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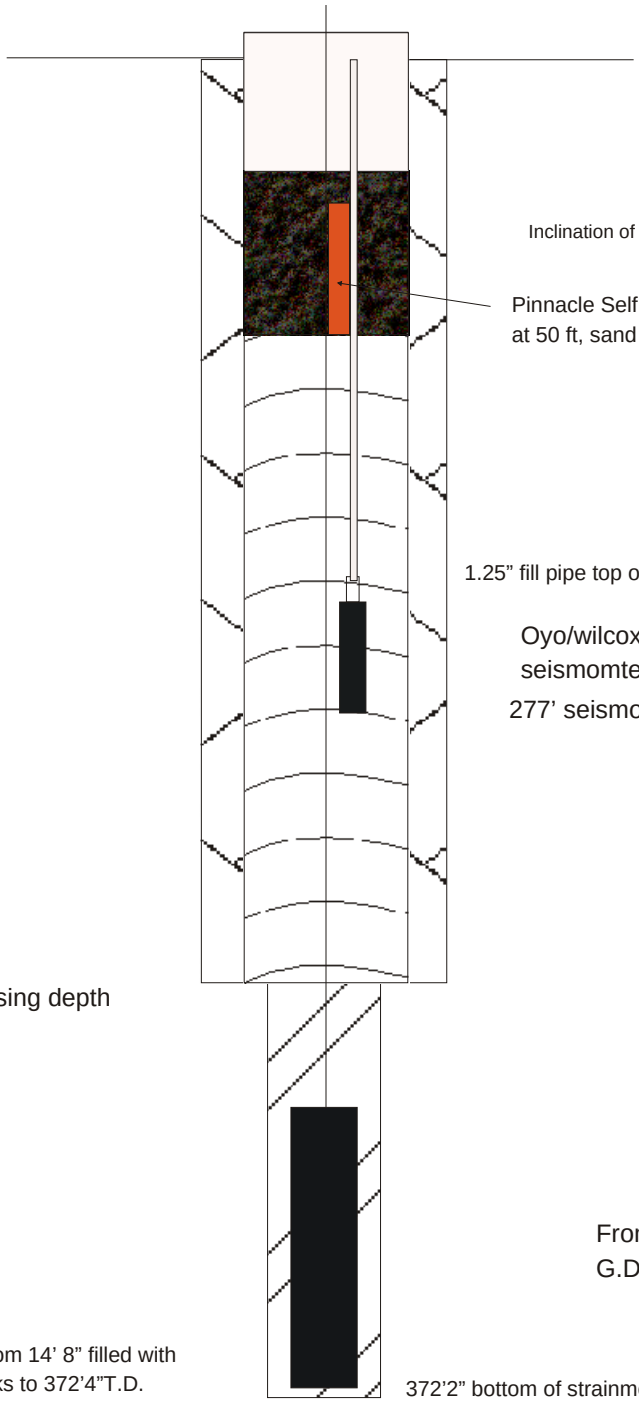
Mauna Loa Strip Dilatometer

4.0” casing inside 4.5” borehole
with 4” cored section from 356’10”’ to 387’5’’

total length of borehole cemented back to 50’ of surface

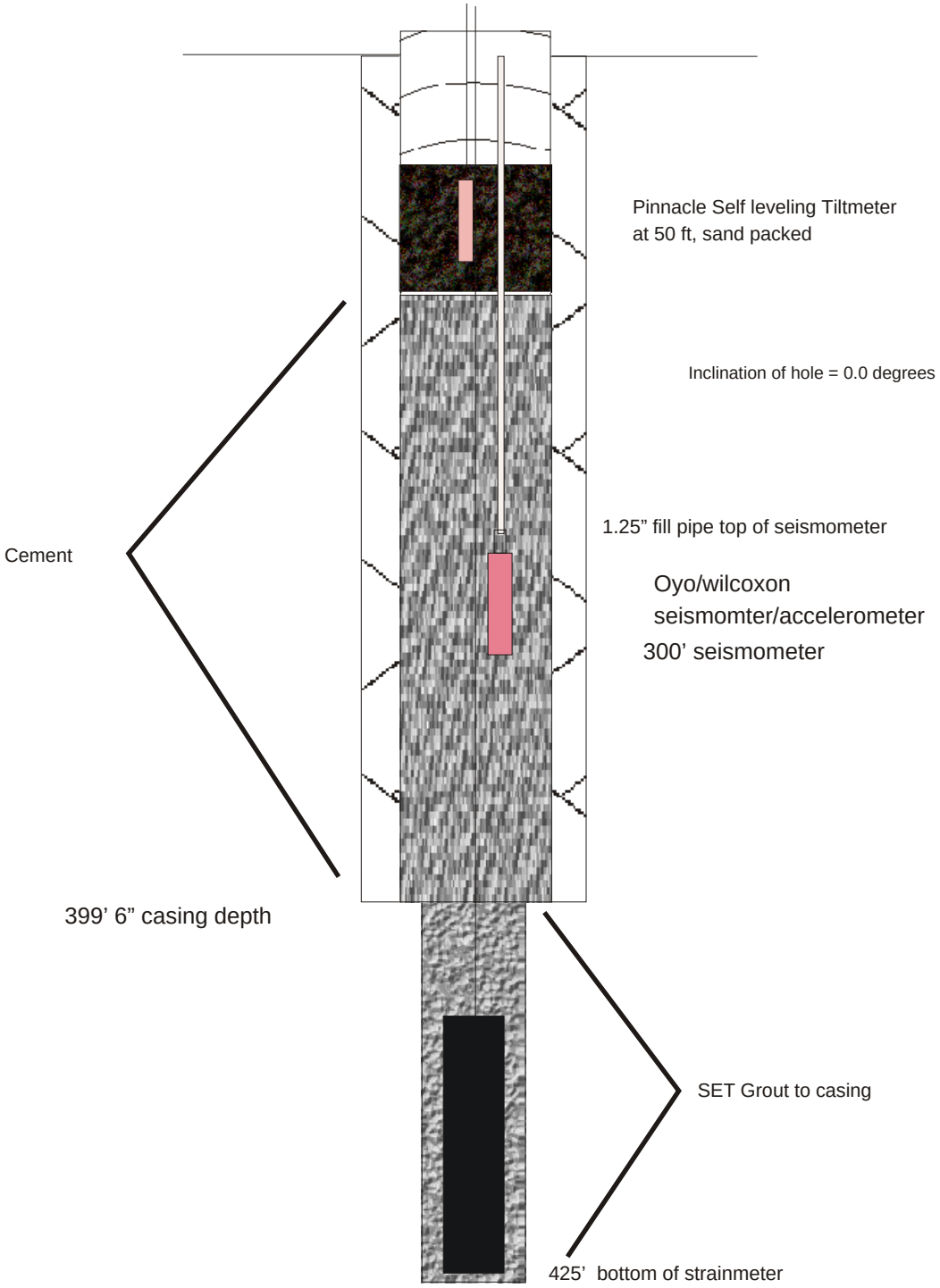


From notes of 09/01/00
G.D. Myren

Hokukano Dilatometer

4.0” casing inside 4.5” borehole
with 4” cored section from 399.5’ to 425’ 6”

total length of borehole cemented back to 50’ of surface



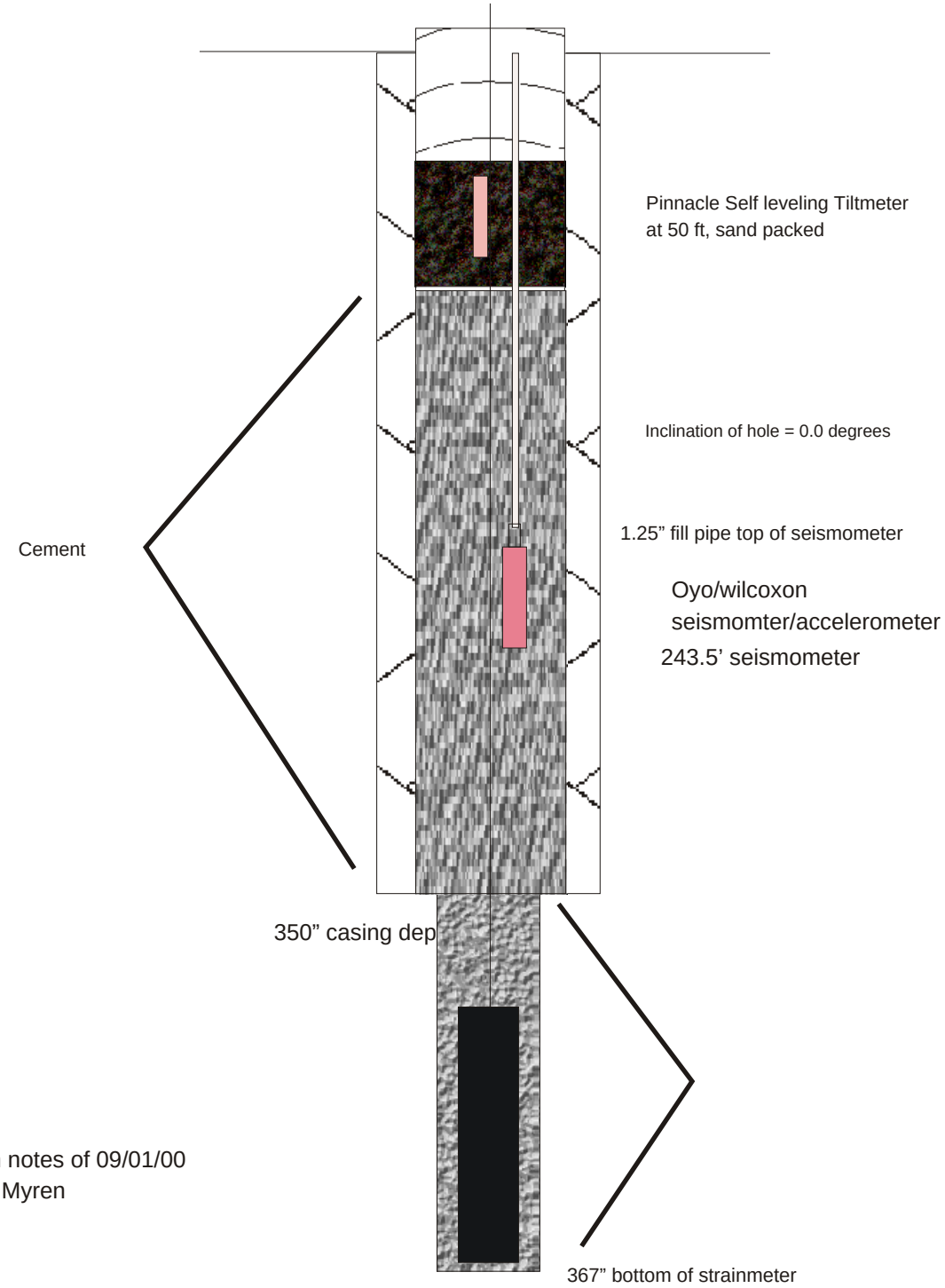
T.D. = 428’ 9”
bottom 3’ filled with rock

From notes of 09/01/00
G.D. Myren

Mauna Loa Observatory Dilatometer

4.0” casing inside 4.5” borehole
with 4” cored section from 350’ to 367’3”

