

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

Q 201561 STATION 1151
HAWAII
LATITUDE 20 ° 30' TO 21 ° 00'
LONGITUDE 156 ° 00' TO 156 ° 30'
DIAGRAM NF 4-16 MAUI

Piiholo (Maui Island, Hawaiian Government Survey, 1871).—In north central part of Maui, on summit of conspicuous hill of same name, in Hamakualoa District, 6½ miles south of the northernmost point of East Maui. Marked by granite post 3¼ feet long set in ground top level with surface and having cross cut in top. It was surrounded by four redwood posts 6 by 6 inches in size.

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
FORM 528

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: Piiholo STATE: Hawaii COUNTY: Maui
ESTABLISHED BY: Hawaiian U.S. YEAR: 1871 LOCALITY: Hamakualoa
RECOVERED BY: V.S. Seward YEAR: 1929

Detailed statement as to the fitness of the original description: Original description and mark of 1877 good. (Note concrete pier & pipe set over original mark.)

New Mark: 3/4" pipe set in concrete pier. Top of pier 5 inches below surface of ground and covered with 1 inch of soil. Over which was built a Type B Hawaii Territory Survey Triangulation Station Monument.

(Note: Four 5" x 5" x 2'0" reinforced concrete posts were built around the 12" x 12" x 2'0" concrete support for the pipe marking the station.

These posts are strong enough to protect the mark and target from Cattle should they at any future time come in contact with this station. At the present time no cattle are pastured on the top of Piiholo.)

* 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.

11-7803

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: PIIHOLU

STATE: HAWAII

YEAR: 1871

FIRST

ORDER

SOURCE: G- 9311

GEODETIC LATITUDE	20 ° 51' 19.657	ELEVATION	688.7 METERS
GEODETIC LONGITUDE	156 17 47.761		2259 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	± FOR Δ θ: ANGLE *
HI 2	5102	626,352.72	189,780.04	+ 0 ° 07' 54"

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE ± FOR Δ θ: FORMULA NEGLECTING THE SECOND TERM

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH (From south)	CODE
AHUPAI	79 16 05.5	79 08 12	5102

QE 308

(continued on next page)

PIIHOLO (continued)

HORIZONTAL CONTROL DATA

by the
NATIONAL GEODETIC SURVEY
OLD HAWAIIAN DATUM

QUAD 201561 STATION 1151
LATITUDE ° ' TO ° '
LONGITUDE ° ' TO ° '
DIAGRAM

RECOVERY DESCRIPTION OF TRIANGULATION STATION

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

NAME OF STATION: PIIHOLO

STATE: Hawaii

COUNTY: Maui

Established By: H.G.S.
CHIEF OF PARTY: C. T. Husemeyer

Year: 1871
Year: 1950

Described by: C. J. Hoepfel

HEIGHT OF TELESCOPE ABOVE STATION MARK 1.86 METERS.1

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	HEIGHT OF LIGHT ABOVE STATION MARK	METERS.
	Surface-station mark, Underground-station mark	OBJECT	BEARING	DISTANCE feet meters
11a		AHUPAI	WNW	00 00 00
11a		Makawao Spire (Saint Joseph Church)	NNE	25 26 04.6
11a		R. M. No. 1	ESE	30.779 9.382
11a		R. M. No. 2	ESE	27.378 8.345

The station is located on the summit of a high, brush covered, knoll which lies about 12 miles east southeast of Hailui, about 5 miles south of Hailui, about 1.5 miles east of the village of Makawao and about 100 yards south of a heavy growth of trees. The station hill, Piihilo, is brush and grass to the south and heavy timber to the north.

To reach from the post office at Makawao, go northerly, on the road which leads toward Hailui for 1.2 miles; turn right, at pole number 86, onto a graded road, and go southeast for 1.6 miles; turn right, pass through a board gate (Key for this gate may be obtained from the Haleakala Ranch Company) and take the higher of two dirt roads and go counter clockwise, around the north side of the hill, for 0.4 mile to

to the high ground and the station.

The station is the top and center of a 2 1/2 inch iron pipe which projects about 2 feet from the top of a concrete platform which is 5 feet square and flush with the surface of the ground. In 1929 when this station was re-marked, by the Territory Survey, the station pipe was reported as being only 3/4 inch in diameter. In addition to the station pipe, four other pipes, 2 1/2 inches in diameter and 2 feet high, are set in the cement slab 16 inches from the station.

Reference mark number 1 is a standard disk, stamped PIIHOLO NO 1 1949, set in the top of a square concrete post which projects about 8 inches. It is located about 3 feet lower than the station.

Reference mark number 2 is a standard disk, stamped PIIHOLO NO 2 1949, set in the top of a square concrete post which projects about 8 inches. It is located at about the same elevation as the station.

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

1 Direction-angle measured clockwise, referred to true station.
15-55555-1 U. S. GOVERNMENT PRINTING OFFICE

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: PIIHOLO

ESTABLISHED BY: HGS

YEAR: 1871 STATE: Hawaii

RECOVERED BY: R.C. Munson

YEAR: 1968 COUNTY: Maui
Island: Maui

HEIGHT OF TELESCOPE ABOVE STATION MARK 1.0 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
AHUPAI -----1950 DISTANCE and DIRECTION-----			00 00 00.0
Makawao Spire (St. Joseph Church)	WNW	25 26 04.6	
R.M. No. 1	NNE	30.779 9.382	113 39 04
R.M. No. 2	ESE	27.378 8.345	216 23 23
AHUPAI 1950 -----1968 DISTANCE and DIRECTION-----			00 00 00.0
Makawao, St. Joseph Church, spire	WNW	25 26 04.8	
Paia Sugar Mill Stack	NE	45 42 42.0	
R.M. No. 1	NNE	30.743 9.371	113 39 40
R.M. No. 2	ESE	27.365 8.342	216 23 33

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

Station is located about 1 mile east of Makawao and 1/4-mile west of Kailiili Road, on a prominent hill of about 2260 feet elevation that has a heavy cover of tall trees on the northern part.

To reach station from the post office in Makawao, go north on State Highway 40 for 1.1 miles to crossroad in Kokomo. Turn right on Kailiili Rd. and go 0.4 mile to locked gate. Pass through gate and continue for 0.45 mile to second gate. Pass through gate and continue for 0.5 mile to board gate on right near base of hill, and end of truck travel. Pack westerly, up around right side of hill, on old bulldozed grade for about 0.3 mile to top and station.

Station is marked by a 2-1/2-inch, iron pipe in the center of a 12 x 12-inch concrete pier 2 feet high, at the center of a 6-foot-square concrete platform flush with ground. There are 4 iron pipes 2 feet high, embedded in the concrete platform in a square around the center. Station is in the brushy area of the hilltop, about 75 yards southwest of the tall trees.

Reference mark number one is a standard disk stamped "PIIHOLO NO 1 1949", set in the top of an 8-inch-square, concrete monument that projects 4 inches from ground. It is 5 feet lower than top of station pipe.

Reference mark number two is a standard disk stamped "PIIHOLO NO 2 1949", set in the top of an 8-inch-square, concrete monument projecting 4 inches from ground. It is 3 feet lower than top of station pipe.

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

Q 201561 STATION 1152
HAWAII
LATITUDE 20 ° 30' TO 21 ° 00'
LONGITUDE 156 ° 00' TO 156 ° 30'
DIAGRAM NF 4-16 MAUI

Pimoe (Maui Island, Hawaiian Government Survey, 1879).—In southeastern part of East Maui, on summit of hill of same name, in Honuaula District, in the land of Kanaio, about 3,500 feet south of the main road. Marked by copper triangle buried, with redwood post and cairn over it.

RECOVERY NOTE, TRIANGULATION STATION

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
PAPER 938
(REV. FEB. 1965)

NAME OF STATION: PIMOE

ESTABLISHED BY: Hawaiian Govt. YEAR: 1879 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:

The original station, consisting of a buried copper triangle, was recovered in good condition. A standard disk station mark was set at the exact position of the copper triangle and two reference marks were established. A new description follows.

The station is located on the summit of a prominent, red, cinder cone, named Pim Pimoe, which lies about 5.5 miles southeast of Old Hahana, about 3.5 miles east of La Perouse Bay and about 0.3 mile south of a prison camp.

To reach from the Hahana Post Office at the Ulupalakua Ranch; go south and east, on the dirt road, for 4.0 miles; turn right and go down grade for 0.5 mile to the prison camp; pass to the left hand side of the buildings and follow a track road for 0.2 mile to the northerly foot of the station hill and the end of truck travel. From this point pack south, up the steep slope for about 0.1 mile to the summit and the station.

The station is a standard disk, stamped PIMOE 1950, brazed to the top of a 2 1/2 inch iron pipe which projects about 14 inches.

Reference mark number 1 is a standard disk, stamped PIMOE NO 1 1949, set into a drill hole in a boulder which is about 8 feet in diameter and projects about 8 feet. It is located on the westerly slope of the hill about 10 feet lower than the station.

Reference mark number 2 is a standard disk, stamped PIMOE NO 2 1949, brazed to the top of a 2 1/2 inch iron pipe which projects about 2 feet. It is located on the crest of the hill at about the same elevation as the station.

NOTE	OBJECT	BEARING	FEET	METERS	DIRECTION
	PUU O KANALOA (HGS) 1950				
12c	R. M. No. 1	W	57.744	17.602	00 00 00
pipe	R. M. No. 2	N	80.372	24.498	44 52 33
	HOKUKANE (HGS)	NE	3 miles		132 04 30
					195 45 42.29

Pg
(11-B-55)

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

NAME OF STATION: PIMOE

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 and both reference marks were recovered in good condition as described by C.T.H. in 1950. The prison camp is now abandoned. The 1950 description is adequate.

(continued on next page)

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: PIMOE

STATE: HAWAII

YEAR: 1879

FIRST

ORDER

SOURCE: G- 9311

GEODETIC LATITUDE:	20 36 49.195	ELEVATION:	538.4
GEODETIC LONGITUDE:	156 22 26.142		1766
			METERS FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	B OR A OR ANGLE
HI 2	5102	600,109.07	101,904.23	+ 0 06 11

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE B OR A OR ANGLE FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH (From south)	CODE
PUU O KANALOA	80 02 44.8	79 56 34	5102

QE 322

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 201561 STATION 1152
LATITUDE ° ' TO ° '
LONGITUDE ° ' TO ° '
DIAGRAM

PIMOE (continued)

R

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: PIMOE
ESTABLISHED BY: HGS YEAR: 1879 STATE: Hawaii
RECOVERED BY: R.C. Munson YEAR: 1968 COUNTY: Maui
Island: Maui

HEIGHT OF TELESCOPE ABOVE STATION MARK 1.24 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 O KANALOA (HGS) -----1950	DISTANCE AND DIRECTION---			00 00 00.0
R.M. No. 1	W	57.744	17.602	44 52 33
R.M. No. 2	N	80.372	24.498	132 04 30
PUU O KANALOA (HTS) 1929 ---1968	DISTANCE AND DIRECTION---			00 00 00.0
R.M. No. 1	NW	57.819	17.623	44 52 32
R.M. No. 2	NE	80.327	24.483	132 04 21
Hanamania Point, Light, 1969	SW			334 39 30.4

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

Station is located in the southern part of the island, about 3 miles northeast of La Perouse Bay and 3 miles southeast of the Ulupalakua Ranch headquarters, on a prominent, bare hill of about 1766 feet elevation that lies about 1-1/2 miles south of Pillani Highway.

To reach station from the post office at Ulupalakua, go southeast on State Highway 37 for 0.9 mile to fork. Take right fork and go 2.7 miles;

take side road right and go downhill 0.6 mile to base of hill and end of truck travel. Pack up steep hill about 1/4-mile to station.

Station mark is a standard disk stamped "PIMOE 1950", set in the top of a 2-inch iron pipe that is set in concrete and projects 1 foot from ground. It is at the southerly and lower end of the hilltop. A small cairn is built over the mark.

Reference mark number one is a standard disk stamped "PIMOE NO 1 1949", cemented in a drill hole in the mauka end of a large, prominent lava rock formation about 5 feet thick, 12 feet long and projecting about 7 feet above ground on upper side. The mark is 14.2 feet lower than station mark.

Reference mark number two is a standard disk stamped "PIMOE NO 2 1949", set in the top of a 2-inch iron pipe projecting 1 foot from ground. It is on the highest point of the hilltop, about 4 feet higher than station mark.

Q0 155

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

0 201561 STATION 1155
HAWAII
LATITUDE 20 ° 30' TO 21 ° 00'
LONGITUDE 156 ° 00' TO 156 ° 30'
DIAGRAM NF 4-16 MAUI

U. S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC SURVEY
Form 535
Rev. Aug. 1968

DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: POHUE

STATE:

Hawaii COUNTY: Maui

CHIEF OF PARTY: C.T. Husemeyer

YEAR: 1950

Described by: G.B.G.

NOTE	HEIGHT OF TELESCOPE ABOVE STATION MARK	HEIGHT OF LIGHT ABOVE STATION MARK
2	1.57 METERS	1.27 METERS
2	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
		feet
		meters
		DIRECTION:
12c	MUOLEA / Reference mark No.1	NW 36.60 11.155 0 00 00.0
12a	Spire, Puuiki Catholic Church	N 0.5 miles 138 01 26.2
12a	Reference mark No.2	SSW 24.05 7.330 344 16 09.2

Located on the southeast coast of East Maui, land of Pohue, about 4 miles, airline, south southwest of Hana, and about 4.5 miles north-east of Kipahulu Village, on the west side of a grassy point about 250 feet in from the extreme end of land. 75 feet from and 20 feet above the sea, 17 paces east and inshore from a stone wall that extends to the very edge of the lava bluff.

A standard disk set in lava out crop projecting 6 inches, stamped POHUE 1950.

Reference mark No.1 is northwest of the station. A standard disk cemented in drill hole in a large lava boulder used as base stone for corner of stone wall. Square on outside and mark in extreme southeast corner. Stamped POHUE NO 1 1950.

Reference mark No.2 is south southwest of the station and 10 paces south of a stone wall. A standard disk cemented in a drill hole in solid lava. Stamped POHUE NO 2 1950.

To reach from the Post office in Hana: go southwesterly on coast highway toward Kipahulu for 4.8 miles to a point where highway passes through a cut in low rock ridge. From here pack east for about 0.15 miles to sea shore and station.

Detailed description

* 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. 10-60352-1 U. S. GOVERNMENT PRINTING OFFICE

(continued on next page)

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: POHUE

STATE: HAWAII

YEAR: 1950

FIRST

-ORDER

SOURCE: G- 9311

GEODETIC LATITUDE:	20 ° 41 ' 54.567	ELEVATION:	8.2 METERS
GEODETIC LONGITUDE:	156 00 06.357		27 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	φ OR Δ φ ANGLE °
HI 2	5102	727,256.16	133,088.86	+ 0 14 06

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

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH (From south)	CODE
AZIMUTH MARK	57 ° 45 ' 21.0	57 ° 31 ' 15 "	5102

QE 338

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 201561 STATION 1155
LATITUDE ° ' TO ° '
LONGITUDE ° ' TO ° '
DIAGRAM

POHUE (continued)

R

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: POHUE
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				
MUOLEA -----1950 DISTANCE and DIRECTION				00	00	00.0	
RM No. 1	NW	36.60	11.155	106	34	32	
RM No. 2	SSW	24.05	7.330	344	16	09	
MUOLEA 1950 -----1969 DISTANCE and DIRECTION				00	00	00.0	
Asimuth Mark	SW	Approx.	0.3 mile	13	19	29.4	
R.M. No. 1	NW	36.575	11.148	106	35	21	
R.M. No. 2	SW	24.050	7.331	344	15	49	

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

Station is located about 4 miles south of Hana, in pasture land on Popokanaloa Point, about 27 feet above sea level.

To reach station from the post office in Hana, go south on State Highway 31 for 3.8 miles to fork. Take left fork and go 0.35 mile, turn left on macadam driveway, at power pole 100, and go 0.1 mile to gate in fence

corner. From here pack southerly, down across pasture, about 1000 feet.

Station mark is a standard disk cemented in a drill hole in an 18-inch, triangular rock outcrop that projects 8 inches from ground. It is at the head of a small, naupaka-filled gully, about 75 feet from water line, at north corner of a cove, 38 yards east of a lone coconut palm, 50 yards south of a stone wall, and about 50 yards northeast of the mouth of Pukuilua Stream. There is a tripod signal, built of 2 x 4's, about 7 feet high, centered over the station.

Reference mark number one is a standard disk stamped "POHUE NO 1 1950" cemented in a drill hole in a square boulder projecting 2 feet from ground. It is in the southeast corner of a stone enclosure and 4 feet higher than station mark.

