APPENDIX M

SHOP SUBMITTALS – IRON WALL PROJECT

CONNELLY-GPM, INC.
ESTABLISHED 1875
3154 SOUTH CALIFORNIA AVENUE · CHICAGO, ILLINOIS 60608-5776
PHONE: [redacted] 247-7231 AREA CODE 773 FAX: [redacted] 247-7239

October 1, 1997

SCREEN SPECIFICATION
ETI CC-1004

U.S. SCREEN NUMBER	
4	100% PASSING
8	95 - 100% PASSING
16	75 - 90
30	25 - 45
50	0 - 10
100	0 - 5

MATERIAL WEIGHS APPROXIMATELY 140 - 150 POUNDS PER CUBIC FOOT

Revised 8/97

[redacted]

☒ APPROVED

☐ APPROVED AS CORRECTED
(Resubmit final copy for file)

☐ REVISE AND RESUBMIT BEFORE PROCEEDING

☐ NOT APPROVED

Reviewed only for conformance with the design concept of the project and with information given in the Contract Documents. The Contractor is responsible for dimensions to be confirmed and correlated at the job site; for information that pertains solely to the fabrication processes or to techniques of construction and for coordination of the work of all trades.

STEARNS & WHELER L.L.C., Engineers and Scientists

By DC Clark Date 10/2/97

DKC

S&W Services, Inc.
One Remington Park Drive, Cazenovia, NY 13035
(315) 655-4953 Fax: (315) 655-2285

SHOP SUBMITTAL

Separation Geotextile only

1. Shop Submittal Number 2, Sherburne Reactive Iron Wall
2. Deviations: None ✓; As Listed _____
3. Reference Specification Number 02420
4. Reference Drawing Number N/A
5. Space Requirement: As Designed ✓; Different, As Listed _____
6. Representation is made to the Owner and Engineer that the Contractor has determined and verified all field measurements and quantities, field construction criteria, materials, catalog numbers and similar data; that he has reviewed and coordinated the information in each shop drawing with the requirements of the work and the Contract Documents; and hereby approves this submittal.

Contractor S+W Services, Inc.

Signature _____

☒ APPROVED for Separation Geotextile
☐ APPROVED AS CORRECTED
(Resubmit final copy for file)
☐ REVISE AND RESUBMIT BEFORE PROCEEDING
☐ NOT APPROVED

Reviewed only for conformance with the design concept of the project and with information given in the Contract Documents. The Contractor is responsible to: dimensions to be confirmed and correlated at the job site; for information that pertains solely to the fabrication processes or to techniques of construction and for coordination of the work of all trades.
STEARNS & WHELER L.L.C., Engineers and Scientists

By BAS Date 11/10/97

Carthage Mills

"Since 1958 - America's First Geotextile Company"

Carthage Mills
FX-120HS

Non-Woven Filtration/Separation Geotextile

Product Description

FX-120HS, a non-woven multipurpose geotextile fabric composed of 100% polypropylene staple filament yarns, heatbonded and needlepunched. Carbon black has been added for extra UV protection.

FX-120HS Physical Properties

PHYSICAL PROPERTIES	TEST METHOD	MARV*
Weight, oz/sy	ASTM D-3776	12.0
Tensile Strength (lb/in)	ASTM D-4632	325
Tensile Elongation (%)	ASTM D-4632	50
Burst Strength (psi)	ASTM D-3786	600
Trapezoidal Tear (lbs)	ASTM D-4533	120
Puncture Strength (lbs)	ASTM D-4833	180
Water Permittivity (sec/-1)	ASTM D-4491	1.0
Water Permeability (cm/sec)	ASTM D-4491	.25
AOS (Std Sieve)	ASTM D-4751	70
Water Flow Rate (gpm/sf)	ASTM D-4491	90

Standard Roll Sizes: 15' x 300'
Standard Roll Weight: 390 lbs

* Minimum Average Roll Value

S&W Services, Inc.
One Remington Park Drive, Cazenovia, NY 13035
(315) 655-4953 Fax: (315) 655-2285

SHOP SUBMITTAL

1. Shop Submittal Number 3 & 5, Sherburne Reactive Iron Wall
2. Deviations: None ✓; As Listed _____
3. Reference Specification Number 1300
4. Reference Drawing Number N/A
5. Space Requirement: As Designed ✓; Different, As Listed _____
6. Representation is made to the Owner and Engineer that the Contractor has determined and verified all field measurements and quantities, field construction criteria, materials, catalog numbers and similar data; that he has reviewed and coordinated the information in each shop drawing with the requirements of the work and the Contract Documents; and hereby approves this submittal.

