

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 201564 STATION 1001  
 HAWAII  
 LATITUDE 20 °30' TO 21 °00'  
 LONGITUDE 156 °30' TO 157 °00'  
 DIAGRAM NF 4-16 MAUI

**NO ORIGINAL TEXT**

ADJUSTED HORIZONTAL CONTROL DATA

Form 526  
 (11-8-55)

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

**R**

NAME OF STATION: **AK (Cairn)**  
 ESTABLISHED BY: **J.B.M.** YEAR: **1914** STATE: **Hawaii**  
 RECOVERED BY: **H.J. Seaborg** YEAR: **1962** COUNTY: **Maui**

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

**Island: Lanai**  
 A cairn with traces of whitewash was recovered on the point on the south side of Kapoho Gulch and is assumed to be original station. It partially torn down, so was re-built to a height of about 5 feet. Station is about a 3/4 mile pack from the south end of track road (Highway 44) at Naha Gulch.

NAME OF STATION: **AK-CAIRN**

STATE: **HAWAII**

YEAR: **1914**

**THIRD**

ORDER

SOURCE: **G-SP156**

**NO OBSERVATION CHECK ON THIS POSITION**

GEODETIC LATITUDE:	20 °46'09.68"	ELEVATION:	METERS
GEODETIC LONGITUDE:	156 50 05.29		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	GEOD. TRIANGLE ANGLE *
HI 2	5102	442,560.48	158,390.91	- 0 °03'35"

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

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

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

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

COM-DC 34314

QI 611

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 201564 STATION 1002  
HAWAII  
LATITUDE 20° 30' TO 21° 00'  
LONGITUDE 156° 30' TO 157° 00'  
DIAGRAM NF 4-16 MAUI

NO TEXT

## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: AL  
STATE: HAWAII YEAR: 1914 ORDER: THIRD

COURSE: C-SP156  
NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE: 20° 53' 39.40	ELEVATION:	METERS
GEODETIC LONGITUDE: 156° 41' 17.97		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	B HOR Δ RI ANGLE
HI 2	5102	492,607.07	203,734.12	- 0° 00' 28"

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

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

Q3 022

# HORIZONTAL CONTROL DATA

by the  
 National Ocean Survey  
 OLD HAWAIIAN DATUM

0 201564 STATION 1003  
 HAWAII  
 LATITUDE 20 °30' TO 21 °00'  
 LONGITUDE 156 °30' TO 157 °00'  
 DIAGRAM NF 4-16 MAUI

DEPARTMENT OF COMMERCE  
 U. S. COAST AND GEODETIC SURVEY  
 FORM 526  
 Rev. Aug. 1968

### DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: ANU STATE: Hawaii COUNTY: Maui

CHIEF OF PARTY: C.T. Husemeyer YEAR: 1950 Described by: G.B.G.

NOTE: HEIGHT OF TELESCOPE ABOVE STATION MARK 1.67 METERS. HEIGHT OF LIGHT ABOVE STATION MARK 1.37 METERS.

NOTE*	HEIGHT OF TELESCOPE ABOVE STATION MARK METERS.1	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:
2	Surface-station mark					
	Underground-station mark					
				feet	meters	
4	WAIAKOIA		WSW	14.92	4.546	0 00 00.0
4	R.M.No.1		E	18.74	5.711	124 54 12
	R.M.No.2		E	39.76	12.028	329 02 49
	Forest Service Boundary Mon.					329 55

Detailed description

Located on the south side of West Maui, Wailuku District, about 6 miles southwest of Wailuku and about 3.5 miles north of McGregor Point, on the west end and highest point of Puu Anu. A standard disk set in a boulder projecting 8 inches. Stamped ANU 1949.

Reference mark No.1 is west southwest of the station. A standard disk set in a boulder projecting 15 inches, stamped ANU NO 1 1949.

Reference mark No.2 is east of the station. A standard disk set in a boulder flush with the ground, stamped ANU NO 2 1949.

A Forest Service boundary Monument with a 3 inch iron pipe 4 feet high is 39.76 feet east of the station.

To reach from the Post Office at Wailuku: go westerly on Lahaina highway for 7.8 miles, turn right through a board gate and follow track road northerly up hill for 2.0 miles to a concrete water tank, bear right on old road, cross deep gulch, then bear left up long grassy ridge for 2.7 miles to westerly foot of prominent hill. From here pack easterly to top of hill and station.

Form 526  
 (11-8-55)

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

**R**

NAME OF STATION: ANU  
 ESTABLISHED BY: C.T.H. YEAR: 1950 STATE: Hawaii  
 RECOVERED BY: H.J.S. YEAR: 1961 COUNTY: Maui

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. Although no measurements were taken to the reference marks, it is believed that the directions are reversed. The distances appear to be correct. Directions for reaching the station are correct. The driving time is about 1 hour. The description is adequate.

\* 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 ANU  
 STATE: HAWAII YEAR 1950 FIRST ORDER

SOURCE: G- 9311

GEODETIC LATITUDE:	20 °49 '28.645	ELEVATION	905.0 METERS
GEODETIC LONGITUDE:	156 33 01.071		2971 FEET

STATE COORDINATES (SPM)				
STATE & ZONE	CODE	X	Y	∠ OR Δ OR ANGLE
HI 2	5102	539,740.13	178,449.02	+ 0 02 29

\* 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
RICE	345 46 35.8	345 44 07	5102

QE 375

# HORIZONTAL CONTROL DATA

QUAD 201564 STATION 1003

by the  
 NATIONAL GEODETIC SURVEY  
 OLD HAWAIIAN DATUM

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

ANU (continued)

FORM 526  
 (9-16-69)

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

**R**

NAME OF STATION: ANU  
 ESTABLISHED BY: C.T. Husemeyer YEAR: 1950 STATE: Hawaii  
 RECOVERED BY: R.C. Munson YEAR: 1969 COUNTY: Maui  
 Island: Maui

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

OBJECT	BEARING	DISTANCE		DIRECTION
		FEET	METERS	
RICE -----1950 DISTANCE and DIRECTION				00 00 00.0
R.M. No. 1	WSW	14.92	4.546	75 32 12
R.M. No. 2	E	18.74	5.711	279 40 49
Forest Service Boundary Mon.	E	39.76	12.028	280 33 00
RICE 1950 -----1969 DISTANCE and DIRECTION				00 00 00.0
R.M. No. 2	SW	18.742	5.713	75 33 33
Puu Nene Sugar Mill, S. stack	ENE			256 33 28.9
R.M. No. 1	E	14.882	4.537	279 41 55
Forest Service Boundary Mon.	E	39.760	12.120	280 32 36

Station was recovered and all marks found in good condition. A discrepancy was noted in the distance to the Forest Service Boundary Monument, and upon double-checking, it was found that the 1950 distance in feet is correct, but an error was made in reading or recording the meter distance. It was also found that the RMs are listed wrong as to angle, in the box of the 1950 description. The above 1969 data is correct.

Station is located about 5-1/2 miles southwest of Wailuku and 3 miles northwest of Maalaea Harbor, on the summit of Puu Anu, a bare-topped hill of about 2972 feet elevation, along Kealaloloa Ridge, about 1/2-mile north of a large power line.

To reach station from the post office in Wailuku, go south on State Highway 30 for 7.0 miles to Maalaea Harbor; continue on the highway for 0.9 mile to board gate on right. Pass through gate and go up old track road for 4.4 miles to base of hill. Pack uphill about 100 yards to station.

Station mark is a standard disk stamped "ANU 1949", cemented in a drill hole in a bedrock outcrop that projects 1 foot from ground.

Reference mark number one is a standard disk stamped "ANU NO 1 1949", cemented in a drill hole in a flat bedrock outcrop projecting 1 foot from ground, and is 6 inches lower than station mark.

Reference mark number two is a standard disk stamped "ANU NO 2 1949", cemented in a drill hole in a 2-foot bedrock outcrop projecting 1 foot from ground, and is 16 inches lower than station mark.

Forest Service Boundary Monument is a badly-rusted, 3-inch-diameter, iron pipe that projects 3-1/2 feet from ground and has a small cairn built around the bottom. Top of pipe is at same elevation as station mark.

NOTE: A 4-wheel-drive vehicle is required.

\*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.

# HORIZONTAL CONTROL DATA

by the  
 National Ocean Survey  
 OLD HAWAIIAN DATUM

0 201564 STATION 1004  
 HAWAII  
 LATITUDE 20 ° 30' TO 21 ° 00'  
 LONGITUDE 156 ° 30' TO 157 ° 00'  
 DIAGRAM NF 4-16 MAUI

## DESCRIPTION OF TRIANGULATION STATION

DEPARTMENT OF COMMERCE  
 U. S. COAST AND GEODETIC SURVEY  
 FORM 515  
 Rev. Aug. 1965

NAME OF STATION: **AWEHI** STATE: **Hawaii** COUNTY: **Mau**  
 Island: **Lanai** Described by: **R. F. Hanson**

CHIEF OF PARTY: **Harold J. Seaborg** YEAR: **1962**

NOTE\* HEIGHT OF TELESCOPE ABOVE STATION MARK **1.39** METERS.† HEIGHT OF LIGHT ABOVE STATION MARK METERS.

NOTE*	HEIGHT OF TELESCOPE ABOVE STATION MARK	HEIGHT OF LIGHT ABOVE STATION MARK	DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION			
			OBJECT	BEARING	DISTANCE	
			feet	meters		
4	Surface-station mark, Underground-station mark					
					00 00 00.0	
12c	PUU NENE R.M. No. 1	SE	16.65	5.074	172 46 05	
12c	R.M. No. 2	SW	12.83	3.910	275 46 24	

Station is located about 7 miles airline east-southeast of Lanai City, 1-1/4 miles northeast of the end of Highway 44 (which ends at Naha Gulch), and 1/4 mile northwest of the shorelines of the island; at about 155 feet elevation on a flat, kiawe-covered hill, and about 100 yards north of an old track road.

To reach station from the post office in Lanai City, go northerly on Highway 44 for 8.6 miles to end of paved road. Continue on dirt road, Highway 44, for 6.5 miles to old Keomuku Village. Continue ahead for 1.0 mile to a fork. Take left fork and follow road along shoreline for 3.6 miles to point where road winds up over a rocky ridge. Continue southerly on the road for 1.15 miles to red tank on left. Continue ahead for 0.1 mile to a dim side road sharp right, 100 feet before reaching a very leaning coconut tree. Turn sharp right and go northerly for 0.1

mile to washout and end of truck travel. Pack northwest up washed-out road for about 300 yards to cairn in road. Bear right, off of road, and go northerly through brush for about 100 yards, keeping about same elevation, to station.

Station mark is a standard disk stamped "AWEHI 1962", cemented in a drill hole in a flat, 8 x 10-foot bedrock outcrop that is flush with surrounding ground. It is 7 feet south of the southeast corner of an old, 12-foot-square, rock enclosure that is about 2 feet high, 5 feet northwest of a cairn, and about 8 yards southeast of a lone, 6 x 8-foot boulder.

Reference mark number one is a standard disk stamped "AWEHI NO 1 1962", cemented in a drill hole in a 4 x 6-foot boulder that projects 1 foot above ground. It is about 1-1/2 feet lower than station mark.

Reference mark number two is a standard disk stamped "AWEHI NO 2 1962", cemented in a drill hole in a 2 x 2-1/2-foot boulder that projects 6 inches above ground. It is at about the same elevation as the station.

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

## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: **AWEHI**  
 STATE: **HAWAII** YEAR: **1962** SECOND ORDER

SOURCE: **G-13124**

GEODETIC LATITUDE	20 ° 47' 40.508	ELEVATION	40.8 METERS
GEODETIC LONGITUDE	156 49 20.777		154 FEET

STATE COORDINATES (feet)				
STATE & ZONE	CODE	X	Y	OR Δ or ANGLE
HI 2	5102	446,793.43	167,550.35	- 0 05 19

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

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH*	CODE
PUU NENE	153 25 22.2	153 28 41	5102

QF 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

Q 201564 STATION 1005  
 HAWAII  
 LATITUDE 20° 30' TO 21° 00'  
 LONGITUDE 156° 30' TO 157° 00'  
 DIAGRAM NF 4-16 MAUI

NO TEXT

### ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: BANL  
 STATE: HAWAII YEAR: 1904 THIRDO -ORDER

SOURCE: G-SP156  
 NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE:	20 35 52.08	ELEVATION:	METERS
GEODETIC LONGITUDE:	156 33 26.42		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	$\beta$ OR $\Delta$ OR ANGLE
HI 2	5102	537,391.08	96,064.52	+ 0 02' 19"

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

TO STATION OR OBJECT	GEODETIC AZIMUTH (From 1900)	PLANE AZIMUTH (From 1900)	CODE

QD 158

# HORIZONTAL CONTROL DATA

by the  
 National Ocean Survey  
 OLD HAWAIIAN DATUM

0 201564 STATION 1006  
 HAWAII  
 LATITUDE 20° 30' TO 21° 00'  
 LONGITUDE 156° 30' TO 157° 00'  
 DIAGRAM NF 4-16 MAUI

BEACH (Maui County, Hawaii, O.W.S., 1931)--Station is on the E coast of Lanai Island, at Halepalaoa, about 12 ft. in-shore from the high-waterline, 6-1/2 ft. S of the S edge of an old wharf, and 51 ft. SE of the SE corner of a warehouse. It is marked by a 4-ft. piece of rail steel driven 3 ft. into the ground.

OBJECT	DISTANCE	DIRECTION
KEKAA	feet	0°00'00"
Pioneer stack		17 17 06
NE corner post of wharf	264	27 15 00

(11-7000)

## RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: ~~BEACH~~  
 ESTABLISHED BY: O.W.S. YEAR: 1931 STATE: Hawaii  
 RECOVERED BY: H.J. Seaborg YEAR: 1962 COUNTY: Maui  
 Island: Lanai

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

Station is destroyed. It was searched for by measurements from old description but could not be found.

If name of party should be inserted here. The officer who fully staked the station should sign his name at the end of note. Use of above forms is not to be used for every station recovered.

Form DC 3431a

## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: BEACH  
 STATE: HAWAII YEAR: 1931 THIRD ORDER  
 SOURCE: G-1432

GEODETIC LATITUDE: 20 49 59.739	ELEVATION: 1 METERS
GEODETIC LONGITUDE: 156 48 53.456	SCALED FEET

STATE COORDINATES (FEET)				
STATE & ZONE	CODE	X	Y	U (OR Δ) OR Δ ±
HI 2	5102	447,398.56	181,595.04	- 0 03 10

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

TO STATION OR OBJECT	GEODETIC AZIMUTH (From sea level)	PLANE AZIMUTH (From sea level)	CODE
KEKAA	228 18 55.2	228 22 05	5102

# HORIZONTAL CONTROL DATA

by the  
 National Ocean Survey  
 OLD HAWAIIAN DATUM

0 201564 STATION 1007  
 HAWAII  
 LATITUDE 20 °30' TO 21 °00'  
 LONGITUDE 156 °30' TO 157 °00'  
 DIAGRAM NF 4-16 MAUI

DEPARTMENT OF COMMERCE  
 U. S. COAST AND GEODETIC SURVEY  
 Form 833  
 Rev. Aug. 1963

TRAVERSE  
 DESCRIPTION OF ~~TRANGULATION~~ STATION

NAME OF STATION: BECK STATE: HAWAII COUNTY: MAUI

CHIEF OF PARTY: R.J. Seaborg YEAR: 1963 Described by: R.A.R.

