 foot of its original location by measurements and angle observations from the two reference marks.

The original disk was set in a concrete block about 24 inches square but with a heavier base. Two heavy nails were placed between the station and the existing roadway. Otherwise, the original description is unchanged.

The reestablishment of the station was done under the supervision of Mr. Chas. L. Murray of the Territorial Survey Department.

(continued on next page)

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: KAUMOALI 2
STATE: HAWAII YEAR: 1948 SECOND ORDER

SOURCE G- 9279

GEODETIC LATITUDE	20 03 55.954	ELEVATION	133.3 METERS
GEODETIC LONGITUDE	155 23 45.749		437 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	ϕ OR Δ OR ANGLE
HI 1	5101	535,676.64	447,487.13	+ 0 02 08

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

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH (From south)	CODE
MAHAKUOLO 2	125 19 51.4	125 17 43	5101

QE 181

HORIZONTAL CONTROL DATA

by the
NATIONAL GEODETIC SURVEY
OLD HAWAIIAN DATUM

QUAD 201552

STATION 1013

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

KAUMOALI 2 (continued)

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: KAUMOALI 2
ESTABLISHED BY: L.C. Wilder YEAR: 1948 STATE: Hawaii BENCH MARK(S) ALSO ☐
RECOVERED BY: D.M. Whipp YEAR: 1966 COUNTY: Hawaii
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: Island:Hawaii

R

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

Station is destroyed. The ridge has been cleared off and planted in sugar cane. Station monument was found pushed nearly out of ground by machinery; a search was made for an underground mark but none was found. The station had apparently been built up over an old survey point because a 2-1/2-inch iron pipe was found extending from the bottom of the concrete monument.

Reference mark number one was recovered in good condition. A search was made for reference mark number two by distance and angle but it was not found and is believed destroyed by machinery.

Reference mark number one is a standard disk stamped "1 1948", cemented in a drill hole in a 12-inch boulder flush with ground. It is 21 feet east of center line of field road and 6 feet west of edge of ridge, where road begins to drop downgrade to north.

To reach from the post office in Laupahoehoe, go northwest 0.1 mile; turn left and go northwest on State Highway 19 for 11.2 miles to fork in Paaui village; continue ahead on the highway for 1.6 miles to paved side road right. Turn right and go 0.15 mile to T-junction. Turn left and go 0.05 mile to side road right, by cemetery. Turn right and go down long hill for 0.7 mile to T-junction. Turn left and go 0.35 mile to side road right, just after crossing bridge across Kaumoali Stream. Turn right and go north 200 feet along west side of gulch to crest of hill.

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

Q 201552 STATION 1014
HAWAII
LATITUDE 20 °00' TO 20 °30'
LONGITUDE 155 °00' TO 155 °30'
DIAGRAM NE 5-1,5 HAWAII

NO ORIGINAL TEXT

Koholalele (Hawaii Island, Hawaiian Government Survey, 1877; E. R. Hand, 1913).—Near northeastern coast of Hawaii, in the central part of Hamakua district, on the eastern summit of Puu Piele, a conspicuous hogback hill trending north and south which is seen ¼ mile above the government road, between the post offices of Kukaiau and Paauilo. The lower or seaward end of this hill is covered with bushes. To reach the station start at the large schoolhouse, red, trimmed with white, and go along the government road toward Kukaiau, passing the road down to Paauilo mill; a few yards farther on take the trail which leads up the hill. When on top the hill will be seen to consist of two parallel hogbacks; the station is on the highest point of the east hogback. The hill is on range with the Paauilo sugar mill and the red and white schoolhouse. Station marked by a concrete cylinder about 8 inches in diameter projecting some 4 inches above surface of ground with copper plate of the United States Geological Survey in top. It is surrounded by a pile of small boulders. Reference mark is station *Water*, an octagonal water tank on the lower end of the west hogback. It is about 80 meters from station bearing N. 29° W.

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
PORTER 538

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: **KOHOLALELE**
ESTABLISHED BY: Hawaiian Govt. YEAR: 1877 STATE: **HAWAII**
RECOVERED BY: L. C. Wilder YEAR: 1948 COUNTY: **HAWAII**

Detailed statement as to the fitness of the original description: The original station was not recovered. It is not known how the 1877 station was marked. In 1913 E. R. Hand reported recovering a U. S. Geological Survey disk set in the top of an 8 inch concrete cylinder. About 1929 the Territory Survey Department reported recovering a 4 inch iron pipe which was set in concrete. Also in 1929 the Territory Survey constructed a concrete platform, 6 feet square and 4 feet high, over the station. The present survey has recovered a 4 inch iron pipe which projects 4 inches from a concrete base which is 1 1/2 inches high. No disk was found in the pipe. A new description follows—

The station is located on the crest of a low north-south ridge; about 5 miles west of Ookaia, about 2.5 miles southeast of Paauilo, 2.5 miles west southwest of Popoloau Point, about 200 yards south of three old water tanks and about 100 yards north of a heavy growth of timber.

The station is the center of a 2 1/2 inch iron pipe which projects 10 inches from the top of a concrete platform. The top of this pipe is 26 inches higher than the top of the pipe which marks the old station.

No reference marks were set at this station.

To reach the station from the post office at Paauilo; go south and east, on the road which leads toward Hilo, for 2.3 miles. Turn right, go westerly for about 100 feet, turn left and go south and west, on a paved road, for 1.8 miles; turn right, onto a dirt road, and go westerly for 0.2 mile; pass through a board gate and follow a field road northwesterly for 0.2 mile; pass under a power line and continue northwesterly, up a steep grade, for 0.1 mile to the crest of the ridge and the station.