Contractor S+W Services, Inc.

Signature _____

☐ APPROVED
☒ APPROVED AS CORRECTED ~~(Resubmit final copy for file)~~ – Please submit QA/QC for Backfill Compaction for separate approval.
☐ REVISE AND RESUBMIT BEFORE PROCEEDING
☐ NOT APPROVED

Reviewed only for conformance with the design concept of the project and with information given in the Contract Documents. The Contractor is responsible to: dimensions to be confirmed and correlated at the job site; for information that pertains solely to the fabrication processes or to techniques of construction and for coordination of the work of all trades.

STEARNS & WHELER L.L.C., Engineers and Scientists

By _____ Date _____

Note:
- Workplan approved
- Full QA/QC plan not approved yet.

Diane -
FYI

S&W Services, Inc.

CONFIDENTIALITY NOTICE

This facsimile transmission, including this Cover Sheet and any accompanying documents (individually and collectively, "the Transmission"), contains information for S&W Services, Inc. The transmission is intended solely for the use of the individual or entity to which it is addressed and may contain information that is privileged, confidential, and or otherwise exempt from disclosure under applicable law.

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FACSIMILE MESSAGE TRANSMITTAL FORM

DATE: 6-Nov-97

FAX #: (518) 457-7743

We are sending you 6 pages (including this one).

Please deliver the following pages to:

NAME: Mr. David Chiusano

NYSDEC / dc

DEPARTMENT: Div. of Environmental Remediation

FROM: Gregory M. Myka, Construction Coordinator

JOB #:

RE: Sherburn Reactive Iron Wall Installation

COMMENTS:

Dave Chiusano.

Attached are copies of the work plan, including QA/QC, from Horizontal Technologies.

Also attached is a copy of the attendance list from yesterdays meeting.

Please call with any questions. 315/655 - 4953.

Thank you--

Greg

One Remington Park Drive
Cazenovia, New York 13035
Phone: (315) 655 - 4953
Fax: (315) 655 - 2285

IF YOU DO NOT RECEIVE ALL PAGES, PLEASE CALL US AS SOON AS POSSIBLE. THANK YOU.

HORIZONTAL TECHNOLOGIES INC.
TECHNICAL PROPOSAL
FOR
CONSTRUCTION OF PERMEABLE TREATMENT WALL
HOWARD PROPERTY
SHERBURNE, NEW YORK
August 18, 1997

Introduction

Horizontal Technologies Incorporated (HTI) is the leading provider of Trenched Horizontal Systems in the United States. The company is a unique blend of professional, technical, and field experienced personnel combined with innovative proprietary technologies and systems. This unique combination of talent and technology is completely focused on solving problems related to remediation of the subsurface environment.

With our customized trenching equipment, HTI offers a unique method of installing Iron Sand Permeable Treatment Walls. Advantages of our installation method over other excavation and placement techniques include:

- The ability to excavate and backfill a fixed-width trench to depths of 30 ft below the working platform. This ensures that minimal cuttings are generated and, consequently, minimal waste of Iron Sand.
- Installation of a continuous Iron Sand Wall without using slurry mixtures thereby eliminating the associated mess and health and safety hazards.
- Rapid installation rates of 100-500 ft/day depending on site lithology.
- During excavation and placement de-watering is not required.

S&W Services has requested a technical and cost proposal for installing 490 linear feet of an Iron Sand Wall at the Howard Property located in Sherburne, New York. HTI offers the following proposal in response to this request.

Job Requirements

The site geology consists of a shallow silt layer underlain by a sand and gravel zone underlain by a clay zone. Discussions with S&W personnel indicate that the shallow silt zone may contain cobbles. Therefore, HTI plans to pretrench to the bottom of the silt zone to remove these cobbles prior to installation of the Iron Sand Wall. There has been no indication that cobbles exist below the shallow silt zone. If cobbles which may create problems for our one-pass trencher are encountered below the silt zone, this will constitute a change in conditions.