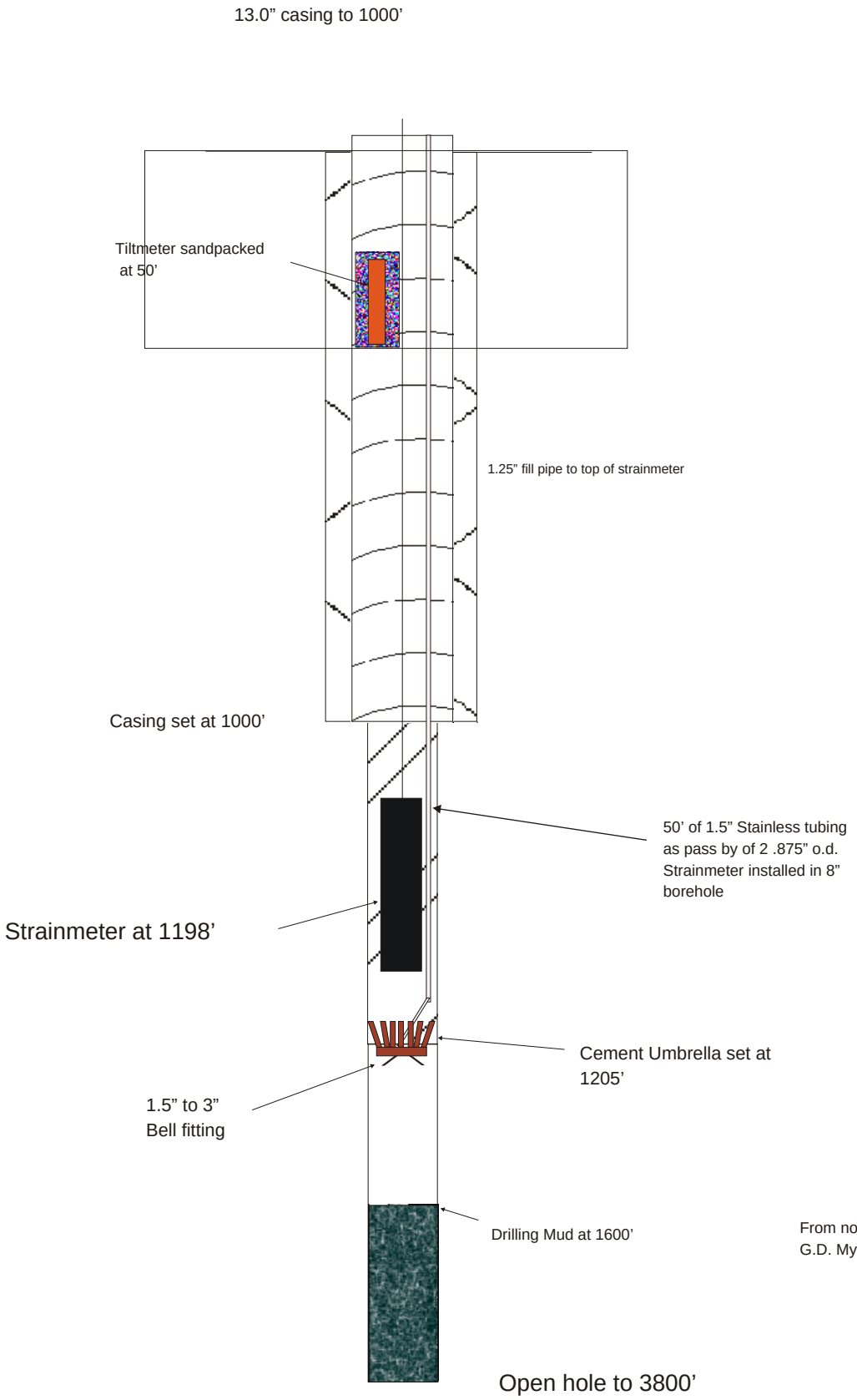
total length of borehole cemented back to 45’ of surface



From notes of 09/01/00
G.D. Myren

T.D. = 367’3””

Keller Dilatometer



From notes 05/18/04
G.D. Myren

degussa.
Construction Chemicals

SET® GROUT

General-construction mineral-aggregate nonshrink grout

PRODUCT DATA

3 03600 Grouts

Description

Set® Grout is a Portland-cement-based construction grout containing mineral aggregate. It is designed to meet all of the performance requirements of the Corps of Engineers Specification CRD C 621 and ASTM C 1107, Grades B and C, at a consistency from flowable to damp pack.

Yield

One 50 lb (22.7 kg) bag of Set® Grout mixed with 1.0 gallon (3.8 L) of water, provides approximately 0.42 ft³ (0.012 m³) of mixed grout (at a flowable mix).

Packaging

50 lb (22.7 kg) multi-wall paper bags

Shelf Life

1 year when properly stored

Storage

Store in unopened packaging in a clean, dry environment

Features	Benefits
▪ Natural gray color	Blends in with surrounding concrete
▪ Free of inorganic accelerators, including chlorides or other salts	Will not corrode reinforcing steel
▪ Can be extended with clean, well-graded coarse aggregate	Fills large voids without additional mix water
▪ Hardens free of bleeding at stiff, plastic, or flowable consistencies	Provides effective bearing area for load transfer

Where to Use

APPLICATION

- Normal loads for columns and baseplates
- Anchoring bolts and reinforcing bars
- Bedding grout for precast panels
- Repairing of cavities resulting from ineffective concrete consolidation
- Caulking concrete pipe
- Backfilling, underpinning foundations, and pressure grouting of slabs needing alignment
- General-construction applications

How to Apply

Application

Consult the Set® Grout product bag for installation details. For aggregate extension guidelines, refer to Appendix MB-10: Guide to Cementitious Grouting.

Curing

Cure all exposed grout shoulders by wet curing for 24 hours and then applying a recommended curing compound compliant with ASTM C 309 or preferably ASTM C 1315.

For Best Performance

- Contact your local representative for a pre-job conference to plan the installation.
- When grouting in temperatures below 50° F (10° C) or above 90° F (32° C), special procedures are required. Store and mix grout to produce the desired mixed-grout temperature. If bagged material is hot, use cold water; if bagged material is cold, use warm water to achieve a mixed-product temperature as close to 70° F (21° C) as possible. Consult with your Degussa representative for use of Set® Grout outside of the recommended temperature range.
- Do not use Set Grout where it will contact steel designed for stresses above 80,000 psi (552 MPa). Use Masterflow® 816, Masterflow® 1341, or Masterflow® 1205 post-tensioning cable grouts instead.
- Do not add plasticizers, accelerators, retarders, or other admixtures or additives without the specific written authorization of Degussa Technical Service.
- For best results, do not attempt to place Set® Grout under a baseplate with less than 1" (25 mm) of vertical clearance.
- Do not place Set® Grout in any lifts greater than 6" (15 cm) unless the product is extended with aggregate.

Protection and Repair

www.DegussaBuildingSystems.com

Technical Data

Composition

Set® Grout is a Portland-cement-based grout containing mineral aggregate.

Compliances

- CRD C 621, Grades B and C, and ASTM C 1107, Grades B and C, at a consistency from flowable to dry pack
- City of Los Angeles Research Report Number RR 23137

Test Data

PROPERTY	RESULTS			TEST METHODS
Flowable Mix[1]				ASTM C230
Approximate water, gallons (L)	1.0 (3.8)			
Flow, 5 drops, %	126 – 145			
Compressive strength, psi (MPa)				ASTM C 942, according to ASTM C 1107
		Consistency		
	Flowable[2]	Plastic[3]	Stiff[4]	
3 day	3,000 (21)	5,000 (35)	6,000 (41)	
7 day	5,000 (35)	6,500 (45)	8,900 (61)	
28 day	7,000 (48)	9,000 (62)	10,000 (69)	

[1] At a constant percent of water, consistency will vary with temperature. Final set takes place in approximately 6 hours at a flowable consistency at 70° F (21° C)

[2] 140% flow on flow table, ASTM C 230, 5 drops in 3 seconds.

[3] 100% flow on flow table, ASTM C 230, 5 drops in 3 seconds.

[4] 40% flow on flow table, ASTM C 230, 5 drops in 3 seconds.

Expect reasonable variations from the results shown because of varying temperatures and atmospheric conditions at the jobsite. Control field and laboratory tests on the desired placing consistency rather than strictly on water content.

- Where precision alignment and severe service, such as heavy loading, rolling, or impact resistance, are required, use metallic-reinforced, non-catalyzed Embeco® 885 grout. If the amount of impact resistance needed is not great enough to require metallic reinforcement, use mineral-aggregate Masterflow® 928 grout.
- Make certain the most current versions of product data sheet and MSDS are being used; call Customer Service (1-800-433-9517) to verify the most current versions.
- Proper application is the responsibility of the user. Field visits by Degussa personnel are for the purpose of making technical recommendations only and not for supervising or providing quality control on the jobsite.

Health and Safety

SET® GROUT

Caution

Risks

Eye irritant. Skin irritant. Causes burns. Lung irritant. May cause delayed lung injury.

Precautions

KEEP OUT OF THE REACH OF CHILDREN. Avoid contact with eyes. Wear suitable protective eyewear. Avoid prolonged or repeated contact with skin. Wear suitable gloves. Wear suitable protective clothing. Do not breathe dust. In case of insufficient ventilation, wear suitable respiratory equipment. Wash soiled clothing before reuse.

First Aid

Wash exposed skin with soap and water. Flush eyes with large quantities of water. If breathing is difficult, move person to fresh air.

Waste Disposal Method

This product when discarded or disposed of is not listed as a hazardous waste in federal regulations. Dispose of in a landfill in accordance with local regulations.

For additional information on personal protective equipment, first aid, and emergency procedures, refer to the product Material Safety Data Sheet (MSDS) on the job site or contact the company at the address or phone numbers given below.

Proposition 65

This product contains materials listed by the state of California as known to cause cancer, birth defects, or reproductive harm.

VOC Content

0 lbs/gal or 0 g/L.

For medical emergencies only, call ChemTrec (1-800-424-9300).

Degussa Building Systems
889 Valley Park Drive
Shakopee, MN 55379
www.degussabuildingsystems.com
Customer Service 800-433-9517
Technical Service 800-243-6739

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Form No. 101624 MSI (Replaces 1121)
Printed on recycled paper including 10% post-consumer fiber

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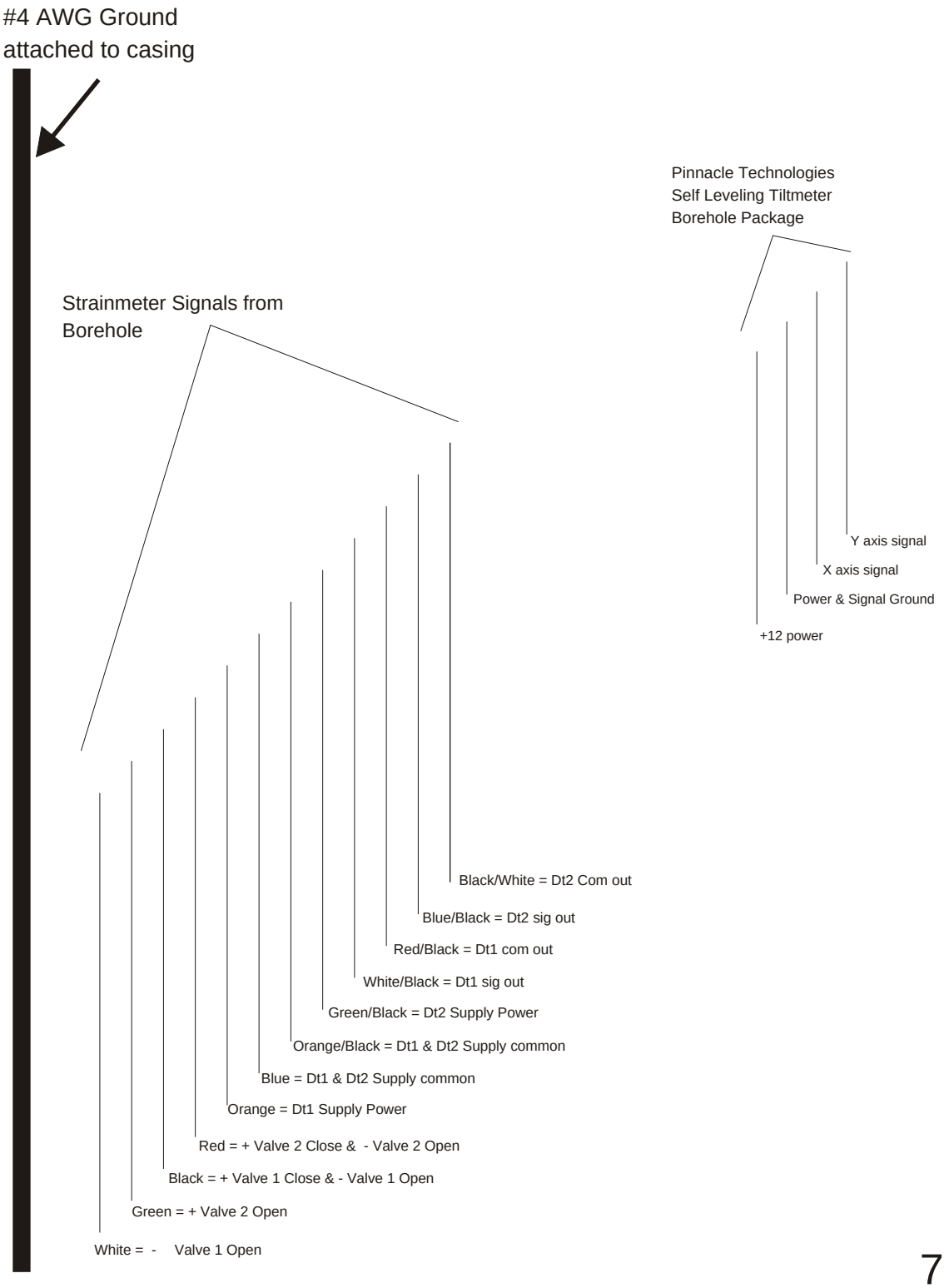
Borehole Signals Wires