Object	Direction	Distance
PAAUHAU (metal target) NW	00 00 00	
KOHOLA E	157 33 25.1	
KIHK (metal target) S	256 50 55.7	

An early recovery note reports; Original station recovered by W.H. Barringer in March 1911. Remarkd by bronze tablet set over old mark in top of concrete post. Elevation stamped 1506.

(continued on next page)

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: **KOHOLALELE**

STATE: **HAWAII**

YEAR: 1877

SECOND

ORDER

SOURCE: G- 5275

GEODETIC LATITUDE:	20 °01' 20.623	ELEVATION	460.5 METERS
GEODETIC LONGITUDE:	155 21 37.527		1511 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	# OR Δ & ANGLE
HI 1	5101	547,912.91	431,825.98	+ 0 02 52

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

TO STATION OR OBJECT	GEODETIC AZIMUTH (from south)	PLANE AZIMUTH (from south)	CODE
OPIHILALA	145 26 10.1	145 23 18	5101

QE 125

HORIZONTAL CONTROL DATA

by the
NATIONAL GEODETIC SURVEY
OLD HAWAIIAN DATUM

QUAD 201552

STATION 1014

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

KOHOLAILELE (continued)

FORM 526a
(9-18-69)

U.S. DEPARTMENT OF COMMERCE
COAST AND GEODETIC SURVEY

R

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: KOHOLAILELE
ESTABLISHED BY: HGS YEAR: 1877 STATE: Hawaii
RECOVERED BY: D.M. Whipp YEAR: 1966 COUNTY: Hawaii
Island: Hawaii

HEIGHT OF TELESCOPE ABOVE STATION MARK 2.52 METERS.		HEIGHT OF LIGHT ABOVE STATION MARK METERS.		
DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION				
OBJECT	BEARING	DISTANCE		DIRECTION
		FEET	METERS	
OPIHILALA (HGS) 1949				00 00 00.0
RM No. 1	N	19.598	5.974	29 47 45
RM No. 2	S	44.197	13.472	209 47 42

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

Station is located about 1-1/2 miles southeast of Paauilo and 1 mile southwest of State Highway 19, at about 1541 feet elevation, on a low, narrow, north-south ridge covered with ironwood trees, between cane fields.

To reach station from the post office at Laupahoehoe, go northwest 0.1 mile; turn left, and continue northwest, on State Highway 19, for 9.4 miles to Kukaiau Village; continue on the highway for 0.4 mile to crossroad at power pole #175. Turn left, past curved stone wall, and go up-grade 1.1 miles to crossroad. Turn right and go 0.15 mile, crossing a

dip and passing under power line, to crest of ridge and end of truck travel. Walk north along ridge for about 75 yards to station.

Station mark is a U.S. Geological Survey disk stamped "1506", set in concrete 12 inches down inside of a 4-inch iron pipe which projects about 2 inches from the top of a 16-inch-diameter concrete monument that extends 16 inches above ground. NOTE: The pipe is usually filled with water and debris and mark cannot be seen. Station is 48 feet north of a triangle blaze on a 12-inch ironwood. A Type A signal built by the Hawaii Territorial Survey is centered over the mark, with the 6-foot-square concrete platform 4 feet above ground. A red and white metal target extends about 8 feet above the platform.

Reference mark number one is a standard disk stamped "KOHOLAILELE HGS 1877 NO 1 1966", brazed to the top of a 2-inch iron pipe that is set in concrete and projects 6 inches above ground. It is 6 feet west-northwest of a 6-inch ironwood tree and 2-1/2 feet lower than station mark.

Reference mark number two is a standard disk stamped "KOHOLAILELE HGS 1877 NO 2 1966", brazed to the top of a 2-inch iron pipe that is set in concrete and projects 6 inches above ground. It is 4 feet northwest of the 12-inch tree with triangle blaze and 1-1/2 feet higher than station mark.

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: KOHOLAILELE
ESTABLISHED BY: HGS YEAR: 1877 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:

Station was recovered as described in 1966 and all marks found in good condition.

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

Q 201552 STATION 1015
HAWAII
LATITUDE 20 °00' TO 20 °30'
LONGITUDE 155 °00' TO 155 °30'
DIAGRAM NE 5-15 HAWAII

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
Form 888
Rev. Aug. 1968

DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: KUKUI STATE: Hawaii COUNTY: Hawaii
Island: Hawaii
Described by: R.F. Hanson

CHIEF OF PARTY: D.M. Whipp YEAR: 1967
HEIGHT OF TELESCOPE ABOVE STATION MARK 1.5 METERS.1
HEIGHT OF LIGHT ABOVE STATION MARK METERS.

NOTE*	HEIGHT OF TELESCOPE ABOVE STATION MARK	DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION	BEARING	DISTANCE		DIRECTION:
				feet	meters	
1a	Surface-station mark,					
7a	Underground-station mark					
		PAAUHAU (HGS) 1877	NW	13.245	4.038	00 00 00.0
		RM No. 2	ESE			32 53 56
		Paauilo, Stack, 1948	ESE	9.687	2.953	177 55 55.2
		RM No. 1				184 12 41

Station is located in the northern part of the island, about 2-3/4 miles west-northwest of Paauilo, along the southwest side of State Highway 19, above a very high cutbank on a prominent hill planted in sugar cane, between Kukuilamalahii and Waikaaalulu Gulches. The cutbank is about 90 feet high and has a fringe of small ironwoods along the edge. To reach station from the post office at Paauilo, go northwesterly on State Highway 19 for 3.25 miles to crossroad at power pole 64. Turn left and go upgrade on main cane field road for 0.15 mile; take left fork and follow winding field road for 0.2 mile to top of hill and station on left.