The Iron Sand Wall will be constructed in two sections to a depth of 18 ft below the working surface. The long section will be 370 ft long. The short section will be 120 ft long and parallel to the long section as indicated on the project drawings. Prior to construction of the Iron Sand Wall a 3 ft deep land bench will be excavated along the path of the wall. Approximately 1285 cubic yards of material will be removed to create this land bench. The land bench will be 20 ft wide east (upgradient) of the Iron Sand Wall and 8 ft west (downgradient) of the Iron Sand Wall. All of the cuttings excavated during the installation of the Iron Sand Wall will be placed on the upgradient side of the wall via a conveyor belt system that is attached to the trenching machine. These potentially contaminated cuttings will then be leveled and compacted in the bench area. After installation of the Iron Sand Wall the not-contaminated stockpiled soils will be placed back in the land bench on top of the potentially contaminated cuttings to create positive surface drainage away from the Iron Sand Wall.

The Iron Sand will be delivered to the site in bulk via covered and lined dump trucks or in 3000 lb bags via flatbed trucks. The Iron Sand will be tarped or stored in a nearby building upon arrival so that it will stay dry until installation. Arrival will occur over an approximate 2 week delivery window.

The bid package also requests unit pricing for Iron Sand Wall installations greater than 490 linear feet, removal and disposal of PPE and sorbent pads, upgrading the roadway to the work site, and upgrade of unsuitable bench subgrade. HTI will need one weeks notice prior to the start of installation for Iron Sand Wall installations greater than 490 linear ft in order to have the iron sand delivered to the site prior to construction. For upgrading the bench subgrade we propose using our wooden mats if required instead of constructing the geotextile and gravel pad upgrade as specified in the plans.

During the site walk the following items were clarified:

- HTI will not be responsible for providing a site trailer, utilities, or a porta-john.
- We will use the S&W Health and Safety Plan and air monitoring will be performed by S&W.
- There are no potential underground utilities in the area of excavation and trenching.
- Barricade requirements will consist of erecting a 4 ft high orange fence around the construction site.
- EnviroMetal has waived all licensing fee requirements for this project.
- Water can be obtained via fire hydrant from the town of Sherburne.

Installation Procedure

The installation of HTI's system is accomplished using custom designed and manufactured equipment. This equipment is built in Florida using both standard and proprietary components. The trenching and delivery operation cuts a fixed-width trench (16 inches) and in one-pass continuously

Stearns & Wheler, LLC
ENVIRONMENTAL ENGINEERS & SCIENTISTS

MEMORANDUM

TO: GMM, TLH, MEH, File 1587.0

FROM: D K Clark

DATE: November 19, 1997

RE: Submittal #6 - Health and Safety Plan

I reviewed the submittal for content only. Because the contract documents did not specify the submittal of the HSP be to the Engineer, there is no need to approve the HSP. However, the HSP was reviewed to verify that items in Specification Section 01030 specifically listed as being required in the HSP were listed in the submittal. The reason for this review is that Stearns & Wheler, LLC has agreed to provide instruments for air monitoring during the construction project. It was also agreed that Stearns & Wheler's field representative would undertake the perimeter air monitoring required by the NYSDOH and specified in the contract documents.

However, due to liability issues related to worker safety and health issues, Stearns & Wheler's directors have decided that it is not the Engineer's responsibility to specify the air monitoring requirements and action levels for determining the contractor's workers PPE levels in the work zone and/or exclusion zone. Determining these issues should be up to the contractor, or a CIH working for the contractor, therefore the HSP contents specified in Specification Section 01030. In other words, S&W Services, or HTI, needs to identify action levels for upgrading PPE, and identify monitoring requirements (instrument and frequency) to provide for levels of protection they feel are appropriate for protecting their own worker health and safety. Once this information is specified in the contractor's HSP, then the Engineer can assist in collecting and recording the monitoring data, so the contractor's On-site, Health and Safety manager can make decisions about stopping the work, if necessary, and/or upgrading the level of PPE for appropriate workers.