Seismic

Strip Road

Telemetry Wiring

From Hole

Seismic Cable

Color	Component
	Accel.
Red	Vert +
Blk	Vert -
Drk Brn	Horiz1. +
Pink	Horiz1. -
Orange	Horiz2 +
Yellow	Horiz2 -
	Velocity
Blue	Vert. +
Green	Vert -
Grey	Horiz1 +
White	Horiz1 -
Purple	Horiz2 +
Lt. Brown	Horiz2 -

Strain Cable

Red	DT1 Strain
Black	Pressure
Green	Common

Reftek Inputs

Channel	Component
1	Accel. V+
	Accel. V -
2	Accel. H1 +
	Accel. H1 -
3	Accel. H2 +
	Accel. H2 -
4	Vel. V +
	Vel. V -
5	Strain DT1 +
	Common -
6	Pressure +
	Common -

Hokukano

Seismic Telemetry Wiring

From Hole

Seismic Cable

Color	Component
	Accel.
Red	Vert +
black	Vert -
red/blk	Horiz1. +
blk/gry	Horiz1. -
org	Horiz2 +
org/blk	Horiz2 -
	Velocity
blu	Vert. +
grn	Vert -
wht/blk	Horiz1 +
wht	Horiz1 -
blu/wht	Horiz2 +
grn/blk	Horiz2 -

Strain Cable

Red	DT1 Strain
Black	Pressure
Green	Common

Reftek Inputs

Channel	Component
1	Accel. V+
	Accel. V -
2	Accel. H1 +
	Accel. H1 -
3	Accel. H2 +
	Accel. H2 -
4	Vel. V +
	Vel. V -
5	Strain DT1 +
	Common -
6	Pressure +
	Common -

Mauna Loa Telemetry Wiring

From Hole

Seismic Cable

Color	Component
	Accel.
Red	Vert +
black	Vert -
red/blk	Horiz1. +
blk/gry	Horiz1. -
org	Horiz2 +
org/blk	Horiz2 -
	Velocity
blu	Vert. +
grn	Vert -
wht/blk	Horiz1 +
wht	Horiz1 -
blu/wht	Horiz2 +
grn/blk	Horiz2 -

Strain Cable

Red	DT1 Strain
Black	Pressure
Green	Common

Reftek Inputs

Channel	Component
1	Accel. V+
	Accel. V -
2	Accel. H1 +
	Accel. H1 -
3	Accel. H2 +
	Accel. H2 -
4	Vel. V +
	Vel. V -
5	Strain DT1 +
	Common -
6	Pressure +
	Common -

Keller Seismic Telemetry Wiring

From Hole

Seismic Cable

Color	Component
	Accel.
Red	Vert +
Blk	Vert -
Drk Brn	Horiz1. +
Pink	Horiz1. -
Orange	Horiz2 +
Yellow	Horiz2 -
	Velocity
Blue	Vert. +
Green	Vert -
Grey	Horiz1 +
White	Horiz1 -
Purple	Horiz2 +
Lt. Brown	Horiz2 -

Strain Cable

Red	DT1 Strain
Black	Pressure
Green	Common

Reftek Inputs

Channel	Component
1	Accel. V+
	Accel. V -
2	Accel. H1 +
	Accel. H1 -
3	Accel. H2 +
	Accel. H2 -
4	Vel. V +
	Vel. V -
5	Strain DT1 +
	Common -
6	Pressure +
	Common -

Wilcoxon Box Inputs

	Wilcoxon Box Inputs	Hokukano & Mauna Loa	Keller & Strip
V1	wht blk	red black	red blk
H1	red blk	red/blk blk/gry	dk brn pink
H2	grn blk	org org/blk	org ylw

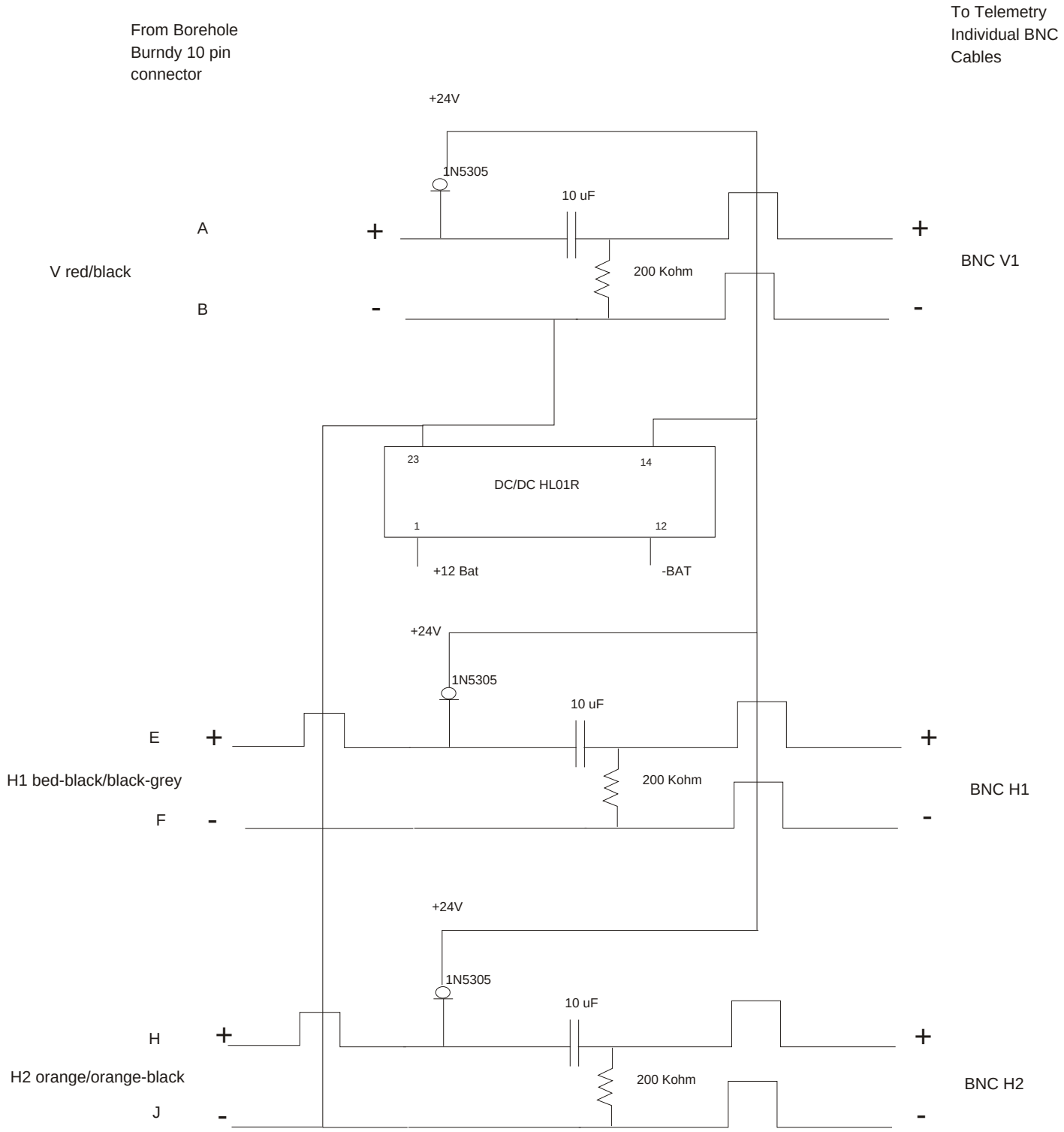
Wilcoxon Outputs

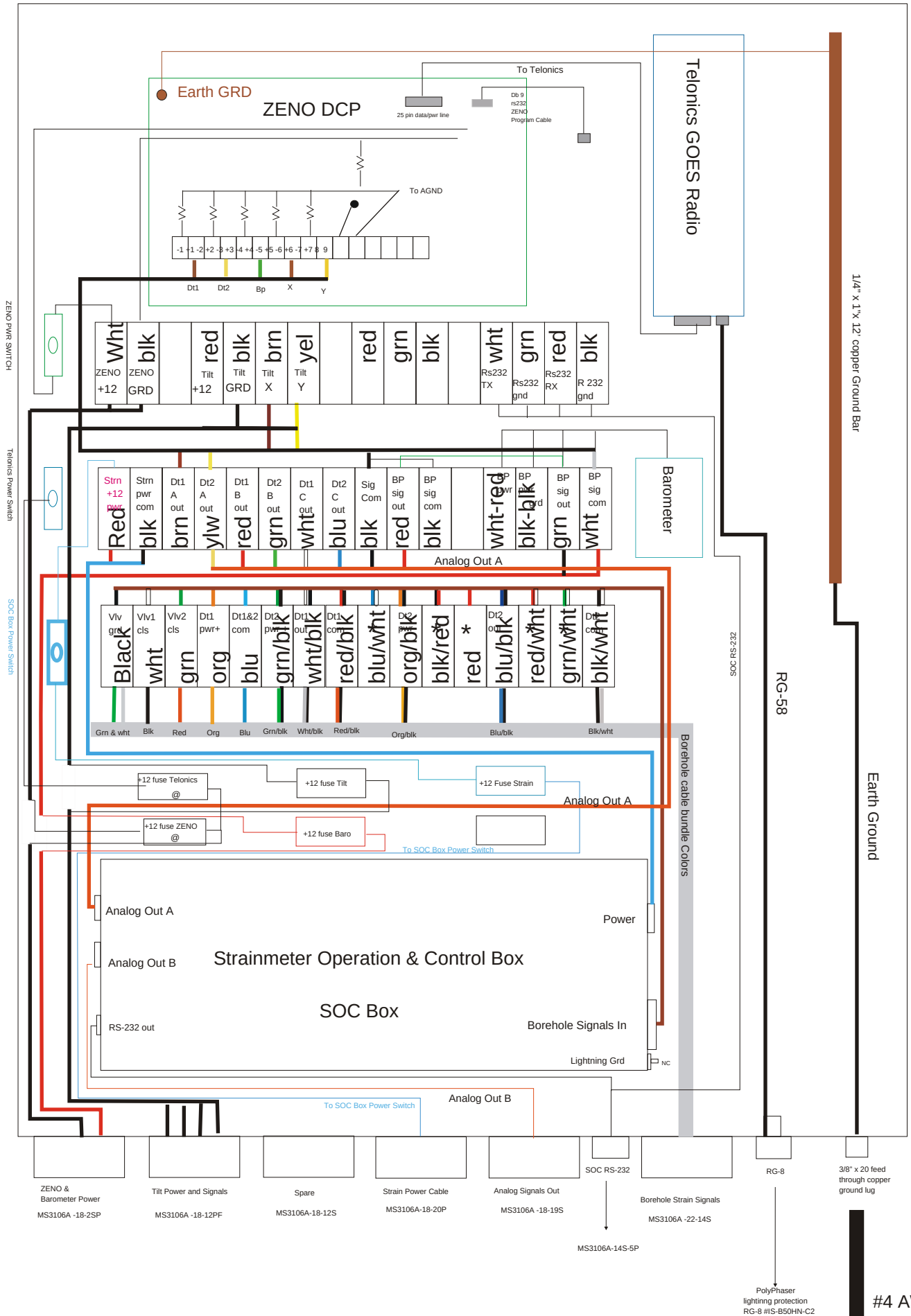
V1 BNC Cable

H1 BNC Cable

H2 BNC Cable

Wilcoxon Wireing





* Not Used

@ ZENO & Telonics share the same power, but are switched sepately.

Carlon #C2420A4
24"x20"x7.5"
Hinged cover NEMA Circuit Safe
Cabinet Enclosure

ZENO®-3200 Specifications

I. INPUTS AND OUTPUTS

A. **Sixteen Analog Inputs.** Seven channels of differential or fourteen channels of single-ended inputs.
- **Ultra-High Resolution:** ±18-bit with 50/60 Hz noise rejection (Sample rate up to 2 channels per second).
- **High Resolution:** ±15-bit with 50/60 Hz noise rejection (Sample rate up to 15 channels per second).
- **Medium Resolution:** ±13-bit (Sample rate up to 50 channels per second).
- **Low Resolution:** Two unipolar channels available at ±12-bit A/D. (On a separate fast A/D converter).