Reference mark number two is a standard disk stamped "POHUE NO 2 1950" cemented in a drill hole in a lava outcrop, 6 feet mauka from the naupaka brush line and 2 feet lower than station mark.

Asimuth mark is a standard disk stamped "POHUE 1950 1969", cemented in a drill hole in the top of a 30-inch bedrock outcrop projecting 2-1/2 feet from ground. It is down on a slope, in pasture, 95 feet southeast of center line of highway, 81.5 feet southeast of fence corner, 92 feet east of telephone pole No. 92T, and 14.3 feet southwest of the fence line.

To reach from end of truck travel, go back out to highway, turn left, and go south 0.55 mile to telephone pole 92T and azimuth mark on left.

QE 294

Q 201561 STATION 1157
HAWAII
LATITUDE 20° 30' TO 21° 00'
LONGITUDE 156° 00' TO 156° 30'
DIAGRAM NF 4-16 MAUI

NO TEXT

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION **POPOLOA**

STATE HAWAII

YEAR 1904

THIRD

ORDER

SOURCE: G-SP15c

GEODETIC LATITUDE:	20 40 05.48	ELEVATION:	METERS
GEODETIC LONGITUDE:	156 04 35.40		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ (OR Δ or ANGLE)
HI 2	5102	701,752.12	121,983.85	+ 0° 12' 30"

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

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

QD 169

Q0 169

QD 110

HORIZONTAL CONTROL DATA

DATE: 10/10/68
BY: J. L. HARRIS
FOR: J. L. HARRIS

PROJECT: J. L. HARRIS
SUBJECT: J. L. HARRIS

REVISION: 1.0
APPROVED: J. L. HARRIS
DATE: 10/10/68

1. PURPOSE AND SCOPE

2. REFERENCES

3. DEFINITIONS

4. DATA

5. CONCLUSIONS

6. RECOMMENDATIONS

7. APPENDICES

8. REFERENCES

9. CONCLUSIONS

10. RECOMMENDATIONS

11. APPENDICES

12. REFERENCES

13. CONCLUSIONS

14. RECOMMENDATIONS

15. APPENDICES

16. REFERENCES

17. CONCLUSIONS

18. RECOMMENDATIONS

19. APPENDICES

20. REFERENCES

21. CONCLUSIONS

22. RECOMMENDATIONS

23. APPENDICES

24. REFERENCES

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

Q 201561 STATION 1159
HAWAII
LATITUDE 20° 30' TO 21° 00'
LONGITUDE 156° 00' TO 156° 30'
DIAGRAM NF 4-16 MAUI

DEPARTMENT OF COMMERCE
U.S. COAST AND GEODETIC SURVEY
Form 526
Rev. Aug. 1963

DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: PUHILELE STATE: Hawaii COUNTY: Maui

CHIEF OF PARTY: C. T. Eusemeyer YEAR: 1950 Described by: C. J. Hoepfel

NOTE: HEIGHT OF TELESCOPE ABOVE STATION MARK 1.81 METERS.1 HEIGHT OF LIGHT ABOVE STATION MARK METERS.

2	OBJECT	BEARING	DISTANCE		DIRECTION
			feet	meters	
12a	MUOLEA				00 00 00
	R. M. No. 1	SW	38.308	11.676	162 23 41
	Kipahulu, Stack	W			227 36 52.0
12a	R. M. No. 2	NW	33.974	10.356	258 22 14

The station is located on Puhilele Point and lies about 1.0 east of Kipahulu, about 0.3 mile south of the Catholic Church, about 100 feet north of the sea bluff and in the easterly part of a rock wall inclosure.

The station is a standard disk, stamped PUHILELE 1950, set into a drill hole in bedrock which is flush with the surface of the ground.

Reference mark number 1 is a standard disk, stamped PUHILELE NO 1 1950, set into a drill hole in bedrock which projects about 10 inches. It is located 25 feet east of a rock wall and about 4 feet lower than the station.

Reference mark number 2 is a standard disk, stamped PUHILELE NO 2

1950, set into a drill hole in bedrock which projects about 10 inches. It is located at about the same elevation as the station.

Form 526a
(9-5-58)

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

Name of Station: PUHILELE

Established By: C.T.H. Year: 1950 State: HAWAII
Recovered By: H. J. Seaborg Year: 1963 County: MAUI

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

Station was recovered in good condition. The following should be added to the description:

To reach the station from the Catholic Church in Kipahulu, proceed east along state highway for about 0.5 miles to a locked gate at the head of Kukui Bay. (The key to this gate can be obtained from the repair sheds of the Upper Kipahulu Ranch, located in Kipahulu) Thence proceed along the western shore of Kukui Bay for about 0.4 miles over pasture roads to the first group of broken rock walls and the station.

(continued on next page)

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: PUHILELE
STATE: HAWAII YEAR: 1950 FIRST ORDER

SOURCE: G- 9311

GEODETIC LATITUDE:	20 59 22.726	ELEVATION:	23.9 METERS
GEODETIC LONGITUDE:	156 03 00.347		78 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ or ANGLE
HI 2	5102	710,795.00	117,703.81	+ 0 13 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
KIPAHULU CATHOLIC CHURCH	140 41 46.1	140 28 43	5102

QE 345

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 201561 STATION 1159
LATITUDE ° ' TO ° '
LONGITUDE ° ' TO ° '
DIAGRAM

PUHILELE (continued)

R

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: PUHILELE
ESTABLISHED BY: C.T. Hugemeyer YEAR: 1950 STATE: Hawaii
RECOVERED BY: R.C. Munson YEAR: 1968 COUNTY: Maui
Island: Maui

15810.

HEIGHT OF TELESCOPE ABOVE STATION MARK 1.55 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		
KIPAHULU CATHOLIC CHURCH -----1950		DISTANCE and	DIRECTION	00	00 00.0
R.M. No. 1	SW	38.308	11.676	249	33 12
Kipahulu, Old Sugar Mill, stack	W			314	46 22.5
R.M. No. 2	NW	33.974	10.356	343	31 45
KIPAHULU CATHOLIC CHURCH 1950--1968		DISTANCE and	DIRECTION	00	00 00.0
R.M. No. 1	SW	38.230	11.653	249	31 46
Kipahulu, Old Sugar Mill, stack	W			314	46 20.9
R.M. No. 2	NW	33.970	10.354	343	31 21

Station was recovered and all marks found in good condition. A discrepancy of .023 meter was noted in the distance to RM No. 1; it was double-checked and found that the 1950 distance was apparently slope distance. A complete description follows:

Station is located about 8 miles southwest of Hana, 1/2-mile east of the Kipahulu Ranch Headquarters, and about 1150 feet southeast of a cemetery and the Kanekaula Heiau, on a bare knoll surrounded by a stone fence

about 80 feet square.

To reach station from the post office at Ulupalakua, go southeast on State Highway 37 for 0.85 mile; take right fork and follow State Highway 31 for 26.9 miles to the Kipahulu Ranch Headquarters on left. Continue on highway for 0.65 mile to locked board gate on right. (Key was obtained at the Ranch Headquarters). Pass through gate and follow track road down slope for 0.45 mile to station on left, where road passes through gap in stone wall.

Station mark is a standard disk stamped "PUHILELE 1950", cemented in a drill hole in bedrock flush with ground. It is 20 feet southwest of the northeast stone fence and 64 feet southeast of center line of road. Reference mark number one is a standard disk stamped "PUHILELE NO 1 1950", cemented in a drill hole in lava bedrock that projects 6 inches from ground. It is 2.9 feet lower than station mark.

Reference mark number two is a standard disk stamped "PUHILELE NO 2 1950", cemented in a drill hole in a bedrock ledge that projects 6 inches from ground. It is 30 feet southeast of center line of road and 10 inches higher than station mark.

Station KIPAHULU CATHOLIC CHURCH 1950 will serve as the azimuth mark. It is 1151 feet northwest of station.

QB 040

STANDARD CONTRACT

1. Name of the
Contractor
2. Address
3. City
4. State

1. Name of the
Contractor
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Contractor
2. Address
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4. State

1. Name of the
Contractor
2. Address
3. City
4. State

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM,

201561 STATION 1161
HAWAII
LATITUDE 20° 30' TO 21° 00'
LONGITUDE 156° 00' TO 156° 30'
DIAGRAM NF 4-16 MAUI

DEPARTMENT OF COMMERCE
U.S. COAST AND GEODETIC SURVEY
Form 532
Rev. Aug. 1968

DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: PULEHU STATE: Hawaii COUNTY: Maui

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

NOTE: HEIGHT OF TELESCOPE ABOVE STATION MARK 1.36 METERS. HEIGHT OF LIGHT ABOVE STATION MARK 1.06 METERS.

PIPE	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	
12c	Puu O Kali MGS 1950		SW	7 miles		0 00 00.0
	C.A.A. Sta. WYTH Cupola		N	21.722	6.621	70 30 18.80
12c	R.M. No. 2		NW	3.5 miles		120 13 25.5
	Maui Airport Landing Beacon		SE	19.379	5.907	145 26 20.08
	R.M. No. 1					328 35 13.5

Located in southern Maui, Wailuku District, about 7 miles southeast of Kahului about 3 miles east southeast of Kihel and about 0.4 miles south of a plantation dirt road, on summit of a low knoll in open pasture land.

Station is a standard disk cemented in the top of a 4 inch iron pipe which is set in concrete and projects about 2 feet. Stamped PULEHU 1949.

Reference mark No. 1 is southeast of the station. A standard disk set in a boulder projecting about 1 foot, stamped PULEHU NO 1 1949.

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

To reach from the Post Office at Kihel: go southeast for about 200 feet then turn left and go northeast on a graded road for 3.0 miles, turn right and go easterly on a field road for 0.5 miles, cross over irrigation ditch, turn left and go northerly for 0.25 miles, turn right and follow dim track road for 0.2 miles to a gate. Enter pasture, turn right and go across country for 0.5 miles to top of ridge and station.

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: PULEHU
STATE: HAWAII YEAR: 1950 FIRST ORDER

SOURCE: G- 9311

GEODETIC LATITUDE:	20° 48' 01.960	ELEVATION:	158.3 METERS
GEODETIC LONGITUDE:	156° 25' 16.539		519 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ OR ANGLE
HI 2	5102	583,819.68	169,752.72	+ 0° 05' 14"

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

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH (From south)	CODE
PUU O KALI	335 44 30.3	335 39 16	5102

QE 300

* 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.)

(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 201561 STATION 1161
LATITUDE ° ' TO ° '
LONGITUDE ° ' TO ° '
DIAGRAM

PULEHU (continued)

R

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: PULEHU
ESTABLISHED BY: C.T. Husemeyer YEAR: 1950 STATE: Hawaii
RECOVERED BY: R.C. Munson YEAR: 1968 COUNTY: Maui
Island: Maui

RECOVERED BY: [REDACTED] ISLAND: MAUI

HEIGHT OF TELESCOPE ABOVE STATION MARK		HEIGHT OF LIGHT ABOVE STATION MARK		METERS.	
1.5 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 O KALI (HGS) -----1950 DISTANCE and DIRECTION-----				00	00 00.0
R.M. No. 2	W	21.722	6.621	120	13 25.5
R.M. No. 1	SE	19.379	5.907	328	35 13.5
PUU O KALI (HGS) 1879 ---1968 DISTANCE and DIRECTION-----				00	00 00.0
R.M. No. 2	W	21.732	6.624	120	17 03
Puu Nene, Puu Nene Sugar Mill, south stack, 1912	NNW			178	50 21.2
R.M. No. 1	ESE	19.341	5.896	328	32 51

Station was recovered and all marks found in good condition. The track road is now blocked by a fence line at edge of cane field and the station cannot be driven. A complete description follows:
Station is located about 5 miles south-southeast of Puunene, 3 miles east-northeast of the post office at Kihai, 1250 feet east of a fence line, and about 2000 feet east of the east edge of cane fields and another fence

line bordering the field; on a flat, grassy rise in pastureland, at about 519 feet elevation.

To reach station from the post office at Kihai, go east and northeast on Upper Kihai Road for 0.8 mile to diagonal crossroad; bear right and go 2.25 miles to a T-road right. Turn right and go 0.5 mile to T-junction, just after crossing canal. Turn right and go south 0.3 mile to fork. Take left fork and go 0.15 mile to end of truck travel by an arterial canal junction on right. Pack east, up through trees, for about 2000 feet to station.

Station mark is a standard disk stamped "PULEHU 1949", set in cement in the top of a 3-inch iron pipe set in concrete and projecting 14 inches from ground. There is a large cairn with a target pole, centered over the mark.

Reference mark number one is a standard disk stamped "PULEHU NO 1 1949", cemented in a drill hole in a rounded bedrock outcrop projecting 8 inches from ground, and 16 inches lower than station mark.

Reference mark number two is a standard disk stamped "PULEHU NO 2 1949", cemented in a drill hole in bedrock flush with ground, and 3 feet lower than station mark.

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 201501 STATION 1163
HAWAII
LATITUDE 20 ° 30' TO 21 ° 00'
LONGITUDE 156 ° 00' TO 156 ° 30'
DIAGRAM NF 4-16 MAUI

NO TEXT

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: PUU HINA1
STATE: HAWAII YEAR: 1912 THIRD ORDER

SOURCE: G-SP156

GEODETIC LATITUDE:	20 ° 47' 13.79	ELEVATION:	METERS
GEODETIC LONGITUDE:	156 03 41.62		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ FOR Δ 01 ANGLE *
HI 2	5102	706,697.68	165,216.46	+ 0 ° 12' 53"

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

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

QD 101

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

0 201561 STATION 1164
HAWAII
LATITUDE 20 °30' TO 21 °00'
LONGITUDE 156 °00' TO 156 °30'
DIAGRAM NF 4-16 MAUI

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
Form 535
Rev. Aug. 1963

DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: PUU HINAI 2 STATE: Hawaii COUNTY: Maui

CHIEF OF PARTY: C.T. Husemeyer YEAR: 1950 Described by: G.B.G.
NOTE: HEIGHT OF TELESCOPE ABOVE STATION MARK 1.43 METERS. HEIGHT OF LIGHT ABOVE STATION MARK 1.13 METERS.
pipe Surface station mark DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION
pipe Underground station mark

OBJECT	BEARING	DISTANCE		DIRECTION
		Feet	Meters	
KAPAUOLA				
pipe Reference Mark No.1	NW	21.80	6.647	0 00 00.0
pipe Reference Mark No.2	SE	20.17	6.147	60 56 18- 199 09 00-✓

Located near the east end of East Maui, in land of Makapuu, on the south end of a low hill of the same name, about 5 miles, airline, west of Hana, about 2 miles in from the coast and 3/4 mile south of the highway.

Station is a standard disk cemented in a 2 inch galvanized iron pipe set in concrete projecting 8 inches. Stamped PUU HINAI 2 1950. Reference mark No.1 is northwest of the station. A standard disk cemented to the top of a 2 inch galvanized iron pipe projecting 12 inches. Stamped PUU HINAI 2 NO 1 1950.

Reference mark No.2 is southeast of the station. A standard disk cemented to the top of a 2 inch galvanized iron pipe projecting 12 inches. Stamped PUU HINAI 2 NO 2 1950.

To reach from the Post Office at Hana: go westerly on coast highway for miles. Turn left through a wire gate just after crossing a concrete bridge and follow track road south for 1.2 miles to a fence. From here pack south to top of hill and station.

OFB 526
11-8-55)

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

NAME OF STATION: PUU HINAI 2
ESTABLISHED BY: C.T.H. YEAR: 1950 STATE: Hawaii
RECOVERED BY: H.J.S. YEAR: 1961 COUNTY: Maui

Detailed statement as to the status of the original description; including marks found, stampings, changes made, and other pertinent facts:
The station and both reference marks were recovered in good condition in an area of heavy guava brush. The hill on which the station is located is prominent but the lines out of the station are blocked.

To reach the station from the intersection of the Hana highway and the road to Hana Airport, go west along the Hana Highway for 3.2 miles to a banana farm and an aluminum shed on the left (south). Turn left through gate and follow road through banana farm for 1.2 miles to a fence and the end of truck travel. Leave truck and pack southeasterly up old volcanic cone to level top and station. An abandoned pillbox is on the hill about 100 feet lower than the station. Care should be exercised in climbing the hill as the heavy brush conceals many pitfalls.

(11-8-55)

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: PUU HINAI 2
ESTABLISHED BY: C.T.H. YEAR: 1950 STATE: Hawaii
RECOVERED BY: H.R.P. YEAR: 1963 COUNTY: Maui

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

Station mark recovered in good condition as described. The reference marks were not searched for. The top of hill is overgrown with dense brush and grass. The mark projects only a few inches and is near the northeasterly edge of hill.