The following items were specified in Specification Section 01030 but were not specifically called out in the HSP provided as Submittal #6:

- Limits of acceptable oxygen and contaminant concentrations within the breathing zone of the excavation location and the surrounding work area. As part of this requirement, the breathing zone monitoring and frequency of monitoring should be specified.

- Downwind perimeter monitoring should be specified, including maximum allowable concentrations for single readings and averages for multiple readings. (This has been specified in the HSP attached to the Contract Documents. The NYSDOH has reviewed and approved the HSP in the Contract Documents, so an easy way to meet these requirements is to just reiterate what was included in the previous document, provided S&W Services' Health and Safety Officer is comfortable with these requirements.)

The Iron Sand Wall will be constructed in two sections to a depth of 18 ft below the working surface. The long section will be 370 ft long. The short section will be 120 ft long and parallel to the long section as indicated on the project drawings. Prior to construction of the Iron Sand Wall a 3 ft deep land bench will be excavated along the path of the wall. Approximately 1285 cubic yards of material will be removed to create this land bench. The land bench will be 20 ft wide east (upgradient) of the Iron Sand Wall and 8 ft west (downgradient) of the Iron Sand Wall. All of the cuttings excavated during the installation of the Iron Sand Wall will be placed on the upgradient side of the wall via a conveyor belt system that is attached to the trenching machine. These potentially contaminated cuttings will then be leveled and compacted in the bench area. After installation of the Iron Sand Wall the not-contaminated stockpiled soils will be placed back in the land bench on top of the potentially contaminated cuttings to create positive surface drainage away from the Iron Sand Wall.

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- Barricade requirements will consist of erecting a 4 ft high orange fence around the construction site.
- EnviroMetal has waived all licensing fee requirements for this project.
- Water can be obtained via fire hydrant from the town of Sherburne.

Installation Procedure

The installation of HTI's system is accomplished using custom designed and manufactured equipment. This equipment is built in Florida using both standard and proprietary components. The trenching and delivery operation cuts a fixed-width trench (16 inches) and in one-pass continuously

backfills the trench with the Iron Sand to create a Permeable Treatment Wall. There are no open trenches and de-watering is not required for installation.

The delivery system for this installation will be 14 inches wide on the inside. Based on the native soils at the site (soupy sand and gravel), we feel that this installation width will ensure a minimum 12-inch wide Iron Sand Wall. During installation the depth will be checked continuously using a laser-guided leveling system. The feed rate of the Iron Sand will be closely monitored to ensure that we are achieving the required installation width.

The trenching machine will be readied for installation by attaching the cutting boom and Iron Sand delivery system. The cutting boom will excavate a trench by rotating the cutting chain until the boom and delivery system has cut into a vertical position relative to ground surface. The vertical orientation of the cutting boom and delivery system is a key factor in successful installation of fine-grained backfill such as Iron Sand. The vertical drop of these fine-grained materials into the subsurface allows successful placement to the total trench depth. Other companies can use angled delivery systems that involve sending the fine-grained material down a slope of 60 degrees or less. While this type of delivery usually works for rounded gravels, it is not optimal for fine-grained materials that, because of the incline, may not be delivered successfully to the deeper trench section.

At this point the delivery system will be loaded with Iron Sand. A sacrificial back end of the box will be released and the trencher will begin a forward motion while simultaneously cutting the trench, placing the cuttings adjacent to the trench, and backfilling the trench with Iron Sand from total depth to the working surface. The Iron Sand will be transferred from the storage area to the trencher delivery system using front-end loaders and/or excavators. Installation proceeds until the shorter run of the Iron Sand Wall has been installed. The cutting boom will then be pulled out of the ground and the trencher repositioned to begin the longer Iron Sand Wall run. The above procedure will be followed until the longer run is installed.

Health and Safety

All work will be accomplished in appropriate PPE. All operators and laborers will be 40-hour OSHA trained with a current 8-hour refresher. We assume that the client will provide Health and Safety monitoring in accordance with the site specific Health and Safety Plan. The Health and Safety Plan will be in compliance with 29 CFR 1910.120 and other OSHA requirements.

Based on information received to date, we assume that all work will be performed in Levels C or D PPE. The designated Health and Safety Officer will have stop-work authority in the event that action levels are exceeded in the work areas. Modifications of the site and level of protection will be adjusted accordingly.