Station mark is a standard disk stamped "KUKUI 1967", set in the top of a 10-inch-square, concrete monument that projects 5 inches.

It is at north end of cane field, in line with the ironwood trees, in tall grass, 7 feet southwest of edge of cutbank and 3 feet east of a white witness post.

Underground mark is a standard disk stamped "KUKUI 1967", set in concrete about 3 feet below ground level.

Reference mark number one is a standard disk stamped "KUKUI NO 1 1967", set in cement in the top of a 3-inch, iron pipe that is set in concrete and projects 3 inches above ground. It is among the small ironwoods, 5 feet southwest of edge of cutbank and about 1 foot lower than station mark.

Reference mark number two is a standard disk stamped "KUKUI NO 2 1967", set in cement in the top of a 2-inch, iron pipe that is set in concrete and projects 4 inches above ground. It is in grassy area, 5 feet southwest of edge of cutbank and at same elevation as station mark.

NOTE: This station was established to replace destroyed station KUKUILAMALAHIEE 1948, which was located on high point of the hill, about 300 feet to southwest.

* Refer to notes in manuals of triangulation and state publications of triangulation. 1 Direction-angle measured clockwise, referred to initial station.
† To nearest meter only, when no trigonometric leveling is being done. 16-60000-1 U. S. GOVERNMENT PRINTING OFFICE

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: KUKUI
STATE: HAWAII YEAR: 1967 SECOND ORDER

SOURCE G-13903

GEODETIC LATITUDE:	20 03 38.9182	ELEVATION	205	METERS
GEODETIC LONGITUDE:	155 24 42.4953	SCALED		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	SP OR Δ Δ ANGLE
Hi 1	5101	530,268.03	445,765.42	+ 0 31 49

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE $\theta = \theta_0 + \Delta \theta$ FORMULA NEGLECTING THE SECOND TERM

TO STATION OR OBJECT	GEODETIC AZIMUTH (From station)	PLANE AZIMUTH* (From station)	CODE
PAAUHAU	100 14 35.3	100 12 46	5101

QF 492

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

Q 201552 STATION 1016
HAWAII
LATITUDE 20° 00' TO 20° 30'
LONGITUDE 155° 00' TO 155° 50'
DIAGRAM NE 5-1.5 HAWAII

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
PAPER 555
REV. APR. 1948

DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: KUKUILAMALAMAHEE STATE: HAWAII COUNTY: HAWAII
CHIEF OF PARTY: L.C. WILDER YEAR: 1948 Described by: C. L. Murray
NOTE: HEIGHT OF TELESCOPE ABOVE STATION MARK METERS: HEIGHT OF LIGHT ABOVE STATION MARK METERS:
Surface-station mark, DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION
Underground-station mark

OBJECT	BEARING	DISTANCE		DIRECTION	
		feet	meters	° ' "	° ' "
MAHAUOLO 2				0 00 00	
R. M. No. 1 E		100.16	30.529	113 19 00.4	
R. M. No. 2 SE		125.34	38.205	148 04 58.5	

An old H.T.S. station located in the Hamakua District in the northern part of the Island of Hawaii 2.6 miles west of Paauilo Village and 1.3 miles inland from the sea. Situated on a prominent hill just above the government main road, 100 feet west of a line of eucalyptus trees and is surrounded by cane.

The old station mark, a circular concrete post firmly imbedded in the ground was found. A standard disk was cemented in a drill-hole in the middle of the concrete post. The disk is stamped "Kukuilamalamahee 1948". A small cairn of stones covers the station mark.

Two reference marks cemented in the tops of 2-inch pipes three feet long and driven solidly in the ground are located near a fence line running north and south along the line of eucalyptus trees.

To reach the station from Paauilo Village drive westerly along the main government road to Honokaa a distance of about 2.8 miles and turn left up a plantation road that goes up the easterly side of the hill to the cane field surrounding the station. The hill is the only prominent hill in the vicinity and can be identified by the line of eucalyptus trees on the east slope.

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: KUKUILAMALAMAHEE
ESTABLISHED BY: L.C. Wilder YEAR: 1948 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:

Station was searched for by angle, but was not found, and is believed to have been destroyed by cultivation. The row of trees mentioned in original description was recently removed and the reference marks are also gone.

A new station, KUKUI, was established nearby in April, 1967; see description for that station.

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: KUKUILAMALAMAHEE
STATE: HAWAII YEAR: 1948 SECOND ORDER

SOURCE: G- 9275

GEODETIC LATITUDE	20° 03' 35.891	ELEVATION	286.0 METERS
GEODETIC LONGITUDE	155° 24' 43.818		958 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	HEIGHT
HI 1	5101	530,142.10	445,459.96	+ 0 01 45

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE $\sin^{-1} \Delta \theta$ FORMULA NEGLECTING THE SECOND TERM

TO STATION OR OBJECT	GEODETIC AZIMUTH (From station)	PLANE AZIMUTH (From station)	CODE
MAHAUOLO 2	153 22 16.2	153 20 27	5101

QE 180

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 201552 STATION 1018
HAWAII
LATITUDE 20° 00' TO 20° 30'
LONGITUDE 155° 00' TO 155° 30'
DIAGRAM NE 5-1.5 HAWAII

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
Form 535
Rev. Aug. 1966

DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: MAHAUOLO 2 STATE: HAWAII COUNTY: HAWAII

CHIEF OF PARTY: L. C. Wilder YEAR: 1948 Described by: C. L. Murray

NOTE*	HEIGHT OF TELESCOPE ABOVE STATION MARK METERS.1	HEIGHT OF LIGHT ABOVE STATION MARK METERS.1	DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION			
			DISTANCE		DIRECTION	
	Surface-station mark Underground-station mark		feet	meters		
	KUKUILAMALAMAHEE				0 00 00	
	R. M. No. 2 NW		13.90	4.237	183 34 05.7	
	R. M. No. 1 SW		51.40	15.665	324 28 15.2	

Established by U.S.C. & G.S. in 1948 and is located in the Hamakua District on the northern part of the Island of Hawaii one mile east of Paauhau Mill and 0.15 mile inland from the coast.