(continued on next page)

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: PUU HINAI 2

STATE: HAWAII

YEAR: 1950

FIRST

ORDER

SOURCE: G- 9311

GEODETIC LATITUDE:	20 °47' 14.012	ELEVATION:	502.0 METERS
GEODETIC LONGITUDE:	156 03 41.675		1647 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	8 OR Δ 8' ANGLE
HI 2	5102	706,692.38	165,238.84	+ 0 °12' 55"

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE 8 OR Δ 8' FORMULA NEGLECTING THE SECOND TERM

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH (From south)	CODE
KAPAUOLA	114 18 34.8	114 05 42	5102

QE 327

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 201561

STATION 1164

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

PUU HINAI 2 (continued)

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: PUU HINAI 2
ESTABLISHED BY: C.T. Husemeyer YEAR: 1950 STATE: Hawaii BENCH MARK(S) ALSO ☐
RECOVERED BY: R.C. Munson YEAR: 1968 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:

Station was recovered and all marks found in good condition. The station becomes blocked by high brush in a short time. Lines from north-west around to southeast were cleared at this time and a target put up. A complete description follows:

Station is located about 5 miles west-northwest of Hana and 1 mile south of State Highway 36, on the north end of the top of Puu Hinai, a sharp, brush and tree covered hill of about 1647 feet elevation.

To reach station from the post office in Hana, go north and west on State Highway 36 for 3.4 miles to junction with the airport road. Continue ahead for 3.0 miles to metal house on left. Pass through gate on left, and follow track road for 0.75 mile to end of road near base of hill. Pack up through trees, around right side of hill, then bear left and go up more gradual climb to top and station. About a 1-1/2-hr. pack due to dense brush.

Station mark is a standard disk stamped PUU HINAI 2 1950, set in the top of a 2-inch iron pipe set in concrete and projecting 8 inches.

Reference mark number one is a standard disk stamped "PUU HINAI 2 NO 1 1950", set in the top of a 2-inch iron pipe projecting 1 foot from ground, and 30 inches lower than station mark. It is 6.650 m (21.817 ft.) from station, in azimuth 175° 14' 53".

Reference mark number two is a standard disk stamped "PUU HINAI 2 NO 2 1950", set in the top of a 2-inch iron pipe projecting 8 inches from ground, and 14 inches lower than station mark. It is 6.141 m, (20.143 ft.) from station, in azimuth 313° 27' 35".

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

Q 201561 STATION 1165
HAWAII
LATITUDE 20 °30' TO 21 °00'
LONGITUDE 156 °00' TO 156 °30'
DIAGRAM NF 4-16 MAUI

Puu Io (Maui Island, Hawaiian Government Survey, 1879).—In the southwest part of East Maui, Kula District, on the summit of the hill Puu Io, near its west end and just below the government road in the land of Paeehu. Marked by a concrete post.

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

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: Puu Io STATE: Hawaii COUNTY: Maui
ESTABLISHED BY: Hawaiian C.S. YEAR: 1879 LOCALITY: Kula
RECOVERED BY: V.S. Seward YEAR: 1929

Detailed statement as to the fitness of the original description:

Note: Govt. Road mentioned is the old Govt. Road and is about one mile mauka of present Govt. Road.

Mark Found. Concrete post.

New Mark: Standard bronze tablet set in a concrete pier, over which was built a Type A Hawaii Territory Survey Triangulation Station Monument.

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

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: PUU IO
ESTABLISHED BY: H.G.S. YEAR: 1879 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 was recovered in good condition.
To reach from the Waiakoa Post Office: go southwesterly on paved road for 4.4 miles, take left fork as per sign Keokea & Kula San. and go about 200 feet, then take right fork and follow red dirt road westerly for 2.8 miles to gate at large barn. Take right fork and continue ahead for 0.4 miles to gate on right. Turn right through gate then go right about 0.2 miles to top of hill and station.

OBJECT	DISTANCE	DIRECTION
PUU O KALI (HGS) 1950	Miles	0 00 00.0
Kula Sanitarium, Flag staff	3	43 04 30.5
Radio Range Sta. Center mast	5	238 38 10.8

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: PUU IO
ESTABLISHED BY: H.G.S. YEAR: 1879 STATE: Hawaii
RECOVERED BY: W.R. Porter 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 as previously described by C.T. Husemeyer in 1950 and found to be in good condition. A modified description follows:

To reach the station from the Waiakoa Post Office, go southwesterly on Hawaii Highway 37 for 4.4 miles to a fork, take the left fork as per sign "Keokea and Kula Sanatorium" and go about 200 feet to a side road right. Turn right (westerly) for 1.7 miles to a gate, continue through the gate for 0.5 miles to another gate, continue through gate for 0.5 miles to a gate at the ruins of an old barn on the left. Only the foundations of the barn remain standing. Continue ahead for 0.2 miles to station hill and the end of truck travel. Station is on the western end of the hill and about 10 feet below the highest point.

(continued on next page)

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

COMB-DC 34314

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: PUU IO

STATE: HAWAII

YEAR: 1879

FIRST

ORDER

SOURCE: G- 9311

GEODETIC LATITUDE	20 40 31.995	ELEVATION	866.2 METERS
GEODETIC LONGITUDE	156 23 09.087		2842 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	APPROX. ANGLE
HI 2	5102	555,950.73	124,375.21	+ 0 05 57

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

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH (From south)	CODE
PUU OLAI	59 48 03.7	59 42 07	5102

QE 315

HORIZONTAL CONTROL DATA

by the
NATIONAL GEODETIC SURVEY
OLD HAWAIIAN DATUM

QUAD 201561 STATION 1165

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

PUU IO (continued)

OBJECT	DISTANCE (approx)	DIRECTION
PUU OLAI 1879	4.3 miles	0° 00' 00.0"
McGregor Point Light 1950	10 miles	68 50 23.23
PUU O KALI 1879	3.5 miles	116 59 54.21
RAYOLAI 1961	4.3 miles	354 13 53.00

FORM 526a
(5-15-65)

U.S. DEPARTMENT OF COMMERCE
COAST AND GEODETIC SURVEY

R

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: PUU IO
ESTABLISHED BY: HGS YEAR: 1879 STATE: Hawaii
RECOVERED BY: R.C. Munson YEAR: 1968 COUNTY: Maui
Island: Maui

HEIGHT OF TELESCOPE ABOVE STATION MARK 2.3 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 OLAI (HGS) 1879	-----	1965	DISTANCE	and DIRECTION-----
RM 1	E	5.41	1.650	215 23 04
PUU OLAI (HGS) 1879	-----	1968	DISTANCE	and DIRECTION-----
Molokini Lighthouse, 1950	SW			00 00 00.0
Koolea, Kula Sanatorium, light- ning rod	NE			09 01 25.0
R.M. No. 1	E	5.422	1.653	160 04 25.1
				215 31 42

Station mark and RM No. 1 were recovered in good condition. A complete description follows:

Station is located about 2-1/2 miles southwest of the Kula Sanatorium, 2 miles northeast of the Ulupalakua Ranch headquarters and post office, in pasture land of the Ulupalakua Ranch, on the summit of Puu Io, a bare hill of about 2842 feet elevation.

To reach station from the post office at Ulupalakua Ranch headquarters, go north on State Highway 37 for 1.1 miles to junction with

State Highway 31; continue north for 0.5 mile to board gate on right. Pass through gate and follow track road upgrade for 0.75 mile; take left fork and go 0.3 mile to wire gate at large tree row. Pass through gate and go left on track road along fence for 0.25 mile to end of truck travel, opposite station hill on left. Pack west about 700 feet to station.

Station mark is an HTS disk, unstamped, set in concrete 4 inches below ground level, on the flat west end of the hilltop. There is a Type A signal centered over the mark, with the 6-foot-square, concrete platform 2 feet above ground, and a red and white metal target extending 8 feet above the platform.

Reference mark number one is a standard disk stamped "PUU IO NO 1 1929", set in a mass of concrete about 16 inches in diameter, flush with ground. It is 14 inches northeast of the southeast corner of the platform and hidden by tall grass.

NOTE: Key for locked gate was obtained from the Ulupalakua Ranch office.

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

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

USCGM-DC 27179-P88

FORM 526a
(5-15-65)

U.S. DEPARTMENT OF COMMERCE
COAST AND GEODETIC SURVEY

R

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: PUU IO
ESTABLISHED BY: H.G.S. YEAR: 1879 STATE: Hawaii
RECOVERED BY: L.F. Woodcock YEAR: 1965 COUNTY: 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	
PUU OLAI	SW	4.9 miles		000 00 00
RM 1	E	5.41	1.650	215 23 04

Station was recovered as described in good condition. A reference mark was set at the station. Reference mark is a standard disk stamped PUU IO NO 1 1929, set in a concrete filled 2" iron pipe driven flush with the ground about one foot from the edge of the concrete base. Reference mark was used as a shoran station in 1965.

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 201561 STATION 1166
HAWAII
LATITUDE 20 °30' TO 21 °00'
LONGITUDE 156 °00' TO 156 °30'
DIAGRAM NF 4-16 MAUI

SEE STATION PUU IO

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: PUU IO RM 1

STATE HAWAII

YEAR 1965

FIRST

-ORDER

SOURCE G-12664
NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE:	20 °40 '31.990	ELEVATION:	866	METERS
GEODETIC LONGITUDE:	156 23 09.030	SCALED		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	ϕ OR Δ ϕ ANGLE *
HI 2	5102	595,996.14	124,374.72	+ 0 °05 '37 "

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

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

POSITION DETERMINED BY TRAVERSE FROM STATION PUU IO

QF 575

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

0 201561 STATION 1167
HAWAII
LATITUDE 20 °30' TO 21 °00'
LONGITUDE 156 °00' TO 156 °30'
DIAGRAM NF 4-16 MAUI

Puu Kanaloa (Maui Island, Hawaiian Government Survey, 1879).—On summit of hill of same name, in southwestern part of East Maui, in Honuula District, in land of Keoneolo, and near the shore. Marked by a copper triangle, buried, with redwood post and cairn of stones above. Searched for and not found in 1904.

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
Form 510
(Rev. Feb. 1965)

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: Puu Kanaloa STATE: Hawaii COUNTY: Maui
ESTABLISHED BY: H.G.S. YEAR: 1879 LOCALITY: Honuula
RECOVERED BY: V.S.Seward YEAR: 1929

Detailed statement as to the fitness of the original description:

Present Mark: Type B Hawaii Territory Survey Triangulation Station Monument.

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
Form 510
(Rev. Feb. 1965)

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: PUU KANALOA, STATE: Hawaii
ESTABLISHED BY: Hawaiian Govt., YEAR: 1879
RECOVERED BY: C. T. Ihsemeyer 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 original station, consisting of a copper triangle and a redwood post was not recovered. The station name should be PUU O KANALO. See description for PUU O KANALO for a complete history of this station. One day was spent in searching for the original station.

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

10-00000-0

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: PUU KANALO

STATE: HAWAII

YEAR: 1879

SECOND

—ORDER

SOURCE: G-SP156

GEODETIC LATITUDE:	20 36 21.010	ELEVATION:	65	METERS
GEODETIC LONGITUDE:	156 25 15.878	SCALED		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ OR ANGLE *
HI 2	5102	583,989.55	99,034.01	+ 0 05 11 "

* 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

Q 201561 STATION 1168
HAWAII
LATITUDE 20 °30' TO 21 °00'
LONGITUDE 156 °00' TO 156 °30'
DIAGRAM
NF 4-16 MAUI

Puu Kanaloa (Maui Island, J. F. Pratt, 1904).—On southwestern coast of Maui, on the highest point of the southern crest of the conspicuous hill known as Puu o Kanaloa just north of the native settlement in La Perouse Bay. Not identical with the Hawaiian Government Survey station which could not be recovered. Marked by a bottle buried about 16 inches below surface of ground.

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: Puu Kanaloa STATE: Hawaii COUNTY: Maui
ESTABLISHED BY: J.F. Pratt YEAR: 1904 LOCALITY: southwest coast Maui.
RECOVERED BY: * O.W. Swainson YEAR: 1931

Detailed statement as to the fitness of the original description:

Station was not visited, but Hawn. Govt. signal could be seen.

* 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.

11-5703

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

Q 201561 STATION 1168
HAWAII
LATITUDE 20 °30' TO 21 °00'
LONGITUDE 156 °00' TO 156 °30'
DIAGRAM
NF 4-16 MAUI

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: PUU KANALOA

STATE HAWAII

YEAR 1904

THIRD

ORDER

SOURCE: G-SP156

GEODETTIC LATITUDE	20 36 21.022	ELEVATION	65	METERS
GEODETTIC LONGITUDE	156 25 15.975	SCALED		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ OR ANGLE
HI 2	5102	583,980.34	99,035.21	+ 0 05 11

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

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

QD 145

QD 145

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 201561 STATION 1169
HAWAII
LATITUDE 20 ° 30' TO 21 ° 00'
LONGITUDE 156 ° 00' TO 156 ° 30'
DIAGRAM NF 4-16 MAUI

NO ORIGINAL TEXT

RECOVERY NOTE, TRIANGULATION STATION INTERSECTION

NAME OF STATION: Puu Keonehunehune, summit, steel tank
ESTABLISHED BY: C.T. Husemeyer YEAR: 1950 STATE: Hawaii BENCH MARK(S) ALSO ☐
RECOVERED BY: R.C. Munson YEAR: 1968 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:

Station was identified by angle. Located about 2-1/4 miles east of Ulupalakua, on a bare hill of about 4383 feet elevation. Station is a large, prominent, silver tank.

R

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: PUU KEONEHUNEHUNE SUMMIT TANK

STATE: HAWAII

YEAR: 1950

THIRD

-ORDER

SOURCE: G- 9311

GEODETIC LATITUDE:	20 39 11.52	ELEVATION:	METERS
GEODETIC LONGITUDE:	156 21 54.12		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ OR ANGLE *
HI 2	5102	603,124.24	116,309.24	+ 0 06 23

* 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

QE 425

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 201561 STATION 1170
HAWAII
LATITUDE 20 ° 30' TO 21 ° 00'
LONGITUDE 156 ° 00' TO 156 ° 30'
DIAGRAM NF 4-16 MAUI

NO TEXT

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: PUU KUA

STATE: HAWAII

YEAR: 1912

THIRD

ORDER

SOURCE: G-SP156

GEODETIC LATITUDE:	20 ° 50' 01.47	ELEVATION:	METERS
GEODETIC LONGITUDE:	156 19 32.64		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ or ANGLE *
HI 2	5102	616,422.36	181,869.60	+ 0 07' 17"

* 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

QD 077

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

Q 201561 STATION 1171
HAWAII
LATITUDE 20° 30' TO 21° 00'
LONGITUDE 156° 00' TO 156° 30'
DIAGRAM NF 4-16 MAUI

ADJUSTED HORIZONTAL CONTROL DATA

NO ORIGINAL TEXT

Puu Kukai (Maui Island, Hawaiian Government Survey, 1877; J. C. Gauger, 1912).—On northeast coast of East Maui, in Hamakualoa District, on summit of a brush-covered hill near the shore in Papaaea Nui, about 450 meters back from the shore. Marked by a 2-inch galvanized iron pipe set in a block of concrete.

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: PUU KUKAI
ESTABLISHED BY: HGS YEAR: 1877 STATE: Hawaii
RECOVERED BY: R.C. Munson YEAR: 1968 COUNTY: Maui
Island: Maui

HEIGHT OF TELESCOPE ABOVE STATION MARK		1.3 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				
PAUWALU (HGS) 1877	NW			00 00 00.0			
Huelo, Door of Faith Church, cupola				180 00 17.0			
HUELO 2 (HTS) 1950				202 36 15.7			

Station was recovered in good condition, however there is doubt as to its accuracy.

Located about 7-1/2 miles east-northeast of Haiku, 3/4-mile east-northeast of the village of Kailua, and 3/4-mile north-northeast of Papaaea Reservoir, on a small flat-topped hill of about 574 feet elevation.

To reach station from the intersection of Baldwin Ave. and State Highway 36 in Paia, go east on State Highway 36 for 16 miles to Kailua Village; continue ahead for 0.65 mile to side road left, on hairpin right turn of highway, just after crossing Nailililihaele Stream. Go left for 0.05 mile

to locked gate (key was obtained from the East Maui Irrigation Co. Office at Kailua Village). Pass through gate and continue for 0.5 mile to fork. Take left fork and go 0.1 mile to end of truck travel by low hill on the right. Walk northeast up through brush about 50 yards to station.