NOTE*	HEIGHT OF TELESCOPE 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	HEIGHT OF LIGHT ABOVE STATION MARK METERS.	
			feet	meters
2	Surface-station mark. Underground-station mark			
	OBJECT	BEARING	DIRECTION: 0 / 0	
12a	GREY 2, 1963 "V.G."	SE	2.1 miles approx.	0 00 00.0
12a	R.M.1	E	57.79 17.623	301 09 41.
12a	R.M.2	S	44.66 13.615	23 56 14

Detailed description:

Station is on the east end of Kahoolawe Island, 1 mile west of the southerly shore of Kanapou Bay and 1.7 miles north of the south shore of the island. It is about a 2 mile walk from the beach at Beck Cove at the head of Kanapou Bay and is located on a red dirt ridge scattered with small boulders and outcrops of bedrock. Looking to the right of the south tangent of Maui Island from the station, a green ridge southeast of Beck Cove is visible over a red dirt ridge.

To reach station from the sand beach at Beck Cove, proceed in a south-westerly direction up the rock slide gully to the top of a 700 foot ridge, keeping to the left side of the gully. From the top of the ridge, proceed right

(northwest) 1 mile to the station. It is about a 1½ hour pack to the station.

The station is marked with a standard triangulation disk, stamped BECK 1963 set in cement in a drill hole in a small outcrop of bedrock projecting about 1 foot.

Reference mark 1 is at approximately the same elevation as the station mark. It is a standard disk stamped BECK NO. 1 1963 set in cement in a drill hole in a small outcrop of bedrock.

Reference mark 2 is about 1 meter below the station mark. It is a standard disk stamped BECK NO. 2 1963 set in cement in a drill hole in a small outcrop of bedrock.

\* Refer to notes in manuals of triangulation and state publications on triangulation.  
 † To nearest meter only, when no trigonometric leveling is being done.

‡ Direction-angle measured clockwise, referred to initial station.  
 16-58852-1 U. S. GOVERNMENT PRINTING OFFICE

## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: BECK  
 STATE: HAWAII YEAR: 1963 SECOND ORDER

SOURCE: G-13249

GEODETIC LATITUDE	20 32 33.5156	ELEVATION:	350.2 METERS
GEODETIC LONGITUDE	156 34 23.2055		1063 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	N FOR Δ ANGLE
HI 2	5102	532,007.83	76,028.44	+ 0 01 58

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

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH (From south)	CODE
GREY 2	284 33 43.9	284 31 46	5102

QF 395



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 201564 STATION 1008  
 HAWAII  
 LATITUDE 20 ° 30' TO 21 ° 00'  
 LONGITUDE 156 ° 30' TO 157 ° 00'  
 DIAGRAM NF 4-16 MAUI

NO TEXT

## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: BENCH

STATE HAWAII

YEAR 1904

THIRD ORDER

SOURCE G-SP15c  
 NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE:	20 32' 49.16	ELEVATION:	METERS
GEODETIC LONGITUDE:	156 33' 17.38		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	$\theta$ OR $\Delta$ OR ANGLE *
HI 2	5102	538,262.56	77,610.70	+ 0 02' 21"

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

TO STATION OR OBJECT	GEODETIC AZIMUTH (from $\theta$ or $\Delta$ )	PLANE AZIMUTH (from $\theta$ or $\Delta$ )	CODE

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 201504 STATION 1009  
 HAWAII  
 LATITUDE 20° 30' TO 21° 00'  
 LONGITUDE 156° 30' TO 157° 00'  
 DIAGRAM NF 4-16 MAUI

SEE STATION GIL 2

## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: BENCH MARK 26 M USGS

STATE HAWAII

YEAR 1962

SECOND

-ORDER

SOURCE: G-13124  
 NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE:	20° 55' 04.748	ELEVATION:	5.94 METERS
GEODETIC LONGITUDE:	156° 54' 13.154		12.9 FEET

STATE COORDINATES (1:24)				
STATE & ZONE	CODE	X	Y	S OR Δ OF ANGLE*
HI 2	5102	419,118.57	212,404.24	- 0° 05' 05"

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

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

POSITION DETERMINED BY TRAVERSE FROM STATION GIL 2

QF 378

# HORIZONTAL CONTROL DATA

by the  
 National Ocean Survey  
 OLD HAWAIIAN DATUM

Q 201564 STATION 1010  
 HAWAII  
 LATITUDE 20° 30' TO 21° 00'  
 LONGITUDE 156° 30' TO 157° 00'  
 DIAGRAM NF 4-16 MAUI

## DESCRIPTION OF TRIANGULATION STATION

DEPARTMENT OF COMMERCE  
 U. S. COAST AND GEODETIC SURVEY  
 Form 525  
 Rev. Aug. 1968

NAME OF STATION: BENCH MARK 27 M USGS STATE: Hawaii COUNTY: Maui  
 Island, Lanai  
 Described by: J. R. S.

CHIEF OF PARTY: H. J. Seaborg YEAR: 1962  
 HEIGHT OF TELESCOPE ABOVE STATION MARK 1.20 METERS.† HEIGHT OF LIGHT ABOVE STATION MARK METERS.

NOTE*	Surface-station mark Underground-station mark	DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION			
		OBJECT	BEARING	DISTANCE	
feet	meters			°	'
	HONOWAE				00 00 00.0
12c	R.M. No. 1	E	16.34	4.980	211 14 23
12c	R.M. No. 2	SW	10.78	3.285	319 48 15

Station is located about 7 miles northwest of Lanai City, about 1.5 miles west of a large wrecked ship, and a rocky point known as Lae Wahie, about 100 feet south of the north shore of the island.

To reach from the Post Office in Lanai City, go northwest on Lanai Ave. and State Highway 44 northerly for 3.0 miles to two board gates on the left, pass through the right one of these gates, then turn right on dim track road and follow it for 0.6 mile to a fork. Take left for 0.1 mile to a water trough, continue ahead for 1.0 mile to a board gate. Pass through gate and continue for 2.7 miles to the start of rough, rocky jeep road. Continue on rocky jeep road for about 1.8 miles, just before reaching a large sand trap. From here pack about 100 yards to a fishing hut at the shore, turn left and go about 140 yards to a

small rocky knoll that is about 20 feet above sea level.

Station mark is a standard USGS disk stamped, BM 27 M 20 feet 1923, cemented in a drill hole in bedrock that is flush, about 100 feet south of the coast line and 2 feet south of a rock cairn.

Reference mark No. 2 is a standard disk stamped, BM 27 M USGS NO 2 1962, cemented in a drill hole in bedrock that is 1 foot higher than the station, 12 feet southwest of the cairn.

Reference mark No. 1 is a standard disk stamped, BM 27 M USGS NO 1 1962, cemented in a drill hole in boulder that is 1 foot higher than the station, 18 feet southeast of the cairn.

Detailed description:

\* 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. 16-54882-1 U. S. GOVERNMENT PRINTING OFFICE

## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION BENCH MARK 27 M USGS  
 STATE HAWAII YEAR 1962 SECOND ORDER

SOURCE G-13124

GEODETIC LATITUDE	20 55 35.134	ELEVATION	6.02 METERS
GEODETIC LONGITUDE	156 56 26.457		19.8 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	ρ OR Δ ρ ANGLE †
HI 2	5102	406,486.24	215,490.09	- 0 05 52

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

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH † (From south)	CODE
HONOWAE	97 03 46.7	97 09 39	5102

QF 355

# HORIZONTAL CONTROL DATA

by the  
 National Ocean Survey  
 OLD HAWAIIAN DATUM

0 201564 STATION 1011  
 HAWAII  
 LATITUDE 20 ° 30' TO 21 ° 00'  
 LONGITUDE 156 ° 30' TO 157 ° 00'  
 DIAGRAM NF 4-16 MAUI

DEPARTMENT OF COMMERCE  
 U. S. COAST AND GEODETIC SURVEY  
 FORM 525  
 Rev. Aug. 1963

## DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: BENCH MARK 855 USGS  
 STATE: HAWAII COUNTY: MAUI  
 ISLAND: KAHOOILAWE  
 Described by: S. Z. B.

CHIEF OF PARTY: Harold J. Seaborg YEAR: 1963

NOTE*	HEIGHT OF TELESCOPE ABOVE STATION MARK 1.46 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      meters	DIRECTION: °   '   "
	Surface-station mark, Underground-station mark					
			COB 2	NW		00 00 00.0
			KAHOOLAWE 2	ENE		77 58 10.8

Station is 1.7 miles SE of Makaanee Point, 3.8 miles ENE of Kealaikahiki Point, 3 miles NW of Paukoae Island, located on W rim of Kaelialalo Crater near edge of keawe brush at about 855 ft elevation, about 300 yards N of red dirt bombing range and 300 yards W of large water hole in crater.

To reach from Smuggler Cove, follow rough caterpillar road starting at SE end of sandy beach for about 4 miles in NE direction to red dirt bombing range. Cross bombing area, then proceed N to top of brushy hill.

Station mark is USGS bronze disk, stamped Hawaii 855, cemented in drill hole of brown rock outcrop about 8 ft in diameter, projecting 3 ft above ground.

No reference marks. Station COB 2 will serve as azimuth mark.

## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: BENCH MARK 855 USGS

STATE: HAWAII

YEAR: 1963

SECOND

SOURCE: G-13249

GEODETIC LATITUDE:	20 32' 40.1039	ELEVATION:	259.0 METERS
GEODETIC LONGITUDE:	156 38 48.4312		850 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	ORDER Δ BI ANGLE
HI 2	5102	506,801.57	76,684.56	+ 0 00 25

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

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH (From south)	CODE
COB 2	168 14 44.6	168 14 20	5102

QF 407

\* 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.

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 201564 STATION 1012  
 HAWAII  
 LATITUDE 20 °30' TO 21 °00'  
 LONGITUDE 156 °30' TO 157 °00'  
 DIAGRAM NF 4-16 MAUI

NO TEXT

## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION **BERT**  
 STATE **HAWAII** YEAR **1904** ORDER **THIRD**

SOURCE **G-SP156**  
 NO OBSERVATION CHECK ON THIS POSITION

GEODEIC LATITUDE	20 35 17.91	ELEVATION	METERS
GEODEIC LONGITUDE	156 32 59.44		FEET

STATE COORDINATES (feet)				
STATE & ZONE	CODE	X	Y	$\rho$ HOR $\Delta$ ANGLE*
HI 2	5102	539,956.72	92,618.55	+ 0 02 28

\* PLANE AZIMUTH HAS BEEN COMPUTED BY THE  $\rho$  HOR  $\Delta$  FORMULA NEGLECTING THE SECOND TERM

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

QQ 200

# HORIZONTAL CONTROL DATA

by the  
 National Ocean Survey  
 OLD HAWAIIAN DATUM

0 201564 STATION 1013  
 HAWAII  
 LATITUDE 20 ° 30' TO 21 ° 00'  
 LONGITUDE 156 ° 30' TO 157 ° 00'  
 DIAGRAM NF 4-16 MAUI

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

## DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: **BLACK 2** STATE: **Hawaii** COUNTY: **Maui**  
 Island: **Kahoolawe**  
 CHIEF OF PARTY: **Harold J. Seaborg** YEAR: **1963** Described by: **L. F. Van Scoy**  
 HEIGHT OF TELESCOPE ABOVE STATION MARK METERS: **1.62** HEIGHT OF LIGHT ABOVE STATION MARK METERS: \_\_\_\_\_

NOTE	HEIGHT OF TELESCOPE ABOVE STATION MARK METERS	DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION	DISTANCE		DIRECTION		
			feet	meters	°	'	"
2	Surface-station mark, Underground-station mark						
12a		KANELOA			00	00	00.0
		R.M. No. 1	SE	33.95	10.35	86	24 30
12a		R.M. No. 2	S	32.25	9.83	128	31 00

Station is located along the crest of a narrow-topped, brushy ridge of about 800 feet elevation, about midway along the south coast of Kahoolawe Island and 1/4 mile southwest of the north tip of Kamohio Bay.

Station is best reached by making skiff landing in Smuggler Cove at west end of the island, thence packing easterly along old road for about 5 miles, and then southerly, cross-country, about 1 mile to head of Kamohio Bay and station.

Station mark is a standard disk stamped "BLACK 2 1963", cemented in a drill hole in a 12 x 18-inch exposed section of bedrock flush with the ground. It is in a small clear area, about 300 feet north-northeast of highest point of ridge and 50 feet west of edge of bluff.

Reference mark number one is a standard disk stamped "BLACK 2 NO 1 1963", cemented in a drill hole in a 1 x 2-foot bedrock outcrop that projects about 8 inches above ground. It is at the north edge of a clump of keawe brush, 35 feet west of edge of bluff, and about 1 foot lower than station mark.

Reference mark number two is a standard disk stamped "BLACK 2 NO 2 1963", cemented in a drill hole in a 2-foot-diameter, bedrock outcrop that projects about 4 inches above ground. It is set along the ridge-top trail at about same elevation as station mark.

Detailed description

\* 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. 16-46202-1 U. S. GOVERNMENT PRINTING OFFICE

## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: **BLACK 2**  
 STATE: **HAWAII** YEAR: **1963** SECOND - ORDER  
 SOURCE: **G-13245**

GEODETIC LATITUDE	20 31 32.4686	ELEVATION	250.8 METERS
GEODETIC LONGITUDE	156 36 22.3380		823 FEET

STATE COORDINATES (feet)				
STATE & ZONE	CODE	X	Y	± COR. Δ RI ANGLT
HI 2	5102	520,688.13	69,864.23	+ 0 01 16

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

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH (From south)	CODE
KANELOA	241 03 00.2	241 01 44	5102

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 201564 STATION 1014  
 HAWAII  
 LATITUDE 20° 30' TO 21° 00'  
 LONGITUDE 156° 30' TO 157° 00'  
 DIAGRAM NF 4-16 HAWAII

**Blow** (Kahoolawe Island, J. F. Pratt, 1904).—On the eastern end of Kahoolawe Island, on a bare red hill a little south of the highest point of the island. The left tangent to the point on opposite side of Becks Cove bears S. 57° 30' E. (mag.). Marked by bottle buried neck down, bottom of bottle being about 1 foot below surface of ground.

FORM 526e  
 (9-5-56)

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

Name of Station: **BLOW**  
 Established by: **J.F.P.** Year: **1904** State: **Hawaii**  
 Recovered by: **H.J.S.** Year: **1963** County: **Maui**

Island: **Kahoolawe**

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

A rock  
 cairn with 2X4 wood pole was found in the approximate location of the station. The buried bottle mentioned in the description was searched for but not recovered. A new permanent marked station, BLOW 2, was established about 0.1 of a mile north of the old station as the old line between BLOW and KAHOOLOWE would not see without constructing a tower. No tie was made to the old station.

## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: **BLOW**  
 STATE: **HAWAII**

YEAR: **1964**

ORDER: **THIRD**

SOURCE: **G-SP156**

GEODETIC LATITUDE	20 53 46.661	ELEVATION SCALED	450	METERS FEET
GEODETIC LONGITUDE	156 34 06.027			

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	∠ OR Δ ANGLE*
HI 2	5102	533,635.95	83,408.86	+ 0° 02' 04"

\* PLANE AZIMUTH—HAS BEEN COMPUTED BY THE 2-10R Δ 01 FORMULA NEGLECTING THE SECOND TERM.