The station is located on a fairly prominent rise of land in a small rocky waste area surrounded by cane and is in the same vicinity of the old H.T.S. station "Mahakuolo" which is lost. "Mahakuolo 2" is marked with a standard disk cemented in drill-hole in solid rock and stamped "Mahakuolo 2 1948".

Reference Mark No. 1 is cemented in drill-hole on top of a square concrete box from which a concrete ditch runs in a south-erly direction.

Reference Mark No. 2 is cemented in a drill-hole in solid rock about three feet lower than the station.

To reach the station from Honokaa Village proceed easterly along the main road to Hilo a distance of about 1.5 miles to the road which turns down to Paauhau Mill. This road follows the east bank of a deep gulch for about a mile then turns right about one half mile more to Paauhau Mill. Just before reaching the mill turn right into a deep gulch and continue along a plantation road running parallel to the sea for about 0.7 mile to a 2-foot concrete ditch running down towards the sea. Walk down the ditch about 700 feet along a gradual slope to a sharp drop in the terrain. From this point turn west 50 feet into the cane field to the station.

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: MAHAUOLO 2
ESTABLISHED BY: L.C. Wilder YEAR: 1948 STATE: Hawaii BENCH MARK(S) ALSO ☐
RECOVERED BY: D.M. Whipp YEAR: 1967 COUNTY: Hawaii
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN:

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

Station was destroyed and replaced by MAHAUOLO 3 1967 which is about 50 feet northwest.

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: MAHAUOLO 2

STATE: HAWAII YEAR: 1948 SECOND ORDER

SOURCE G- 9279

GEODETIC LATITUDE:	20 05 07.338	ELEVATION:	81.2 METERS
GEODETIC LONGITUDE:	155 25 32.348		266 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	± 10R Δ ± 1 ANGLE *
HI 1	5101	525,511.55	454,683.07	+ 0 01 32

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

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH * (From south)	CODE
KUKUILAMALAMAHEE	333 21 59.6	333 20 28	5101

QE 179

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

0 201552 STATION 1019
HAWAII
LATITUDE 20 °00' TO 20 °30'
LONGITUDE 155 °00' TO 155 °30'
DIAGRAM NE 5-1.5 HAWAII

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
Form 855
Rev. Aug 1965

DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION:	MAHAKUOLO 3	STATE:	Hawaii	COUNTY:	Hawaii
CHIEF OF PARTY:	D.M. Whipp	YEAR:	1967	Island:	Hawaii
				Described by:	R.F. Hanson
NOTE:	HEIGHT OF TELESCOPE ABOVE STATION MARK	1.5	METERS, 1	HEIGHT OF LIGHT ABOVE STATION MARK	METERS.
1b 7a	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		DIRECTION
			feet	meters	
	KAU				00 00 00.0
	KUKUI	SE	28	23	51.45
	PAAUHAU (HGS) 1877	SW	103	52	38.43
	Paauilo, Stack, 1948	ESE	354	08	34.4

Station is located in the northern part of the island, about 1 mile east of Paauhau Village and 700 feet inland from seacoast, on a slightly rounded high point in a cane field, just before hill breaks quite steeply down to northeast.

To reach station from the post office in Paauilo, go northwest on State Highway 19 for 4.9 miles to paved crossroad at highway sign "ELEV 1000 FEET". Turn right and go downgrade for 1.3 miles to T-junction. Turn sharp right and go 0.25 mile to side road left (this is the 5th cane road going left). Turn sharp left and go 0.15 mile to end of truck travel 57 feet before break in cane road where it begins very steep drop down to northeast. Walk left, northwest, across cane field for 62 feet to station.

Station mark is a standard disk stamped "MAHAKUOLO 3 1967", set in the top of a 12-inch-diameter, concrete monument that projects 1 inch above ground. It is 62.0 feet northwest of center line of cane road, 400 feet southwest, upgrade, from ironwood trees along edge of field, and 15 inches northeast of a 2-inch, iron pipe that is 15 feet high and has a red metal flag with yellow diamond in center mounted on top. The pipe is set in a mass of concrete about 2 feet square. An old section of concrete slab 3 feet long extends on an angle from the ground 2 feet northwest of station mark.

Underground mark is a standard disk stamped "MAHAKUOLO 3 1967", set in concrete about 3 feet below ground level.

No reference marks were established as sugar cane is planted up to station all around.

NOTE: This station was established to replace destroyed station MAHAKUOLO 2 1948 which was about 50 feet northwest.