S&W Services, Inc.
One Remington Park Drive, Cazenovia, NY 13035
(315) 655-4953 Fax: (315) 655-2285

approved by BAS.

SHOP SUBMITTAL

Job Name: Sherbrine - Permeable Reacting Iron Wall Job No.: 7014wiconst

Client: General Semiconductor Contract No.: 36

1. Shop Submittal Number: Piezometer Transducers
2. Deviations: None ~~N/A~~; As Listed Terminal box -
3. Reference Specification Number: 223C
4. Reference Drawing Number: n/a
5. Space Requirement: As Designed ✓; Different, As Listed
6. Representation is made to the Owner and Engineer that the Contractor has determined and verified all field measurements and quantities, field construction criteria, materials, catalog numbers and similar data; that he has reviewed and coordinated the information in each shop drawing with the requirements of the work and the Contract Documents; and hereby approves this submittal.

Contractor S+W Services Inc. / Paul Wolff

Signature

Facsimile Transmission

Parratt - Wolff, Inc.

Deliver To: Mr. Greg Myka
Company: S & W Services, Inc.
Fax No.: (315) 655-2285 Phone No.: (315) 655-4053

Sent By: Bill Morrow
Parratt - Wolff, Inc.
Fisher Road
East Syracuse, NY 13057
Phone: (315) 437-1429 Fax: (315) 437-1770

Date: January 21, 1998

Number of Pages (including this one): 2

Message:

Re: 97265
Submittals - Terminal Box
Contract No. 3
Howard Farm Property
Sherburne, New York

Greg:

Enclosed is a justification for our proposed substitution. An original will be mailed to your office today.

Bill Morrow

parratt wolff inc

January 21, 1998

Mr. Greg Myka
S & W Services, Inc.
One Remington Park Drive
Cazenovia, New York 13035

Re: 97265
Submittals – Terminal Box
Contract No. 3
Howard Farm Property
Sherburne, New York

Dear Mr. Myka:

We propose to substitute the terminal box specified in the above contract (Slope Indicators' "Connector Box", part no. 57706012) for an improved unit. The proposed unit "Terminal Box", (part no. 57711600) is constructed of the same materials as the specified box. The differences are in the connectors. By using a Terminal Box, the transducer cables can be hard-wired directly to the box. By hard-wiring each cable to the box, we can avoid using seven connecters, thereby increasing reliability while decreasing cost. The Terminal Box also offer improved read-out capabilities. With the Terminal Box, only one connection is required and the data from all seven transducers can be obtained by flipping a switch. The Connector Box requires the operator to connect and disconnect the readout unit for each transducer. Connecting the read-out box seven times is time consuming and more importantly decreases the reliability of the system. From our experience, most failure with systems occurs in the connecters.

I called Mr. Pierre Gouvin on January 21, 1998, the Technical Representative for Slope Indicator for this region. He indicated that at this time, Slope Indicator is no longer making the Connector Box for the reasons outline above.

If you require any additional information, please contact me.

Very truly yours,

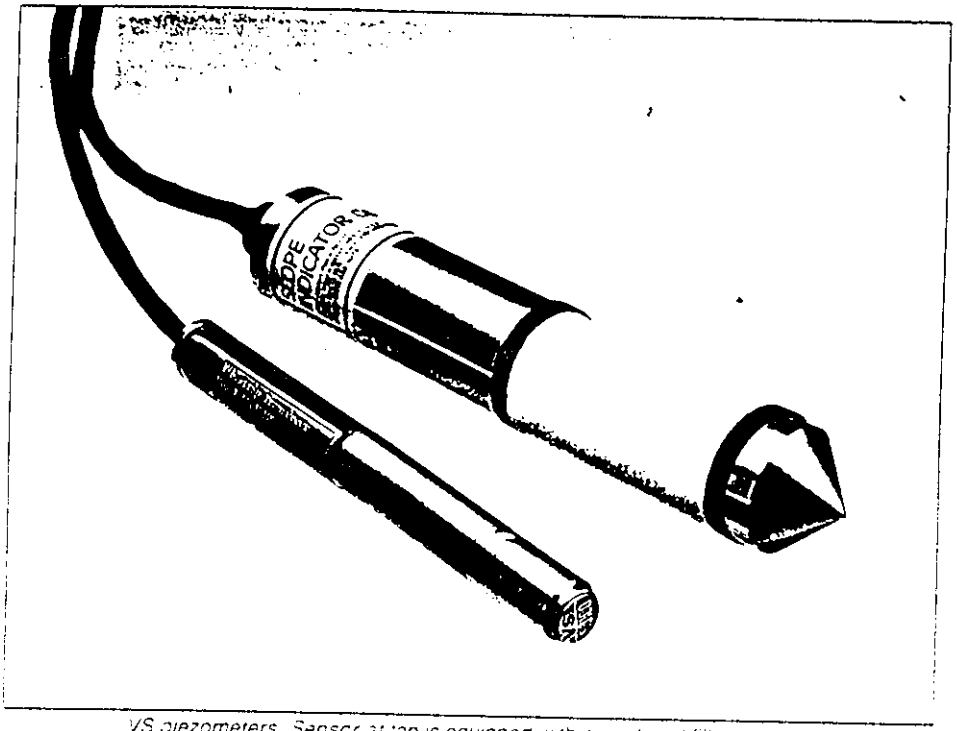
PARRATT-WOLFF, INC.