Station is marked by a 2-1/2-inch, iron pipe projecting 8 inches from the top of a 12-inch-diameter, concrete monument that projects 14 inches from ground.

Huelo, Door of Faith Church, cupola is a square, concrete block cupola, with a white, pyramidal roof, on top of which is a 4 x 4-inch white post about 3 feet tall. Cupola is on west end of a rectangular, concrete block church building.

NAME OF STATION: PUU KUKAI

STATE: HAWAII

YEAR: 1877

THIRD

—ORDER

SOURCE: G-12664
NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE: 20° 53' 51.21018	ELEVATION: 175	METERS: FEET
GEODETIC LONGITUDE: 156 12 23.66523	SCALED	

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	# 10R Δ #1 ANGLE "
HI 2	5102	657,018.98	235,150.01	+ 3 09 51 "

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

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH (From south)	CODE
PAUWALU	297 36 38.6	297 26 48	5102

POSITION DETERMINED BY TRAVERSE FROM STATION PAUWALU

QF 577

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

by the
National Ocean Survey
OLD HAWAIIAN DATUM

Q 201561 STATION 1172
HAWAII
LATITUDE 20 ° 30' TO 21 ° 00'
LONGITUDE 156 ° 00' TO 156 ° 30'
DIAGRAM NF 4-16 MAUI

Puu Mahoe (Maui Island, Hawaiian Government Survey, 1879).—In southeastern part of East Maui, in Honouaula District, on the southern summit of Puu Mahoe (Twin Hills), in Kaunuaheane, on southwestern slope of Haleakala, about 4 miles from the sea. Marked by copper triangle buried, with redwood post and cairn of stones above it.

RECOVERY NOTE, TRIANGULATION STATION

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
Form 526
(Rev. Feb. 1949)

NAME OF STATION: PUU MAHOE

ESTABLISHED BY: Hawaiian G.S. YEAR: 1879 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:

The position of the old station was determined and a thorough search was made. It appears to have been destroyed by Army installations.

* 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 recommended.

18-04194

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: PUU MAHOE

STATE: HAWAII

YEAR. 1879

SECOND

ORDER

SOURCE: G-SP156

GEODETIC LATITUDE:	20 38 06.367	ELEVATION SCALED	811	METERS FEET
GEODETIC LONGITUDE:	156 23 14.226			

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ (ON Δ S \angle ANGLE $^{\circ}$)
HI 2	5102	555,528.03	109,682.02	+ 0 $^{\circ}$ 05' 55"

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE $\theta = \arctan \frac{b}{a}$ FORMULA NEGLECTING THE SECOND TERM.

FORMULA REFLECTING THE SECOND TERM.			
TO STATION OR OBJECT	GEODETTIC AZIMUTH (From south)	PLANE AZIMUTH * (From south)	CODE

QD 103

QD 103

Q 201561 STATION 1173
HAWAII
LATITUDE 20 ° 30' TO 21 ° 00'
LONGITUDE 156 ° 00' TO 156 ° 30'
DIAGRAM NF 4-16 MAUI

ADJUSTED HORIZONTAL CONTROL DATA

NO TEXT

NAME OF STATION: PUU MAHOE 2

STATE: HAWAII

YEAR 1904

THIRD

-ORDER-

SOURCE: G-SP156

GEODETIC LATITUDE:	20 38 12.63	ELEVATION:	METERS
GEODETIC LONGITUDE:	156 23 21.74		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ OR ANGLE °
HI 2	5102	554,813.27	110,312.67	+ 0° 05' 52"

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

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

00 151

00 151

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

Q 201561 STATION 1174
HAWAII
LATITUDE 20 °30' TO 21 °00'
LONGITUDE 156 °00' TO 156 °30'
DIAGRAM NF 4-16 MAUI

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
Form 855
Rev. Aug. 1948

DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: PUU MANEONEO 2 STATE: Hawaii County: Maui

CHIEF OF PARTY: C.T. Husemeyer		YEAR: 1950		Described by: G.B.G.	
NOTE	HEIGHT OF TELESCOPE ABOVE STATION MARK	1.50 METERS	HEIGHT OF LIGHT ABOVE STATION MARK	1.20 METERS	
1A	Surface-station mark	DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION			
7B	Underground-station mark				
OBJECT		BEARING		DISTANCE	
				feet	meters
KA LAE O KA ILIO (HGS)				0 00 00	
12c	Reference Mark No.1	SE	21.86	6.667	42 18 41
12c	Reference Mark No.2	WSW	22.88	6.975	150 10 01
	Bolt	NNW	8.10	2.468	241 11 40

Located on the southeast coast of Maui, South Hana District, in land of Maneaneo, 2 miles west of the Kaupo Catholic Church, 1 mile east of the mouth of Hawelewele Gulch on a bare hill 0.2 miles inshore from a point midway between Lae O Apole and Point Lapehu, and 1/4 mile south of the present government road.

Station is a standard disk set in a square topped concrete post projecting 6 inches, stamped, PUU MANEONEO 2 1950

Reference mark No.1 is southeast of the station. A standard disk cemented in a drill hole in lava boulder projecting 18 inches, stamped PUU MANEONEO 2 1950.

Reference mark No.2 is west southwest of the station. A standard disk cemented in a drill hole in a lava boulder projecting 1 foot, stamped PUU MANEONEO 2 1950.

Old station was described as- an iron pin and cairn of stones, and 4 reference rocks marked with crosses each 5 feet distant. The cairn and three reference rocks were recovered. The iron pin could not be found.

To reach from the Post Office at Hana: go southwesterly on the coast road for about 22.5 miles. Here turn left and pick way across country for about 0.25 miles to highest point of a bare hill and station.

A square head iron bolt cemented in a drill hole in a buried boulder was placed at the approximate position as the old station as near as could be determined by the reference marks.

The underground mark is a standard disk stamped MANEONEO 2 1950. Set in an irregular mass of concrete 36 inches below the surface.

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: PUU MANEONEO 2

STATE: HAWAII

YEAR: 1950

FIRST

ORDER

SOURCE: G- 9311

GEODETIC LATITUDE	20 37 47.195	ELEVATION	108.5 METERS
GEODETIC LONGITUDE	156 10 16.855		356 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	9-OR-Δ-θ: ANGLE
HI 2	5102	669,369.40	107,923.65	+ 0 10 28

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE 9-OR-Δ-θ: FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH (From south)	CODE
AZIMUTH MARK 1968	238 04 54.8	237 54 26	5102

QE 380

* 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.)
16-58800-1 U. S. GOVERNMENT PRINTING OFFICE

(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 201561

STATION 1174

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

PUU MANEONEO 2 (continued)

R

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: PUU MANEONEO 2
ESTABLISHED BY: C.T. Husemeyer YEAR: 1950 STATE: Hawaii
RECOVERED BY: R.C. Munson YEAR: 1968 COUNTY: Maui
Island: Maui

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		DIRECTION	
		FEET	METERS		
KA LAE O KA ILIO (HGS) -----1950	DISTANCE AND DIRECTION			00	00 00.0
R.M. No. 1	SE	21.86	6.667	42	18 41
R.M. No. 2	WSW	22.88	6.975	150	10 01
Bolt	NNW	8.10	2.468	241	11 40
KA LAE O KA ILIO (HGS) 1885---1968	DISTANCE AND DIRECTION			00	00 00.0
R.M. No. 1	SE	21.771	6.636	42	18 50
R.M. No. 2	WSW	22.863	6.969	150	09 28
Iron Bolt	NNW	8.095	2.468	241	11 05
Azimuth mark	NE	(About 1/4-mile)		311	16 26.4

Station was recovered and all marks found in good condition. A discrepancy was noted in the distance to RM No. 1; it was double-checked and the 1950 distance found to be slope distance. A complete description follows:

Station is located about 3 miles west-southwest of Kaupo, on the grassy bluff overlooking Waiu Bay. It is about 900 feet south of the highway and

at about 356 feet elevation.

To reach station from the post office at Ulupalakua, go southeast on State Highway 37 for 0.85 mile; take right fork and follow Highway 31 for 17.1 miles to top of grade and end of truck travel. Pack southerly down along ridge about 1/4-mile to station.

Station mark is a standard disk stamped "PUU MANEONEO 2 1950", set in the top of an 8-inch-square, concrete monument projecting 7 inches from ground. There is a 6-foot-diameter, stone pier, 3 feet high, built around the mark.

Reference mark number one is a standard disk stamped "PUU MANEONEO 2 NO 1 1950", cemented in a drill hole in a 30-inch boulder that projects 15 inches from ground. It is 2 feet lower than station mark.

Reference mark number two is a standard disk stamped "PUU MANEONEO 2 NO 2 1950", cemented in a drill hole in a 3-foot-diameter boulder that projects 2 feet from ground. It is 0.6 foot lower than station mark.

Iron bolt is a 1-inch-square bolt head, cemented in a drill hole in the pointed tip of a grey boulder projecting 8 inches from ground, and 6 inches higher than station mark.

Azimuth mark is a standard disk stamped "PUU MANEONEO 2 1950 1968", cemented in a drill hole in a large, 5-foot boulder that projects 3-1/2 feet above ground. It is along north side of road, 75 feet west of crest where road passes over rise, 41 feet north of center line of road, about 15 feet higher than road, and 40 yards northwest, across road, from a fenced enclosure. To reach from end of truck travel, continue east on highway for 0.35 mile to mark on left.

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 201561 STATION 1175
HAWAII
LATITUDE 20 ° 30' TO 21 ° 00'
LONGITUDE 156 ° 00' TO 156 ° 30'
DIAGRAM NF 4-16 MAUI

NO TEXT

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: PUU NA IO

STATE: HAWAII

YEAR 1904

THIRD

ORDER

SOURCE: G-SP156

GEODETIC LATITUDE:	20 37' 11.57	ELEVATION:	METERS FEET
GEODETIC LONGITUDE:	156 24 26.05		

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	Bearing or Angle *
HI 2	5102	588,714.59	104,142.30	+ 0 05 25 "

* BEARING OR ANGLE

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

RECORDING THE SECOND TERM.			
TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH * (From south)	CODE

QJ 152

43 152

NO. 100-100000-100000

NO. 100-100000-100000

HORIZONTAL CONTROL DATA

Q 201561 STATION 1176
HAWAII
LATITUDE 20 °30' TO 21 °00'
LONGITUDE 156 °00' TO 156 °30'
DIAGRAM NF 4-16 MAUI

ADJUSTED HORIZONTAL CONTROL DATA

YEAR 1912

THIRD

00000

There is an oriental cemetery about the sides of the hill, Puu Nana, on which the station is located.

GEODETIC LATITUDE: 20° 54' 06.657 GEODETIC LONGITUDE: 156 23 56.369	ELEVATION: 55 METERS SCALED FEET
--	-------------------------------------

RECOVERY NOTE, TRIANGULATION STATION

Detailed statement as to the fitness of the original description: Original Description and mark not changed. Type A Hawaii Territory Survey Triangulation Station Monument built over mark found.

RECOVERY
DESCRIPTION OF TRIANGULATION STATION

STATE: Hawaii HAWAII COUNTY: Maui
YEAR: 1943 LOCALITY:

Height of signal above station mark	meters.
Height of telescope above station mark	meters.
Detailed description:	

LOCALITY:			
DISTANCES AND DIRECTIONS TO REFERENCE MARKS AND PROMINENT OBJECTS			
OBJECT	DISTANCE	DIRECTION	AZIMUTH
		D I B	G I B

NOTE OF RECOVERY

NOTE OF RECOVERY
Record description is adequate for this station. The Territory of Hawaii has, in recent years, erected an observing platform approximately 18 inches high, of concrete and masonry, over the station marker and erected a permanent target thereon. This station is being encroached upon by excavation for borrow, however, and will probably be disturbed in position completely destroyed in 1943. Station PuuNene 2 was established 175.97 feet, azimuth zero, from the original station in this survey, at a point which will probably be near the highest point of the remaining cinder cone after excavation is completed.

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: POU NENE
ESTABLISHED BY: J. C. Gauger / YEAR: 1912 / STATE: Hawaii
RECOVERED BY: C. T. Husemeyer / YEAR: 1950 / COUNTY: Maui

The original station has been destroyed due to the removal of most of the hill to provide cinders for Airport construction. A small spire was left standing and a new station, stamped POU NENE 2 1949, was established in this position.

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

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

QF 023

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

Q 201561 STATION 1177
HAWAII
LATITUDE 20° 30' TO 21° 00'
LONGITUDE 156° 00' TO 156° 30'
DIAGRAM NF 4-16 MAUI

ADJUSTED HORIZONTAL CONTROL DATA

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
Form 1025
Rev. Oct., 1953

DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: PUU NENE 2

CHIEF OF PARTY:

Surface-station mark, Note,*

Underground-station mark, Note,*

Reference mark, Note,*

Reference mark, Note,*

Azimuth mark, Note,*

Witness mark, Note,*

Height of light above station mark, meters.

Height of telescope above station mark, meters.†

Detailed description: Letter of Holmes & Narver, P. O. Box 301, Kahului, T.H., dated 2/24/43:

It will be noted that from the original station a standard brass station marker was set off on an azimuth of zero. Initial pointing was on MAUI NORTH BASE, and the published azimuth PUU NENE - NORTH BASE was accepted. Distance between the original station and the new station was carefully measured with standard steel tape, compensated for temperature, tension and slope, and found to be 175.97 feet. The station marker was stamped "PUU NENE 2, 1943" and reference marks, bronze discs, established as follows:

R. M. No. 1; On range with Station HAIKU, azimuth 250°15'43" and 56.73 feet distant.

R. M. No. 2; Azimuth zero, and stamped "AZ MARK", distance 2,080 feet.

The new station was placed on the south slope of Puu Nene Hill, at a point estimated to be near the highest point of the hill after excavation is completed. Station is 10 feet inside the boundary fence of a Japanese cemetery, 30 feet east of the northwest corner of said fence, and consists of a bronze disc set 6" above the ground in concrete four feet deep. It will see all stations used in the original net.

PUU NENE will be destroyed by excavation for new construction.

Described by

Marked by

* Refer to pages 108 and 109, Special Publication No. 125, or to pages 113 and 114, Special Publication No. 145.
† To nearest meter only, when no trigonometric leveling is being done.

NAME OF STATION PUU NENE 2

STATE HAWAII

YEAR 1943

THIRD

-ORDER

SOURCE: G- 5535

NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE	20° 54' 04".913	ELEVATION	40	METERS
GEODETIC LONGITUDE	156° 23' 56.369	SCALED		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	Bearing Angle
HI 2	5102	551,365.07	206,383.81	+ 0° 05' 44"

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

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

POSITION DETERMINED BY TRAVERSE FROM STATION PUU NENE

QF 043

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

Q 201561 STATION 1178
HAWAII
LATITUDE 20 ° 30' TO 21 ° 00'
LONGITUDE 156 ° 00' TO 156 ° 30'
DIAGRAM NF 4-16 MAUI

DEPARTMENT OF COMMERCE
U.S. COAST AND GEODETIC SURVEY
Form 536
Rev. Aug. 1968

DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: PUU NENE 2

STATE: Hawaii COUNTY: Maui

CHIEF OF PARTY: C. T. Husemeyer

YEAR: 1950

Described by: C. J. Hoepfel

NOTE*	HEIGHT OF TELESCOPE ABOVE STATION MARK	HEIGHT OF LIGHT ABOVE STATION MARK	METERS	DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION
1	Surface-station mark, Underground-station mark			
	OBJECT	BEARING	DISTANCE feet meters	DIRECTION: ° ' "
	HAU 2			00 00 00
	Azimuth mark (U.S.G.S. B.M.# 49)	W	1.1 mile	202 08 12.3
	Paia, Stack Pumping Station	NE	1.0 mile	334 24 54.2
	Paia, Stack Sugar Mill	ENE	1.5 mile	356 48 06.9

The original station has been lost due to the removal of most of the hill to provide cinders for airport construction. A small spire was left standing and the new station was established in this position. A new description follows.

The station is located on the summit of a low knoll, named Puu Nene, which lies about 5 miles east of Kahului, about 1.5 miles southeast of Spreckelsville, about 1.5 miles west southwest of Paia and about 0.3 mile north of a reservoir.

To reach the station from the post office at Kahului, go southeast and north, on the road toward Paia, for 3.8 miles; turn right and go east for 0.6 mile; (Turn left and go 0.4 mile north to reach the azimuth mark) continue straight ahead, on a graded road, for 0.3 mile; take the left hand fork and continue easterly for 0.75 mile; turn left and go north for about 150 yards to the high point of the hill and the station.