Accuracy and linearity are provided over a wide temperature range as follows:
- **Linearity:** ± 0.001% [-40° to +60°C].
- **Basic Absolute Accuracy:** ±0.05% [-40° to +60°C].
- **Basic Ratiometric Accuracy:** ± 0.01% [+10° to +30°C] - Input range of each channel is software selectable.
- **Wide Dynamic Input Range:** ± 5mV to ± 5V in 10 ranges, with > 1G ohms input resistance.

All analog inputs are fault-protected against shorts, overvoltages, transients and ESD.

B. **Analog Expansion**
- **Up to four multiplexer boards** can be added, each allowing 32 additional single-ended or 16 differential inputs.

C. **Analog Outputs**
- **Optional Digital to Analog expansion board** gives 4 or 8 channels of individually programmable 12-bit analog output at 0 to 5 V (other voltage ranges optional).

D. **18 Digital I/O Channels**
- **Six** Schmitt trigger conditioned inputs.
- **Two** comparator inputs.
- **Six** general purpose input or output channels (Inputs TTL level with pull up resistor, outputs 0 - 5 VDC high impedance).
- **One** switch closure (event counter).

Digital inputs can be configured for frequency, period, count, or event counting. Digital outputs can provide control or alarm signals.
- **Count Inputs:** Up to 65536 counts.
- **Frequency Period Inputs:** Up to 100 KHz, 0.003% accuracy.

E. **Sensor and Auxiliary Power Outputs**
- **Sensor Excitation: Five switched** excitation outputs for software selectable voltages of 1.25, 2.50, 5.00 VDC, with accuracy of 0.01% at up to 100 mA.
- **Reference Outputs: One, fixed** for sensor signal offsets.
- **Power Outputs (Switched): (3 at 12 volt, 2 at 5 volt)**
  - +12 VDC
    - One 12 VDC at 700 mA.
    - Two 12 VDC at 150 mA.
  - +5 VDC
    - Two maximum of 600 mA total for both outputs.
  - Other Power Outputs: optional.

F. **Three Serial Communication Channels**
- **Dedicated RS232 / RS485 / TTL level** with modem control and terminal access.
- **Dedicated RS232** with optional RF modem.
- **RS232 / RS485; SDI-12 optional;** two additional multiplexed TTL optional.
- **RS422 available as option.**
- **Up to two additional** multiplexed channels.

II. CPU AND MEMORY

A. **CPU:** Motorola 68332 32-bit microcontroller. Clock speed 16 MHz.
B. **Program Space:** 256 kBytes of EPROM (512 kBytes optional); 2 kBytes EEPROM.
C. **Data Storage Space:** 64 kBytes standard, 256 kBytes and 1 MB optional (PCMCIA to 20 MB optional).

III. SYSTEM POWER REQUIREMENTS

A. **Power Management:** Advanced power management for very low power consumption includes sensor power switches and dynamic clock. DC-powered system operates from 10.7 to 16 VDC at 10 to 100 mA, depending on application.
B. **Standby Current:** System uses three (3) mA standby current to maximize battery life in low duty cycle applications.
C. **AC Power Option:** 120/240 Volts AC, 50/60Hz power supply/battery charger is optional.

IV. SPECIAL FEATURES

A. **Hardware Watchdog and Power Monitor.**
B. **Software Watchdog Timer.**
C. **Real Time Clock, Battery Backed:** Accurate to 30 seconds per month (5 seconds per month optional).
D. **BIT - Self Test Diagnostics.**
E. **Battery-Backed Logging Memory.**
F. **Non-Volatile System Configuration Settings.**
G. **Individual Channel Programming** of sensor type and sample rate.

V. OPTIONAL FEATURES

A. **Extra Transient Protection.**
B. **PCMCIA slot.**
C. **Up to three Expansion boards.**

VI. PHYSICAL/ENVIRONMENTAL

A. **Dimensions:** 10.25" X 6" X 3.75"
B. **Weight:** 2 lbs / 4 ozs
C. **Wide Temperature Range:** -40°C to +60°C with optional -55°C to +70°C.

COASTAL ENVIRONMENTAL SYSTEMS

820 First Avenue South, Seattle, Washington 98134-1202
Telephone: **206-682-6048 1-800-488-8291** Fax: **206-682-5658**
www.coastalenvironmental.com

ZENO-3200 INTERNAL SOFTWARE (FIRMWARE)
Built-in help-assisted menus in easy-to-read text, accessed by any computer, can be internally programmed:
- Type of sensor and specifications
- Data processing that will occur, requiring single or multiple sensor inputs for calculation
- Data outputs custom configured in real-time or for storage

EEPROM STORAGE
An EEPROM chip remembers all sensor and program settings, changeable only by using ZENO-3200 menus. If disrupted, ZENO-3200 will automatically reboot using the settings that were entered, allowing it to be set up in the office and shipped without programming the unit in the field.

APPLICATION SOFTWARE
A WINDOWS program called DATA INTERCEPTOR is provided by Coastal Environmental Systems which collects, displays and forwards all data from the ZENO-3200. It sends data directly to WINDOWS application programs eliminating the need to decipher custom, proprietary software.

STAND-ALONE PRODUCT OR TURN KEY SYSTEMS
The ZENO-3200 is a stand-alone product or a turn key solution with housings, sensors, towers, communication devices and software applications all supplied by Coastal Environmental Systems.

QUALITY CONTROL
Stress testing of ZENO-3200 units from –40°C to +60°C or optionally at wider ranges assures that all electronic systems are working as specified. No better way exists to cull faulty components and more importantly, confirm work accomplished by engineers and technicians.

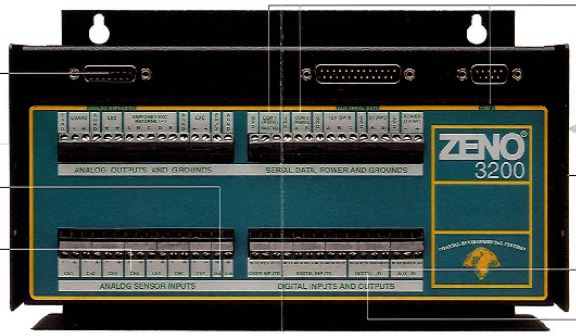
CUSTOMER SUPPORT
Customer support has been a hallmark of Coastal Environmental Systems since 1981. The ZENO-3200 is a product of understanding customer needs—proof that we listen. A customer support program, in place for all these years, is unparalleled. Ask for details and a list of satisfied customers—in the end, their comments are the only real measure of our effectiveness.

TRY OUR NEW WEB SITE
www.coastalenvironmental.com

A/D INPUTS/CONVERSIONS
Fourteen analog inputs with variable (±12 to ±18-bit) conversion increasing accuracy over large dynamic ranges; maximizing sensor performance-to-cost ratios.

ANALOG EXPANSION PORT
Provides analog inputs for additional sensors.

AUXILIARY 12-BIT HIGH SPEED A/D CONVERSION
Two additional channels sampling with 12-bit resolution at up to 20,000 times per second.



SERIAL COMMUNICATIONS
Three hardware UART ports with multiplexing capability to intelligent sensors, additional linked ZENO's, other systems or communication devices.

SOPHISTICATED COMPUTATION AND SAMPLING
The ZENO-3200's 32-bit processing speed enables numerous complex mathematical calculations to be executed using remarkably little power. It samples sensors (if needed) many times per second, expanding data sets, providing more accurate final data.

DATA STORAGE
Single on-board battery-backed memory chip with 256-KByte or 1MByte of memory. Additional memory is available.

DIGITAL I/O PORTS
Up to fifteen channels.

CONTROL OUTPUTS
Using up to seven control outputs, the ZENO-3200 makes decisions affecting related devices or signal alarms.

Example of WINDOWS® applications software. Screen presented describes output from ZENO-3200 displaying DATA INTERCEPTOR software linked to third-party software; configured by customer or by Coastal Environmental Systems' writers.

ZENO®-3200—ADVANCED MEASUREMENT, CONTROL, DATA STORAGE AND TELEMETRY

The ZENO-3200 reads sensors, processes data, checks alarms and control functions and stores and/or telemeters remotely collected data. A Motorola 68332, 32-bit microcontroller allows extremely fast and powerful computing of multiple routines and uses advanced power management for very low power consumption. A *true* real-time executive is used to achieve multi-tasking which samples and communicates simultaneously. Unmatched analog signal conversion, digital I/O, serial communication, programming and data memory *are all located in a single housing.*

Easy to follow, help-assisted menus guide you through minor changes or major projects involving sensors, processing and telemetry.

The primary component of ZENO-3200 is a four-layer, printed circuit board, including transient and RFI protection, in a housing designed to make the ZENO-3200 nearly impervious to noise or radio interference. Every operation is confirmed using both a hardware and software "watchdog."

www.coastal.org

Examine the detailed specifications and call (800) 488-8291 for more information about how the highly sophisticated and versatile ZENO-3200 elevates data gathering capabilities to a new level.

Model 270

SETRACERAM™ for Barometric, Gauge or Absolute Pressure

Barometric Pressure: 600-1100 hPa/mb, 800-1100 hPa/mb
Absolute: 0 to 10, 20, 50, 100 psia / Gauge Pressure: 0 to 5, 10, 20, 50, 100 psig
Non-condensing Air or Gas

For many years, high accuracy environmental and test & measurement applications around the world have relied on the consistent performance of the Setra Model 270 pressure transducer. Applications range from remote weather monitoring and avionics systems, endorsed by government agencies, to crucial compensation for barometric pressure variations in laser interferometers.

Long-term reliability and stability in such demanding application environments are achieved in the 270 with the combination of the SETRACERAM™ capacitive sensor and Setra's proprietary custom IC analog circuit.

The fundamentally simple design and thermally stable glass fused ceramic sensing capsule is coupled with the sophisticated capacitance charge-balance IC circuit where accurate signal conditioning and environmental compensation is performed. Standard accuracy is 0.05% Full Scale, end point method. Higher accuracy and thermal specifications are also available.

Type of Pressure	Pressure Range	Maximum Pressure
Barometric	800 to 1100 hPa/mb 600 to 1100 hPa/mb	20 psia
Absolute	0 to 10, 20, 50, 100 psia	1.5 x rated
Gauge	0 to 5, 10, 20, 50, 100 psig	1.5 x rated

NOTE: Setra adheres to strict quality standards including ISO 9001 and ANSI-Z540-1. The calibration of this product is NIST traceable.

U.S. Patent nos. 4093913, 4168518

159 Swanson Rd., Boxborough, MA/Telephone: 978-263-1400/Fax: 978-264-0292

Applications

- High Accuracy Barometric Pressure Measurement
- Weather and Environmental Data
- Data Buoys and Remote Weather Stations
- Engine Test Cells
- High Accuracy Transfer Standard for Calibration
- CE Mark Compliance

Features

- SETRACERAM™ Sensor
- High Accuracy, ±0.05% FS
- ±0.03% FS Optional Accuracy
- Repeatability Within 0.01% FS
- Excellent Long-Term Stability
- Low Power Consumption
- Instant Warm-Up
- Fast Response

When it comes to a product to rely on - choose the Model 270. When it comes to a company to trust - choose Setra.

ISO 9001 Certified

Visit Setra Online:
http://www.setra.com

setra
800-257-3872

Model 270 Specifications

Performance Data

Accuracy*	<±0.08% FS
Non-Linearity	
End Point	±0.08% FS
Best Fit Straight Line	±0.08% FS
Hysteresis	0.01% FS
Non-Repeatability	0.01% FS
Resolution	Infinite, limited only by output noise level (0.006% FS)
Thermal Effects**	
Compensated Range °F (°C)	+30 to +120 (-1 to +49)
Thermal Zero Shift	
Barometric	<±0.2% FS/100°F (±0.18% FS/60°C)
Other Ranges	<±0.1% FS/100°F (±0.09% FS/60°C)
Thermal Coefficient Sensitivity	<±0.1% FS/100°F (±0.09% FS/60°C)
Long Term Stability	<± 0.1% FS over 6 months at 70°F
Static Acceleration Effect	<±0.01% FS/G
Warm-up	<±0.04% FS shift after 20 minutes at constant temperature and pressure
Time Constant	< 10 milliseconds to reach 90% final output with step function pressure input

*RSS of Non-Linearity, Hysteresis, and Non-Repeatability. Higher accuracy units available on special order.