William Morrow
WHM/blo

P.O. Box 56, 5879 Fisher Road, East Syracuse, NY 13057 Telephone 315-437-1429 or 800-782-7260 FAX 315-437-1770
P.O. Box 1029, 501 Millstone Drive, Hillsborough, NC 27278 Telephone 919-644-2814 or 800-627-7920 FAX 919-644-2817

VS™ Piezometer

For measuring pore pressures and water levels



VS piezometers. Sensor at top is equipped with an optional filter housing.

Applications

Typical applications for the patented* VS piezometer are:

- Monitoring pore pressures to determine safe rates of fill or excavation.
- Monitoring pore pressures to determine slope stability.
- Monitoring the effects of dewatering systems used for excavations.
- Monitoring the effects of ground improvement systems such as vertical drains and sand drains.
- Monitoring pore pressures to check the performance of earth fill dams and embankments.
- Monitoring pore pressures and water levels to check containment systems at land fills and tailings dams.
- Monitoring seepage and ground water movement in embankments, land fill dikes, and dams.
- Monitoring water levels in wells and standpipes.
- Monitoring water level draw down in pump tests.

*US Patent #4 938 068

Operation

The VS piezometer converts water pressure to a frequency signal via a steel strip and a magnetic coil.

The piezometer is designed so that an increase in water pressure directly increases the tensional load on a steel strip. When excited by the magnetic coil, the strip vibrates at its natural frequency.

The vibration of the strip in the proximity of the magnetic coil generates a frequency signal that is transmitted to the readout device.

The readout device processes the signal, applies calibration factors, and displays a reading in the required engineering unit.

Advantages

High Resolution: VS piezometers reliably measure pressure changes as small as 0.021 kPa (0.003 psi), equivalent to a change in water level of only 2.1 mm (0.007 ft).

High Accuracy: VS piezometers in all ranges provide consistent sensor to sensor performance and a standard accuracy of ±0.1% of full scale. Select sensors with an accuracy of ±0.05% FS are also available.

Long Term Stability: Intrinsically more stable than other types of pressure transducers, the VS piezometer exhibits virtually no zero-drift and is ideal for long term applications.

Temperature Stability: Changes in water temperature and temperature differentials within the piezometer itself have a negligible effect on the accuracy of the VS piezometer.

Optional Filter Housing: The filter housing provides a large, cylindrical high-air or low-air entry filter suitable for applications that require direct contact between the filter and the surrounding soil.

Temperature Measurement: The VS piezometer has a built-in temperature sensor.

Reliable Signal Transmission: With properly shielded cable, signals from the VS piezometer are reliably transmitted over long distances.