The station is a standard disk, stamped PUU NENE 2 1949, set in the top and center of a 4 inch iron pipe which projects about 2 feet. This pipe is surrounded by a 30 gallon drum filled with concrete.

No reference marks were set at this station.

The azimuth mark is a U. S. Geological Survey bronze disk, stamped 49, set into a drill hole in the northeast abutment of a concrete bridge over railroad tracks. It is located about 1.1 miles west of the station, about 200 feet south of the Spreckelsville Theatre and 12 feet east of the centerline of the concrete bridge.

Form 536
(11-8-55)

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

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: PUU NENE 2

ESTABLISHED BY: C.T.H.

YEAR: 1950 STATE: Hawaii

RECOVERED BY: H.O.F.

YEAR: 1958 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 1950. Mark was in good condition.

To reach from the P.O. in Kahului go 4.2 miles in a southeast and north direction on the Haleakala-Hana Highway; turn right and go 1.9 miles straight ahead on the Sunnyside Road; turn left and go north for about 150 yards to the high point of the hill and the station.

(continued on next page)

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

COMB-DC 34514

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: PUU NENE 2

STATE: HAWAII

YEAR: 1950

FIRST

ORDER

SOURCE: G- 9311

GEODETIC LATITUDE:	20 54 06.562	ELEVATION:	55.0 METERS
GEODETIC LONGITUDE:	156 23 56.104		180 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	# HOR Δ # V ANGLE
HI 2	5102	551,389.92	206,550.22	+ 0 05 44

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE # HOR Δ # V FORMULA NEGLECTING THE SECOND TERM

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH (From south)	CODE
AZ MK BENCH MARK 49 USGS	92 45 44.9	92 40 01	5102

QE 306

HORIZONTAL CONTROL DATA

by the
NATIONAL GEODETIC SURVEY
OLD HAWAIIAN DATUM

QUAD 201561

STATION 1178

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

PUU NENE 2 (continued)

OFB 326
11-8-55)

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

R

NAME OF STATION: PUU NENE 2
ESTABLISHED BY: C.T.H. YEAR: 1950 STATE: Hawaii
RECOVERED BY: W.R.P. YEAR: 1960 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. There is a pole signal over the mark. The azimuth mark was not searched for.

R

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: PUU NENE 2
ESTABLISHED BY: C.T. Husemeyer YEAR: 1950 STATE: Hawaii
RECOVERED BY: R.C. Munson YEAR: 1968 COUNTY: Maui
Island: Maui

HEIGHT OF TELESCOPE ABOVE STATION MARK 1.2 METERS		DISTANCE		DIRECTION	
OBJECT		FEET	METERS		
PIIHOLO (HGS) 1871				00 00 00.0	
R.M. No. 2	SW	8.989	2.740	89 21 29	
VOR, Kahului Radio OCG, 1960	W			154 36 02.4	
Paia Sugar Mill Stack	ENE			311 11 41.2	
R.M. No. 1	ESE	9.002	2.744	358 40 22	

Station mark and azimuth mark were recovered in good condition, however the azimuth mark is now blocked by trees. Two reference marks were established. A complete description follows:

Station is located about 4-1/2 miles east of Kahului, and 1-1/2 miles west-southwest of the Paia Sugar Mill, on a small, steep-sided, brown rock knoll of about 180 feet elevation, which is the only remaining high point at an old cinder quarry. It is about 50 yards southwest of a rubbish dump and is near the point at which station PUU NENE 1912 was located. To reach station from the intersection of State Highways 32 and 35 in Kahului, go east on State Highway 32 and 36 for 3.3 miles to junction with

State Highway 37 (Haleakala Highway). Continue ahead for 0.5 mile to a crossroad. Turn right and go east for 1.75 miles to side road left. Go left 0.05 mile to T-junction at quarry, then bear left along left side of quarry for 0.1 mile to end of truck travel. From here pack east about 100 yards to station.

Station mark is a standard disk stamped "PUU NENE 2 1950", set in the top of a 4-inch iron pipe filled with concrete and projecting 7 inches from the top of a 20-inch-diameter, concrete-filled, metal cylinder (section of old 30-gal. drum) projecting 16 inches above ground.

Reference mark number one is a standard disk stamped "PUU NENE 2 1950 NO 1 1968", cemented in a drill hole in bedrock projecting 6 inches above ground, and is about 4 feet lower than station mark.

Reference mark number two is a standard disk stamped "PUU NENE 2 1950 NO 2 1968", cemented in a drill hole in sloping bedrock, and is about 4-1/2 feet lower than station mark.

Azimuth mark (BM 49 USGS 1950) is a U.S. Geological Survey disk, stamped "49", cemented in a drill hole in the top of a concrete retaining wall flush with ground on north side and extending up about 20 feet from the floor of old railroad ravine. It is on east side of macadam road, 180 feet south of a walk leading in to old theater, 13 feet east of center line of road, 1 foot east of base of guard-rail of old concrete bridge that spans old railroad bed, and is at the break in the guard rail where the wing runs northeast. To reach the mark from the post office at Spreckelsville, go south on main road for 0.3 mile.

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

Q 201561 STATION 1179
HAWAII
LATITUDE 20 ° 30' TO 21 ° 00'
LONGITUDE 156 ° 00' TO 156 ° 30'
DIAGRAM NF 4-16 MAUI

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

DESCRIPTION OF TRIANGULATION INTERSECTION STATION

PUU NENE
NAME OF STATION: AIRPORT BEACON YEAR: 1950 STATE: Hawaii COUNTY: Maui
CHIEF OF PARTY: G. T. Ihsemeier

Description, including sketch of object:

The station is the center of the rotating airport beacon at the Puunene Airport.

The beacon flashes white and green and is mounted on a pole tripod which is 60.7 feet in height.

It is located on the easterly side of the runways about 200 feet north-east of the control tower.

This airport will soon be abandoned.

Form 526
(11-8-55)

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

R

NAME OF STATION: Puu Nene Airport beacon
ESTABLISHED BY: U.T.M. 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 was recovered. The airport has been abandoned and the buildings have been torn down the light has been removed from the pole structure but the tower and the base structure of the light mounting are still in place.

* 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.

COAS-DC 31314

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: PUU NENE AIRPORT BEACON

STATE: HAWAII

YEAR: 1950

THIRD

-ORDER

SOURCE: G- 9311

GEODETIC LATITUDE:	20 ° 45 ' 26.396	ELEVATION:	METERS
GEODETIC LONGITUDE:	156 27 44.967		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ °' ANGLE *
HI 2	5102	569,726.51	178,251.94	+ 0 ° 04 ' 21 "

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

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

QE 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 201561 STATION 1180
HAWAII
LATITUDE 20 ° 30' TO 21 ° 00'
LONGITUDE 156 ° 00' TO 156 ° 30'
DIAGRAM NF 4-16 MAUI

NO ORIGINAL TEXT

ADJUSTED HORIZONTAL CONTROL DATA

DEPARTMENT OF COMMERCE,
U. S. OCEANIC AND ATMOSPHERIC SURVEY,
FORM 505

RECOVERY NOTE, TRIANGULATION STATION.

R

NAME OF STATION: PUU NENE MILL, CUPOLA STATE: HAWAII COUNTY: MAUI
ESTABLISHED BY: I. C. G. YEAR: 1912 LOCALITY: WAILUKU DISTRICT
RECOVERED BY: K. T. ADAMS YEAR: 1922

Detailed statement as to the fitness of the original description: The square, open cupola, with pole projecting
above from center of roof on the Puu Nene sugar mill located in Puu Nene settlement,
about 2 miles SSE from Kahului.

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

NAME OF STATION: PUU NENE MILL CUPOLA

STATE: HAWAII

YEAR: 1912

THIRD

—ORDER

SOURCE: G-SP156

GEODETIC LATITUDE	20 52 14.798	ELEVATION	METERS
GEODETIC LONGITUDE	156 27 20.653		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	β FOR Δ α ANGLE *
HI 2	5102	572,010.73	195,245.23	+ 0° 04' 31"

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

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

Q3 062

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

0 201561 STATION 1181
HAWAII
LATITUDE 20 ° 30' TO 21 ° 00'
LONGITUDE 156 ° 00' TO 156 ° 30'
DIAGRAM NF 4-16 MAUI

NO ORIGINAL TEXT

RECOVERY NOTE, TRIANGULATION STATION.

NAME OF STATION: PUU NENE SUGAR MILL N STACK
ESTABLISHED BY: J.C.G. YEAR: 1912 STATE: HAWAII COUNTY: MAUI
RECOVERED BY: K.T. ADAMS YEAR: 1929 LOCALITY: HAILUKU DISTRICT

Detailed statement as to the fitness of the original description: The north east smoke stack of the sugar mill in Puunene about 2 miles SSE of Kahului Harbor. The stack is 180 feet in height.

U.S. COAST AND GEODETIC SURVEY
Form 535 b

RECOVERY OF TRIANGULATION INTERSECTION STATION

NAME OF STATION: PUU NENE YEAR: 1950 STATE: Hawaii COUNTY: Maui
SUGAR MILL, NORTH STACK
CHIEF OF PARTY: C. T. Husemeyer

Description, including sketch of object:

The station is the top and center of the most northerly of two smoke stacks at the Puunene Sugar Mill in the village of Puunene.

The stack rises from a 20 foot by 20 foot concrete platform which is about 25 feet in height. The total height of the stack and base is 178 feet.

This stack was erected in 1900. Probably the same as located 1912.

(11-6-55)

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: Puu Nene Sugar Mill, North Stack
ESTABLISHED BY: J.C.G. YEAR: 1912 STATE: Hawaii
RECOVERED BY: W.R.P. YEAR: 1960 COUNTY: Maui

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

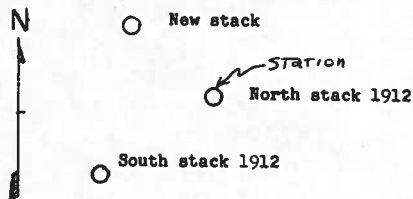
The station was recovered as described. It is the northerly and most easterly of the three red and white painted stacks at the H.C. and S mill at Puu Nene.

RECOVERY NOTE, TRIANGULATION STATION INTERSECTION

NAME OF STATION: Puu Nene Sugar Mill, north stack
ESTABLISHED BY: J.C.G. YEAR: 1912 STATE: Hawaii BENCH MARK(S) ALSO ☐
RECOVERED BY: R.C. Munson YEAR: 1968 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:

Station was identified by angle and recovered. A new stack has been erected and there are now 3 nearly identical stacks at the mill. The new stack is the most northerly of the 3, while the station stack is the most easterly one, setting on a 60-degree angle northeast from the southernmost stack, and on a 45-degree angle southeast from the new stack. All 3 stacks are painted alternate orange and white and are about 178 feet high.



ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: PUU NENE SUGAR MILL N STACK

STATE: HAWAII

YEAR: 1912

THIRD

ORDER

SOURCE: G- 9311

GEODETIC LATITUDE: 20 ° 32' 15.577	ELEVATION	METERS
GEODETIC LONGITUDE: 156 27 22.094		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	# HOR Δ & ANGLE *
HI 2	5102	571,873.97	195,323.65	+ 0 04 30

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

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

QE 401

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 201561 STATION 1182
HAWAII
LATITUDE 20 ° 30' TO 21 ° 00'
LONGITUDE 156 ° 00' TO 156 ° 30'
DIAGRAM NF 4-16 MAUI

NO ORIGINAL TEXT

ADJUSTED HORIZONTAL CONTROL DATA

DEPARTMENT OF COMMERCE, U. S. COAST AND GEODETIC SURVEY
FORM 526
NAME OF STATION: PUA NENE SUGAR MILL S STACK HAWAII COUNTY: MAUI
ESTABLISHED BY: J.C.G. YEAR: 1912 STATE: HAWAII LOCALITY: WAIKUKU DISTRICT
RECOVERED BY: K.T. ADAMS YEAR: 1929

Detailed statement as to the fitness of the original description: The southwest smoke stack of the sugar mill in Pua Nene about 2 miles SSE of Kahului Harbor. The stack is 180 feet in height.

RECOVERY OF TRIANGULATION INTERSECTION STATION

NAME OF STATION: PUA NENE YEAR: 1950 STATE: Hawaii COUNTY: Maui
SUGAR MILL, SOUTH STACK
CHIEF OF PARTY: C. T. Munson

Description, including sketch of object:

The station is the top and center of the most southerly of two smoke stacks at the Puunene Sugar Mill in the village of Puunene.

The stack rises from a 20 foot by 20 foot concrete base which is about 25 feet in height. The total height of the stack and base is 178 feet.

This stack was erected in 1900. Probably the same as located 1912.

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: Pua Nene Sugar Mill, South Stack
ESTABLISHED BY: J.C.G. YEAR: 1912 STATE: Hawaii
RECOVERED BY: H.J.S. YEAR: 1960 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. It is the southerly and most westerly of the three red and white painted stacks at the H.C. and S Sugar Mill at Pua Nene.

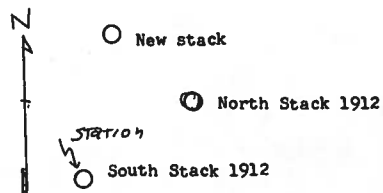
(W.R.P., 1963)--Station recovered as described. Description adequate and correct. This stack now has red obstruction lights up the sides.

RECOVERY NOTE, TRIANGULATION STATION INTERSECTION

NAME OF STATION: Pua Nene Sugar Mill, south stack
ESTABLISHED BY: J.C.G. YEAR: 1912 STATE: Hawaii BENCH MARK(S) ALSO ☐
RECOVERED BY: R.C. Munson YEAR: 1968 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:

Station was identified by angle and recovered. A new stack has been erected and there are now 3 nearly identical stacks at the mill. The new stack is the most northerly of the 3, while the station stack is the most southerly, setting on an 18° angle, south-southwest, from the new and northernmost stack, and on an angle of 60°, southwest, from the easternmost stack. All 3 stacks are painted alternate orange and white and are about 178 feet high.



NAME OF STATION: PUA NENE SUGAR MILL S STACK

STATE: HAWAII

YEAR: 1912

THIRD

-ORDER

SOURCE: G- 9311

GEODETIC LATITUDE:	20 ° 52' 14.531	ELEVATION:	METERS
GEODETIC LONGITUDE:	156 27 24.252		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ (OR Δ) ANGLE °
HI 2	5102	571,669.46	195,217.85	+ 0 04 29

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

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

QE 402

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

Q 201561 STATION 1183
HAWAII
LATITUDE 20° 30' TO 21° 00'
LONGITUDE 156° 00' TO 156° 30'
DIAGRAM NF 4-16 MAUI

Puu Nianiau, (Maui Island, Hawaiian Government Survey).—Near center of East Maui, in Kula District, on summit of high hill east of road leading from Makawao to the summit of Mount Haleakala, 2 miles from the brink of the crater. Marked by iron stake and cairn of stones.

DEPARTMENT OF COMMERCE
U.S. COAST AND GEODETIC SURVEY
FOURTH DISTRICT
(REV. FEB. 1965)

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: PUU NIANIAU

ESTABLISHED BY: Hawaiian Govt. YEAR: 1877 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:

The original station, consisting of an iron stake and cairn of stones, was not recovered. At the time of this survey, a drill hole in the center of a carved triangle was found and a standard disk, stamped PUU NIANIAU 1950, was set in the center of this triangle. A U.S.G.S. bench mark was also recovered 3.250 feet west of the triangle.

Note: It appears that the point used was the original station. See complete description.

DEPARTMENT OF COMMERCE
U.S. COAST AND GEODETIC SURVEY
FOURTH DISTRICT
(REV. AUG. 1965)

RECOVERY OF TRIANGULATION STATION

NAME OF STATION: PUU NIANIAU

STATE: Hawaii COUNTY: Maui

Established By: HGS

Year: 1877

CHIEF OF PARTY: C. T. Husemeyer

Year: 1950

Described by: C. J. Hoepfel

NOTE: HEIGHT OF TELESCOPE ABOVE STATION MARK 1.72 METERS. HEIGHT OF LIGHT ABOVE STATION MARK METERS.

OBJECT	BEARING	DISTANCE		DIRECTION
		feet	meters	
PIIHOLO (HGS) 1877				00 00 00
12c R. L. No. 1	E	15.336	4.674	115 41 13
12c R. L. No. 2	S	26.241	7.999	198 53 42
BH (USGS)	W	3.250	0.990	295 41

The station is located on the westerly summit of Puu Nianiau, a grass covered knoll, which lies on the northwest slope of Haleakala about 11.5 miles north of Kahawihapapa, about 11 miles south of Hoolewa Point and forms the north-west corner of the Hawaii National Park.