**Units calibrated at nominal 70°F. Maximum thermal error computed from this datum.

Environmental Data

Temperature	
Operating °F (°C)	0 to +175 (-18 to +80)
Storage °F (°C)	-65 to +250 (-54 to +120)
Vibration	2g from 5Hz to 500Hz
Acceleration	10g
Shock	50g Operating 1/2 sine 10ms
Pressure fitting	1/8"-27 NPT Internal
Electrical connection	2-foot Multi-conductor Cable
Weight (approx.)	9 ounces (0.25 Kgm)

Electrical Data

Electrical Circuit*	4-Wire (+Exc, -Exc, +Out, -Out)
Excitation**	22 to 32 VDC Fully protected against miswiring
Output***	0 to 5 VDC****
Isolation	The insulation resistance between all signal leads tied together and case ground is 100 megohms minimum at 25 VDC.
Output Impedance	<5 ohms
Output Noise	<200 microvolts RMS (0 Hz to 100 Hz).
Current Consumption	8 mA (0.2 Watts)

*For best performance, either negative excitation or negative output should be connected to case (ground). Both leads cannot be connected to case (ground). Units calibrated at the factory with negative excitation connected to case.

**Internal regulation minimizes effect of excitation variation, with < ±0.005% FS output change. Will operate on 28 VDC aircraft power per MIL-STD-704A and not be damaged by emergency power conditions.

***Calibrated into a 50K ohm load, operable into a 5000 ohm load or greater.

****Zero output factory set to within ±5 mV.
Span (Full Scale) output factory set to within ±5 mV.

Options

Electrical Options

623	12 VDC excitation (11 to 15 VDC)

Performance Options

708	Compensated temperature, -13°F to +150°F (±0.13% FS/100°F zero and span effect). Cannot be ordered with option 707.
707	±0.08% FS (RSS) Accuracy with ±0.027% FS Linearity (End Point Method). Cannot be ordered with option 708.

Mechanical Options

808-825	Up to 25 ft. of cable can be supplied. Please specify cable length when ordering (i.e. 805 for 5 ft. cable).
865	NEMA 4 Weather Proof Enclosure
911	Etched Metal Stainless Steel Tag

Special Range

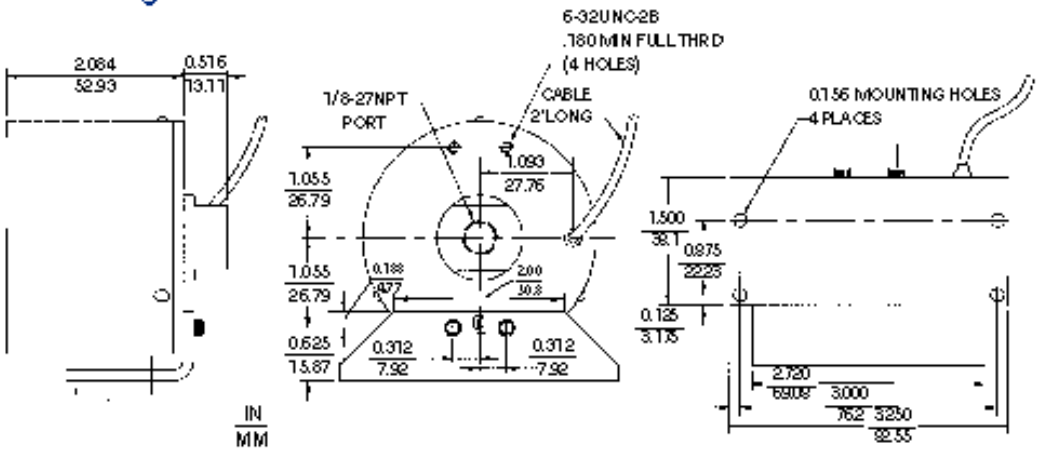
SR	Special Range (Specify Range Required).

Pressure Media

Non-condensing air or gas compatible with hard anodized aluminum, alumina ceramics, gold, fluorocarbon elastomer sealant & Buna-N O-Ring.

Specifications subject to change without notice.

Outline Drawings

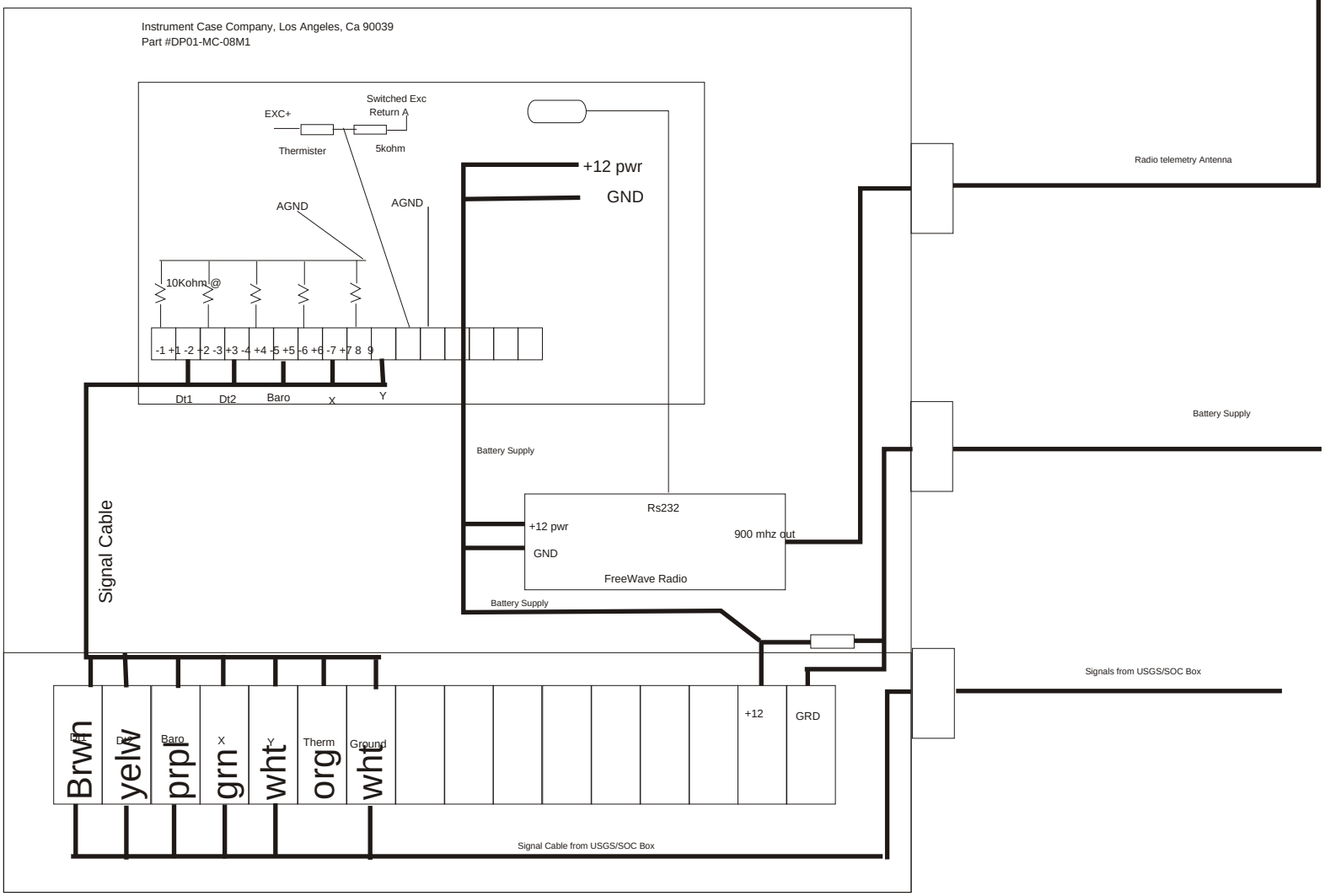


With we provide application assistance on all Setra products, both personally and through our literature, it is the customer's responsibility to determine the suitability of the product in the application.

159 Swanson Road, Boxborough, MA 01719/Tel 978-263-1400;
Toll Free 800-257-3872; Fax 978-264-0292; email sales@setra.com

setra

Free Wave Box

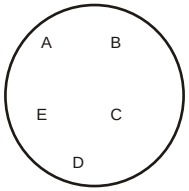


Inputs2001dcpbox.cdr

Rev 09/29/01

Solder side

Receptacles

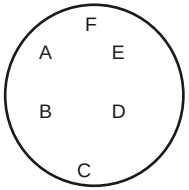


5 pin female

ZENO/BARO

power

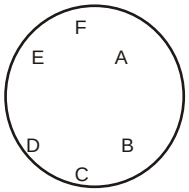
A - Bat DCP blk
B + Bat DCP wht
C + Bat Baro Setra wht
D NC
E - Bat Baro Setra blk



6 pin male

Tlitmeter

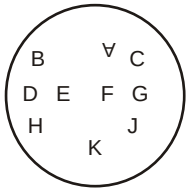
A -Bat tilt blk
B X out brn
C NC
D Y out ylw
E + Bat red
F NC



6 pin female

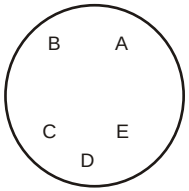
Pore Pressure

A NC
B Pore Pres sig out BLK
C Pore Press Com GRN
D Pore Press BAT RED
E NC
F NC



Spare

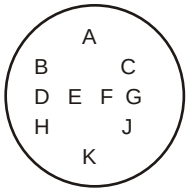
female



5 pin male

Strainmeter Power

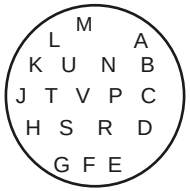
A + Bat Red
B - Bat Blk
C - Bat Blk
D NC
E + Bat Red



10 pin female

Signal to A/D

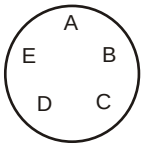
A dt1A out + brn
B dt1B out + red
C NC
D Baro out + red
E Baro out com blk
F dt2C out + blu
G dt2A out + ylw
H dt1&2,A,B,C com blk
J dt2B out + grn
K dt1C out + wht



Strainmeter cable

19 pin female

A Valve #1,2 open + Blk
B Valve #1 close + wht
C dt1 C out - sig red
D Valve #2 close + grn
E dt1 A,B,C IN + pwr org
F dt1&2 A,B,C IN - pwr blu
G dt1 A out + sig wht/blk
H dt 1 A out - sig red/blk
J dt2 A,B,C IN pwr + grn/blk
K dt1 B out - sig org/blk
L dt2 A out + sig blu/blk
M dt2 A,B,C out - sig blk/wht
N dt2 B out + sig red/wht
P dt2 C out + sig grn/wht
R dt1 B out + sig blu/wht
S dt1 C out + sig blk/red



Female

RS-232

Strainmeter

A tx wht
B iso-GND grn
C RX red
D iso - gnd blk
E NC

2001MAMbox

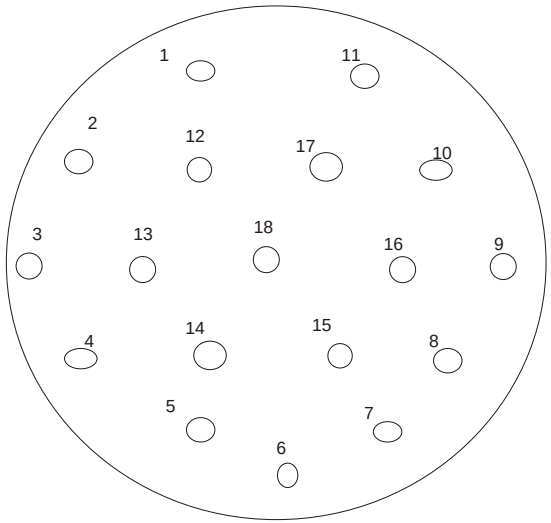
Strainmeter Inputs

Carol Cable#C0787 multi-conductor
foil shield

BoreholeDCPBox.cdr

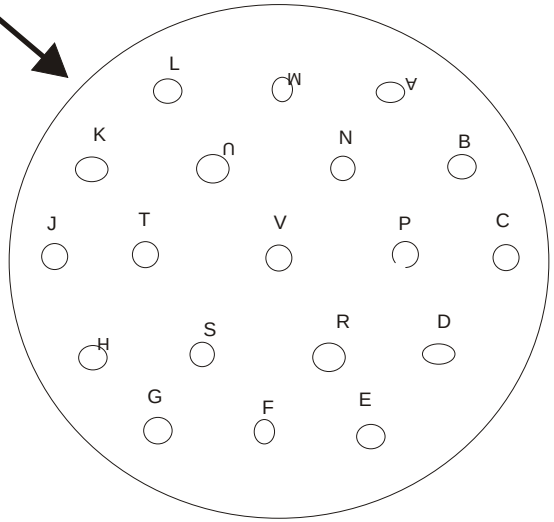
REV 9/29/01

STRAINMETER ELECTRONICS BOX CONNECTOR		Borehole cable	strainmeter to	19 pin DCP BOX connector
12 & 17	- valve 1&2 close	black	1	A
1	+valve 1 close	white	2	B
9	DT1 C sig out -	red	3	C
11	valve #2 close	green	4	D
2	DT 1 A,B,C IN +	orange	5	E
13	DT 1&2 A,B,C IN -	blue	6	F
4	DT 1 A sig out +	wht/blk trace	7	G
5	DT 1 A sig out -	red/blk trace	8	H
3	DT 2 A,B,C IN +	grn/blk trace	9	J
7	DT 1 B out -	org/blk trace	10	K
10	DT 2 A out +	blu/blk trace	11	L
14	DT 2 A,B,C out -	blk/wht trace	12	M
16	DT 2 B out +	red/wht trace	13	N
15	DT 2 C out +	grn/wht trace	14	P
6	DT 1 B out +	blu/wht trace	15	R
8	DT 1 C out +	blk/red trace	16	S