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

# HORIZONTAL CONTROL DATA

by the  
 National Ocean Survey  
 OLD HAWAIIAN DATUM

0 201564 STATION 1015  
 HAWAII  
 LATITUDE 20 ° 30' TO 21 ° 00'  
 LONGITUDE 156 ° 30' TO 157 ° 00'  
 DIAGRAM NF 4-16 MAUI

DEPARTMENT OF COMMERCE  
 U. S. COAST AND GEODETIC SURVEY  
 FORM 515  
 Rev. Aug. 1963

## DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: **BLOW 2** STATE: **Hawaii** COUNTY: **Maui**  
**Kahoolawe Island**  
 CHIEF OF PARTY: **Harold J. Seaborg** YEAR: **1963** Described by: **R. F. Hanson**  
 HEIGHT OF TELESCOPE ABOVE STATION MARK **1.47** 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			
		OBJECT	BEARING	DISTANCE feet meters	DIRECTION: O I N
4	Surface-station mark, Underground-station mark				
12c		<b>KAHOOLAWE 2</b>		<b>00 00 00.0</b>	
12c		<b>R.M. No. 2</b>	<b>NNE 61.91</b>	<b>18.872</b>	<b>105 59 35</b>
12c		<b>R.M. No. 1</b>	<b>WNW 89.24</b>	<b>27.202</b>	<b>359 31 57</b>

Station is located on the east end of Kahoolawe Island, on a bare, red dirt, flat-topped hill, about 1/4 mile north of the highest point on the island and slightly lower. It is about 1-1/2 miles airline west-southwest of the northwest corner of Kanapou Bay, and 2-1/2 miles airline south-southwest of Hakioua Bay. Station was reached by small-boat landing in Hakioua Bay, or cove, and thence proceeding on foot southwesterly up along the open, red dirt ridge about 2-1/2 miles to station.  
 Station mark is a standard disk stamped "BLOW 2 1963", cemented in a drill hole in the 8-inch-square, exposed surface of a boulder that is flush with the ground. It is about 100 yards northeast of the rim of an old crater, and 12 feet north of a 6-foot ledge.

Reference mark number one is a standard disk stamped "BLOW 2 NO 1 1963", cemented in a drill hole in a 12 x 16-inch boulder flush with the ground, setting in the center of a scattering of small brush and grass clumps, and is about 2 feet lower than the station.

NOTE: The arrow on the disk points southerly, at about a 90-degree angle to the station.

Reference mark number two is a standard disk stamped "BLOW 2 NO 2 1963", cemented in a drill hole in a 10-inch boulder flush with the ground and about 3 feet lower than the station.

NOTE: The arrow on the disk points on about a 30-degree angle to the right of the station.

Station **KAHOOLAWE 2** will serve as the azimuth mark.

## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: **BLOW 2**  
 STATE: **HAWAII** YEAR: **1963** SECOND ORDER

SOURCE: **G-13249**

GEODETIC LATITUDE	<b>20 33 52.1127</b>	ELEVATION	<b>448.0</b> METERS
GEODETIC LONGITUDE	<b>156 34 05.3498</b>		<b>1472</b> FEET

STATE COORDINATES (feet)				
STATE & ZONE	CODE	X	Y	# OR Δ or ANGLE*
<b>Hi 2</b>	<b>5102</b>	<b>533,699.97</b>	<b>83,958.91</b>	<b>+ 0 02 05</b>

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

TO STATION OR OBJECT	GEODETIC AZIMUTH (from south)	PLANE AZIMUTH (from south)	CODE
<b>KAHOOLAWE 2</b>	<b>100 21 47.2</b>	<b>100 19 42</b>	<b>5102</b>

QF 353

\* 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 levelling is being done.  
 16-64802-1 U. S. GOVERNMENT PRINTING OFFICE



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 201564 STATION 1016  
 HAWAII  
 LATITUDE 20 ° 30' TO 21 ° 00'  
 LONGITUDE 156 ° 30' TO 157 ° 00'  
 DIAGRAM NF 4-16 MAUI

## NO ORIGINAL TEXT

**Bold** (Maui Island, F. W. Perkins, 1900; J. C. Gauger, 1912).—A hydrographic signal of 1900 near shore of Maalaea Bay. A large boulder about 4 feet high lying above the government road about 100 meters northwest of McGregors Light. The boulder is by far the largest isolated rock in this vicinity.

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: **BOLD**  
 ESTABLISHED BY: **F.W.P.** YEAR: **1900** STATE: **Hawaii** BENCH MARK(S) ALSO   
 RECOVERED BY: **R.C. Munson** YEAR: **1969** COUNTY: **Maui**  
 AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: **Island: Maui**

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

A large boulder was found in the vicinity, and appears to have been whitewashed once. The position was checked by traverse from McGregor Point Light, and it is believed this is the old station. It is now hidden by kiawe trees, and of no value.

**R**

## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: **BOLD**  
 STATE: **HAWAII** YEAR: **1900** THIRD ORDER

SOURCE: **G- 1432**

GEODETIC LATITUDE:	20 ° 46 ' 53.466	ELEVATION	METERS
GEODETIC LONGITUDE:	156 31 34.057		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	∠ OR Δ ∠ ANGLE *
HI 2	5102	548,008.04	162,799.49	+ 0 ° 03 ' 00 "

\* 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

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# HORIZONTAL CONTROL DATA

by the  
 National Ocean Survey  
 OLD HAWAIIAN DATUM

Q 201564 STATION 1017  
 HAWAII  
 LATITUDE 20° 30' TO 21° 00'  
 LONGITUDE 156° 30' TO 157° 00'  
 DIAGRAM NF 4-16 MAUI

NO TEXT

## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: BUD  
 STATE: HAWAII YEAR: 1914 THIRD ORDER

SOURCE: G-SP156  
 NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE:	20° 55' 09.30"	ELEVATION:	METERS
GEODETIC LONGITUDE:	156° 41' 57.00"		FEET

STATE COORDINATES (feet)				
STATE & ZONE	CODE	X	Y	$\theta$ OR $\Delta$ OR ANGLE *
HI 2	5102	488,508.13	212,804.50	- 0° 00' 42"

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

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

QQ 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 201564      STATION 1018  
HAWAII  
LATITUDE    20 °30' TO 21 °00'  
LONGITUDE 156 °30' TO 157 °00'  
DIAGRAM                      NF 4-16    MAUI

## NO ORIGINAL TEXT

## ADJUSTED HORIZONTAL CONTROL DATA

Form 526  
(11-8-55)

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

**R**

NAME OF STATION: Cairn on Hill

ESTABLISHED BY: F.G.E.      YEAR: 1927    STATE: Hawaii  
RECOVERED BY: H.J. Seaborg    YEAR: 1962    COUNTY: Maui

Island: Lanai

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

Station is marked by a large cairn and was found in good condition. Cairn was re-built to a height of 5 feet, and has a 10-foot pole in the center.

Station lies about 4-1/2 miles airline southeast of Lanai City, on the summit of a prominent bare hill of 1454 feet elevation, that is the westernmost one of the group of low bare hills overlooking the pineapple fields to the west and northwest.

Form 526  
(11-8-55)

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

**R**

NAME OF STATION: CAIRN ON HILL

ESTABLISHED BY: F.G.E.      YEAR: 1927    STATE: Hawaii  
RECOVERED BY: E.P.C.      YEAR: 1964    COUNTY: Maui

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 1962 recovery.

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

NAME OF STATION: CAIRN ON HILL  
STATE: HAWAII      YEAR: 1927      THIRD ORDER

SOURCE: G-SPI56  
NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE:	ELEVATION	METERS
20 °46'08.59		
GEODETIC LONGITUDE:	156 53 27.81	FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	β OR Δ OR ANGLE °
HI 2	5102	423,341.95	158,304.28	- 0 04 47

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

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

QI 622

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 201564 STATION 1019  
 HAWAII  
 LATITUDE 20° 30' TO 21° 00'  
 LONGITUDE 156° 30' TO 157° 00'  
 DIAGRAM NF 4-16 MAUI

NO TEXT

## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION CHANGE  
 STATE: HAWAII YEAR: 1904 THIRD ORDER

SOURCE G-SPI56  
 NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE:	20° 33' 46.09	ELEVATION	METERS
GEODETIC LONGITUDE:	156° 32' 57.50		FEET

STATE COORDINATES (feet)				
STATE & ZONE	CODE	X	Y	$\theta$ OR $\Delta$ ANGLE *
HI 2	5102	540,147.71	83,555.56	+ 0° 02' 28"

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

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

QO 203

# HORIZONTAL CONTROL DATA

by the  
 National Ocean Survey  
 OLD HAWAIIAN DATUM

Q 201564 STATION 1020  
 HAWAII  
 LATITUDE 20 ° 30' TO 21 ° 00'  
 LONGITUDE 156 ° 30' TO 157 ° 00'  
 DIAGRAM NF 4-16 MAUI

U.S. DEPARTMENT OF COMMERCE  
 U. S. COAST AND GEODETIC SURVEY  
 FORM 502  
 Rev. Aug. 1963

## DESCRIPTION OF TRAVEL STATION

NAME OF STATION: COB 2 STATE: Hawaii COUNTY: Maui  
 Island: Kahoolawe  
 Described by: G.L. Short  
 CHIEF OF PARTY: Harold J. Seaborg YEAR: 1963

NOTE*	HEIGHT OF TELESCOPE ABOVE STATION MARK METERS.1	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	meters	O / #
4	Surface-station mark, Underground-station mark					
12c	SEE 2 R.M. No. 2	ESE	63.17	19.255	00 00 00.0	
12c	R.M. No. 1	SSW	51.32	15.643	311 27 58	

Station is located on the north slope of Kahoolawe Island, about 4 miles airline east-northeast of the western tip of the island and 1-1/4 miles southeast of Makaalae Point, on a boulder-covered knoll of about 700 feet elevation. It lies about 1/2 mile southeast of a lower, boulder-covered knoll and 1/2 mile north-northwest of the highest point of the west rim of Kaelialalo Crater, and about 150 feet lower than that point.

Station is best reached by making a skiff landing in the cove about 3/4 mile east of Makaalae Point and packing southerly up slope about 1 mile to station.

NOTE: Station may also be reached from Smuggler Cove by packing

northeasterly along old road for about 3-1/2 miles to west end of crater rim, then bearing northerly around rim of crater and going down slope about 1/2 mile to station.

Station mark is a standard disk stamped "COB 2 1963", cemented in a drill hole in a 2 x 5-foot boulder flush with the ground. It is at the south side of a prominent, 6 x 8-foot rock that projects about 6 feet above the ground.

Reference mark number one is a standard disk stamped "COB 2 NO 1 1963", cemented in a drill hole in a boulder that projects about 3 feet above ground.

Reference mark number two is a standard disk stamped "COB 2 NO 2 1963", cemented in a drill hole in the top of a 6-foot-square, brown boulder that projects 3 feet above ground.

\* 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 COB 2  
 STATE HAWAII YEAR 1963 SECOND ORDER

SOURCE G-13249

GEODETIC LATITUDE	20 33 06.6597	ELEVATION	216.1 METERS
GEODETIC LONGITUDE	156 38 54.3063		705 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	ϕ OR Δ OR ANGLE*
HI 2	5102	506,242.93	79,367.47	+ U 00 25

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

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH* (From south)	CODE
SEE 2	72 11 45.0	72 11 22	5102

QF 406



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 201564 STATION 1022  
 HAWAII  
 LATITUDE 20 ° 30' TO 21 ° 00'  
 LONGITUDE 156 ° 30' TO 157 ° 00'  
 DIAGRAM NF 4-16 MAUI

NO TEXT

## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: CRACK  
 STATE: HAWAII YEAR: 1904 THIRD ORDER #

SOURCE: G-SP156  
 NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE:	20 ° 36' 25.35	ELEVATION:	METERS
GEODETIC LONGITUDE:	156 ° 34' 55.72		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	$\beta$ OR $\Delta$ $\phi$ ANGLE *
HI 2	5102	530,805.55	99,417.04	+ 0 ° 01' 54"

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

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

QQ 196

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 201564 STATION 1023  
 HAWAII  
 LATITUDE 20° 30' TO 21° 00'  
 LONGITUDE 156° 30' TO 157° 00'  
 DIAGRAM NF 4-16 MAUI

NO TEXT

## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: ORY  
 STATE: HAWAII YEAR: 1904 THIRD ORDER

SOURCE: G-SP150

GEODETIC LATITUDE:	20° 34' 28.422"	ELEVATION	METERS
GEODETIC LONGITUDE:	156° 38' 18.625"		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	$\theta$ OR $\Delta$ OR ANGLE *
HI 2	5102	509,852.33	87,612.72	+ 0° 00' 56"

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

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

QQ 215



# HORIZONTAL CONTROL DATA

by the  
 National Ocean Survey  
 OLD HAWAIIAN DATUM

0 201564 STATION 1024  
 HAWAII  
 LATITUDE 20 ° 30' TO 21 ° 00'  
 LONGITUDE 156 ° 30' TO 157 ° 00'  
 DIAGRAM NF 4-16 MAUI

TRAVERSE  
 DESCRIPTION OF TRIANGULATION STATION

DEPARTMENT OF COMMERCE  
 U. S. COAST AND GEODETIC SURVEY  
 Form 532  
 Rev. Aug. 1965

NAME OF STATION: **EAT 2** STATE: **Hawaii** COUNTY: **Maui**  
 Island: **Kahoolawe**  
 Described by: **L.F. Van Scoy**

CHIEF OF PARTY: **H.J. Seaborg** YEAR: **1963**  
 HEIGHT OF TELESCOPE ABOVE STATION MARK **1.55 METERS.**  
 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			
		OBJECT	BEARING	DISTANCE	DIRECTION
			feet	meters	
12c	Surface-station mark; Underground-station mark	KANELOA			00 00 00.0
		R.M. No. 1	44.80	13.653	205 16 09
12c		R.M. No. 2	35.60	10.850	269 24 29

Detailed description:

Station is located in the southeast part of Kahoolawe Island, about 1-1/4 miles southwest of Beck Cove, 2 miles east of Kamohio Bay and 1/4 mile north of the south shoreline of the island, on the summit of a low, rocky knoll of about 680 feet elevation. Station is best reached by skiff landing in Beck Cove; from here pack southwesterly up steep, rocky canyon for about 3/4 mile to top. Go left, southerly, across rough, red dirt area for about 3/4 mile to knoll and station.

Station mark is a standard disk stamped "EAT 2 1963", cemented in a drill hole in a 2 x 2-foot boulder that projects about 3 inches. It is at the northeast side of a large pile of rocks that is the remains of an old cairn.

Reference mark number one is a standard disk stamped "EAT 2 No 1 1963", cemented in a drill hole in a 2-1/2 x 2-1/2-foot, triangular shaped boulder that projects about 18 inches.

Reference mark number two is a standard disk stamped "EAT 2 NO 2 1963", cemented in a drill hole in a 2-foot-diameter boulder that projects about 8 inches.