To reach from the post office at Kahului; go easterly, on the road which leads toward Hana, for 3.1 miles; turn right and go southeast, on the road which leads toward the Hawaii National Park, for 14.3 miles; turn left, onto a narrow, paved road, and go southeasterly for 10.4 miles to the Haleakala Mountain Lodge and the end of truck travel. From this point pack north for about 0.2 mile to the westerly summit of the hill and the station.

The station is a standard disk, stamped PUU NIANIAU 1950, set into a drill hole which was found in the center of a carved triangle. It is in a flat boulder which is flush with the surface of the soil. The iron pin, mentioned in the 1877 description was not found.

The U. S. Geological Survey mark is a bronze disk, stamped 35 H 1928 6845, set into a drill hole in a boulder which is about flush with the surface of the ground.

Reference mark number 1 is a standard disk, stamped PUU NIANIAU NO 1 1950, set into a drill hole in a boulder which projects about 1 foot. It is located at about the same elevation as the station.

Reference mark number 2 is a standard disk, stamped PUU NIANIAU NO 2 1950, set into a drill hole in a boulder which is flush with the surface of the ground. It is located 5 feet east of the edge of the cliff at about the same elevation as the station.

(continued on next page)

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: PUU NIANIAU

STATE: HAWAII

YEAR: 1877

FIRST

ORDER

SOURCE G- 9311

GEODETIC LATITUDE:	20° 46' 32.177	ELEVATION:	2087.9 METERS
GEODETIC LONGITUDE:	156° 14' 51.550		6850 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ OR ANGLE
HI 2	5102	643,140.58	160,816.41	+ 0 08 55

* 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
PIIHOLO	150 03 05.5	149 54 11	5102

QE 297

HORIZONTAL CONTROL DATA

by the
NATIONAL GEODETIC SURVEY
OLD HAWAIIAN DATUM

QUAD 201561 STATION 1183

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

PUU NIANIAU (continued)

R

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: PUU NIANIAU
ESTABLISHED BY: HGS YEAR: 1877 STATE: Hawaii
RECOVERED BY: R.C. Munson YEAR: 1968 COUNTY: Maui
Island: Maui

HEIGHT OF TELESCOPE ABOVE STATION MARK 1.4 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	
PIIHOLO (HGS) -----1950	DISTANCE	and DIRECTION-----		00 00 00.0
R.M. No. 1	E	15.336	4.674	115 41 13
R.M. No. 2	S	26.241	7.999	198 53 42
EM (USGS)	W	3.250	0.990	295 41
PIIHOLO (HGS) 1877 -----1968	DISTANCE	and DIRECTION-----		00 00 00.0
R.M. No. 1	E	15.296	4.662	115 43 38
R.M. No. 2	SSE	26 168	7.976	198 56 19
Waiakoa, Holy Ghost Church spire	WSW	292	56	07.5
EM 35 M (USGS)	WSW	3.248	0.990	295 26 07

Station was recovered and all marks found in good condition. A witness post was set. It is now possible to drive to station with 4-w-d vehicle. There is now a wooden antenna pole and a corrugated metal hut on the hill-top. A complete description follows:

Station is located about 7 miles southeast of Pukalani, on the western slopes of Haleakala, on the summit of Puu Nianiau, a bare hill of about

6849 feet elevation, at the northwest corner of Haleakala National Park Boundary.

To reach station from the post office in Pukalani, go southeast on State Highway 37 for 0.35 mile; take left fork and follow State Highway 377 for 6.2 miles; take left fork and follow State Highway 378 for 10.1 miles to side road right, at S-curve of highway. Go right, up steep bulldozed grade for 0.3 mile to top of hill and station.

Station mark is a standard disk stamped "PUU NIANIAU 1950", cemented in a drill hole in a 12 x 12-inch bedrock outcrop projecting 4 inches from ground. It is 53 feet south of a wooden antenna pole, 68 feet south of the southwest corner of a metal hut, and 5 feet south of a witness post.

Reference mark number one is a standard disk stamped "PUU NIANIAU NO 1 1950", cemented in a drill hole in a bedrock outcrop 2 feet in diameter and projecting 1 foot from ground. It is 1 foot higher than station mark.

Reference mark number two is a standard disk stamped "PUU NIANIAU NO 2 1950", cemented in a drill hole in bedrock flush with ground. It is 1-1/2 feet east of edge of bluff and 18 inches higher than station mark.

Bench Mark 35 M (USGS) is a USGS bench mark disk, stamped "35 M 1923 6843", cemented in a drill hole in bedrock 6 feet northeast of edge of bluff and at same elevation as station mark.

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

Q 201561 STATION 1184
HAWAII
LATITUDE 20° 30' TO 21° 00'
LONGITUDE 156° 00' TO 156° 30'
DIAGRAM NF 4-16 MAUI

NO ORIGINAL TEXT

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
PORT 228
(REV. Feb. 1965)

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: PUU O KALI
ESTABLISHED BY: Hawaiian G.S. YEAR: 1879 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: In the western part of East Maui, in Kula District, on the boundary between Waiohuli and Keokea, and on the south side of the crater of Puu O Kali. Marked by concrete post. In 1929 the station was remarked by Hawaii Territory Survey, V.S. Seward, with a type B monument. The center of the 2 1/2 inch iron pipe target holder was used as the station.

To reach from the Waialae Post Office: go south on Kula road for 1.3 miles, turn right across cattle guard and follow bladed road down hill for 2.4 miles, turn left through board gate just east of a corral and go southwesterly on main track road for 2.1 miles. Turn right across country and drive to top of crater at east end and station at fence line.

OBJECT	DISTANCE	DIRECTION
PUU IO (HGS) 1950	Miles	0 00 00.0
Holy Ghost Catholic Church	5	243 11 58.5
Flagstaff, Kula Sanitarium	5	320 03 50.9

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: PUU O KALI
ESTABLISHED BY: HGS
RECOVERED BY: R.C. Munson YEAR: 1968 STATE: Hawaii BENCH MARK(S) ALSO ☐
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: Maui
Island: Maui

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

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

Station is located about 2-1/2 miles northwest of Keokea Village, 4-1/4 miles east of Kalama Park, and 6 miles southeast of the Kihei post office, at about 1481 feet elevation, on the south rim of Puu O Kali crater, a prominent, red-colored, flat hill, on the boundary line between Waiohuli and Keokea.

To reach station from the post office at Kihei, go south on State Highway 31 for 1.1 miles; turn left onto Kaonoulu Street, at south side of Maui Lu Resort, and go 0.2 mile to board gate on right. Pass through gate and follow the main track road easterly for 2.6 miles to fork. Take right fork and go 3.6 miles to board gate at northeast corner of a corral. Pass through gate and continue for 50 feet to second board gate on right. Pass through this gate and follow track road southerly for 1.05 miles to board gate. Pass through gate, cross ravine just above very deep drop and go 0.05 mile to second gate. Pass through gate and continue on dim track

road for 0.7 mile to fork. Take right fork and go 0.4 mile to base of red hill on right. Turn back to right and go 0.1 mile through trees to east base of rim, then go left up onto rim and go southerly for 0.1 mile to fence line and station. NOTE: A 4-wheel-drive vehicle is required. Station is marked by a Type B signal, a 6-foot-square, concrete platform flush with ground and with a 12 x 12-inch concrete pier extending 26 inches above it's center. A 2-1/2-inch iron pipe in the center of the pier holds a removable, red and white metal target that extends 9 feet above the platform. Station is 4 feet east of a wire fence.

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: PUU O KALI

STATE: HAWAII

YEAR: 1879

FIRST

-ORDER

SOURCE G- 9311

GEODETIC LATITUDE	20 44 01.905	ELEVATION	451.5 METERS
GEODETIC LONGITUDE	156 23 21.559		1481 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	Bearing & Angle
HI 2	5102	554,770.21	145,551.03	+ 0° 05' 54"

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE B-108-4 FORMULA NEGLECTING THE SECOND TERM

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH (From south)	CODE
PUU IO	356 47 57.2	356 42 03	5102

QE 295

WILSON, J. A. 1914

WILSON, J. A. 1914

1

1



HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

Q 201561 STATION 1185
HAWAII
LATITUDE 20 °30' TO 21 °00'
LONGITUDE 156 °00' TO 156 °30'
DIAGRAM NF 4-16 MAUI

NO ORIGINAL TEXT

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
Form 555
Rev. Aug. 1966

RECOVERY

DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: PUU O KANALOA

STATE:

Hawaii

COUNTY: Maui

Established By: O.W.Swainson Year: 1931

CHIEF OF PARTY: C. T. Husemeyer

YEAR: 1950

Described by: G. J. Hoepfel

NOTE: HEIGHT OF TELESCOPE ABOVE STATION MARK 0.98 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		DIRECTION
					feet	meters	
			PUU OLAI (HGS) 1905	NE	00	00	00
			Kanaloa Spire (Catholic Church)	NE	106	23	20.8
			Manamamoa Lighthouse	ESE	203	36	00.3

The original station, consisting of a buried copper triangle with a redwood post and cairn above, was established in 1879.
In 1904 the original station was not recovered and a new station, consisting of a bottle buried 16 inches below the surface of the ground, was established.
In 1915 a 1 1/2 inch iron pipe set loosely in the ground was recovered.
In 1929 a 1 1/2 inch iron pipe was recovered and a type B Territory Monument was built at the station site.
In 1950 this type B monument was recovered in good condition. A new description follows.

The station is located on the southeasterly rim of a low volcanic cone

named Puu O Kanaloa, which lies about 13 miles south southeast of Kihei and about 0.2 mile north of La Perouse Bay.

To reach from the post office at Kihei, go south, on the road which leads toward La Perouse Bay, for 3.7 miles; pass through Kalama Park and continue south, on the main traveled road, for 5.9 miles; cross over a cattle guard and continue south for 1.8 miles; pass to the left hand side of the Maui Radio Range Station (QAI) and continue south and east, over the old lava flows, for 2.8 miles to La Perouse Bay and the end of truck travel. From this point pack northerly, up the steep slope, for about 0.1 mile to the high ground and the station.

The station is the top and center of a 2 1/2 inch iron pipe which projects about 4 inches from the top of a 12 by 12 inch concrete post which is 2 1/2 feet in height. This post is surrounded by a concrete platform 6 feet square and flush with the surface of the ground.

FC
(11-8-55)

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

NAME OF STATION: PUU O KANALOA

ESTABLISHED BY: O.W.S.

YEAR: 1931 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 volcanic cone is U shaped and is covered with kiawe brush. The recovery note is adequate.

(continued on next page)

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: PUU O KANALOA

STATE: HAWAII

YEAR: 1931

FIRST

ORDER

SOURCE: G- 9311

GEODETIC LATITUDE:	20 °36' 21.117	ELEVATION:	64.7 METERS
GEODETIC LONGITUDE:	156 25 15.908		212 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ OR ANGLE °
HI 2	5102	583,986.69	99,044.80	+ 0 05 11 °

* 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
AZIMUTH MARK 1968	105 37 41.6	105 32 30	5102

QE 321

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 201561 STATION 1185
LATITUDE ° ' TO ° '
LONGITUDE ° ' TO ° '
DIAGRAM

PUU O KANALOA (continued)

R

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: PUU O KANALOA
ESTABLISHED BY: O.W. Swainson YEAR: 1931 STATE: Hawaii
RECOVERED BY: R.C. Munson YEAR: 1968 COUNTY: Maui
Island: Maui

OBJECT	BEARING	DISTANCE		DIRECTION
		FEET	METERS	
PIMO (HGS) 1879				00 00 00.0
Hanamania Point, Lighthouse 1931	SSE			83 12 09.6
R.M. No. 1	S	30.873	9.411	108 53 00
Asimuth mark	WNW	(Approx. 1/2 mi.)		205 35 56.6
R.M. No. 2	NW	18.900	5.761	237 08 56

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

Station is located in the southern part of the island, about 1/4-mile northeast of the north end of La Perouse Bay, on a kiawe-covered hill of about 212 feet elevation which is the easterly rim of an old crater.

To reach station from the post office at Kihei, go south on State Highway 31 for 6.1 miles to end of macadam road; continue on graded road for 3.2 miles to junction where Highway 31 goes left, mauka. Continue

ahead on coast road for 4.2 miles to azimuth mark on right, across from power pole No. 22. Continue ahead for 0.45 mile to dim track road left, just past the driveway to house on right at La Perouse Bay. Go left through trees along base of hill for 0.1 mile to end of truck travel just below old bulldozed strip going up over hill. Pack up the strip to crest of hill, then go right, uphill, about 200 yards to station.

Station is marked by a Type B signal, with the 6-foot-square, concrete platform flush with ground, and a center concrete pier 12 inches square and 2 feet high, with a 2-1/2-inch pipe in the center, which holds a red and white metal target. Center of pipe is station.

Reference mark number one is a standard disk stamped "KANALOA HTS 1929 NO 1 1968", cemented in a drill hole in a red bedrock outcrop that projects 3 inches from ground. It is 3 feet lower than top of station pipe.

Reference mark number two is a standard disk stamped "KANALOA HTS 1929 NO 2 1968", cemented in a drill hole in a small, 8-inch bedrock outcrop projecting 2 inches from ground. It is 3-1/2 feet lower than station pipe.

Asimuth mark is a standard disk stamped "PUU O KANALOA HTS 1929 1968", cemented in a drill hole in the top of a large, rounded lava dome about 15 feet in diameter. It is located along the southwest side of the road and in the rough lava land; about 100 yards northwest from the southeast edge of the lava flow, 147.6 feet southwest of power pole No. 22, 120 feet southwest of center line of road, 42 feet west-southwest of a sharp, prominent, pointed lava formation about 10 feet high, and 2 feet south-west of a 3-foot cairn.

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

Q 201561 STATION 1186
HAWAII
LATITUDE 20 °30' TO 21 °00'
LONGITUDE 156 °00' TO 156 °30'
DIAGRAM NF 4-16 MAUI

NO ORIGINAL TEXT

Puu o Koha (Maui Island, Hawaiian Government Survey).—In Kula, Maui,
in western part of Kaliialui, on summit of hill. Marked by concrete post.

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
FOURTH DISTRICT
(Rev. Feb. 1968)
RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: PUU O KOHA
ESTABLISHED BY: HGS
RECOVERED BY: C. T. Rosemeyer
YEAR: 1912
STATE: Hawaii
YEAR: 1950
COUNTY: Maui

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

New description follows: located on the westerly top of a low knoll, named Puu O Koha, at the extreme west edge of the Makawai District, about 8 miles, airline, southeast of Kahului and about 5.5 miles south of Paia, on land owned by the Hawaiian Commercial and Sugar Co. In 1929 the station was recovered by the Territory Survey and remarked with a K.T.S. bronze disk set in a concrete post flush with the ground, over which was placed a Type A monument. The center of the two inch pipe in monument was used as station.

Reference mark No. 1 is south southwest of the station. A standard disk set in a concrete post projecting 8 inches above the ground, stamped PUU O KOHA NO 1 1949. Reference mark No. 2 is west northwest of the station. A standard disk set in a concrete post projecting 8 inches above the ground, stamped PUU O KOHA NO 2 1949.

OBJECT	DISTANCE	DIRECTION
PULEHU	feet meters	0 00 00.0
R.M. No. 2 WNW	30.19 9.203	47 33 15.4
Stack, pump plant, Paia N	6 miles	109 28 17.6
Stack, H.C. & S. Mill, Paia	5.5 miles	113 50 52.6
R.M. No. 1 SSW	29.11 8.373	315 02 11.1

* 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.