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION:	MAHAKUOLO 3
STATE:	HAWAII
YEAR:	1967
SECOND	ORDER
SOURCE:	G-13503

GEODETIC LATITUDE	20 °05' 37.0163	ELEVATION	81	METERS
GEODETIC LONGITUDE	155 25 31.9165	SCALED		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	# 10N Δ 11 ANGLE
HI 1	5101	525,552.69	454,650.63	+ 0 01 32

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

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH (From south)	CODE
KAU	303 40 24.6	303 38 53	5101

QF 451

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

0 201552 STATION 1020
HAWAII
LATITUDE 20 °00' TO 20 °30'
LONGITUDE 155 °00' TO 155 °30'
DIAGRAM NE 5-1,5 HAWAII

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
PUBLISHED
Ed. July, 1959

DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: **NEW**
CHIEF OF PARTY: **O. W. Swains on,**
Surface-station mark, Note,*
Underground-station mark, Note,*
Reference mark, Note,*
Reference mark, Note,*
Witness mark, Note,*
Witness mark, Note,*
Height of signal above station mark meters.
Height of telescope above station mark meters.
Detailed description:

STATE: **Hawaii** COUNTY: **Hawaii**
YEAR: **1932** LOCALITY: **North Coast of Hawaii.**

DISTANCES AND DIRECTIONS TO REFERENCE MARKS AND PROMINENT OBJECTS			
OBJECT	DISTANCE	DIRECTION	AZIMUTH
		0 1 2	0 1 2

Station mark is a standard disk embedded in a mass of concrete projecting about 6" above the ground. It is located about 200 metres inland from the shore line and about 5/8 mile East of Monokaa Stack. It is about 600 metres north of station IKI and is reached by following along the irrigation ditch and line of trees, running from IKI northward to the shore. There is a small break in the trees where the station is located.

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: **NEW**
ESTABLISHED BY: **O.W.S.** YEAR: **1932** STATE: **Hawaii** BENCH MARK(S) ALSO ☐
RECOVERED BY: **D.M. Whipp** YEAR: **1966** 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:

Station has been destroyed by machinery. The concrete monument, with disk in top, was found laying on top of the ground. Disk was removed from monument at this time.

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: **NEW**

STATE: **HAWAII**

YEAR: **1932**

THIRD

ORDER

SOURCE: **G- 1085**

GEODETIC LATITUDE	20 06 00.65	ELEVATION	67	METERS
GEODETIC LONGITUDE	155 27 31.34	SCALED		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	COORD	X	Y	$\theta - \alpha \Delta \theta$ ANGUL *
HI 1	5101	514,156.95	460,057.37	+ 0 00 51

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

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

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

0 201552 STATION 1021
HAWAII
LATITUDE 20 ° 00' TO 20 ° 30'
LONGITUDE 155 ° 00' TO 155 ° 30'
DIAGRAM NE 5-1,5 HAWAII

NO ORIGINAL TEXT

ADJUSTED HORIZONTAL CONTROL DATA

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: **Ookala, stack**
ESTABLISHED BY: **E.R.H.** YEAR: **1913** STATE: **Hawaii** BENCH MARK(S) ALSO ☐
RECOVERED BY: **D.M. Whipp** YEAR: **1966** 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:

Station was recovered in good condition, however it is to be removed soon, as the Ookala Sugar Mill has been enlarged, and a slightly shorter stack has been built at the new plant a short distance north of station.

R

NAME OF STATION **OONALA STACK**

STATE **HAWAII**

YEAR **1913**

THIRD

-ORDER

SOURCE **G-52184**

GEODETIC LATITUDE	20 01 11.970	ELEVATION:	METERS
GEODETIC LONGITUDE	155 17 10.605		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ HOR Δ H ¹ ANGLE °
H1 1	5101	573,565.85	430,575.91	+ 0 04 23

¹ PLANE AZIMUTH HAS BEEN COMPUTED BY THE θ HOR Δ H¹ FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH ¹ (From south)	CODE

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

201552 STATION 1022
HAWAII
LATITUDE 20 °00' TO 20 °30'
LONGITUDE 155 °00' TO 155 °30'
DIAGRAM NE 5-1,5 HAWAII

NO ORIGINAL TEXT

ADJUSTED HORIZONTAL CONTROL DATA

DEPARTMENT OF COMMERCE RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: Opihilala STATE: Hawaii COUNTY: Hawaii
ESTABLISHED BY: H.G.S. YEAR: 1881 LOCALITY: Paauilo, Hamakua, Hawaii
RECOVERED BY: Chas.L. Murray YEAR: 1938

Detailed statement as to the fitness of the original description:
Location of Station: On the upper bank of the Government main road thru Paauilo village. The station is located near the top of the long concrete stairway leading to the Japanese school lot.

Old Station mark found: 10" cylindrical concrete monument marked with Δ and drill hole in center of same.

New station mark: H.T.S. Type D monument (Triangular concrete monument 7 1/2 ft 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 RECOVERY OF TRIANGULATION STATION

NAME OF STATION: OPIHILALA STATE: HAWAII COUNTY: HAMAKUA
Established By: H.G.S. Year: 1881
CHIEF OF PARTY: L. C. WILDER Year: 1948 Described by: G. L. MURRAY

NOTE,*	HEIGHT OF TELESCOPE ABOVE STATION MARK		METERS.1		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		DIRECTION:			
			feet	meters	°	'	"	
KOHOLALELE R. M. No. 1		SW	48.08	14.655	00	00	00	
					102	26	32	

This station is an old Hawaiian Government station established in 1881. It is located in Paauilo village, Hamakua, Hawaii on the high road out directly above the middle of the business part of the village and about 200 feet east of the postoffice. At the top of a long concrete stairway up the roadbank southwest and 45 feet distant from the station.

The station is marked by a concrete monument 10 inches in diameter, the top of which is marked with a triangle out, with a drill hole in the center. Surrounding the mark is a triangular slab of concrete 6 feet on each side, with a 2 1/2 inch pipe 2 feet long set on steel legs, cemented in place over the old mark which is exposed to view.