\* Refer to notes in manuals of triangulation and state publications on 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: **EAT 2**  
 STATE: **HAWAII** YEAR: **1963** ORDER: **SECOND**

SOURCE: **G-13249**  
 NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE: 20 51 20.9404	ELEVATION: 201.8 METERS
GEODETIC LONGITUDE: 156 33 58.7796	002 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ OR ANGLE
HI 2	5102	534,333.66	68,707.90	+ 0 02 07

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

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH (From south)	CODE
KANELOA	133 13 41.0	133 11 34	5102

QF 397

# HORIZONTAL CONTROL DATA

by the  
 National Ocean Survey  
 OLD HAWAIIAN DATUM

0 201564 STATION 1025  
 HAWAII  
 LATITUDE 20 ° 30' TO 21 ° 00'  
 LONGITUDE 156 ° 30' TO 157 ° 00'  
 DIAGRAM NF 4-16 MAUI

TRAVERSE  
 DESCRIPTION OF TRIANGULATION STATION

DEPARTMENT OF COMMERCE  
 U. S. COAST AND GEODETIC SURVEY  
 FORM 533  
 Rev. Aug. 1962

NAME OF STATION: **EGG 2** STATE: **Hawaii** COUNTY: **Mau**  
 Island: **Kahoolawe**  
 Described by: **L.F. Van Scoy**

CHIEF OF PARTY: **H.J. Seaborg** YEAR: **1963**  
 HEIGHT OF TELESCOPE ABOVE STATION MARK **1.50** 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		
		OBJECT	BEARING	DIRECTION †
			feet	meters
2	Surface-station mark			
	Underground-station mark			
12a	LOW 2			00 00 00.0
12a	R.M. No. 1	NE	85.08	26.846 146 52 20
12a	R.M. No. 2	SW	68.54	20.890 334 45 39

Station is located at the northeast end of Kahoolawe Island, about 1-1/2 miles southeast from the northernmost point of the island; on the slope above the rock bluff at Hakioawa Point, at about 60 feet above sea level.

Station is reached by making skiff landing in the cove at Hakioawa Point and packing south up onto the rocky bluff on south side of the cove.

Station mark is a standard disk stamped "EGG 2 1963", cemented in a drill hole in a small, flat, bedrock outcrop that projects about 2 feet. It is in the middle of the slope and about 225 feet southwest of edge of bluff.

Reference mark number one is a standard disk stamped "EGG 2 NO 1 1963", cemented in a drill hole in a 5 x 5-foot bedrock outcrop that projects about 1 foot. It is 4-1/2 feet lower than station.

Reference mark number two is a standard disk stamped "EGG 2 NO 2 1963", cemented in a drill hole in a 5 x 8-foot bedrock outcrop that projects about 2 feet. It is about 4 feet higher than station.

Detailed description

## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION **EGG 2**  
 STATE **HAWAII** YEAR **1963** SECOND **-ORDER**

SOURCE **G-13245**

GEODETIC LATITUDE	20 35 41.4890	ELEVATION	-8.5 METERS
GEODETIC LONGITUDE	156 33 16.1981		62 FEET

STATE COORDINATES (Foot)				
STATE & ZONE	CODE	X	Y	SPHERICAL ANGLE *
HI 2	5102	538,362.93	94,996.67	+ 0 02 22

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

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH (From south)	CODE
LOW 2	91 22 21.0	91 19 59	5102

QF 412

# HORIZONTAL CONTROL DATA

by the  
 National Ocean Survey  
 OLD HAWAIIAN DATUM

0 201564 STATION 1026  
 HAWAII  
 LATITUDE 20 °30' TO 21 °00'  
 LONGITUDE 156 °30' TO 157 °00'  
 DIAGRAM NF 4-16 MAUI

DEPARTMENT OF COMMERCE  
 U. S. COAST AND GEODETIC SURVEY  
 FORM 505  
 MAY, AUG. 1963

## TRaverse DESCRIPTION OF TRANSIT STATION

NAME OF STATION: **ERR 2** STATE: **Hawaii** COUNTY: **Maui**  
 CHIEF OF PARTY: **H. J. Seaborg** YEAR: **1963** Island: **Kahoolawe**  
 Described by: **Mr. P. Van Sooy**

NOTE*	HEIGHT OF TELESCOPE ABOVE STATION MARK METERS.†	HEIGHT OF LIGHT ABOVE STATION MARK METERS.	DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION				
			OBJECT	BEARING	DISTANCE		DIRECTION‡
					feet	meters	
2	Surface-station mark, Underground-station mark	1.5					
12c	SEE 2		NE		00	00	00
	HANA (light on pole on building)		SE	1.5 mile	65	51	32.2
	Concrete Observation Tower		SE	0.6 mile	60	47	53.5
	RM 2		SSE		132	43	50
12a	RM 1		N		337	27	38

Detailed description:

Station is located on a small, grassy, flat topped knoll, about 42 meters above mean sea level, and near the northwest corner of Kahoolawe Island. The station is about 0.4 mile south of the northwesterly shoreline of the island and about 0.2 mile east of the westerly shoreline of the island.

To reach the station from the southerly end of the beach at Smugglers Cove on the west end of the island, pack cross-country about 1.1 mile north-northwest to small grassy knoll and station.

Station is located about 60 feet south of the north edge of the knoll, and about 25 feet east of the west edge of the knoll. Station is marked by a stand-

ard disk, stamped ERR 2 1963, cemented in a drill hole in a 2 foot diameter section of rock outcropping that projects about 4 inches.

No underground mark was established.

Reference mark number 1 is a standard disk, stamped ERR 2 NO 1 1963, cemented in a drill hole in the top of a 3x2 foot section of rock outcropping that projects about 6 inches. Mark is north of the station and at about the same elevation.

Reference mark number 2 is a standard disk, stamped ERR 2 NO 2 1963, and cemented in a drill hole in the top of a 2.5 foot boulder that projects about 10 inches. Mark is near the westerly edge of the knoll, south-southwest of the station, and at about the same elevation.

No distances were obtained to reference marks.

\* Refer to notes in manuals of triangulation and state publications of triangulation.  
 † Star only, when no trigonometric leveling is being done. ‡ Direction-angle measured clockwise, referred to initial station.  
 16-60802-1 U. S. GOVERNMENT PRINTING OFFICE

## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: **ERR 2**  
 STATE: **HAWAII** YEAR: **1963** SECOND ORDER  
 SOURCE: **G-13249**

GEODETIC LATITUDE: 20 31 37.9413	ELEVATION: 15.5 METERS
GEODETIC LONGITUDE: 156 41 53.0482	52 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	# OH Δ #1 ANGLE*
HI 2	5102	485,198.18	70,413.57	- 0 00 40

\* PLANE AZIMUTH HAS BEEN COMPUTED BY THE # OH Δ #1 FORMULA NEGLECTING THE SECOND TERM

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH*	CODE
SEE 2	231 11 19.2	231 11 59	5102

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 201564 STATION 1027  
 HAWAII  
 LATITUDE 20 °30' TO 21 °00'  
 LONGITUDE 156 °30' TO 157 °00'  
 DIAGRAM NF 4-16 MAUI

SEE STATION KAEO

## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION FOREST RESERVE BDRY MARK  
 STATE HAWAII YEAR 1950 SECOND ORDER

SOURCE G- 9311  
 NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE	20 58 30.575	ELEVATION	513	METERS
GEODETIC LONGITUDE	156 37 18.739	SCALED		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	$\rho$ OR $\Delta$ OR ANGLE *
HI 2	5102	515,282.15	233,153.34	+ 0 00 58

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

TO STATION OR OBJECT	GEODETIC AZIMUTH (From north)	PLANE AZIMUTH (From north)	CODE
POSITION DETERMINED BY TRAVERSE FROM STATION KAEO			
QE 432			

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 201564 STATION 1028  
 HAWAII  
 LATITUDE 20 ° 30' TO 21 ° 00'  
 LONGITUDE 156 ° 30' TO 157 ° 00'  
 DIAGRAM NF 4-16 MAUI

SEE STATION ANU

## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: FOREST SERVICE BDRY MON

STATE: HAWAII

YEAR: 1950

SECOND

-ORDER

SOURCE: G- 9311

NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE:	20 ° 49' 28.670	ELEVATION:	626	METERS
GEODETIC LONGITUDE:	156 33 00.656	SCALED		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	$\phi$ OR $\Delta$ OR ANGLE *
HI 2	5102	539,779.49	178,451.57	+ 0 ° 02' 29"

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

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH * (From south)	CODE
POSITION DETERMINED BY TRAVERSE FROM STATION ANU			
QE 433			

# HORIZONTAL CONTROL DATA

by the  
 National Ocean Survey  
 OLD HAWAIIAN DATUM

0 201564 STATION 1029  
 HAWAII  
 LATITUDE 20 ° 30' TO 21 ° 00'  
 LONGITUDE 156 ° 30' TO 157 ° 00'  
 DIAGRAM NF 4-16 MAUI

**Gale (Lanai Island, F. G. Engle, 1927).**—About 6 feet back from edge of red earth bluff which overlooks the western shore of Lanai. Station reached by turning south from the government road at a point east of the hill called Kanepuu, along a fence line near a pineapple field to the stretch of eroded ground, and continuing west to edge of bluff. Marked according to note 4, standard disk in boulder which projects several inches above the ground. Two reference marks, note 12c, standard reference disks in boulders, were set at the following distances and azimuths from the station: No. 1, 6.545 meters (21.47 feet), 196° 04'; No. 2, 6.860 meters (22.51 feet) 295° 06'.

GALE (Maui County, Hawaii, F.G.E., 1927; O.W.S., 1931)  
 --Description should be re-

written as follows:

Station is on the NW part of Lanai Island, about 1/4 mi. W of a hill called Kanepuu, about 1 mi. W of a road, and about 15 ft. back from the edge of a prominent, red-earth bluff which overlooks the W shore of Lanai.

Station is reached by turning W from the Government road at Kanepuu Hill, going over the top of Kanepuu Hill and then down about 1/4 mi. to the edge of the bluff.

It is marked with a standard station disk set in a boulder which projects several in. above the ground. Two reference marks are standard reference-mark disks set in boulders at the following distances and azimuths from the station:

R.M. 1 is 6.545 m. (21.47 ft.) at 196° 04'.  
 R.M. 2 is 6.860 m. (22.51 ft.) at 295° 06'.

## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: GALE  
 STATE: HAWAII YEAR: 1927 THIRD ORDER

SOURCE: G-SP156

GEODETIC LATITUDE:	20 ° 52' 16.180	ELEVATION	521	METERS
GEODETIC LONGITUDE:	156 59 39.837	SCALED		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	$\phi$ OR $\Delta$ OR ANGLE *
HI 2	5102	388,113.18	195,451.44	- 0 ° 37' 00 "

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

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH* (From south)	CODE
KAHOLO	353 49 56.5	353 56 56	5102

QI 613

(continued on next page)

# HORIZONTAL CONTROL DATA

by the  
 NATIONAL GEODETIC SURVEY  
 OLD HAWAIIAN DATUM

QUAD 201564 STATION 1029

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

GALE (continued)

FORM 326a  
 (6-10-62)

U.S. DEPARTMENT OF COMMERCE  
 COAST AND GEODETIC SURVEY

R

## RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: **GALE**  
 ESTABLISHED BY: **F.G.E.** YEAR: **1927** STATE: **Hawaii**  
 RECOVERED BY: **H.J. Staborg** YEAR: **1962** COUNTY: **Mau**  
 Island: **Lanai**

HEIGHT OF TELESCOPE ABOVE STATION MARK **1.40** METERS, HEIGHT OF LIGHT ABOVE STATION MARK METERS.

OBJECT	BEARING	DISTANCE		DIRECTION
		FEET	METERS	
KAHOLO 1927 1962				00 00 00.0
R.M. No. 4	N 88	28.952	8.825	165 08 00
R.M. No. 3	E	31.940	9.737	277 01 04

Station mark was recovered in good condition. Both reference marks one and two have been destroyed; they were set in small, 12-inch boulders which have had the earth eroded from around them by the wind, and they were found setting on top of the ground. Two new reference marks, number three and four, were established. A complete description follows:

Station is located about 5-1/2 miles airline northwest of Lanai City and 1015 meters west of Kanepuu Hill, near the west edge of the bare, red mesa that overlooks the west coast of the island.

To reach station from the post office in Lanai City, go northwest on Lanai Avenue for 0.05 mile; turn left and go 0.15 mile to crossroad. Turn right and go 0.5 mile to end of paved road. Continue ahead, on graded road, for 0.8 mile to a crossroad. Turn right and follow main road through pineapple fields for 3.1 miles to end of fields. Continue ahead on dirt road for 0.95 mile to fork. Take right fork through ironwood trees for 0.75 mile to dim left fork, just before passing through a tree row which crosses main road. Turn left and go 0.1 mile to large, corrugated metal rain-trap on right. Continue ahead for 0.1 mile to dim right fork. Take the right fork and follow road westerly across a red, eroded area for 1.0 mile to prominent grassy hummock on right of road. Go right, leaving road, and go westerly 0.1 mile to edge of mesa and station.

Station mark is a standard disk stamped "GALE 1927", cemented in a drill hole in a 1-foot boulder that projects 3 inches above ground. It is 5.3 feet southeast of a white witness post and 18 feet east of edge of mesa.

Reference mark number three is a standard disk stamped "GALE NO 3 1927 1962", braced to the top of a 1-1/2-inch iron pipe that is set in cement and projects 3 inches above ground. It is about 1-1/2 feet higher than station mark.

Reference mark number four is a standard disk stamped "GALE NO 4 1927 1962", braced to the top of a 1-1/2-inch iron pipe that is set in cement and projects 3 inches above ground. It is about 1 foot lower than station mark.

Station KANEPUU (HGS) 1879 1962 will serve as the azimuth 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.

USCOMNAV-DC 37171

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 201564 STATION 1030  
 HAWAII  
 LATITUDE 20 ° 30' TO 21 ° 00'  
 LONGITUDE 156 ° 30' TO 157 ° 00'  
 DIAGRAM NF 4-16 MAUI

NO TEXT

## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: GAY 1  
 STATE: HAWAII YEAR: 1912 ORDER: THIRD

SOURCE: G-SP156

GEODETIC LATITUDE:	20 54 19.18	ELEVATION:	METERS
GEODETIC LONGITUDE:	156 31 56.53		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	$\delta$ OR $\Delta$ OR ANGLE*
HI 2	5102	545,838.11	207,766.26	+ 0° 02' 53"

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

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

QQ 029



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 201564 STATION 1031  
 HAWAII  
 LATITUDE 20 ° 30' TO 21 ° 00'  
 LONGITUDE 156 ° 30' TO 157 ° 00'  
 DIAGRAM NF 4-16 MAUI

NO TEXT

## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION GAY 2  
 STATE HAWAII YEAR 1912 THIRD ORDER

SOURCE G-SP156

GEODETIC LATITUDE	20 55 22.70	ELEVATION	METERS
GEODETIC LONGITUDE	156 52 15.75		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	$\theta$ ICR $\Delta$ $\alpha$ ANGLE *
HI 2	5102	544,006.90	214,173.42	+ 0 02 46 "

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

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

WD 050

# HORIZONTAL CONTROL DATA

by the  
 National Ocean Survey  
 OLD HAWAIIAN DATUM.

0 201564 STATION 1032  
 HAWAII  
 LATITUDE 20 °30' TO 21 °00'  
 LONGITUDE 156 °30' TO 157 °00'  
 DIAGRAM NF 4-16 MAUI

DEPARTMENT OF COMMERCE  
 U. S. COAST AND GEODETIC SURVEY  
 FORM 655  
 Rev. Aug. 1963

## DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: GIL 2 STATE: Hawaii COUNTY: Maui  
 Island: Lanai  
 Described by: J. R. S.