10-5648C

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: PUU O KOHA

STATE: HAWAII

YEAR: 1912

FIRST

ORDER

SOURCE: G- 9311

GEODETIC LATITUDE:	20 49 33.437	ELEVATION:	320.0 METERS
GEODETIC LONGITUDE:	156 22 17.434		1050 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ 10R Δ 01 ANGLE *
HI 2	5102	600,795.74	179,010.44	+ 0 06 18

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

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH * (From south)	CODE
PUU PANE	290 26 48.7	290 20 31	5102

QE 298

(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 201561

STATION 1186

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

PUU O KOHA (continued)

R

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: PUU O KOHA
ESTABLISHED BY: HGS
RECOVERED BY: R.C. Munson
YEAR: 1912
YEAR: 1968
STATE: Hawaii
COUNTY: Maui
Island: Maui

HEIGHT OF TELESCOPE ABOVE STATION MARK		2.71 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 PANE (HGS) 1871 -----1950 ---	SE	DIRECTION-----		00	00	00.0	
Waiakoa, Holy Ghost Cath. Church		(36	28	43)			
PUU PANE (HGS) 1871 -----1968 DISTANCE	and DIRECTION-----	00	00	00.0			
Waiakoa Holy Ghost Catholic Church, spire, 1950	SE			36	28	39.7	
R.M. No. 4	NE	46.312	14.116	283	24	47	
Radio Mast, Makawao, KNUI	E			332	00	59.4	
R.M. No. 3	ESE	69.099	21.061	354	00	51	

Station mark was recovered in good condition. Both reference marks have been destroyed, so 2 new ones were established at this time. A complete description follows:

Station is located about 5-1/2 miles south of upper Paia, 0.6 mile east of the point where the Loop Road crosses the Kauhikoa Ditch, and about 1800 feet west of the division between sugar cane land and pineapple land; on the west end of a flat-topped ridge, at the west end of a cane road,

surrounded by cane, and at about 1050 feet elevation. To reach station from the post office in Puunene, go east on Hansen Rd. for 1.0 mile to crossroad. Turn right and go southeast on Pulehu Rd. for 3.6 miles to Lowrie Ditch; continue ahead for 0.15 mile to crossroad where 5 roads intersect. Continue ahead, on the left 1 of the 2 roads in that direction, and go 0.65 mile; take right fork and go 1.0 mile to Kauhikoa Ditch. Cross canal and continue for 1.0 mile to side road left. Go left 0.1 mile to to side road left. Go west 0.35 mile to end of road and station in clearing.

Station mark is an HTS disk, unstamped, set in concrete flush with ground. A Type A signal is centered over the mark, with the 6 x 6-foot concrete platform 3 feet above ground and a red and white metal target extending 6 feet above it. Station sets near the west side of a 60-foot-diameter clearing in the cane field.

Reference mark number three is a standard disk stamped "PUU O KOHA HGS NO 3 1968", set in the top of a 10-inch-diameter, concrete monument at the north side of an irrigation ditch box, about flush with ground. It is 9 feet south of center line of track road and 2.9 feet higher than station mark.

Reference mark number four is a standard disk stamped "PUU O KOHA HGS NO 4 1968", cemented in a drill hole in the concrete rim of an irrigation ditch box projecting 2 inches above ground. It is 4-1/2 feet southeast of the corner of a section of flat-bottomed, concrete flume, and is 0.7 foot higher than station mark.

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

Q 201561 STATION 1187
HAWAII
LATITUDE 20 °30' TO 21 °00'
LONGITUDE 156 °00' TO 156 °30'
DIAGRAM NF 4-16 MAUI

NO ORIGINAL TEXT

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

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: PUU OLAI
ESTABLISHED BY: H.G.S. YEAR: 1879 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:

Old description: "Maui Island, Hawaiian Government Survey, 1879. J.F. Pratt, 1905. On the southwest coast of East Maui, in Honouliuli Dist., on the highest point of the conspicuous hill known as Puu Olai or Millers Hill, about 1 mile southwest from Makana Bay. It is on the southeast summit east of the main crater. Marked by concrete post about 8 inches square set in ground and projecting about 2 inches above the surface. Station was recovered in 1929 by the Hawaii Territorial Survey, V.S. Seward, and remarked with a Type B station monument. The old mark is not now visible.

The center of the 2 1/2 inch iron pipe target holder was used as station. To reach from the Post Office at Kihel: go south on main road toward La Paluse Bay for 11.0 miles, turn right and go 0.1 mile to foot of hill.

OBJECT	DISTANCE	DIRECTION
KAMOA	MILES	
Radio Range Tower, center of	5 0.5	0 00 00.0
La Perouse Light	3	140 08 42.2
Molokini Light	5.5	144 56 15.5
		260 45 32.8

Form 526
(11-8-55)

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

NAME OF STATION: PUU OLAI
ESTABLISHED BY: H.G.S. YEAR: 1879 STATE: Hawaii
RECOVERED BY: W.R. Porter 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 location of the station is as described. The Hawaiian State Government has remarked the station according to Note 14B. The concrete platform rests on the ground and projects about 8 inches above ground level. A signal post is supported by a 2-1/2 inch iron pipe set in the concrete slab. The signal may be removed. The station is the center of the 2-1/2 inch iron pipe.

Form 526
(11-8-55)

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

NAME OF STATION: PUU OLAI
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 as described by C.T.H. in 1950. The type B Hawaiian Territory Survey monument is in good condition, and is visible from the road. It is about 1/2 mile north of the F.A.A. low frequency range towers.

(continued on next page)

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: PUU OLAI

STATE: HAWAII

YEAR: 1879

FIRST

ORDER

SOURCE: G- 9311

GEODETIC LATITUDE:	20 38 22.438	ELEVATION:	109.6 METERS
GEODETIC LONGITUDE:	156 27 05.471		360 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ & ANGLE *
HI 2	5102	573,562.23	111,270.01	+ 0 04 33

* 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 318

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 201561 STATION 1187
LATITUDE ° ' TO ° '
LONGITUDE ° ' TO ° '
DIAGRAM

PUU OLAI (continued)

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: PUU OLAI
ESTABLISHED BY: HGS YEAR: 1879 STATE: Hawaii BENCH MARK(S) ALSO ☐
RECOVERED BY: R.C. Munson YEAR: 1968 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:

Station was recovered in good condition. Located about 10 miles south of the Kihei post office, 1-1/4 miles south-southwest of Makena, and 1500 feet west of the main road, on the summit of Puu Olai, a hill of about 360 feet elevation, along the coast.

To reach station from the post office at Kihei, go south on State Highway 31 for 6.1 miles to end of macadam road; continue on graded road for 3.4 miles to junction where Highway 31 goes left, mauka. Continue ahead for 1.45 miles to side road right. Go right for 0.15 mile to fork; take right fork and go 0.1 mile to start of trail on left. Pack up good trail about 1/3-mile to top of hill and station.

Station is marked by a Type B signal, with the 6-foot-square, concrete platform flush with ground. At center of platform is a 12 x 12-inch concrete pier 2 feet high, with a 2-1/2-inch pipe in the center, which holds a red and white metal target. Center of pipe is station.

NO TEXT

by the
National Ocean Survey
OLD HAWAIIAN DATUM

ADJUSTED HORIZONTAL CONTROL DATA

—ORDER

GEODETIC LATITUDE: 20 39 00.33 GEODETIC LONGITUDE: 156 20 52.11	ELEVATION: _____ METERS _____ FEET
--	---------------------------------------

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ° OR Δ θ° ANGLE $^\circ$
HI 2	5102	609,015.57	115,151.17	+ 0 06 45

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

AZIMUTH HAS BEEN COMPUTED BY THE θ FOR Δ θ FORMULA NEGLECTING THE SECOND TERM			
TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH * (From south)	CODE

QO 153

QO 153

HORIZONTAL CONTROL DATA

NO TEXT ON

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

Q 201561 STATION 1189
HAWAII
LATITUDE 20 °30' TO 21 °00'
LONGITUDE 156 °00' TO 156 °30'
DIAGRAM NF 4-16 MAUI

NO ORIGINAL TEXT

DEPARTMENT OF COMMERCE
U. S. OCEANIC AND ATMOSPHERIC SURVEY
PAPER 536
(Rev. Feb. 1965)

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: PUU PANE
ESTABLISHED BY: H.G.S. YEAR: 1871 STATE: Hawaii
RECOVERED BY: S.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:

In central Maui, Kula District, on the summit of hill of same name in Aapueo, Kula; above the government road and south of a grove of Hua-hele trees. Marked by a granite post 3½ feet long with cross cut in top sunk level with ground and surrounded by four posts 6 by 6 inches in size.

In 1929 the Hawaii Territorial Survey, V.S. Seward, recovered the station and remarked it with a standard H.T.S. bronze disk set in a concrete post flush with the ground, over which was placed a Type A monument. Mark not stamped.

Reference mark No. 1 is south of the station. A standard disk set in a square topped concrete post projecting 8 inches, stamped PUU PANE NO 1 1950.

Reference mark No. 2 is east of the station. A standard disk set in a square topped concrete post projecting 8 inches, stamped PUU PANE NO 2 1950.

To reach from the Post Office at Kahului: go easterly on main road toward Hana for 2.7 miles, turn right and go southeast toward Kula for 9.3 miles, turn left off highway and follow concrete track road east for 0.85 miles to a fence corner on left. Turn sharp left and pick way to summit of hill and station.

OBJECT	DISTANCE	DIRECTION
PIIHOLO (HGS) 1950	Feet Meters	0 00 00.0
R.M. No. 2 E	41.64 / 12.692	62 08 07 ✓
Holy Ghost Church, Spire	3 miles	170 12 40.9 ✓
R.M. No. 1 S	37.47 / 11.421	339 54 34 ✓

(continued on next page)

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: PUU PANE

STATE: HAWAII

YEAR: 1871

FIRST

-ORDER

SOURCE: G- 9311

GEODETIC LATITUDE:	20 °48 '27.196	ELEVATION:	784.3	METERS
GEODETIC LONGITUDE:	156 19 08.573		2573	FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ HOR Δ S1 ANGLE °
HI 2	5102	618,725.75	172,362.99	+ 0 °07 '25 "

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE θ HOR Δ S1 FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH * (From south)	CODE
PUU O KOHA	110 27 55.8	110 20 31	5102

QE 296

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 201561 STATION 1189

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

PUU PANE (continued)

R

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: PUU PANE
ESTABLISHED BY: HGS YEAR: 1871 STATE: Hawaii
RECOVERED BY: R.C. Munson YEAR: 1968 COUNTY: Maui
Maui Island

HEIGHT OF TELESCOPE ABOVE STATION MARK 2.44 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 O KOHA (HGS) 1929-----1950	DISTANCE	and DIRECTION----		00 00 00.0
R.M. No. 1	S	37.47	11.421	73 12 58
R.M. No. 2	E	41.64	12.692	155 26 31
Holy Ghost Church, spire				263 31 05.1
PUU O KOHA (HGS) 1929-----1968	DISTANCE	and DIRECTION----		00 00 00.0
R.M. No. 1	N	37.443	11.413	73 11 45
R.M. No. 2	ENE	41.611	12.683	155 26 16
Waiakoa, Holy Ghost Church, spire	SSW			263 30 57.8
	1950			

Station was recovered and all marks found in good condition, however, RM No. 1 is north of station instead of south. A complete description follows:

Station is located about 2-1/2 miles southeast of Pukalani and 1/2-mile east of State Highway 37, on Puu Pane, a hill of about 2573 feet elevation, that has a cover of large eucalyptus trees along the top and

on the east side, but with the view open to the westward.. Station lies about 50 yards west of a fence and 150 yards west of a corral.

To reach station from the post office at Pukalani, go southeast on State Highway 37 for 0.35 mile; take right fork and continue on the highway for 1.3 miles to crossroad. Turn left on Lower Kula Rd. and go up-grade for 0.3 mile; turn left on concrete track road and go up through pineapple field for 1.0 mile to pipe gate on left. Turn left through gate and go 0.1 mile to corral. From here pack west 150 yards to station.

Station mark is a standard HTS disk, unstamped, set in the top of a 10-inch-square, concrete monument 6 inches lower than ground level, on a small, grassy hump. There is a Type A signal centered over the mark, with the 6 x 6-foot, concrete platform 2-1/2 feet above ground and a red and white metal target extending 8 feet above platform.

Reference mark number one is a standard disk stamped "PUU PANE NO 1 1950", set in the top of an 8-inch-square, concrete monument projecting 6 inches above ground. It is 1.94 feet lower than station mark.

Reference mark number two is a standard disk stamped "PUU PANE NO 2 1950", set in the top of an 8-inch-square, concrete monument projecting 6 inches above ground. It is down among large trees on east slope and is 3.2 feet lower than station mark.

QJ 156

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

Q 201561 STATION 1191
HAWAII
LATITUDE 20 ° 30' TO 21 ° 00'
LONGITUDE 156 ° 00' TO 156 ° 30'
DIAGRAM NF 4-16 MAUI

NO ORIGINAL TEXT

Puuiki (Maui Island, Hawaiian Government Survey, 1878; J. C. Gauger, 1912).—On eastern coast of Maui, in land of Hana, on the rising ground about 70 meters southeast from Puuiki Catholic Church. It is below the old and above the new government roads. Marked (in 1912) by a 2-inch galvanized iron pipe set in block of concrete.

RECOVERY

DESCRIPTION OF TRIANGULATION STATION

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
PAPER 835
REV. AUG. 1963

NAME OF STATION: PUUIKI STATE: Hawaii COUNTY: Maui
Established By: HGS Year: 1878
CHIEF OF PARTY: C. T. Rosemeyer Year: 1950 Described by: C. J. Hoessel

NOTE	HEIGHT OF TELESCOPE ABOVE STATION MARK 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	HEIGHT OF LIGHT ABOVE STATION MARK METERS.	DISTANCE		DIRECTION
				feet	meters	
		OBJECT	BEARING			
12e	FORUVE	R. M. No. 2 ✓	NW	52.920	16.131	00 00 00 ✓
12e		R. M. No. 1 ✓	NE	8.928	2.721	86 08 54 ✓ 148 32 ✓

This station was established in 1878 by the Hawaiian Government Survey and was marked by a concrete post sunk in the ground. The station was recovered by the Territory Survey Department and the mark was reported to be a 2 inch iron pipe set in a core of concrete. The 2 inch iron pipe was recovered in 1950 and a standard disk was set in the top. A new description follows.

The station is located about 4 miles south southwest of Hana, about 100 yards west of the sea, about 200 feet northeast of the Puuiki Catholic Church and between the old and the new government roads.

To reach from the post office at Hana; go southerly, on the road which leads toward Kipahulu, for 4.6 miles to the Puuiki Church and the station.

The station is a standard disk, stamped PUUIKI 1950, set in the top of a 2 inch iron pipe which projects about 4 inches.

Reference mark number 1 is a standard disk, stamped PUUIKI NO 1 1950, set into a drill hole in a boulder which projects about 2 feet. It is located at the northerly end of a rock wall, 3 feet east of a concrete gate post and about 3 feet higher than the station.

Reference mark number 2 is a standard disk, stamped PUUIKI NO 2 1950, set into a drill hole in a boulder which is about 4 feet in diameter and 4 feet high. It is located about 4 feet higher than the station.

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: PUUIKI

STATE: HAWAII

YEAR: 1878

FIRST

ORDER

SOURCE: G- 9311

GEODETIC LATITUDE:	20 ° 42' 18.051	ELEVATION	46.3 METERS
GEODETIC LONGITUDE:	156 00 02.830		152 FEET

STATE COORDINATES (Fvii)				
STATE & ZONE	CODE	X	Y	θ OR Δ ° ANGLE *
HI 2	5102	727,581.30	135,455.64	+ 0 14 08

* 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
MAKAALAE	230 50 05.5	230 35 58	5102

QE 335

(continued on next page)

HORIZONTAL CONTROL DATA

by the
NATIONAL GEODETIC SURVEY
OLD HAWAIIAN DATUM

QUAD 201561

STATION 1191

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

PUUIKI (continued)

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

8-55)

NAME OF STATION: PUUIKI
ESTABLISHED BY: H.G.S.
RECOVERED BY: H.J.S.
YEAR: 1878 STATE: Hawaii
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. A new description follows:

The station is about 4 miles south southwest of Hana, on the east side of the Old Government Road, on the west side of the present State Highway 31, about 100 yards west of the sea and about 200 feet northeast of St. Peters Catholic Church at Puuiki.

To reach the station from the Hana Ranch Offices at Hana, go south along State Highway 31 for 4.6 miles to the junction of the old Government Road and the present State Highway 31 and the entrance to the St. Peters Church grounds.

The station is a standard station mark disk stamped PUUIKI 1950 set in top of a 6 inch concrete monument which projects 4 inches. It is 25.2 feet southwest of the southwest corner of a house, 7.4 feet east of a tele phone pole and 3 feet northwest of a guy wire anchor in heavy grass.

Reference mark 1 is a standard reference disk stamped PUUIKI NO 1 1950 set in a drill hole in a boulder about 4 ft. in diameter and about 4 ft. high and on the edge of the bank at the south side of the house mentioned.

Reference mark 2 is a standard reference disk stamped PUUIKI NO 2 1950 set in a drill hole in a rock which is part of the wall between the church yard and the old Government Road. It is at the north end of the wall and is 3 feet east of the east concrete gatepost.

Descriptions of the reference marks were reversed in the 1950 recovery note but the directions and distances were correct.