(continued on next page)

NAME OF STATION: OPIHILALA

STATE: HAWAII

YEAR: 1881

SECOND

ORDER

SOURCE: G- 9275

GEODETIC LATITUDE:	20 °02' 40.827	ELEVATION	259.0 METERS
GEODETIC LONGITUDE:	155 22 35.995		830 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ or ANGLE *
HI 1	5101	542,331.76	439,612.71	+ 0 02 32

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

TO STATION OR OBJECT	GEODETIC AZIMUTH (From true N)	PLANE AZIMUTH *	CODE
KOHOLALELE	325 25 50.1	325 23 18	5101

QE 182

HORIZONTAL CONTROL DATA

by the
NATIONAL GEODETIC SURVEY
OLD HAWAIIAN DATUM

QUAD 201552 STATION 1022

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

OPIHILALA (continued)

FORM 524a
(2-13-65)

U.S. DEPARTMENT OF COMMERCE
COAST AND GEODETIC SURVEY

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: OPIHILALA
ESTABLISHED BY: H.G.S. YEAR: 1881 STATE: Hawaii
RECOVERED BY: D.M. Whipp YEAR: 1966 COUNTY: Hawaii
Island: Hawaii

HEIGHT OF TELESCOPE ABOVE STATION MARK		1.63 METERS.		HEIGHT OF LIGHT ABOVE STATION MARK		METERS.	
DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION							
OBJECT	BEARING	DISTANCE		DIRECTION			
		FEET	METERS				
KOHOLAILE (HGS) 1877-----1948	DISTANCE	and DIRECTION---		00	00	00.0	
R.M. No. 1	SW	48.08	14.655	102	26	32	
KOHOLAILE (HGS) 1877-----1966	DISTANCE	and DIRECTION---		00	00	00.0	
RM NO. 2	SE	75.570	23.034	05	26	40	
RM No. 1	WSW	48.065	14.650	102	27	02	

Station and RM No. 1 were recovered in good condition. An additional reference mark was established. A complete description follows;

Station is located in Paauilo village, in the northwest corner of the lawn at the north end of the cemetery at the Hongwanji Buddhist Church, on top of the high cutbank above the business section of town, and 45 feet east of the top of the long concrete stairway coming up from the street below.

To reach from the post office in Laupahoehoe, go northwest 0.1 mile; turn left onto State Highway 19 and continue northwest for 11.2 miles to fork in Paauilo village. Turn left off highway and go northwest on the main street for 0.1 mile to narrow macadam driveway on left, just west of the school driveway. Turn left and follow driveway upgrade for 0.05 mile to macadam parking area. Continue ahead across north edge of lawn for 100 feet to station.

Station is marked by a 1-inch drill hole in the center of a 9-inch diameter concrete monument that projects 2 inches above the center of a triangular concrete platform that is 7 feet on each side and flush with ground. A 2-1/2-inch iron pipe, supported by 3 iron legs embedded in the concrete platform, is mounted vertically over the mark and supports a metal target. Station is 68 feet north of an iron cemetery fence, 230 feet northwest of center of church front entrance, 7-1/2 feet west-northwest of a line extended from the southeast side of the Higashi Gift Shop, and about 350 feet north-northwest of the county water tank.

Reference mark number one is a standard disk stamped "1 1948", cemented in a drill hole in the west end of the concrete approach at head of the long stairway, 6 inches in from edge of concrete and partly covered by a 2-inch water pipe. The mark is 1.56 feet higher than station.

Reference mark number two is a standard disk stamped "OPIHILALA HGS 1948 NO 2 1966", cemented in a drill hole in the top of a 10-inch-square concrete block flush with ground. It is 21.5 feet east of the southeast corner of the iron cemetery fence, 33 feet west-northwest of edge of macadam parking area, 6 inches lower than station mark, and at the base of the bank above which the cemetery is located.

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: OPIHILALA
ESTABLISHED BY: H.G.S. YEAR: 1881 STATE: HAWAII BENCH MARK(S) ALSO ☐
RECOVERED BY: R. B. MELBY YEAR: 1978 COUNTY: HAWAII
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: AT PAAUILO

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

THE STATION AND REFERENCE MARK 1 AND 2 WERE RECOVERED IN GOOD CONDITION AS DESCRIBED IN 1966. THE METAL SIGNAL OVER THE STATION IS BADLY RUSTED.

NOAA FORM 76-165
(12-72)