CHIEF OF PARTY: H. J. Seaborg YEAR: 1962  
 HEIGHT OF TELESCOPE ABOVE STATION MARK 1.66 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	DISTANCE		DIRECTION
			feet	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				

Station is located about 7.0 miles north-northeast of Lanai City, on the north shore of the island, on a small rocky knoll that is about 30 ft. above sea level, and in the foundation of an old lighthouse. To reach from the Post Office in Lanai City, go northwest on Lanai Ave. and State Highway 44 for 3.0 miles to two board gates on the left, continue on State Highway 44 for 5.9 miles to the bottom of the grade to a side road on the left and sign "SHIPWRECK BEACH". Turn left and follow road northwesterly for 1.3 miles to a group of beach homes. Continue on the road for 0.4 miles to the end of the road at a small beach home. From here pack about 30 yards west to a small rise and a old concrete foundation.

The station mark is a standard disk stamped, GIL 2 1962, cemented in a drill hole in the center of the concrete foundation. Reference mark No. 2 is a standard disk stamped, GIL 2 NO. 2 1962, cemented in a drill hole in a boulder that projects 1.5 feet, about 52 feet south of the south edge of the concrete foundation and one foot lower than the station. EM 26 M (USGS) is a standard USGS disk stamped, EM 26 M 1923, cemented in a drill hole in a boulder that is about 85 feet north-northeast of the north edge of the concrete foundation and 15 feet lower than the station.

### RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: GIL 2  
 ESTABLISHED BY: H. J. Seaborg YEAR: 1962 STATE: Hawaii BENCH MARK(S) ALSO   
 RECOVERED BY: R. L. Newsom YEAR: 1968 COUNTY: Maui

AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN:  
 5.2 miles bearing 017° from Lanai City, Lanai

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 previously described.  
 No search was made for reference marks.

## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: GIL 2  
 STATE: HAWAII YEAR: 1962 SECOND ORDER

SOURCE: G-13124

GEODETIC LATITUDE	20 55 04.044	ELEVATION	9.2 METERS
GEODETIC LONGITUDE	156 54 13.711		30 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ or ANGLE*
HI 2	5102	419,065.66	212,333.29	- 0 05 05

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

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH* (From south)	CODE
KAHUA	59 23 48.3	59 28 53	5102

R

QF 357

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 201564 STATION 1033  
 HAWAII  
 LATITUDE 20 ° 30' TO 21 ° 00'  
 LONGITUDE 156 ° 30' TO 157 ° 00'  
 DIAGRAM NF 4-16 MAUI

Goat (Kahoolawe Island, J. F. Pratt, 1904).—Near the south side of Kahoolawe, on a rocky grassy hilltop about 200 meters from the edge of the bluff, between and somewhat nearer the most western of the two deep coves on that side of the island. Marked by flagpole driven in the ground with small stones piled around its base.

GOAT (Maui County, Hawaii, J.F.P., 1904; O.W.S., 1932)  
 --Station is at S Kahoolawe.  
 A 5-ft. cairn of rocks with a 2- by 4-in. center pole was erected over the probable station location from evidence on the ground of a previous pole signal.

## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: GOAT  
 STATE: HAWAII YEAR: 1904 THIRD ORDER  
 SOURCE: G-SP156

GEODETIC LATITUDE	20 31 02.935	ELEVATION	METERS
GEODETIC LONGITUDE	156 57 50.514		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	$\rho$ 10R $\Delta$ $\rho$ 1 ANGLE *
HI 2	5102	512,307.92	66,882.20	+ 0 00 45

\* PLANE AZIMUTH HAS BEEN COMPUTED BY THE  $\rho$  10R  $\Delta$   $\rho$  1 FORMULA NEGLECTING THE SECOND TERM.

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

QQ 186

# HORIZONTAL CONTROL DATA

by the  
 National Ocean Survey  
 OLD HAWAIIAN DATUM

0 201564 STATION 1034  
 HAWAII  
 LATITUDE 20° 30' TO 21° 00'  
 LONGITUDE 156° 30' TO 157° 00'  
 DIAGRAM NF 4-16 MAUI

DEPARTMENT OF COMMERCE  
 U. S. COAST AND GEODETIC SURVEY  
 Form 533  
 Rev. Aug. 1962

## DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: **GREY 3** STATE: **Hawaii** COUNTY: **Maui**  
 Island: **Kahoolawe**  
 Described by: **J. R. L.**

CHIEF OF PARTY: **H. J. S.** YEAR: **1963**

NOTE	HEIGHT OF TELESCOPE ABOVE STATION MARK METERS.	DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION			
		OBJECT	BEARING	DISTANCE feet      meters	DIRECTION °   '   "
4	Surface-station mark, Underground-station mark				
		BLOW 2			00 00 00.0
12c		R.M. No. 1	N	42.10      12.830	37 53 25
12c		R.M. No. 2	W	56.23      17.137	283 50 20

Station is located on the southeast peninsula of Kahoolawe Island about 3/4 of a mile east of the beach in Becks Cove, about 600 meters west from Halona Point and 35 meters south from the edge of the bluff.

Station can best be reached by making a skiff landing in Becks Cove and peaking up the ravine and then eastward along the rim of the bluff to the station.

Station mark is a standard disk stamped "GREY 3 1963", cemented in a drill hole in a rock of 1-foot in diameter that projects 3-inches above the ground.

Reference mark number one is a standard disk stamped "GREY 2 NO 1 1963", cemented in a drill hole in a rock of 1-foot in diameter that projects 6-inches above the ground and is 6-inches below the level of the station.

Reference mark number two is a standard disk stamped "GREY 2 NO 2 1963", cemented in a drill hole in a rock of about 1 1/2 feet in diameter that projects

1-foot above the ground and is about 1-foot below the level of the 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.

## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: **GREY 2**  
 STATE: **HAWAII** YEAR: **1963** SECOND ORDER

SOURCE: **G-13249**

GEODETIC LATITUDE:	20 32 06.6211	ELEVATION:	172.2 METERS
GEODETIC LONGITUDE:	156 32 33.3468		565 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	β OR Δ or ANGLE*
HI 2	5102	542,450.48	73,322.08	+ 0 02 37

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

TOWNSHIP OR OBJECT	GEODETIC AZIMUTH (From true)	"PLANE AZIMUTH" (From true)	CODE
BLOW 2	140 36 02.7	140 33 26	5102

# HORIZONTAL CONTROL DATA

by the  
 National Ocean Survey  
 OLD HAWAIIAN DATUM

0 201564 STATION 1035  
 HAWAII  
 LATITUDE 20 °30' TO 21 °00'  
 LONGITUDE 156 °30' TO 157 °00'  
 DIAGRAM NF 4-16 MAUI

**Hak (Maui Island, J. C. Gauger, 1912).**—On northeastern coast of West Maui, in Kaanapali District, on the top and near the extreme end of the narrow ridge forming Mokeehia Point, and about 10 meters back from the precipitous slope to the shore line. Marked by a 5-inch drain tile pipe cemented flange down into the sandstone with about 5 inches projecting above surface. Pipe is filled with concrete and centered with standard bronze disk.

## RECOVERY NOTE, TRIANGULATION STATION

DEPARTMENT OF COMMERCE  
 U. S. COAST AND GEODETIC SURVEY  
 FORM 336  
 (Rev. Feb. 1965)

NAME OF STATION: **HAK**

ESTABLISHED BY: **J. C. Gauger** YEAR: **1912** STATE: **Hawaii**  
 RECOVERED BY: **C. T. Husemeyer** YEAR: **1950** COUNTY: **Maui**

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

Station recovered as described and in good condition. Located on the northeast coast of Maui, in the Kaanapali District, on the top and near the extreme end of the narrow ridge that juts out into the ocean and is about 300 feet lower than the main land, forming Mokeehia Point, and about 10 meters back from the precipitous slope to the shore line.

Station is a standard disk set in a concrete filled drainage tile cemented flange down in the sandstone and projecting about 5 inches.

Reference mark No. 1 is west southwest of the station. A standard disk set in a sandstone ledge projecting about 18 inches. Stamped HAK NO 1 1949.

Reference mark No. 2 is northwest of the station. A standard disk set in sandstone outcrop flush with the ground and about 7 feet lower than the station. Stamped HAK NO 2 1949.

To reach from the post office at Kahului: go northeast on coast road toward Kahakuloa for eleven miles to a small house on right at the foot of Puu Olai. Continue ahead for 0.1 mile, turn right on track road and go northeasterly on track road through pasture land for 0.8 to end of road. From here pack right to top and end of ridge then steep draw to point and station.

OBJECT	DISTANCE		DIRECTION
	Meters	Feet	
MAUI BASE (H.G.S.) 1912	0 00	00.0	
Reference mark No. 1	10.929	35.856	NSW
Reference mark No. 2	7.211	23.641	WNW

U. S. GOVERNMENT PRINTING OFFICE

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

16-58889-5

## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: **HAK**

STATE: **HAWAII**

YEAR: **1912**

FIRST

GRADE

SOURCE: **G- 9311**

GEODETIC LATITUDE	20 59 18.091	ELEVATION	82.3 METERS
GEODETIC LONGITUDE	156 31 48.285		270 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ θ ANGLE
HI 2	5102	546,594.12	237,924.75	+ 0 02 56

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

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH* (From south)	CODE
OLAI 2	39 32 09.4	39 29 13	5102

QE 351

(continued on next page)

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

# HORIZONTAL CONTROL DATA

by the  
NATIONAL GEODETIC SURVEY  
OLD HAWAIIAN DATUM

QUAD 201564 STATION 1035

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

HAK (continued)

FORM 526  
(6-16-69)

U.S. DEPARTMENT OF COMMERCE  
COAST AND GEODETIC SURVEY

## RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: HAK  
ESTABLISHED BY: J.C. Gauger      YEAR: 1912      STATE: Hawaii  
RECOVERED BY: R.C. Munson      YEAR: 1969      COUNTY: Maui  
Island: Maui

HEIGHT OF TELESCOPE ABOVE STATION MARK 1.28 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	
OLAI 2 -----1950 DISTANCE and DIRECTION				00 00 00.0
R.M. No. 2	NW	24.511	7.471	27 01 41
R.M. No. 1	WSW	35.856	10.929	107 40 26
OLAI 2 1950 -----1969 DISTANCE and DIRECTION				00 00 00.0
R.M. No. 2	SW	35.854	10.929	27 01 19
R.M. No. 1	NW	24.501	7.468	107 41 21

Station was recovered and all marks found in good condition, however the distances and compass directions to the reference marks were listed wrong in the 1950 description. The 1969 distance and direction is correct. A complete description follows:

Station is located about 7 miles north-northwest of Wailuku, on Hakuhee Point, at about 270 feet elevation, on a grassy-topped point about 3/4-mile northeast, down-ridge, from Puu Olai.

To reach station from the junction of Main and Market Streets in

Wailuku, go north on Market Street, continuing on State Highway 33, for 3.6 miles to Waihee Village. Continue on the highway, which later becomes a winding, graveled road, for 5.9 miles to pipe gate on right, at milepost 10 and power pole No. 24. Go through the gate and down farm road for 0.2 mile to house. Pass through wire gate to left of house and follow pasture road, passing through 3 more gates, for 0.75 mile to end of truck travel at fence and end of pasture. Pack down steep hill, then across gulch and up other side, about 1/2-mile to station. NOTE: The route to reach station in 1950 is now quite overgrown.

Station mark is a standard disk unstamped, set in the top of a 6-inch diameter, concrete-filled, sewer pipe projecting 7 inches from ground. It is 27 feet southwest of the prominent, grey sandstone outcrop on end of ridge-top.

Reference mark number one is a standard disk stamped "HAK NO 1 1949", cemented in a drill hole in the sheer bedrock edge of the 270-foot cliff, on west side of hilltop and 6.9 feet lower than station mark.

Reference mark number two is a standard disk stamped "HAK NO 2 1949", cemented in a drill hole in a grey sandstone ledge that projects 2 feet from ground, and is 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

# HORIZONTAL CONTROL DATA

by the  
 National Ocean Survey  
 OLD HAWAIIAN DATUM

0 201564 STATION 1036  
 HAWAII  
 LATITUDE 20 ° 30' TO 21 ° 00'  
 LONGITUDE 156 ° 30' TO 157 ° 00'  
 DIAGRAM NF 4-16 MAUI

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

## DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: HANA

STATE: Hawaii

COUNTY: Maui

Island: Kahoolawe

Described by: J.R.L.

CHIEF OF PARTY: H.J.S.

YEAR: 1963

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		
	1.5 METERS.†				
			BEARING	DISTANCE	DIRECTION‡
				feet	meters
	Surface-station mark, Underground-station mark				

Detailed description:

Station is on the west end of Kahoolawe Island on a small hill about  $\frac{1}{4}$  mile east of Smuggler Cove.

Station is best reached by making a skiff landing in Smuggler Cove then packing northeast along the old road for about  $\frac{1}{4}$  mile. The station is about 200 yards southeast of the road at this point and can be seen from the road. The station can also be seen from Smuggler Cove.

The station is the center of a  $\frac{1}{2}$  inch iron pole which is on top of and extends 4.88 meters above a concrete lookout post. The lookout post is 4.63 meters by 4.56 meters with the longer axis approximately north and south. It is 5.65 meters high and has a rim around the top which is 5.20 x 5.20 meters and 0.30 meters thick.

The top of the building is covered with tar and crushed gravel. A metal ladder is located on the north side of the building near the north west corner. Three meters west of the lookout post is a second, smaller concrete building. Large rocks are stacked around the south, west, and north sides and on top of this second building. To the north of the lookout post are located three power line type poles each about 30 feet high. The three poles are located such that they form a triangle. The southern most pole is one meter north of the lookout post. The second pole is northwest of the first at a distance of about 50 meters. The third pole is northeast of the first at a distance of about 50 meters.

The iron pole which forms the station is painted with orange and white stripes. There are 17 metal steps on the pole with a red light at the top. This light was observed.

There are no reference marks at this station.

## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: HANA

STATE: HAWAII

YEAR: 1963

SECOND

ORDER

SOURCE: G-13249

GEODETIC LATITUDE: 20 ° 31' 03.4217	ELEVATION: 58.4 METERS
GEODETIC LONGITUDE: 156 40 41.8559	192 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	$\theta$ OR $\Delta$ OR ANGLE*
HI 2	5102	496,017.71	66,930.09	- 0 ° 00' 15"

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

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

QF 402

# HORIZONTAL CONTROL DATA

by the  
 National Ocean Survey  
 OLD HAWAIIAN DATUM

0 201564 STATION 1037  
 HAWAII  
 LATITUDE 20 ° 30' TO 21 ° 00'  
 LONGITUDE 156 ° 30' TO 157 ° 00'  
 DIAGRAM NF 4-16 MAUI

NO ORIGINAL TEXT

## ADJUSTED HORIZONTAL CONTROL DATA

FORM 526a  
 (6-19-69)

U.S. DEPARTMENT OF COMMERCE  
 COAST AND GEODETIC SURVEY

R

### RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: HANAKAOO (HGS)  
 ESTABLISHED BY: Hawaii State Survey YEAR: 1961 STATE: Hawaii  
 RECOVERED BY: R.C. Munson YEAR: 1969 COUNTY: Maui  
 Island: Maui

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

OBJECT	BEARING	DISTANCE		DIRECTION
		FEET	METERS	
WAIKULU 2 1950				00 00 00.0
MANINI (HGS) 1882				31 11 18.6
LAINA (HTS) 1919				109 02 31.0
R.M. No. 1	S	12.992	3.961	129 09 46
R.M. No. 2	W	17.265	5.263	220 46 49

A 4-inch, chiseled cross in bedrock was found at the approximate location for the station, and subsequent observations proved it to be the station. It was then re-marked with a standard disk, two reference marks were established and a witness post was set.