Strainmeter Electronics Box connector
solder side

Solder side



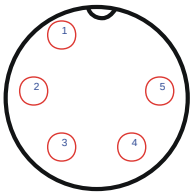
Strainmeter Cable to
Strainmeter/DCP BOX
plug connector, solder side

2001MAMbox

2001electConnctr.cdr

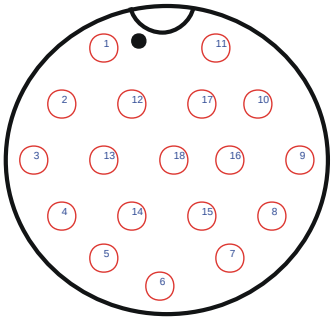
2001 DTM-CIW Strainmeter Electronics Connectors

SOLDER SIDE
PIN MARKING



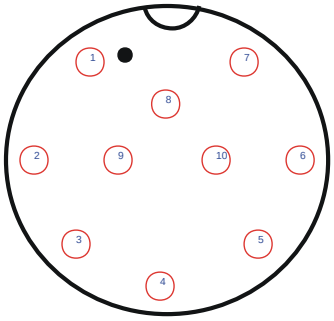
BAT-POWER

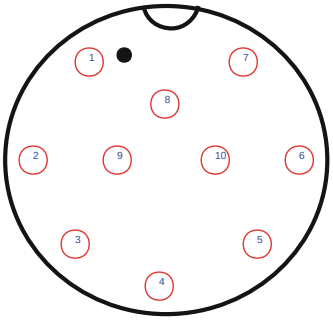
1	-BAT	BLK
2	-BAT	
4	+BAT	WHT
5	+BAT	



STRAINMETER

Black	12+17	- VALVE 1&2 CL
white	1	+ VALVE 1 CL
green	11	+ VALVE 2 CL
orange	2	A - DT1 SUPP
blue	13	A - DT SUPP COMM
grn/blk trce	3	A - DT2 SUPP
orange	2	B - DT1 SUPP
blue	13	B - DT SUPP COMM
grn/blk trce	3	B - DT2 SUPP
orange	2	C - DT1 SUPP
blue	13	C - DT SUPP COMM
grn/blk trce	3	C - DT2 SUPP
wht/blk trce	4	A - DT1 OUT
red/blk trce	5	A - DT1-COM-OUT
blu/blk trce	10	A - DT2 OUT
blk/wht trce	14	A - DT2-COM-OUT
blu/wht trce	6	B - DT1 OUT
org/blk trce	7	B - DT1-COM-OUT
red/wht trce	16	B - DT2 OUT
blk/wht trce	14	B - DT2-COM-OUT
blk/red trce	8	C - DT1 OUT
red	9	C - DT1-COM-OUT
grn/wht trce	15	C - DT-2 OUT
blk/wht trce	14	C - DT-2-COM-OUT
	18	SHIELD





OUTSIDE WORLD

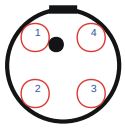
BUFFERED SIGNAL-OUT

1	A - DT-1 OUT	BROWN
8	A DT1-COM-OUT	BLACK
7	A - DT-2 OUT	YELLOW
8	A DT2-COM-OUT	BLACK
2	B - DT-1 OUT	RED
8	B DT1-COM-OUT	BLACK
9	B - DT-2 OUT	GREEN
8	B DT2-COM-OUT	BLACK
10	C - DT-1 OUT	WHITE
8	C - DT1-COM-OUT	BLACK
6	C - DT-2 OUT	BLUE
8	C - DT2-COM-OUT	BLACK
4	BAROMETER	Red
5	BARO-COM-OUT	black

DTM DATA LOGGER

BUFFERED SIGNAL-OUT

1	A - DT-1 OUT
8	A DT1-COM-OUT
7	A - DT-2 OUT
8	A DT2-COM-OUT
2	B - DT-1 OUT
8	B DT1-COM-OUT
9	B - DT-2 OUT
8	B DT2-COM-OUT
10	C - DT-1 OUT
8	C - DT1-COM-OUT
6	C - DT-2 OUT
8	C - DT2-COM-OUT
4	BAROMETER
5	BARO-COM-OUT



VC-RS232-OUT

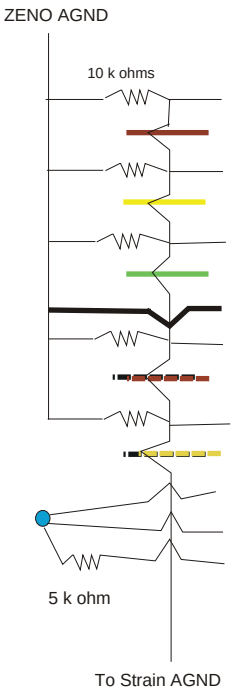
1	TX	WHT
2	ISO-GND	GRN
3	RX	RED
4	ISO-GND	BLK

*Color scheme shown was used to construct cables for use with valve control boxes for use in Hawaii USGS summer 2000 installation.

2001MAMbox

ZENO INPUTS.cdr

2001 analog inputs



Input location	color	ID
Ch1 -		
Ch1+	brown	dt1
Ch2-		
Ch2+	yellow	dt2
Ch3-		
Ch3+	green	baro Setra
Ch6+	blk	short/AGND
Ch4-		
Ch4+	brn/blkstrp	x tilt
Ch5-		
Ch5+	ylw/blkstrp	y tilt
EXC +	red	therm / 5k ohm
Ch6-	black	therm
Swtch EXC RTN A	black	5 Kohm
Ch 24 +	black/wht	rain bucket

Colored lines represent input signal location

Coastal Environmental Systems
ZENO DCP #3200

Telonics TGT-1 Domestic GOES Transmitter

Setra Systems, INC. Pressure Transducers
#270 800-1100 millibar ranges
11-15VDC excitation
0-5vdc output

Carnegie Institute of Washington / Department
of Terrestrial Magnetism SOC Box
(Strainmeter Operation & Control (electronics) Box
for 2 transducer strainmeter