U.S. GOVERNMENT PRINTING OFFICE: 1976-665661/1133 REGION NO. 1

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

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

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

USCOMMA-DC 27179-P59

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

Q 201552 STATION 1023
HAWAII
LATITUDE 20 ° 00' TO 20 ° 30'
LONGITUDE 155 ° 00' TO 155 ° 30'
DIAGRAM NE 5-1,5 HAWAII

NO ORIGINAL TEXT

Paauhau (Hawaii Island, Hawaiian Government Survey, 1877; E. R. Hand, 1913).—On northern coast of Hawaii, in Hamakua District, in land of Paauhau, 150 meters northwest of the Weha-Paauhau Gulch, on a poorly defined flat-topped hill which rises gently to the southeast of the plantation camp called "Paauhau Mauka" and which is about ¼ mile from the station. "Paauhau Mauka" is about ¼ mile above the main government road, about 1¼ miles inshore from the Paauhau mill, and between Honokaa and Paauilo post offices. To reach station, proceed along the government road from either Honokaa or Paauilo post office until the road is reached which turns down to Paauhau post office and mill; 150 meters from this road intersection toward Paauilo post office (or to the northeast) is a road leading up the mountain; 400 meters up this road is the camp "Paauhau Mauka." Continue along, crossing the plantation railroad, and about 140 meters beyond the tracks is a road turning left to a yellow house, occupied in 1913 by Dr. S. R. Brown, Paahau plantation. Follow this road until it turns into a yard, proceed along outside of fence in front of house and along trail into cane in same direction as fence; in all go about 430 meters from the road intersection, then turn to left at right angles and proceed 50 meters to station. From the station "Paauhau Mauka" bears N. 35° W., distant about ½ mile; Doctor Brown's house bears N. 15° E. distant about 275 meters. Original mark was a granite post set in concrete. Now marked by concrete cylinder, 6 inches in diameter, its top flush with ground, and centered with a copper plate, United States Geological Survey. A cairn was built over the station.

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
PAGES 538

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: **PAAUHAU**
ESTABLISHED BY: **Hawaiian Govt.** YEAR: **1877** STATE: **HAWAII**
RECOVERED BY: **L. C. Wilder** YEAR: **1948** COUNTY: **HAWAII**

Detailed statement as to the fitness of the original description: The original station, a granite post set in concrete, was not recovered. In 1913 Mr. E. R. Hand of the U. S. C. & G. S. reported recovering a bronze disk of the U. S. Geological Survey. In 1929 the Hawaiian Government Survey reported recovering a Survey bronze disk. Also in 1929 the Hawaiian Government Survey surrounded the station disk by a 6 foot square slab of concrete which projects about 1 foot above the soil. A 2 1/2 inch iron pipe projects about 18 inches from the top of this platform and was used as the station on this 1948 survey. A new description follows—

The station is located in a cane field about 2 miles southeast of Honokaa, about 2 miles south southwest of Paauhau, about 0.6 mile west of the road which runs between Hilo and Honokaa, about 500 feet northwest of The Weha Paauhau Gulch and about 300 feet southeast of a field road.

To reach from the post office in Honokaa; go southeasterly, on the road which leads toward Hilo, for 0.4 mile; continue straight ahead, southeasterly, for 0.6 mile; take the left hand fork and go southeasterly, toward Hilo, for 0.7 mile to a concrete overpass; cross over the overpass, turn right, onto a dirt road, and go southerly for 0.2 mile to a T road intersection; turn left, southeast, and go 0.1 mile; turn right, south, and go 0.3 mile to the end of truck travel. From this point pack southeasterly, through a cane field, for about 300 feet to the station.

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

4-2818-2

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: **PAAUHAU**

STATE: **HAWAII**

YEAR: **1877**

SECOND

SOURCE: **G- 9279**

GEODETIC LATITUDE:	20 ° 04' 00.487	ELEVATION:	412.7 METERS
GEODETIC LONGITUDE:	155 26 48.883		1354 FEET

STATE COORDINATES (Foot)				
STATE & ZONE	CODE	X	Y	# OR Δ OR ANGLE *
HI 1	5101	518,218.67	447,936.22	+ 0 01 06

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

TO STATION OR OBJECT	GEODETIC AZIMUTH (from south)	PLANE AZIMUTH (from south)	CODE
KUILEI	110 58 44.6	110 57 39	5101

QE 128

(continued on next page)

HORIZONTAL CONTROL DATA

by the
NATIONAL GEODETIC SURVEY
OLD HAWAIIAN DATUM

QUAD 201552 STATION 1023

LATITUDE 0 / TO 0 /
LONGITUDE 0 / TO 0 /
DIAGRAM

PAAUHAU (continued)

The station is the center of a 2 1/2 inch iron pipe which projects about 18 inches from the top of a 6 foot square concrete platform. The platform projects about 1 foot above the soil.

No reference marks were set at this station.

Object	Distance	Direction
KUILEI (metal target)		00 00 00
Paaupau Stack (Paaupau Sugar Co.)	2 miles NNE	89 12 08.3
KOHLO (metal target)		179 50 10.3
KOHOLALELE (metal target)		187 31 13.2

An early recovery note reports: Original station recovered by W.H. Berringer in March 1911. Remarkd by bronze tablet centered in top of original granite post. Elevation stamped 1348.

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: PAAUHAU
ESTABLISHED BY: HGS YEAR: 1877 STATE: Hawaii BENCH MARK(S) ALSO ☐
RECOVERED BY: D.M. Whipp YEAR: 1966 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:

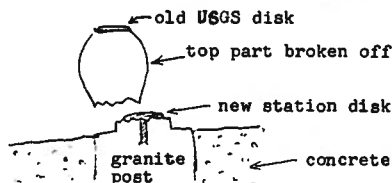
Station was recovered in poor condition. The Type B-1 signal was found to have been pushed about 6 feet north by cane-field machinery, and the station mark, a USGS disk, could be seen in a 7-inch, oval-shaped rock laying in the depression in the center of the concrete platform. Further investigation proved the "rock" to be the top part of the original granite post, snapped off at its 5-inch-diameter neck. The granite post was found very solidly embedded in a large mass of concrete and not shifted. A new station mark was set in the top of the granite post. No reference marks were set because sugar cane is planted up to the station on all sides. A complete description follows:

Station is located in cane field, about 2 miles southeast of Honokaa and 1/2-mile southeast of the junction of State Highways 19 and 24, at about 1354 feet elevation, along the west side of Kahawailiili Gulch, 1/4 mile southwest of a church and cemetery.