Station is located about 3 miles north of Lahaina, 3/4 mile south-southwest of Puukolii Village, and 1 mile east-southeast of the Kaanapali Hotel, on the south side of a cane road, on a brush-covered rise which has a long row of very large boulders hidden in the koa brush.

To reach station from the post office in Lahaina, go northeast on

Papalaua Street for 0.2; turn left and go north on State Highway 30 for 1.25 miles to Mahikuli Street. Turn right and go 0.3 mile to crossroad; turn left and follow main cane road for 0.15 mile; take right fork and continue for 1.9 miles to power pole No. 66. Turn right and go upgrade for 0.05 mile to station on right at top of grade.

Station mark is a standard disk stamped "HANAKAOO HSS 1961 1969", cemented in a drill hole at the center of the original cross, in a 4 x 10-foot bedrock outcrop projecting 1 foot above ground. It is 165 feet east from the main road by power pole 66, 27 feet south of center line of side road, 65 feet west of east end of the brush and boulder row, 40 feet north of a 16-inch pipeline at edge of cane field, 3.8 feet south of a white witness post, and across road from east end of the koa brush patch on north side of road.

Reference mark number one is a standard disk stamped "HANAKAOO HSS 1961 NO 1 1969", cemented in a drill hole in the top of a large boulder that projects 6 feet above ground, and is 1 foot higher than station mark.

Reference mark number two is a standard disk stamped "HANAKAOO HSS 1961 NO 2 1969", cemented in a drill hole in the top of a 6-foot boulder that projects 4 feet from ground. It is at same elevation as station mark.

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

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

USCOMMA-DC 27172-P68

NAME OF STATION: HANAKAOO HGS  
 STATE: HAWAII YEAR: 1961  
 OBS BY HGS  
 SECOND ORDER

SOURCE: G- 9311

GEODETIC LATITUDE	20 55 33.058	ELEVATION	104 METERS
GEODETIC LONGITUDE	156 41 00.365	SCALED	FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	ϕ OR Δ OR ANGLE*
HI 2	5102	494,277.15	215,201.07	- 0 00 22

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

TOW STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH (From south)	CODE
WAIKULU 2	227° 05' 47.2"	227° 06' 09"	5102

QE 371



# HORIZONTAL CONTROL DATA

by the  
 National Ocean Survey  
 OLD HAWAIIAN DATUM

0 201564 STATION 1038  
 HAWAII  
 LATITUDE 20° 30' TO 21° 00'  
 LONGITUDE 156° 30' TO 157° 00'  
 DIAGRAM NF 4-16 MAUI

DEPARTMENT OF COMMERCE  
 U. S. COAST AND GEODETIC SURVEY  
 FORM 555  
 Rev. Aug. 1960

## DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: **HAUA** STATE: **Hawaii** COUNTY: **Maui**  
 Island: **Lanai**  
 CHIEF OF PARTY: **Harold J. Seaborg** YEAR: **1962** Described by: **R.F. Hanson**  
 HEIGHT OF TELESCOPE ABOVE STATION MARK **1.50** METERS. 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				
		OBJECT	BEARING	DISTANCE		DIRECTION †
				feet	meters	° ' "
2	Surface-station mark, Underground-station mark					
12c	LAE	E	20.97'	6.390'	00 00 00.0	
12c	R.M. No. 1				136 34 10	
12c	R.M. No. 2	S	10.25'	3.125'	221 09 39	

Station is located about 5-1/2 miles airline east-northeast of Lanai City and 3/4 mile west-northwest of old Keomuku Village; at about 300 feet elevation, on the ridge running up along the southeast side of Kaa Gulch.  
 To reach station from the post office in Lanai City, go northerly on Highway 44 for 8.6 miles to end of paved road. Continue on Highway 44, dirt road, for 3.3 miles to old fence line crossing road. Continue on road for 2.1 miles to gate at home in trees on right, just after making a right turn. Continue on road for 0.3 mile to wide, sandy wash on right, with fence 50 yards right of road, and end of truck travel. Pack up wash, through kiawe grove, then up along flat-topped ridge to station, a distance of about 1/2 mile from road.

Station mark is a standard disk stamped "HAUA 1962", cemented in a drill hole in a boulder that projects 4 inches above ground. It is 19.3 feet south-southwest of a 3-foot cairn, about 150 yards northeast of a lone, windswept kiawe tree, and about 1/4 mile northwest of Haua Gulch.  
 Reference mark number one is a standard disk stamped "HAUA NO 1 1962", cemented in a drill hole in a boulder that projects about 1-1/2 feet above ground. It is about 2 feet higher than the station.  
 Reference mark number two is a standard disk stamped "HAUA NO 2 1962", cemented in a drill hole in a boulder that projects 1 foot above ground. It is about 2 feet higher than the station.  
 NOTE: Packing time about 20 minutes.

\* 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. 16-52000-1 U. S. GOVERNMENT PRINTING OFFICE

## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: **HAUA**  
 STATE: **HAWAII** YEAR: **1962** ORDER: **SECOND**

SOURCE: **G-13124**

GEODETIC LATITUDE: 20° 31' 24.928	ELEVATION: 75.2 METERS
GEODETIC LONGITUDE: 156° 50' 28.645	247 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ ± ANGLE °
HI 2	5102	440,378.62	190,198.91	- 0 33 44

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

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH* (From south)	CODE
LAE	137 48 55.5	137 52 40	5102

# HORIZONTAL CONTROL DATA

by the  
 National Ocean Survey  
 OLD HAWAIIAN DATUM

0 201564 STATION 1039  
 HAWAII  
 LATITUDE 20° 30' TO 21° 00'  
 LONGITUDE 156° 30' TO 157° 00'  
 DIAGRAM NF 4-16 MAUI

## NO ORIGINAL TEXT

**Hekili (Maui Island, Hawaiian Government Survey, 1879; R. W. Woodworth, 1925).**—On western coast of West Maui, in Lahaina District, land of Olowalu, about 500 meters east from the Olowalu Mill, 50 meters back from the shore line, in a dense growth of algeroba and opium trees which make it (in 1925) unoccupiable and invisible from any other station, or from along the shore line. Marked by a concrete post with cross in top set flush with surface, and surrounded by a cairn of stones.

U.S. DEPARTMENT OF COMMERCE  
 NATIONAL OCEANIC AND ATMOSPHERIC SURVEY  
 FORM 536  
 (REV. FEB. 1968)

### RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: **HEKILI**  
 ESTABLISHED BY: **Hawaiian Govt.** YEAR: **1879** STATE: **Hawaii**  
 RECOVERED BY: **C. T. Hasemeyer** YEAR: **1950** COUNTY: **Maui**

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 good condition. This station was remarked with a standard disk, set in the center of the carved cross which was the original station. High trees prevented the occupation of this station. A 24 foot pole, on the top of a 20 foot wooden tower was used as an intersection target. A new description follows.

The station is located about 600 meters southeast of Olowalu, about 500 meters east of the abandoned Olowalu Mill (abandoned in 1931) and about 50 meters north-east of Hekili Point in a dense grove of trees.

The station is a standard disk, stamped **HEKILI 1949**, set in the top of a concrete post which is about flush with the surface of the ground.

No reference marks were set at this station.

Form 536  
 (11-9-55)

### RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: **HEKILI**  
 ESTABLISHED BY: **H.G.S.** YEAR: **1879** STATE: **Hawaii**  
 RECOVERED BY: **H.J.S.** YEAR: **1961** COUNTY: **Maui**

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 by C.T.H. in 1950. The mark was found covered by dirt to a depth of about 2 in. To reach the station, go 0.5 mile south along State Highway 30 to a side road right at sign "Camp Pecusa". Turn right onto side road for 0.25 mile. The station is on the left between the road and the beach in a dense growth of kiawe trees.

\* 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: **HEKILI**  
 STATE: **HAWAII** YEAR: **1879** THIRD ORDER

SOURCE **G- 9311**

GEODETIC LATITUDE	20 48 40.199	ELEVATION	2	METERS
GEODETIC LONGITUDE	156 37 15.708	SCALED		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ (OR Δ) OF ANGLE*
HI 2	5102	515,586.32	173,549.13	+ 0 00 58

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

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

QE 396

# HORIZONTAL CONTROL DATA

by the  
 NATIONAL GEODETIC SURVEY  
 OLD HAWAIIAN DATUM

QUAD 201564 STATION 1039

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

HEKILI (continued)

FORM 524a  
 (9-18-59)

U.S. DEPARTMENT OF COMMERCE  
 COAST AND GEODETIC SURVEY

R

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: HEKILI  
 ESTABLISHED BY: HGS YEAR: 1879 STATE: Hawaii  
 RECOVERED BY: R.C. Munson YEAR: 1969 COUNTY: Maui  
 Island: Maui

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

OBJECT	BEARING	DISTANCE		DIRECTION
		FEET	METERS	
R.M. No. 1	E	10.705	3.263	275 (Compass Az.)
R.M. No. 2	W	5.533	1.687	96 " " "

NOTE: Compass azimuth (direction from true south) was measured with a Brunton Compass because trees block all lines.

Station mark was recovered in good condition; it was 14 inches below ground surface, but the old tower was still standing, marking the location. Two reference marks were established and a witness post was set. A complete description follows:

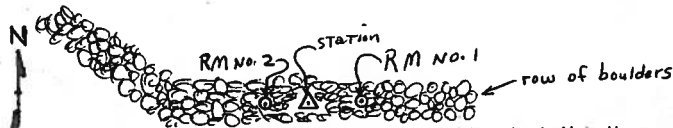
Station is located about 6 miles southeast of Lahaina, 1/4-mile south-east of Olowalu Store, and 1400 feet west-southwest of Camp Pecusa Girls' Camp, at Hekili Point, 90 feet north from seashore, in a dense kiawe grove, and in a prominent, curving row of stones about 90 feet long, 8 feet wide, and 2 feet high, which is probably an old fence. The kiawe trees are up to 75 feet high and all lines are heavily blocked..

To reach station from the post office in Wailuku, go south on State Highway 30 for 5.3 miles to junction with State Highway 31; continue on Highway 30 for 5.75 miles to sign "CAMP PECUSA" on left. Take left fork and go 0.3 mile on track road along edge of cane field to jog in road and end of truck travel. Walk southerly 100 feet to station in trees.

Station mark is a standard disk stamped "HEKILI 1950", set in the top of a 6-inch-square, concrete monument 14 inches below ground surface. It is 100 feet south-southwest from jog in cane road, 35 feet west of east end of stone row, 30 feet east of angle in stone row, and 4 feet south of a white witness post.

Reference mark number one is a standard disk stamped "HEKILI HGS 1879 NO 1 1969", cemented in a drill hole in a 2-foot boulder that projects 6 inches above ground. It is set in the stone row, 24 feet west of east end of the row and 2 feet higher than station mark.

Reference mark number two is a standard disk stamped "HEKILI HGS 1879 NO 2 1969", cemented in a drill hole in a 20-inch boulder that projects 10 inches from ground. It is set in the stone row, 24 feet east from the angle where row changes direction, and is 20 inches higher than station mark.



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

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

USCOMM-DC 27173-P89

# HORIZONTAL CONTROL DATA

by the  
 National Ocean Survey  
 OLD HAWAIIAN DATUM

0 201564 STATION 1040  
 HAWAII  
 LATITUDE 20 ° 30' TO 21 ° 00'  
 LONGITUDE 156 ° 30' TO 157 ° 00'  
 DIAGRAM NF 4-16 MAUI

DEPARTMENT OF COMMERCE  
 U. S. COAST AND GEODETIC SURVEY  
 Form 532  
 Rev. Aug. 1962

## DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: **HII DOLE** STATE: **Hawaii** COUNTY: **Maui**  
 Island: **Lanai**  
 Described by: **R.F. Hanson**

CHIEF OF PARTY: **Harold J. Seaborg** YEAR: **1962**

NOTE*	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	DIRECTION
	1.55				
			Surface-station mark, Underground-station mark		
				feet	meters
			<b>PUU MANU (HGS) 1879 1927</b>		<b>00 00 00.0</b>
			<b>R.M. No. 1</b>	<b>WSN 17.65'</b>	<b>128 37 30'</b>
			<b>R.M. No. 2</b>	<b>MNE 20.90'</b>	<b>234 54 46'</b>

Station is located about 1-1/2 miles airline southeast of Lanai City; on a rim that has a long row of 16-foot jumpers along its northeast edge and is the highest point along the southwest rim of Hii Flats.

To reach station from the post office in Lanai City, go southeast on Lanai Avenue for 0.4 mile to paved T-intersection. Continue straight ahead, on track road along left side of power line and ditch, for 0.2 mile to the city dump. Turn left and follow wide, graded road down into ravine and up other side for 0.3 mile to pineapple field on top of hill. Go left and follow road along left side of field for 0.4 mile to fork. Take right fork, crossing pineapple field and then following along right side of field, for 0.35 mile to dim right fork. Take the right fork and go 0.1 mile along low rise to station.

Station is marked by a 1-1/2-inch iron pipe that is set in the center of a 2-foot-diameter, concrete monument which is flush with the ground and has the word "HII" inscribed in the cement. It is 11.4 feet northeast of a white witness post, 27 feet northwest of a lone, 20-foot pole that is 1 foot in diameter, 10 feet northeast of edge of hill, and 75 yards east-southeast of a lone eucalyptus tree. Station elevation is about 1950 feet.

Reference mark number one is a standard disk stamped "HII NO 1 1962", braced to the top of a 1-1/2-inch iron pipe that is set in cement and projects 1 1/2 inches above ground. It is about 1-1/2 feet west-northwest of a small hummock, in bare dirt area and is at about same elevation as station mark.

Reference mark number two is a standard disk stamped "HII NO 2 1962", braced to the top of a 1-1/2-inch iron pipe that is set in cement and projects 1 1/2 inches above ground. It is about 1 foot higher than the station mark.

Form 532  
 (11-8-65)

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

**R**

NAME OF STATION: **HII DOLE**  
 ESTABLISHED BY: **H.J.S** YEAR: **1962** STATE: **Hawaii**  
 RECOVERED BY: **D.M. Whipp** YEAR: **1965** COUNTY: **Maui**  
 Island: **Lanai**

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

Station was recovered and all marks found in good condition as described in 1962. The distance and direction to the reference marks were checked and found to be correct.

## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: **HII DOLE**  
 STATE: **HAWAII** YEAR: **1962** SECOND ORDER

SOURCE: **G-13124**

GEODETIC LATITUDE	<b>20 ° 49 ' 01.359</b>	ELEVATION:	<b>598.6</b> METERS
GEODETIC LONGITUDE	<b>156 54 16.992</b>		<b>1964</b> FEET

STATE COORDINATES (feet)				
STATE & ZONE	CODE	X	Y	# OR Δ ° ANGLE*
<b>HI 2</b>	<b>5102</b>	<b>418,700.46</b>	<b>175,741.79</b>	<b>- 0 05 ' 05 "</b>

\* 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
<b>PUU MANU HGS</b>	<b>320 52 25.2</b>	<b>320 57 30</b>	<b>5102</b>

QF 363

# HORIZONTAL CONTROL DATA

by the  
 National Ocean Survey  
 OLD HAWAIIAN DATUM

0 201564 STATION 1041  
 HAWAII  
 LATITUDE 20 ° 30' TO 21 ° 00'  
 LONGITUDE 156 ° 30' TO 157 ° 00'  
 DIAGRAM NF 4-16 MAUI

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

## DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: HONOLUA STATE: Hawaii COUNTY: Maui

CHIEF OF PARTY: C.T. Husumeyer YEAR: 1950 Described by: G.B.G.  
 HEIGHT OF TELESCOPE ABOVE STATION MARK 1.180 METERS.1 HEIGHT OF LIGHT ABOVE STATION MARK 0.880 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	
pipe	Surface-station mark					0 00 00.0 ✓
	Underground-station mark					67 19 36.2 ✓
		OBJECT				343 26 49.5 ✓
		WAIHEE 1912	S	15.985 ✓	4.675 ✓	
pipe		Reference mark No.2 ✓	E	16.470 ✓	5.020 ✓	
pipe		Reference mark No.1 ✓				

Located in West Maui, Lahaina District, on the land of Honolua, about 4.5 miles in from the coast and 0.5 miles east of Honolua Stream, on the west end of a high wooded peak and slightly lower than the highest point.

Station is a standard disk set in cement in the top of a 2½ inch galvanized pipe projecting one foot above the ground. Stamped HONOLUA 1949.

Reference mark No.1 is east of the station. A standard disk cemented to the top of a 2½ inch galvanized pipe projecting 1¼ inches. Stamped HONOLUA NO 1 1949.

Reference mark No.2 is south of the station. A standard disk cemented to the top of a 2½ inch galvanized pipe projecting one foot. Stamped HONOLUA NO 2 1949.

To reach from the court house in Lahaina: go northeast on paved coast highway 13.8 miles to mile post 35, turn right and follow plantation road along left edge of pineapple field for 0.7 miles, turn left through a gate and follow old road for 0.9 miles to covered salt trough, continue south across country along edge of canyon for 1.2 miles to a fence corner in a Eucalyptus grove and E.T.T. From here follow 4im trail south along ridge, passing to right of first round hill about half way to station.

## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: HONOLUA

STATE: HAWAII

YEAR: 1950

FIRST

ORDER

SOURCE: G- 9311

GEODETTIC LATITUDE:	20 57 42.756	ELEVATION:	800.7 METERS
GEODETTIC LONGITUDE:	156 36 26.858		2627 FEET

### STATE COORDINATES (Feet)

STATE & ZONE	CODE	X	Y	θ IOR Δ α I ANGLE *
HI 2	5102	520,200.54	228,290.01	+ 0 01 16

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

TO STATION OR OBJECT	GEODETTIC AZIMUTH (From south)	PLANE AZIMUTH * (From south)	CODE
WAIHEE	283 05 38.9	283 04 23	5102

QE 35c

\* Refer to notes in manuals of triangulation and state publications of triangulation. † Direction-angle measured clockwise, referred to tidal station.  
 17 To measure meridian only, when no trigonometric leveling is being done. 16-5010-1 U. S. GOVERNMENT PRINTING OFFICE

# HORIZONTAL CONTROL DATA

by the  
 National Ocean Survey  
 OLD HAWAIIAN DATUM

Q 201564 STATION 1042  
 HAWAII  
 LATITUDE 20 °30' TO 21 °00'  
 LONGITUDE 156 °30' TO 157 °00'  
 DIAGRAM NF 4-16 MAUI

DEPARTMENT OF COMMERCE  
 U. S. COAST AND GEODETIC SURVEY  
 Form 535  
 May, Aug. 1968

## DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION HONOPU

STATE: Hawaii

COUNTY: Maui  
 Island, Lanai

CHIEF OF PARTY: H. J. Seaborg

YEAR: 1962

Described by: J. R. P.

NOTE: HEIGHT OF TELESCOPE ABOVE STATION MARK 1.30 METERS. HEIGHT OF LIGHT ABOVE STATION MARK METERS.

NOTE*	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	BEARING	DISTANCE		DIRECTION †		
				feet	meters	°	'	"
2								
	KIEI							
12c	R.M. No. 1		SSW	43.44	13.245	08	50	00.0
12a	R.M. No. 2		NW	16.44	5.011	166	58	38.6

Station is located about 4.0 miles west of Lanai City, about 3.0 miles north of the wharf, on the west coast of the island at about 850 feet elevation.

To reach the station from the Post Office in Lanai City, go north-west for 0.05 mile, turn left and go southwest for 0.15 mile to Frazier Ave.. Turn right on Frazier Ave. and go northwest for 0.15 mile to the end of paved road. Continue ahead on wide, graded road, which bears to the left for 0.8 mile to a crossroad, continue ahead on main traveled road for 2.45 miles to a fork at the end of the pineapple field. Take right fork and follow road along the edge of the field for 0.3 mile to track road on the left. Turn left and follow track road westerly down slope 0.55 mile, cross pipeline and continue for .2 mile to the station

on the right at a large rock cairn.

Station mark is a standard disk stamped, HONOPU 1962, cemented in a drill hole in red rock outcrop that projects about 4 inches, 30 feet northwest of the road, 28 feet south of the cairn, 10 feet east of a small keawe tree, and 3 feet north of a white witness post.

Reference mark No. 1 is a standard disk stamped, HONOPU NO 1 1962, cemented in a drill hole in a boulder that projects about 8 inches and about level with the station.

Reference mark No. 2 is a standard disk stamped, HONOPU NO 2 1962, cemented in a drill hole in bedrock that projects 2 inches and about 2 feet higher than the station, 12 feet southwest of the cairn.

\* 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: HONOPU

STATE: HAWAII

YEAR: 1962

SECOND ORDER

SOURCE G-13124

GEODETIC LATITUDE:	20 °50'02.232	ELEVATION:	297.1 METERS
GEODETIC LONGITUDE:	156 58 55.117		975 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	β OR Δ or ANGLE*
HI 2	5102	392,327.65	181,928.66	- 0 06 44

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

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH* (From south)	CODE
KIEI	355 49 39.9	355 56 24	5102

QF 376

# HORIZONTAL CONTROL DATA

by the  
 National Ocean Survey  
 OLD HAWAIIAN DATUM

0 201564 STATION 1043  
 HAWAII  
 LATITUDE 20 ° 30' TO 21 ° 00'  
 LONGITUDE 156 ° 30' TO 157 ° 00'  
 DIAGRAM NF 4-16 MAUI

DEPARTMENT OF COMMERCE  
 U. S. COAST AND GEODETIC SURVEY  
 Form 822  
 Rev. Aug. 1962

## DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: **HONOWAE** STATE: **Hawaii** COUNTY: **Maui**  
 Island: **Lanai** Described by: **R.F. Hanson**

CHIEF OF PARTY: **Harold J. Seaborg** YEAR: **1962**  
 Described by: **R.F. Hanson**

NOTE*	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	meters					
	1.19					
12c						00 00 00.0
						118 57 04.
12c						194 13 13

Station is located about 8 miles airline northwest of Lanai City, at Pohakuloa Point; on a sand ridge about 20 feet above sea level, overlooking the prominent black rock point.

To reach station from the post office in Lanai City, go northwest on Lanai Avenue for 0.05 mile; turn left and go 0.15 mile to crossroad. Turn right and go 0.5 mile to end of paved road. Continue ahead on wide, graded road for 0.8 mile to a crossroad. Turn right and follow main road through pineapple fields for 3.1 miles to end of fields. Continue ahead for 0.95 mile to fork. Take right fork through ironwood trees for 0.85 mile to fork. Take right fork and follow track road for 4.2 miles to fork down on coastal sand flats. Take left fork and follow sandy road westerly behind sand dunes for 1.0 mile to fork at old windmill tower. Take left fork and go 0.2 mile to end of road at fishing shack. Pack westerly on

trail along crest of low sand ridge for about 150 yards to highest knoll and station.

Station mark is a standard disk stamped "HONOWAE 1962", braced to the top of a 1-1/2-inch iron pipe that is set in cement and projects 8 inches above ground.

Reference mark number one is a standard disk stamped "HONOWAE NO 1 1962", cemented in a drill hole in a large boulder that projects 2 feet above ground on the northeast side and is flush with the ground on the southwest side. It is about 20 feet lower than the station mark.

Reference mark number two is a standard disk stamped "HONOWAE NO 2 1962", cemented in a drill hole in a large boulder that projects about 4 feet above ground. It is at same elevation as station.

## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: **HONOWAE**  
 STATE: **HAWAII** YEAR: **1962** SECOND ORDER

SOURCE: **G-13124**

GEODETIC LATITUDE	20 55 55.991	ELEVATION	0.5 METERS
GEODETIC LONGITUDE	156 59 25.845		25 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODP	X	Y	$\beta$ OR $\Delta$ OR $\theta$ ANGLE
HI 2	5102	389,484.81	217,626.11	- 0 06 57

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

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH* (From south)	CODE
BM 27 M USGS	277 02 42.6	277 09 40	5102

QF 354





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 201564 STATION 1045  
 HAWAII  
 LATITUDE 20 °30' TO 21 °00'  
 LONGITUDE 156 °30' TO 157 °00'  
 DIAGRAM NF 4-16 MAUI

NO TEXT

## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION HOUSE ON MOUNTAIN EAST GABLE  
 STATE HAWAII YEAR 1899 THIRD ORDER

SOURCE G-SP156  
 NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE	20 58 37.58	ELEVATION	METERS
GEODETIC LONGITUDE	156 32 19.01		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	$\theta$ HOR $\Delta$ $\theta$ 1 ANGLE *
HI 2	5102	543,685.93	233,835.08	+ 0 °02'45"

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

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

QD 028

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 201564 STATION 1046  
 HAWAII  
 LATITUDE 20 ° 30' TO 21 ° 00'  
 LONGITUDE 156 ° 30' TO 157 ° 00'  
 DIAGRAM NF 4-16 MAUI

## NO ORIGINAL TEXT

HUMP (Maui County, Hawaii, J.F.P., 1904; O.W.S., 1932)

It is the E most one of two small, sharp, prominent hills on the high part of Halona Point, on the E side of Kahoolawe Island.

## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: HUMP  
 STATE: HAWAII YEAR: 1904 THIRD ORDER

SOURCE: G-SP156  
 NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE:	20 ° 31' 58.51"	ELEVATION:	METERS
GEODETIC LONGITUDE:	156 ° 32' 13.84"		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	g OR Δ or ANGLE *
HI 2	5102	544,305.08	72,505.21	+ 0 02 44 "

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

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

QD 205

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 201564 STATION 1047  
 HAWAII  
 LATITUDE 20 °30' TO 21 °00'  
 LONGITUDE 156 °30' TO 157 °00'  
 DIAGRAM NF 4-16 MAUI

SEE STATION OLOWALU

## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: HYDRO SIGNAL NR OLOWALU  
 STATE: HAWAII YEAR: 1950 THIRD ORDER

SOURCE: G- 9511  
 NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE:	20 ° 42.291	ELEVATION:	2	METERS
GEODETIC LONGITUDE:	156 37 34.247	SCALED		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	$\theta$ (OR $\Delta$ ) ANGLE*
HI 2	5102	513,827.48	173,759.72	+ 0 00' 52"

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

TO STATION OR OBJECT	GEODETIC AZIMUTH (From north)	PLANE AZIMUTH* (From north)	CODE
POSITION DETERMINED BY TRAVERSE FROM STATION OLOWALU			
QE 435			

# HORIZONTAL CONTROL DATA

by the  
 National Ocean Survey  
 OLD HAWAIIAN DATUM

QUAD 201564 STATION 1048  
 HAWAII  
 LATITUDE 20 ° 30' TO 21 ° 00'  
 LONGITUDE 156 ° 30' TO 157 ° 00'  
 DIAGRAM NF 4-16 MAUI

## NO ORIGINAL TEXT

KAEA (USPLHS) (Maui County, Hawaii, J.B.M., 1914; O.W.S., 1931)  
 The station is located on the SW promontory of Lanai Island, and E of the first bight S of Kahalo Pali. It is marked by a cairn of rocks, white-washed. A tripod signal, boarded up and whitewashed, was erected over the station. The best means of approach is to land on the W side of the bight and cross the stream bed, then go up the side of the bluff, and cross to the signal which is only 1/4 mi. from the bight. No permanent station mark or reference marks were found or placed.

(U.S.L.H.S., 1933)--Abstract of letter from F.A. Edgecomb, Supt. of Lighthouses:

In connection with the preliminary survey of a site for a light station on Palaoa Point, SW coast of Lanai Island, a party of the U.S. Lighthouse Service found a 1/2-in. brass pipe set in a small deteriorated block of concrete, marking what is thought to be triangulation station KAEA.

This mark was surmounted by a new block of concrete 16- by 16- by 12-in. (high), and a new 5/8-in. brass pin set in the new concrete block directly over the old pipe. The letters "U.S.L.H.S." were stamped in the top of the new concrete block.

## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: KAEA USPLHS

STATE: HAWAII

YEAR: 1914

SECOND ORDER

SOURCE: G-13124

GEODETIC LATITUDE: 20 ° 44 ' 09.575	ELEVATION: 23.3 METERS
GEODETIC LONGITUDE: 156 57 59.512	76 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	# OR Δ OR ANGLE *
HI 2	5102	597,536.06	146,338.58	- 0 06 22 *

\* 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
PUU MANU HGS	243 38 47.6	243 45 10	5102

QF 377

(continued on next page)

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

# HORIZONTAL CONTROL DATA

by the  
NATIONAL GEODETIC SURVEY  
OLD HAWAIIAN DATUM

QUAD 201564 STATION 1048

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

KAEA USPLHS (continued)

FORM 328a  
(9-18-62)

U.S. DEPARTMENT OF COMMERCE  
COAST AND GEODETIC SURVEY

## RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: KAEA (USPLHS)  
ESTABLISHED BY: J.B.M. YEAR: 1914 STATE: Hawaii  
RECOVERED BY: H.J. Seaborg YEAR: 1962 COUNTY: Maui  
Island: Lanai

HEIGHT OF TELESCOPE ABOVE STATION MARK 1.19 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	
PUU MANU (HGS) 1879 1927				00 00 00.0
R.M. No. 1	SE	14.49	4.418	60 13 36
USLHS Mark	S	211.12	(64.350)	114 32 22
R.M. No. 2	SW	19.06	5.810	181 23 16.4

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

Station is located about 7-1/2 miles airline southwest of Lanai City, on Palaoa Point, the southernmost part of Lanai Island, on the summit of a rocky knoll of 75 feet elevation, 200 feet north of a track road.

To reach station from the intersection of Highways 44 and 441 at the south edge of Lanai City, go southerly on Highway 441 for 4.1 miles to a fork where the main road turns left, at sign "HULOPOE BAY". Continue ahead on right fork for 0.55 mile to end of paved road at rain gauge 544. Continue ahead on graded road for 1.1 miles to a main crossroad; continue ahead to a crossroad just after crossing a drainage draw, a distance of 0.4 mile. Turn left and go 0.05 mile to end of pine-apple field. Turn right and follow road westerly along south edge of field for 1.45 miles to a reverse-Y on left. Turn sharp left and follow bladed road downgrade for 0.65 mile to beginning of rocky terrain. Continue on rough road for 1.75 miles to station on knoll to right of road.

Station mark is a 1/2-inch iron pin set in the center of a 16-inch-square concrete block that projects 1 foot above ground. It is 426 feet east-northeast of the Palaoa Point Light and about 220 feet north of south shoreline.