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

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: PUUIKI
ESTABLISHED BY: HGS
RECOVERED BY: R.C. Munson
YEAR: 1878
YEAR: 1968
STATE: Hawaii
COUNTY: Maui
Island: Maui

OBJECT	BEARING	DISTANCE		DIRECTION
		FEET	METERS	
MAKAALAE 1950	1950 DISTANCE and DIRECTION			00 00 00.0
R.M. No. 2	NW	52.920	16.131	223 16 30
R.M. No. 1	NE	8.928	2.721	285 44 36
MAKAALAE 1950	1968 DISTANCE and DIRECTION			00 00 00.0
R.M. No. 2	WSW	52.875	16.117	223 15 32
R.M. No. 1	NW	8.779	2.676	285 29 20
Stone pier	NE	(Approx. 3900 ft.)		358 22 55.7

Station was recovered and all marks found in good condition. The descriptions of the RMs are reversed, but the distance and directions are listed correctly. Slight discrepancies were noted in distances to the RMs, they were double-checked and the 1968 distances are correct.

Station is located about 3-1/2 miles south-southwest of Hana, and about 200 feet east of the Puuiki Catholic Church, at east side of the junction of the highway and the church driveway, behind a high, board fence, in the yard of a home.

To reach station from the post office in Hana, go south on State Highway 31 for 3.65 miles to fork. Take right fork, upgrade, for 0.1 mile to top of rise and station on left.

Station mark is a standard disk stamped "PUUIKI 1950", set in the top of a 6-inch-diameter, concrete monument projecting 5 inches from the center of a 16-inch-square, stone and concrete base which projects 3 inches from ground. It is 40 feet east of center line of macadam road, 20.6 feet east of board fence, 25.2 feet south of southwest corner of house, 8.0 feet east of telephone-power pole No. 95, 3.4 feet northwest of the base of a guy-cable, and 3 feet west of a line extended from west side of house.

Reference mark number one is a standard disk stamped "PUUIKI NO 1 1950", cemented in a drill hole in the pointed top of a large, sharp boulder that sets in a shrubbery patch in the yard, and projects 3-1/2 feet from ground. The mark is 7.5 feet northeast of pole No. 95 and about 3-1/2 feet higher than station mark.

Reference mark number two is a standard disk stamped "PUUIKI NO 2 1950", cemented in a drill hole in a boulder projecting 2 feet above ground. It is in the fork of road and church driveway, 4.5 feet east of concrete gatepost, 12.5 feet east of center line of church driveway, at the north end of a stone wall, and 6.6 feet higher than station mark.

Stone pier will serve as an azimuth mark. It is a 6-foot-diameter, stone and mortar, mast foundation, with a conical top which has a 3-inch diameter iron bolt at the top, which is 6 feet above ground. Pier is located 115.5 feet northwest of station MAKAALAE 1950.

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

Q 201561 STATION 1192
HAWAII
LATITUDE 20° 30' TO 21° 30'
LONGITUDE 156° 00' TO 156° 30'
DIAGRAM NF 4-16 MAUI

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
Form 825
Rev. Aug. 1963

DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: RAYOLAI

STATE: Hawaii

COUNTY: Maui

CHIEF OF PARTY: W.R. Porter

YEAR: 1961

Described by: A.C.H.

NOTE	HEIGHT OF TELESCOPE ABOVE STATION MARK	HEIGHT OF LIGHT ABOVE STATION MARK	METERS.		
None	1.4				
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 IO 1879					
11a RM 2		NE	34.050	10.377	0° 00' 00.0
11a RM 1		SE	45.800	13.960	85° 06' 08.4
					51° 26' 24.0

Station is located on the southwest coast of the island of Maui, near the FAA Low Frequency Radio Range installation.

To reach from the Kihel Post Office, go south on Hawaii State Highway 31 for 6.1 miles to end of black top road and cattle guard. Continue south on dirt road to fork in road where Highway 31 turns left. Take right fork and continue south for 1.9 miles to FAA Radio Range Station on right and the southerly of two gates into FAA property. Turn left and go east through break in the lava rock wall into a level field and station site.

Station mark, a standard disk stamped RAYOLAI 1961 is set in a concrete monument projecting 3 inches above the ground. It is 57 feet west of a line of power poles and 210 feet east of the opening in the rock wall.

Reference Mark No. 1, a standard disk stamped RAYOLAI NO 1, 1961 is set in a concrete monument level with the ground. It is 6 feet south-east of a forked tree and 24 feet west of a line of power poles.

Reference Mark No. 2, a standard disk stamped RAYOLAI NO 2, 1961 is set in a concrete monument projecting 3 inches above the ground. It is 40 feet north of the lava rock wall and 27 feet west of a line of power poles.

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: RAYOLAI

ESTABLISHED BY: W.R. Porter

YEAR: 1961

STATE: Hawaii

RECOVERED BY: R.C. Munson

YEAR: 1968

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:

Station has been destroyed by bulldozing. The top of the station monument, with the disk in it, and RM No. 2 in a broken-off part of the monument, were found laying nearby.

A trial point was established in the vicinity by triangulation and the original station point found by inverse from this. Digging uncovered the remainder of the station monument below ground. It was removed and a search made for an underground mark, however none had been established. RM No. 1 was not found and is believed removed also.

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: RAYOLAI

STATE: HAWAII

YEAR: 1961

THIRD

ORDER

SOURCE: G-12717

GEODETIC LATITUDE:	20° 38' 03.909	ELEVATION:	8	METERS
GEODETIC LONGITUDE:	156° 26' 45.797	SCALED		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	ANGLE
H1 2	5102	575,433.35	139,403.14	+ 0° 34' 40"

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

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH (From south)	CODE
PUU IO	234° 00' 43.0	233° 56' 03"	5102

QF 245

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 201561 STATION 1193
 HAWAII
 LATITUDE 20 ° 30' TO 21 ° 00'
 LONGITUDE 156 ° 00' TO 156 ° 30'
 DIAGRAM NF 4-16 MAUI

ADJUSTED HORIZONTAL CONTROL DATA

NO TEXT

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

SOURCE: G-SP156

GEODETIC LATITUDE: 20 ° 45' 19.735	ELEVATION: METERS
GEODETIC LONGITUDE: 156 ° 27' 34.082	FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ 10R Δ ϕ 1 ANGLE *
HI 2	5102	570,791.03	153,367.44	+ 0 ° 04' 24"

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

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

QD 126

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

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

Q 201561 STATION 1194
HAWAII
LATITUDE 20 ° 30' TO 21 ° 00'
LONGITUDE 156 ° 30' TO 156 ° 30'
DIAGRAM NF 4-16 MAUI

NO TEXT

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: RED SPIRE

STATE: HAWAII

YEAR: 1899

THIRD

ORDER

SOURCE: G-SP156

NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE:	20 ° 53 ' 45.41	ELEVATION:	METERS
GEODETIC LONGITUDE:	156 29 59.88		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	δ OR Δ θ ANGLE *
HI 2	5102	556,901.33	204,369.50	+ 0 ° 03 ' 34 "

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

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

QO 056

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 201561 STATION 1195
 HAWAII
 LATITUDE 20 ° 30' TO 21 ° 00'
 LONGITUDE 156 ° 00' TO 156 ° 30'
 DIAGRAM NF 4-16 MAUI

ADJUSTED HORIZONTAL CONTROL DATA

NO TEXT

NAME OF STATION ROAD
 STATE HAWAII YEAR 1900 THIRD ORDER

SOURCE: G-SP156

GEODETIC LATITUDE:	20 47 54.032	ELEVATION:	METERS
GEODETIC LONGITUDE:	156 29 18.005		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ ϕ ANGLE *
HI 2	5102	560,911.05	168,922.78	+ 0 03 48

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

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

40 122

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 201561 STATION 1196
HAWAII
LATITUDE 20 ° 30' TO 21 ° 30'
LONGITUDE 156 ° 00' TO 156 ° 30'
DIAGRAM NF 4-16 MAUI

NO TEXT

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: ROUGH

STATE: HAWAII

YEAR: 1904

THIRD

ORDER

SOURCE: G-SP156

NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE	20 ° 39' 07.72	ELEVATION	METERS
GEODETIC LONGITUDE	156 ° 26' 44.59		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ (R) Δ (A) ANGLE *
HI 2	5102	575,539.23	115,841.13	+ 0° 04' 41"

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE θ (R) Δ (A) FORMULA NEGLECTING THE SECOND TERM

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

00 133

HORIZONTAL LOCATION DATA

NO TEXT

HORIZONTAL CONTROL DATA

by the
NATIONAL GEODETIC SURVEY
OLD HAWAIIAN DATUM

QUAD 201561 STATION 1197
HAWAII
LATITUDE 20°30' TO 21°00'
LONGITUDE 156°00' TO 156°30'
DIAGRAM NF 4-16 MAUI

DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: SATELLITE TRIANG. STATE: Hawaii COUNTY: Maui
STATION 011
CHIEF OF PARTY: J.L. Gammon YEAR: 1966 DESCRIBED BY: JMW

NOTE*	HEIGHT OF CAMERA SURFACE-STATION MARK, UNDERGROUND-STATION MARK	OBJECT	BEARING	DISTANCE		DIRECTION†		
				FEET	METERS			
4	KOLEKOLE, 1950		SW			00	00	00.0
12c	RM 3		N	77.32	23.567	17	04	43.7
desc	Az. Mk.		NE	(0.33 mi.)	85	00		33.6
12d	HANAKAUHI 2		NE	(5.5 mi.)	90	58		
12c	RM 1		E	37.38	11.393	251	02	18.3
12c	RM 2		SW	69.32	21.056	354	08	42.6

Detailed description: The station is located on the southwestern rim of Haleakala Crater in the Haleakala Science Reserve. The station is on property owned by the University of Hawaii and is about 38 miles from the Kahului Airport. To reach the station from the Kahului Airport, follow Highway 38 southwest for 0.5 mile to the junction of Highway 37. Turn left onto Highway 37 and follow it in a southerly direction for 9.2 miles to the junction of Highway 377. Turn left onto 377 and go in a southeasterly direction for 6.2 miles to the junction of Highway 378. Turn left onto Highway 378 and follow it in a southeasterly direction for 21.6 miles to the intersection with Skyline Drive. A large sign reading, "ASTRONOMICAL OBSERVATORIES, UNIVERSITY OF HAWAII, UNIVERSITY OF MICHIGAN, SMITHSONIAN INSTITUTION" is located at the intersection. Turn right and follow Skyline Drive in a southwesterly direction for 0.5 mile to a fork in the road. Follow the left fork for 0.1 mile in a southwesterly direction to a fork intersection. Follow the right fork for 0.3 mile in a westerly direction to another fork intersection. Follow the right fork in a westerly direction thru two large, white posts to the end of the road and the station.

The station has been occupied during the fall and winter of 1966-1967 by Satellite Triangulation Unit 01.

The station is a standard triangulation station disk, stamped SATELLITE TRIANG. STATION 011, 1966, and is set in the top of an 18 inch cylindrical concrete monument which projects about 2 inches above the ground. Four anchor bolts are embedded in the monument seven inches from the disk for the purpose of securing the BC-4 camera pedestal. It is 84.9 feet east of the southeastern most corner of the University of Hawaii Night Sky Observatory, 53.1 feet south of the southern corner of the Aeronautical Radio, Inc. building, and about 50 feet northeast of the end of the road.

No underground mark was established.

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

USCOMM-DC 27171-PI

ADJUSTED HORIZONTAL CONTROL DATA ADJUSTMENT BY NGS

NAME OF STATION: SATE TRI STA 011 OBS BY AMS
STATE: HAWAII YEAR: 1966 THIRD -ORDER

SOURCE: G-13826

GEODETIC LATITUDE:	20°42'38.56101	ELEVATION:	3047.8 METERS
GEODETIC LONGITUDE:	156°15'31.47106		9999 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	§ 108 Δ S1 ANGLE °
HI 2	5102	639,411.76	137,236.81	+ 0°08'39"

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE § 108 Δ S1 FORMULA NEGLECTING THE SECOND TERM.

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

THESE DATA OBTAINED FROM ADJUSTMENT OF MAY 1979

H6 007

(continued on next page)

HORIZONTAL CONTROL DATA

by the
NATIONAL GEODETIC SURVEY
OLD HAWAIIAN DATUM

QUAD 201561

STATION 1197

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

SATE TRI STA 011 (continued)

5

Reference mark 1 is a standard disk, stamped SATELLITE TRIANG. STATION 011, 1966, R.M. 1, set in cement in a depression in a lava boulder, which covers considerable area and projects about 2 feet above the surface of the ground. The mark is 107.3 feet ENE of the southeastern most corner of the University of Hawaii Night Sky Observatory and 78 feet south of the southern corner of the Aeronautical Radio, Inc. building.

Reference mark 2 is a standard disk, stamped KOLEKOLE NO. 2, 1950, set in a drill hole in a triangular (5 feet on a side) lava boulder which projects about 2 feet above the surface of the ground. The mark is 114.5 feet SSW of the southern corner of the Aeronautical Radio, Inc. building and 24 feet E of the southeastern most corner of the University of Hawaii Night Sky Observatory.

Reference mark 3 is a standard disk, stamped KOLEKOLE NO. 3, 1950, set in a drill hole in a lava rock which is about 2 feet in diameter and projects about 8 inches above the surface of the ground. The mark is 17.5 feet N of the west corner of the Aeronautical Radio, Inc. building and 14 feet W of the north corner of the same building.

The azimuth mark is a standard disk, stamped SATELLITE TRIANG. STATION 011, 1966, set flush with the top of a masonry wall beside the path leading to the Red Hill Observatory. The mark is 15.75 feet NW along the wall from the outermost pipe column at the entrance to the observatory.

To reach the azimuth mark from the entrance to the Science Reserve, follow Skyline Drive 0.5 mile to a fork in the road. Take the right fork to the Red Hill Observatory (indicated by a sign).

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

APR 1980
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 201561 STATION 1198
HAWAII
LATITUDE 20°30' TO 21°00'
LONGITUDE 156°00' TO 156°30'
DIAGRAM NF 4-16 MAUI

SEE STATION SATE TRI STA 011

ADJUSTED HORIZONTAL CONTROL DATA ADJUSTMENT BY NGS

NAME OF STATION: SATE TRI STA 011 RM 1

OBS BY AMS

STATE: HAWAII

YEAR: 1966

THIRD -ORDER

SOURCE: G-13826

GEODETIC LATITUDE:	20 42 38.38333	ELEVATION:	3047	METERS
GEODETIC LONGITUDE:	156 15 31.12555	SCALED		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	ϕ OR Δ OR ANGLE
HI 2	5102	639,444.61	137,218.96	+ 0 08 40

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

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH (From south)	CODE
THESE DATA OBTAINED FROM ADJUSTMENT OF MAY 1979			
H6 008			

HORIZONTAL CONTROL DATA

by the
National Ocean Survey
OLD HAWAIIAN DATUM

Q 201561 STATION 1199
HAWAII
LATITUDE 20 ° 30' TO 21 ° 00'
LONGITUDE 156 ° 00' TO 156 ° 30'
DIAGRAM NF 4-16 MAUI

NO TEXT

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: SCHOOL

STATE: HAWAII

YEAR: 1904

THIRD

ORDER

SOURCE: G-SP156

NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE:	20 38' 48.32"	ELEVATION:	METERS
GEODETIC LONGITUDE:	156 26' 47.10"		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ B1 ANGLE *
HI 2	5102	575,503.79	113,681.78	+ 0° 04' 40"

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE θ OR Δ B1 FORMULA NEGLECTING THE SECOND TERM.

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

QO 135

HORIZONTAL CONTROL DATA

Q 201561 STATION 1200
HAWAII
LATITUDE 20 ° 30' TO 21 ° 00'
LONGITUDE 156 ° 00' TO 156 ° 30'
DIAGRAM NF 4-16 MAUI

NO TEXT

ADJUSTED HORIZONTAL CONTROL DATA

STATE HAWAII

YEAR 1900

THIRD

-ORDER

SOURCE: G-SPi56

GEODETIC LATITUDE:	20° 40' 54.904	ELEVATION:	METERS
GEODETIC LONGITUDE:	156 26 49.206		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	β OR Δ OR \angle
HI 2	5102	575,086.22	126,654.26	+ 0 04 39

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

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

QD 128

Q0 128

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 201561 STATION 1201
HAWAII
LATITUDE 20 ° 30' TO 21 ° 00'
LONGITUDE 156 ° 00' TO 156 ° 30'
DIAGRAM NF 4-16 MAUI

NO TEXT

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: SHORE A

STATE: HAWAII

YEAR: 1904

THIRD

-ORDER

SOURCE: G-SP156

GEODETIC LATITUDE:	20 35' 04".87	ELEVATION:	METERS
GEODETIC LONGITUDE:	156 20 19.25		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ θ 1 ANGLE *
HI 2	5102	612,184.20	91,401.94	+ 0 ° 06' 55 "

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

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

QO 156