To reach station from Paaupau, go west on State Highway 19 for 5.3 miles to crossroad at milepost "HILO 39 MI". Turn left, go 25 yards and turn left again; go east 0.35 mile to fork by gas station. Take right fork and go 0.1 mile to old church. Pass along right side of church and cemetery and follow field road up along west side of gulch for 0.3 mile to end of truck travel. Walk westerly across cane field about 250 yards to station.

Station mark is a standard disk stamped "PAAUHAU HGS 1877 1966", cemented in a drill hole in the center of the 5-inch-diameter neck on top of an 8-inch-square granite post that is set in a large mass of concrete about 4 feet in diameter and flush with ground. The mark projects about 1 inch above concrete.

NOTE: Officials of the Paaupau Sugar Co. plan to re-establish the 6-foot-square concrete platform of the Type B-1 signal over the station mark after the present sugar cane crop is harvested about March, 1968.



RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: PAAUHAU
ESTABLISHED BY: HGS YEAR: 1877 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:

Station was recovered in good condition as described in 1966.

FORM CGS-526 (1-69)
USCOMM-OC 18519-P68

U.S. DEPARTMENT OF COMMERCE
COAST AND GEODETIC SURVEY

NO TEXT

by the
National Ocean Survey
OLD HAWAIIAN DATUM

ADJUSTED HORIZONTAL CONTROL DATA

THIRD

ORDER

GEODETIC LATITUDE:	23 04' 14.730	ELEVATION:	METERS
GEODETIC LONGITUDE:	155 27 00.231		FEET

STATE COORDINATES (feet)				
STATE & ZONE	CODE	X	Y	STATION ANGLE
HI 1	5101	517,136.47	449,372.75	+ 0 01 02

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

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

QD 369

Q0 369

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 201552 STATION 1026
HAWAII
LATITUDE 20 °00' TO 20 °30'
LONGITUDE 155 °00' TO 155 °30'
DIAGRAM NE S-1,5 HAWAII

NO TEXT

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION PAAUILO STACK

STATE HAWAII

YEAR 1913

THIRD

ORDER

SOURCE G-SP156

NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE	20 °03'15.56	ELEVATION	METERS
GEODETIC LONGITUDE	155 21 47.85		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ θ ANGLE *
HI 1	5101	540,519.08	443,420.20	+ 0 °02'49"

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

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

QD 362

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 201552 STATION 1027
HAWAII
LATITUDE 20 ° 00 ' TO 20 ° 30 '
LONGITUDE 155 ° 00 ' TO 155 ° 30 '
DIAGRAM NE 5-1,5 HAWAII

NO TEXT

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION PAAUILO STACK

STATE HAWAII

YEAR 1948

THIRD

-ORDER

SOURCE G- 9275

GEODETIC LATITUDE	20 03 15.155	ELEVATION:	METERS
GEODETIC LONGITUDE	155 21 47.630		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	PER Δ H ANGLE *
HI 1	5101	546,940.05	443,375.36	+ 0 02 45

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE PER Δ H FORMULA NEGLECTING THE SECOND TERM.

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

QE 238

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

Q 201552 STATION 1028
HAWAII
LATITUDE 20 ° 00' TO 20 ° 30'
LONGITUDE 155 ° 00' TO 155 ° 30'
DIAGRAM NE 5-1,5 HAWAII

Pohakuhaku (Hawaii Island, E. R. Hand, 1913).—On northeast coast of Hawaii, about 1½ miles west-northwest from Paaulo sugar mill, on a pronounced rise crowned with a great quantity of jagged rock and outcroppings, and about 25 meters back from the edge of the cliff; this is the highest point of the cliffs in this vicinity. This is a rounded point, and to the west-northwest the shore line curves inward, forming a cove across which the stack of Paauhau sugar mill is seen, bearing N. 75° W. Station marked by cross cut deeply into the rock outcrop. It is about 3 feet above the grassy slope, and is surrounded by a white-washed cairn of stones built up to a height of 5 feet. A triangle cut in the outcrop is 0.7 meter from the station, bearing N. 65° E.

RECOVERY NOTE, TRIANGULATION STATION
INTERSECTION

NAME OF STATION: **Pohakuhaku**
ESTABLISHED BY: **E.R.H.** YEAR: **1913** STATE: **Hawaii** BENCH MARK(S) ALSO ☐
RECOVERED BY: **D.M. Whipp** YEAR: **1966** 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:

Station was searched for but not found. A large pile of rock was found in the vicinity, however neither of the described marks in rock were found under it and there was no evidence of the rocks having been whitewashed. This area is now covered with large ironwood trees.

R

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: **POHAKUHAKU**

STATE: **HAWAII**

YEAR: **1913**

THIRD

ORDER

SOURCE: **G-92184**

GEODETIC LATITUDE	20 03 58.870	ELEVATION	62	METERS
GEODETIC LONGITUDE	155 23 04.944	SCALED		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ OR \angle *
HI 1	5101	539,566.31	447,783.86	+ 0 02 22

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

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

QD 363

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 201552 STATION 1030
HAWAII
LATITUDE 20 ° 00' TO 20 ° 30'
LONGITUDE 155 ° 00' TO 155 ° 30'
DIAGRAM NE 5-1.5 HAWAII

NO TEXT.

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: WAIPUNALEI

STATE: HAWAII

YEAR: 1902

THIRD

ORDER

SOURCE: G-SP156

GEODETIC LATITUDE:	20 ° 00' 06.677	ELEVATION:	METERS
GEODETIC LONGITUDE:	155 15 21.379		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	ϕ OR Δ OR ANGLE *
HI 1	5101	583,791.20	424,407.28	+ 0 05' 01"

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

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

QD 356