Order Numbers and Specifications for VS Piezometers

Order #	[illegible]	52612505	52612510
Range	0 to 14 m H_2O	0 to 35 m H_2O	0 to 70 m H_2O
	0 to 20 psi	0 to 50 psi	0 to 100 psi
Maximum Pressure	625% of range	250% of range	125% of range
Resolution using VS DataMate	0 to 14 m H_2O: 2.1 mm H_2O 14 to 35 m H_2O: 7.7 mm H_2O 35 to 70 m H_2O: 16.2 mm H_2O		
	0 to 20 psi: 0.003 psi (0.007 ft H_2O) 20 to 50 psi: 0.005 psi (0.011 ft H_2O) 50 to 100 psi: 0.01 psi (0.023 ft H_2O)		
Accuracy	0.1% FS or 0.05% FS (selected)		
Operation Temp	-29 to 65 °C (-20 to 150 °F)		
RTD Range	-45 to 100 °C (-50 to 212 °F) with VS DataMate		
Filter	Two sintered stainless steel filters with 50 micron pore size		
Materials	Stainless steel (all wetted parts)		
Dimensions	19 x 170 mm (0.75 x 6.7 in)		
Weight	0.23 kg (0.5 lb)		

The order numbers in the table above specify a VS piezometer with two 50 micron filters, a built-in RTD temperature sensor, calibration, and a manual. Signal cable, connector, optional filter housing, and installation accessories are specified by separate order numbers.

Optional Filter Housing

With High Air Entry Filter .. 52612561

With Low Air Entry Filter.. 52612562
Filter housing is factory attached to piezometer. Cylindrical filter has surface area of 92 cm^2 (14 in^2) and can be removed for saturating. High air entry filter has 1 micron pore size. Low air entry filter has 60 micron pore size. Dimensions and weight including VS piezometer: 38 x 241 mm, 1.8 kg (1.5 x 9.5 in, 4 lb).

Hole Forming Kit 52612572
Kit contains auger for drilling hole in clay, hole forming tool with vent groove to make an opening the same shape as the filter housing, and a cross bar for working the forming tool.

Signal Cable

Polyurethane Jacket 50613524
Four conductor, 22 gauge, shielded cable with polyurethane jacket. Suitable for use in monitoring wells. Connected to piezometer at factory.

Polyethylene Jacket ..... [illegible]
Four conductor, 20 gauge, shielded cable with polyethylene jacket. Suitable for direct burial. Connected to piezometer at factory. Requires mechanical seal kit below.

Mechanical Seal Kit 52611300
Required to connect polyethylene cable to VS piezometer. Connection performed at factory.

Universal Connector 57705001

Terminal Boxes

Terminal Box ..... [illegible]
Provides switchable access to 12 terminals, typically configured with one sensor per terminal. Weatherproof fiberglass box measures 290 mm wide x 345 mm high x 135 mm deep including mounting flanges (11.5 x 13.5 x 5.25 inch).

Connector Box 57706012
Provides collection point for signal cables that are terminated with the universal connector (#57705001). Panel provides easy access to 12 connectors. Weatherproof fiberglass box measures 290 mm wide x 345 mm high x 135 mm deep including mounting flanges (11.5 x 13.5 x 5.25 inch).

Readouts & Data Loggers

Compatible readouts include the VS DataMate and the VWP Indicator. See separate data sheets for features and specifications. Compatible data loggers include Campbell Scientific CR10. AVW4 adapter accommodates up to four piezometers. AM416 multiplexer can accommodate 16 piezometers with temperature readings or 32 piezometers without temperature readings.
See separate data sheet.