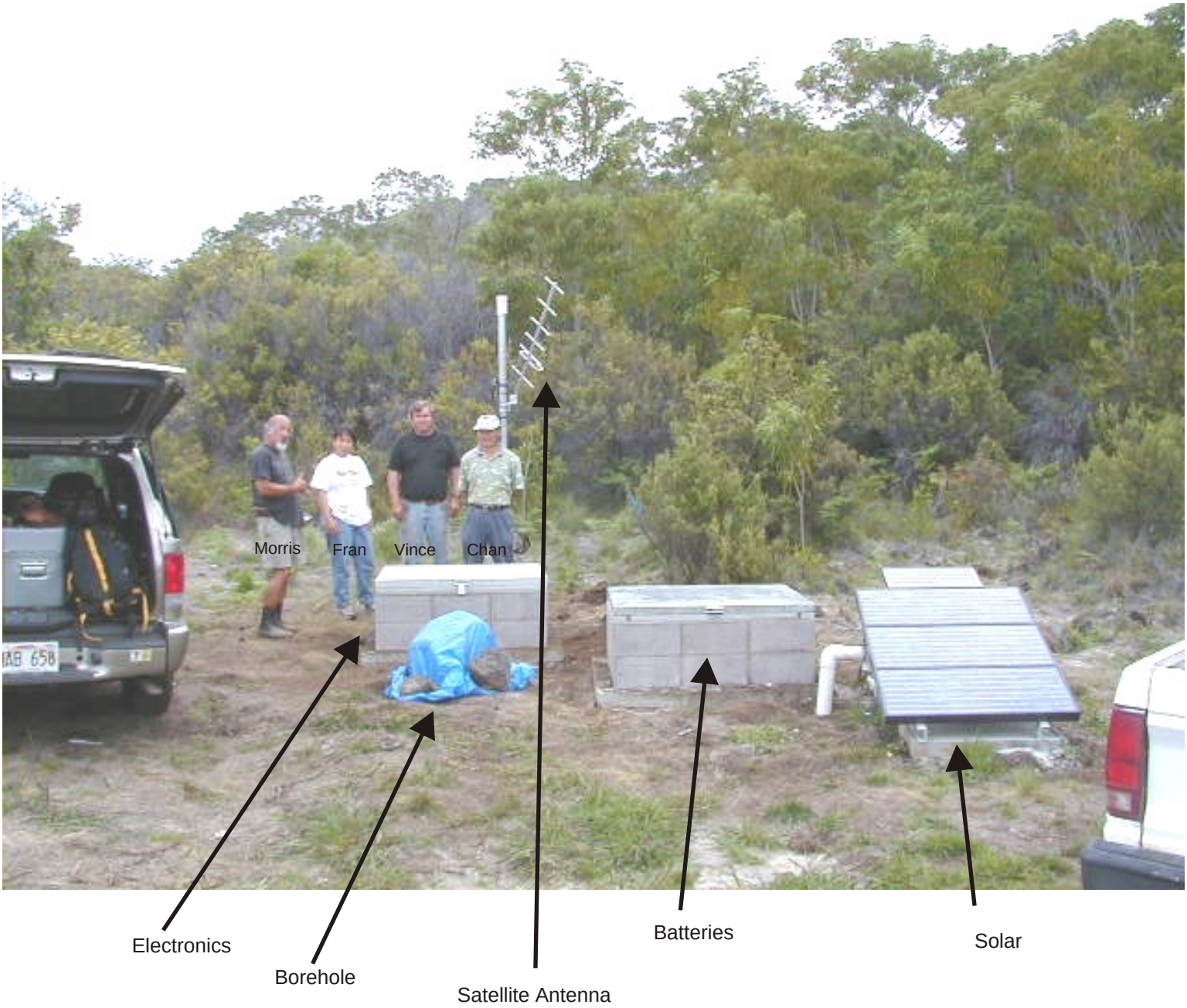


Photo taken September 2000

Strip Road Strain Site

Hokuna Strain site

Solar Panels

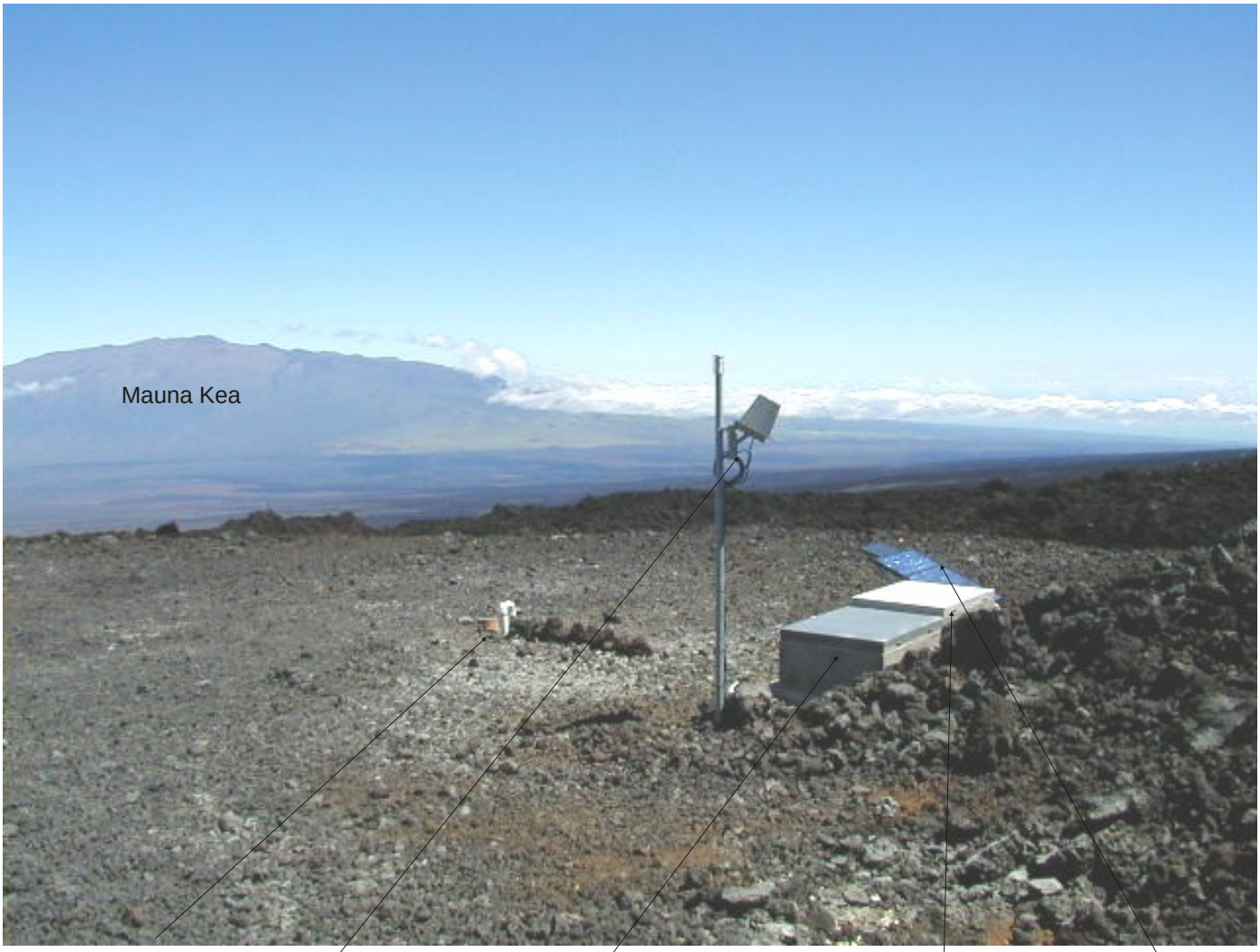
Satellite Antenna

Battery Box & FreeWave

Fran Coloma

Electronics Box

Mauna Loa Strain Site



Borehole

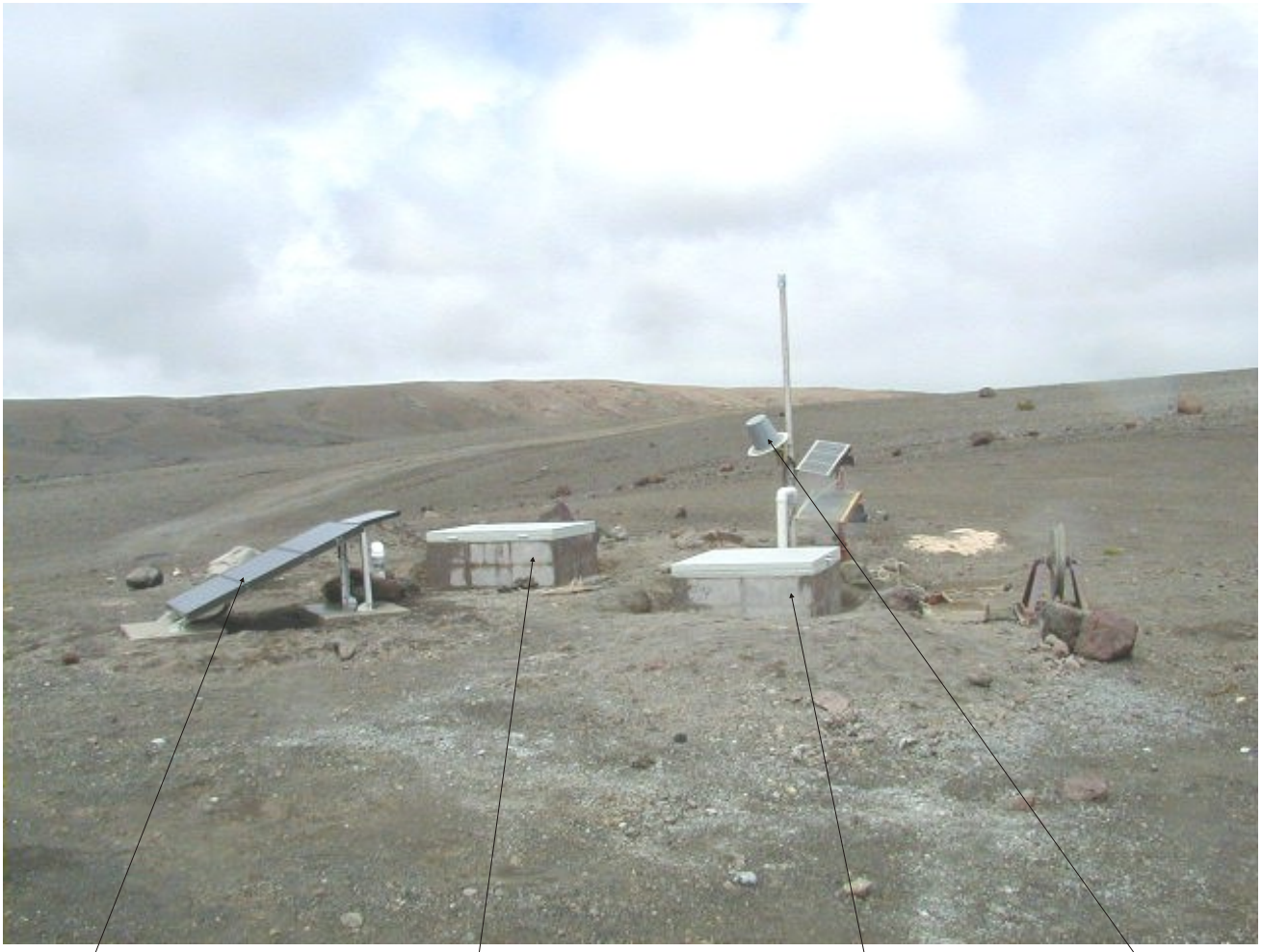
Electronics Box

Solar Panels

Satellite Antenna

Battery Box

Keller Strain Site