Reference mark number one is a standard disk stamped "KAEA NO 1 1914 1962", cemented in a drill hole in bedrock that projects about 1 foot above ground. It is at same elevation as station.

Reference mark number two is a standard disk stamped "KAEA NO 2 1914 1962", cemented in a drill hole in a boulder that projects 1 foot above ground. It is about 1 foot lower than the station.

The USLHS mark is a 1/2-inch metal pin set in the top of a 15-inch-square concrete monument that projects 1 foot above ground. It is at south edge of the track road, on shoreline bluff.

## RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: KAEA (USPLHS)  
ESTABLISHED BY: J.B.M. YEAR: 1914 STATE: HAWAII BENCH MARK(S) ALSO   
RECOVERED BY: C.K. TOWNSEND YEAR: 1976 COUNTY: MAUI ISLAND:  
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: LANAI

7.5 miles southwest of Lanai City

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

Station and reference marks were recovered as described in the 1962 recovery note. Distances measured to the reference marks checked with distances in the recovery note.

# HORIZONTAL CONTROL DATA

by the  
 National Ocean Survey  
 OLD HAWAIIAN DATUM

QUAD 201564 STATION 1049  
 HAWAII  
 LATITUDE 20° 30' TO 21° 00'  
 LONGITUDE 156° 30' TO 157° 00'  
 DIAGRAM NF 4-16 MAUI

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

### DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: **KABO** STATE: **Hawaii** Country: **Kauai**

CHIEF OF PARTY: **C. T. Husemeyer** YEAR: **1950** Described by: **G. J. Hoepfel**

NOTE, Type	HEIGHT OF TELESCOPE ABOVE STATION MARK Underground-station mark	HEIGHT OF LIGHT ABOVE STATION MARK	DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION		
			OBJECT	BEARING	DIRECTION:
		DISTANCE			
		Feet	Meters		
pipe	Surface-station mark, WAIKULU 2	1.40 METERS			00 00 00
pipe	Forest Reserve Boundary Mark		22.892	6.978	108 33 13
pipe	R. L. No. 1		16.382	4.995	214 53 32
pipe	R. L. No. 2		14.385	4.385	305 32 23

The station is located on the summit of a low, wooded, knoll which lies about 8 miles northeast of Lihaina, about 4 miles east of Kahama Point, about 4 miles south southeast of Lipoa Point and about 0.2 mile west of Honolulu Stream.

To reach from the courthouse in the city of Lihaina; go northerly, on the road which leads toward Honokohau, for 10.3 miles; pass the Honokohau School and continue north for 0.4 mile; turn right, onto a dirt road, and go easterly, through the pineapple fields, for 0.8 mile; turn left and go northerly, crossing over a deep gully, for about 0.3 mile; turn right and follow along the right hand side of the pineapple fields for 1.7 miles to pasture land; pass through a board gate and go easterly, on a track road, for 0.45 mile; pass through a board gate at a small corral and follow the track road easterly for 0.7 mile to the end of track travel.

From this point back to the left, northeast, for about 0.2 mile to the summit of the hill and the station.

The station is a standard disk, stamped KABO 1950, brazed to the top of a 2½ inch iron pipe which projects about 18 inches.

Reference mark number 1 is a standard disk, stamped KABO NO 1 1950, brazed to the top of a 2½ inch iron pipe which projects about 8 inches. It is located at about the same elevation as the station.

Reference mark number 2 is a standard disk, stamped KABO NO 2 1950, brazed to the top of a 2½ inch iron pipe which projects about 8 inches. It is located at about the same elevation as the station.

The Forest Reserve Boundary Monument is the center of a 3 inch iron pipe which projects about 5 feet. A steel plate on the top is stamped FR TH. It is located about 5 feet lower than the 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. 16-58272-1 U. S. GOVERNMENT PRINTING OFFICE

(continued on next page)

### ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: **KABO**  
 STATE: **HAWAII** YEAR: **1950** FIRST ORDER

SOURCE: **G- 9311**

GEODETIC LATITUDE:	20° 58' 50.753	ELEVATION:	513.0 METERS
GEODETIC LONGITUDE:	156° 37' 18.687		1683 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ OR ANGLE *
HI 2	5102	515,287.08	233,130.95	+ 0° 00' 58"

\* 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
WAIKULU 2	59 02 21.8	59 01 24	5102

QE 356

# HORIZONTAL CONTROL DATA

by the  
 NATIONAL GEODETIC SURVEY  
 OLD HAWAIIAN DATUM

QUAD 201564

STATION 1049

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

KAEO (continued)

FORM 524a  
 (6-18-65)

U.S. DEPARTMENT OF COMMERCE  
 COAST AND GEODETIC SURVEY

## RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: **KAEO**  
 ESTABLISHED BY: **C.T. Husemeyer** YEAR: **1950** STATE: **Hawaii**  
 RECOVERED BY: **R.C. Munson** YEAR: **1969** COUNTY: **Maui**  
 Island: **Maui**

HEIGHT OF TELESCOPE ABOVE STATION MARK **1.3** METERS. HEIGHT OF LIGHT ABOVE STATION MARK METERS.

OBJECT	BEARING	DISTANCE		DIRECTION
		FEET	METERS	
DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION				
WAIKULU 2 -----1950 DISTANCE and DIRECTION-----				00 00 00.0
Forest Reserve Boundary Mark	NW	22.892	6.978	108 33 13
R.M. No. 1	E	16.382	4.995	214 53 32
R.M. No. 2	S	14.385	4.385	305 32 23
WAIKULU 2 1950 -----1969 DISTANCE and DIRECTION-----				00 00 00.0
Puukolii, Central Power Co. stack	SW			04 55 48
Forest Reserve Boundary Mark	NNW	22.720	6.929	108 30 07
R.M. No. 1	E	16.384	4.995	214 55 20
R.M. No. 2	S	14.380	4.383	305 30 43

Station mark and both RMs were recovered in good condition. The top of the Forest Reserve Boundary Mark pipe has rusted off and the plate with the letters on it was found on the ground. The difference in distance to the pipe was noted and checked; the 1969 distance is correct.

Station is located about 3 miles southeast of Honokahua and 7-1/2 miles northeast of Lahaina, on the summit of Puu Kaeo, a brushy hill of about

1683 feet elevation that lies about 1/2-mile south of the upper end of the pineapple fields

To reach station from the post office in Lahaina, go northeast on Papa-laua Street for 0.2 mile; turn left and go north on State Highway 30 for 10.3 miles to Honokohua School; continue for 0.6 mile to pineapple field on right. Turn right and follow field road along right side of pineapple fields for 3.2 miles to head of a draw. Bear right, across field, then left, for 0.25 mile to board gate on right, at rain gauge. Pack southerly along old road about 1/2-mile to top of grade where road goes down to right. Go left about 100 yards to crest of ridge, then left on old trail for 30 yards; go right, leaving trail, up fern-covered slope about 50 feet to station.

Station mark is a standard disk stamped "KAEO 1950", braced to the top of a 2-inch iron pipe that projects 14 inches from ground.

Reference mark number one is a standard disk stamped "KAEO NO 1 1950", braced to the top of a 2-inch iron pipe that projects 6 inches from ground and is 1 foot lower than station mark.

Reference mark number two is a standard disk stamped "KAEO NO 2 1950", braced to the top of a 2-inch iron pipe that projects 1 foot from ground.

Forest Reserve Boundary Mark is a 3-inch-diameter, iron pipe, with rusted, jagged top, that projects 4 feet from ground. A metal plate with letters F R T H on it, and affixed to a metal cap, was found by the pipe.

NOTE: Top of hill is covered with dense uluhi fern and some low, scattered, ohia brush, and lines are easily cleared.

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

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

USCGMA-DC 37173-P88

# HORIZONTAL CONTROL DATA

by the  
 National Ocean Survey  
 OLD HAWAIIAN DATUM

QUAD 201564 STATION 1050  
 HAWAII  
 LATITUDE 20° 30' TO 21° 00'  
 LONGITUDE 156° 30' TO 157° 00'  
 DIAGRAM NF 4-16 MAUI

DEPARTMENT OF COMMERCE  
 U. S. COAST AND GEODETIC SURVEY  
 FORM 535  
 Rev. Aug. 1968

## DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: **KAHEA** STATE: **Hawaii** COUNTY: **Maui**  
 Island: **Lanai**  
 Described by: **R.F. Hanson**

CHIEF OF PARTY: **Harold J. Seaborg** YEAR: **1962**  
 HEIGHT OF TELESCOPE ABOVE STATION MARK **1.49** METERS.1 HEIGHT OF LIGHT ABOVE STATION MARK METERS.

NOTE*	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	DISTANCE		DIRECTION: ° ' "
			feet	meters	
	HAUA				00 00 00.0
12c	R.M. No. 2	NE	8.03'	2.450'	90 10 43'
12c	R.M. No. 1	SE	14.30'	4.360'	203 58 56'

Station is located about 6-1/2 miles airline east of Lanai City and 1-1/4 miles southeast of old Keomuku Village; on a small tree-covered hill of about 48 feet elevation. It is about 200 yards southwest of the northeast coast of the island and 150 yards southwest of an old well and coconut grove, in a densely wooded area.

To reach station from the post office in Lanai City, go northerly on Highway 44 for 8.6 miles to end of paved road. Continue on dirt road, Highway 44, along coast of island for 6.5 miles to old Keomuku Village. Continue on the road for 1.0 mile to a fork. Take left fork and continue along shoreline for 0.65 mile to old well on right, and a triangle base on coconut tree, just after making a right jog. From here pack southwest through kiawe trees for about 150 yards to low hill and station.

Station mark is a standard disk stamped "KAHEA 1962", cemented in a drill hole in a 2-foot boulder that projects about 5 inches above ground. It is 21 feet east of a large, 6-foot boulder that has some slightly smaller boulders surrounding it.

Reference mark number one is a standard disk stamped "KAHEA NO 1 1962", cemented in a drill hole in a 3 x 4-foot boulder that projects about 8 inches above ground. It is about 5 feet lower than station mark.

Reference mark number two is a standard disk stamped "KAHEA NO 2 1962", cemented in a drill hole in a 3 x 5-foot boulder, about 1-1/2 feet lower than the station mark.

\* 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. 16-58888-1 U. S. GOVERNMENT PRINTING OFFICE

## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: **KAHEA**  
 STATE: **HAWAII** YEAR: **1962** SECOND ORDER

SOURCE: **G-13124**

GEODETIC LATITUDE: 20° 50' 24.426	ELEVATION: 14.2 METERS
GEODETIC LONGITUDE: 156° 49' 15.074	47 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ ± ANGLE*
HI 2	5102	447,293.43	184,087.72	- 0° 03' 18"

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

TO STATION OR OBJECT	GEODETIC AZIMUTH (From 1962)	PLANE AZIMUTH* (From 1962)	CODE
HAUA	131 24 54.0	131 28 12	5102

QF 366



# HORIZONTAL CONTROL DATA

by the  
 National Ocean Survey  
 OLD HAWAIIAN DATUM

QUAD 201564 STATION 1051  
 HAWAII  
 LATITUDE 20° 50' TO 21° 00'  
 LONGITUDE 156° 30' TO 157° 00'  
 DIAGRAM NF 4-16 MAUI

**Kaholo** (Maui County, Hawaii, F. G. Engle, 1927).—On the southwest coast of Lanai Island. Marked by 500-pound boulder, with 3/4-inch drill hole in center of equilateral cement triangle approximately 8 inches on side, and marked "C. & G. S. 1914." Reference marks, note 12c, standard reference disks in bowlders, are at the following distances and azimuths from the station: No. 1, 13.91 meters (45.6 feet), 356° 38'; No. 2, 3.08 meters (10.1 feet), 97° 42'.

**KAHOLO** (Maui County, Hawaii, F.G. Engle, 1927 ; O.W.S., 1931)  
 --Station is on the SW coast of Lanai Island. It was not visited, so top of hill was used for hydrography. No signal was over this point.

FORM 526a  
 (6-18-65)

U. S. DEPARTMENT OF COMMERCE  
 COAST AND GEODETIC SURVEY

## RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: **KAHOLO**  
 ESTABLISHED BY: **J.B.M.** YEAR: **1927** STATE: **Hawaii**  
 RECOVERED BY: **H.J. Seaborg** YEAR: **1962** COUNTY: **Maui**  
 Island: **Lanai**

HEIGHT OF TELESCOPE ABOVE STATION MARK **1.49** 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	
PUU MANU (HGS) 1879 1927				00 00 00.0
R.M. No. 1	S	45.522'	13.875'	98 53 55'
R.M. No. 2	WNW	10.068'	3.069'	200 05 58'
Lanai VOR (LNY)	NE		0.9 mile	324 19 19.9

Station mark and reference mark number two were recovered and found in good condition. Reference mark number one had been removed from the drill hole. The station was originally marked by a 1-1/2-inch-diameter drill hole at the center of a cement triangle. A new station disk and a new reference mark disk were set. A complete description follows:

Station is located about 6 miles southwest of Lanai City and 2-1/4 miles south-southeast of the wharf at Kaunalapau Harbor, on the summit of a ridge of about 1083 feet elevation, which about 1/2 mile west of a slightly higher ridge.

To reach station from the junction of Highways 44 and 441 at the south edge of Lanai City, go westerly on Highway 44 for 3.6 miles to paved left fork. Turn left and follow winding road southerly for 1.25 miles to a dirt side road right, at a hydrant on right. Turn right and go 0.4 mile to fork. Take left fork through pineapple fields for 0.5 mile to fork. Take right fork and go 0.1 mile to edge of field. Bear left and follow road along west side of fields for 0.35 mile to top of hill, 100 yards before reaching the Lanai VOR installation. Turn right and follow track road westerly across flat top of hill and down other side for 0.75 mile to fork at old gate. Take right fork and go up over ridge for 0.3 mile to gate at bottom of grade. Continue on track road for 0.3 mile to dim right fork. Take the right fork and go 0.05 mile to top of low rise and station.

Station mark is a standard disk stamped "KAHOLO 1927 1962", cemented in a drill hole at the center of a 6-inch, cement triangle on the top of a 2-foot-diameter boulder that projects 3 inches above ground. It is 4.2 feet southeast of a white witness post, 38.2 feet northwest of an old concrete stairway foundation that sets at the center of 4 concrete foundation blocks of an old tower, and 755.4 feet southwest of rain-trap No. 37.

Reference mark number one is a standard disk stamped "KAHOLO NO 1 1927 1962", cemented in the original drill hole, in a 30-inch-diameter, red rock outcrop that projects 1 foot above ground. It is 27.4 feet southwest of the southwest end of the concrete stairway foundation and about 2 feet lower than the station.

Reference mark number two is a standard disk stamped "KAHOLO 1927", cemented in a drill hole in a 30-inch-diameter, red bedrock outcrop that projects 8 inches above ground. It is about 10 inches lower than the station.

(H.J.S., 1964)--Station and two reference marks were recovered as described in good condition.

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

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

USCOMM-

158

## ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: **KAHLO**  
 STATE: **HAWAII** YEAR: **1927** THIRD ORDER

SOURCE: **G-SP156**

GEODETIC LATITUDE	20° 45' 27.363	ELEVATION	330 METERS
GEODETIC LONGITUDE	156 58 52.871	SCALED	FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	β OR Δ OR ANGLE
H I 2	5102	392,480.62	154,196.30	- 0 06 42

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

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH (From south)	CODE
PUU MANU	257 45 27.6	257 52 10	5102

QI 615