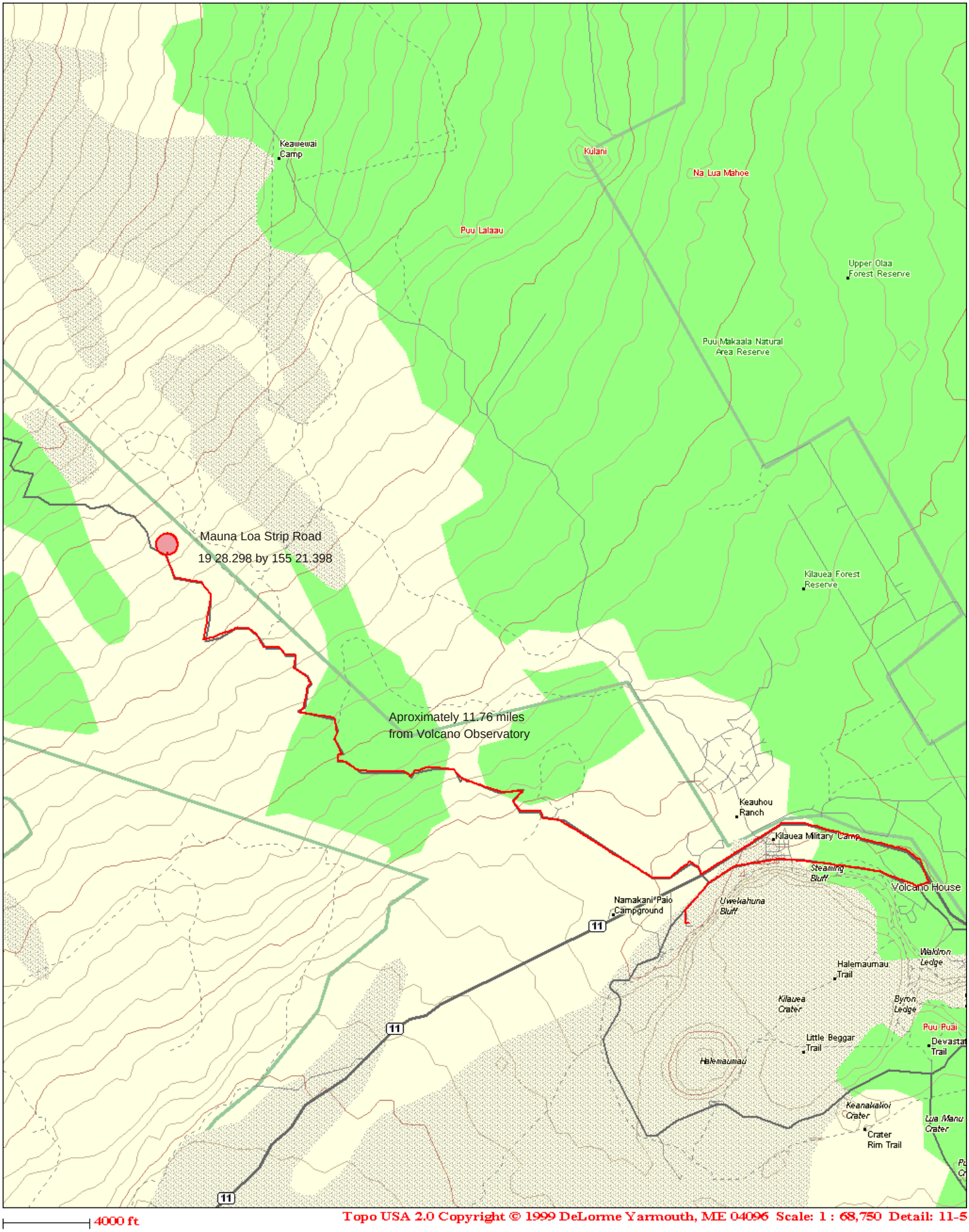


Solar Panels

Battery & Freewave

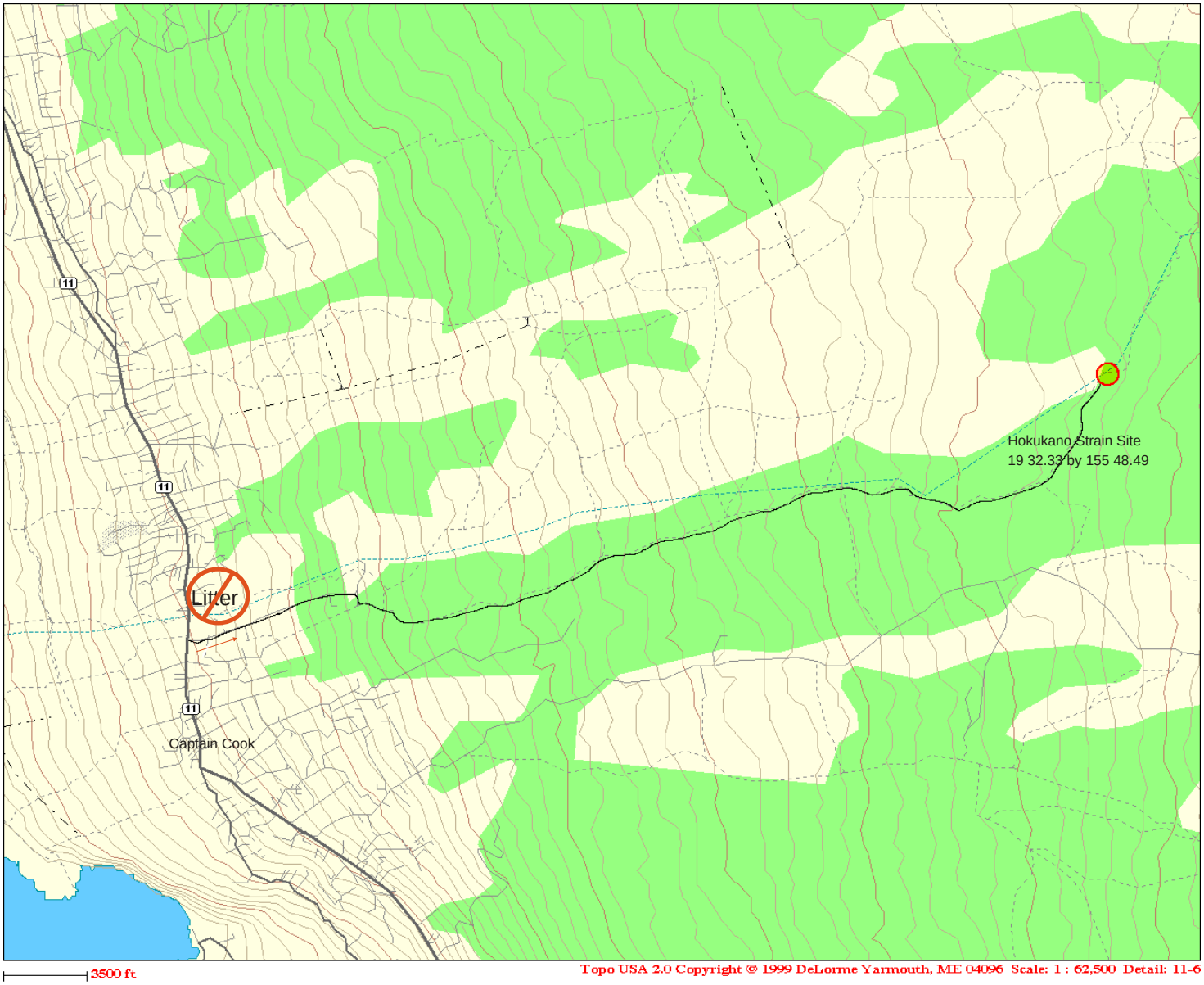
Satellite Antenna

Electronics Enclosure

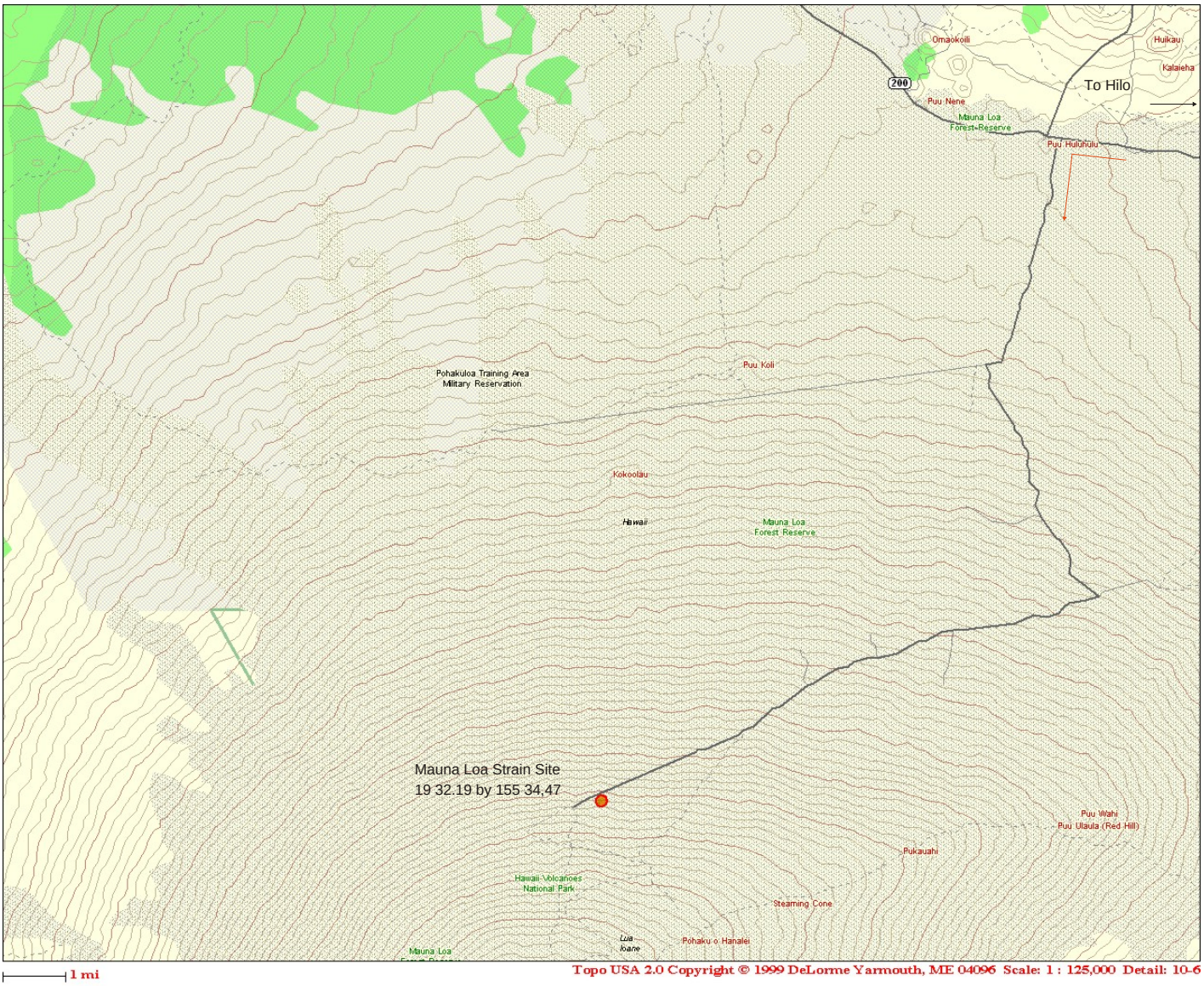


Mauna Loa Strip Rd Strain Site

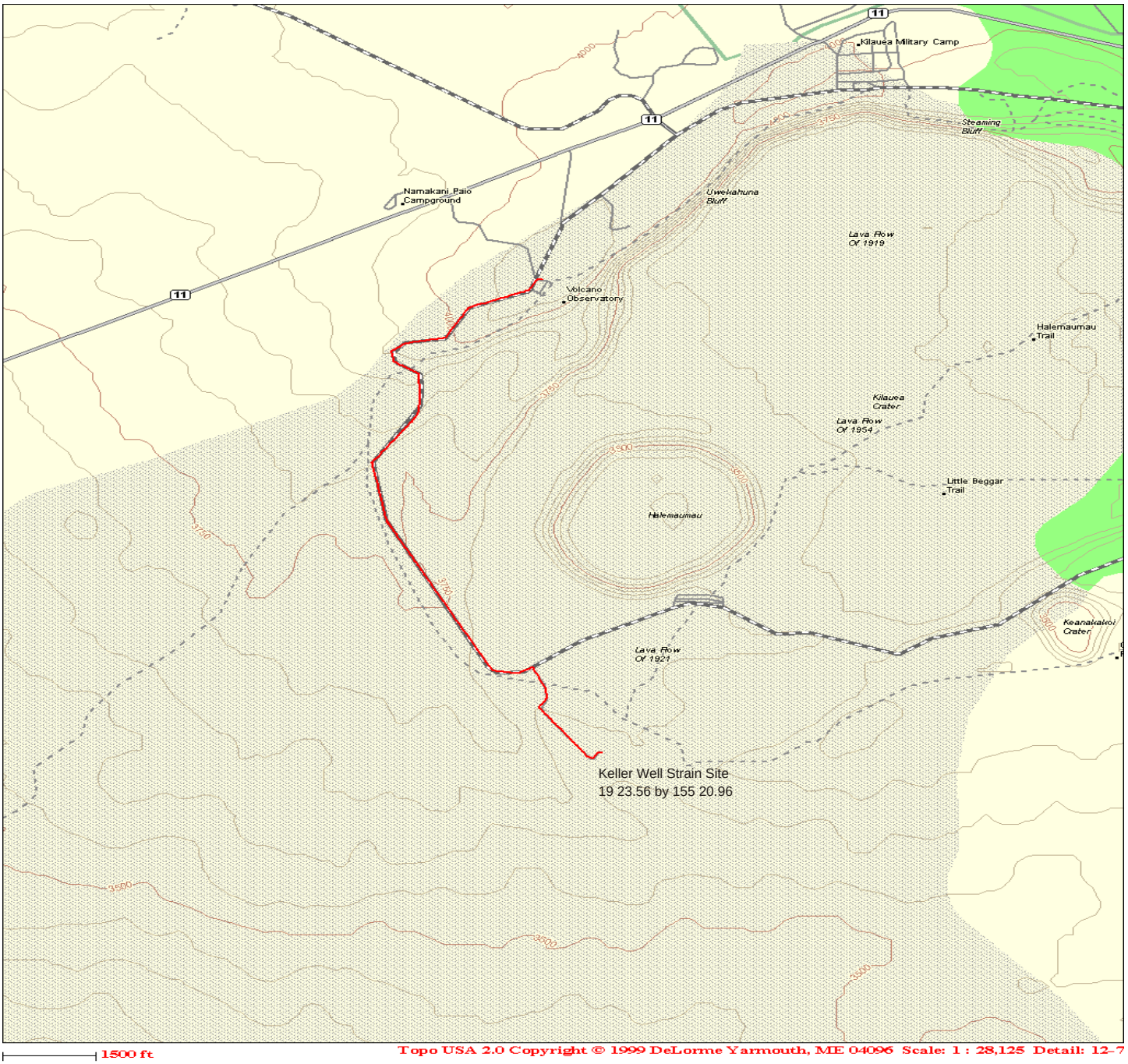
Hokukano Strain site

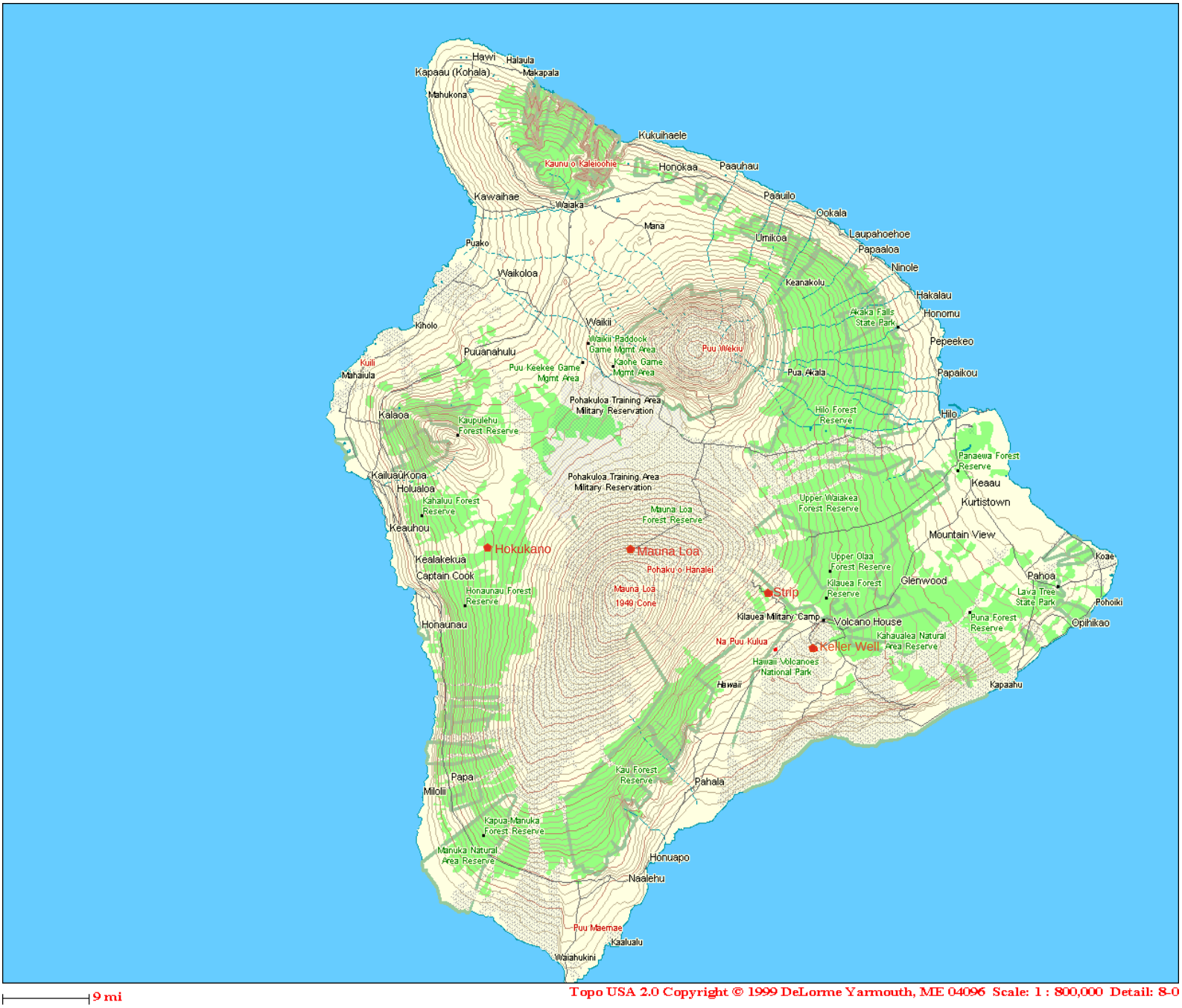


Mauna Loa Strain Site



Keller Well Strain Site





Island of Hawaii

Volumetric Strainmeter Sites