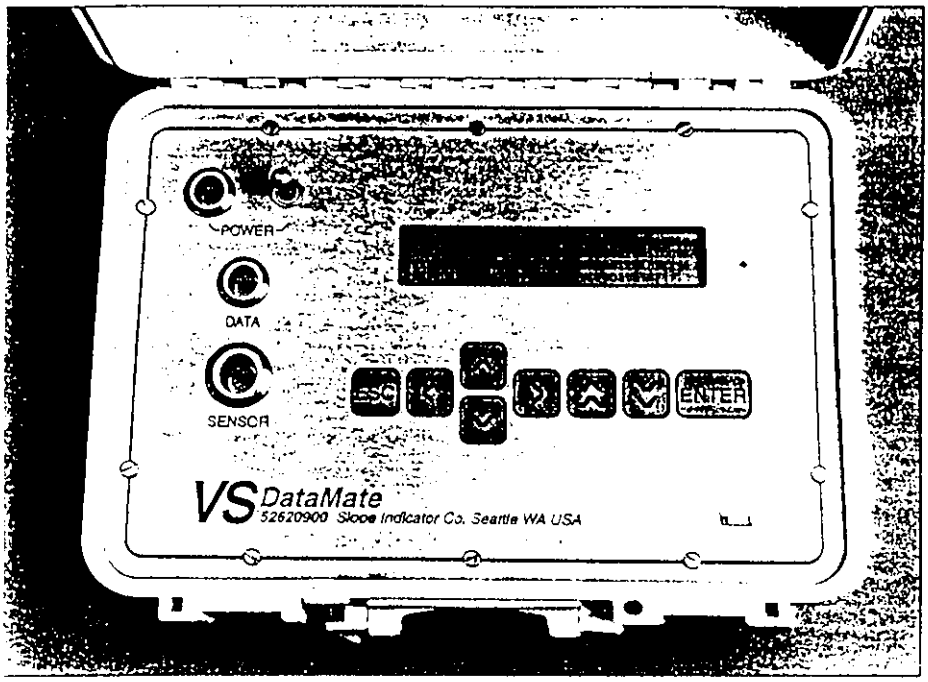
Slope Indicator Company
A Boart Longyear group company
3450 Monte Villa Parkway, PO Box 3015
Bothell, WA 98041-3015 USA
Tel: 206-806-2200 Fax: 206-806-2250
Order Desk: 800-331-0703

SLOPE INDICATOR

SINCO 70001773-0196

VS® DataMate

Records data from vibrating-wire and vibrating-strip sensors



VS DataMate

The VS DataMate reads and stores data from vibrating wire piezometers, strain gauges, settlement cells, load cells, extensometers, joint meters, and other vibrating wire or vibrating strip sensors.

Designed for hard use in difficult environments, the VS DataMate is splashproof and easy to operate.

The VS DataMate also provides sophisticated functions, such as "math macros" for convenient on-site calculations, an automatic reminder that warns if readings are overdue, and an "auto-read" mode that transforms the DataMate into a single sensor data logger.

Manager software, a required accessory, is used to program the DataMate and to transfer data between the DataMate and any IBM compatible PC.

IDAgraph software, an optional accessory, simplifies data handling, assists with data analysis, and generates graphs and reports.

Overview of Operation

First, the operator enters sensor calibrations into a database created by the Manager program. This is a one-time task.

Next, the operator transfers sensor information to the VS DataMate. After this simple, quick process, the DataMate is ready to use.

In the field, the operator selects a sensor, connects it to the DataMate, and with a single touch of a key, records the reading, the time, and the date. The operator can also view previously recorded data for comparison and validation.

At any convenient time, the operator transfers data to a PC, where it is automatically stored in database files. The powerful IDAgraph program can then generate graphs and reports.

Advantages

- **Displays Engineering Units:** Unlike other vibrating wire readout devices, the VS DataMate displays readings in units of pressure, length, strain, temperature, etc.
- **Calculates in the Field:** A unique "math macro" function performs calculations at the touch of a key. For example, a math macro can calculate the load on a strut from a series of strain gauge readings.
- **Stores 2,500 Readings:** The large memory capacity allows the operator to keep previous data in memory, for instant review and comparison with new data.
- **Transfers Data to PC:** Electronic transfer of data between the DataMate and the PC saves time and eliminates transcription errors.
- **Simplifies Data Handling:** The VS DataMate is designed to reduce the massive "data overload" associated with computerized data collection. The Manager program transfers readings from the DataMate directly into a database. IDAgraph software then generates presentation-quality graphs and reports from the database.
- **Monitors Automatically:** The VS DataMate can be programmed for unattended monitoring of one sensor, automatically recording sensor reading, temperature, time, and date at specified intervals.
- **Reads Temperature:** The VS DataMate can read RTD and thermistor temperature sensors in addition to nearly all types of vibrating wire sensors.
- **Operates in Cold Weather:** High quality components and a special LCD allow the VS DataMate to operate in temperatures from -20 to 50 °C (-4 to 122 °F).

VS DataMate Specifications

General Description: Portable readout and recording unit for vibrating wire and vibrating strip sensors.

Sensor Compatibility: Pluck-type vibrating wire or vibrating strip sensors that operate between 450 and 6000 Hz; constant-oscillation vibrating-wire sensors such as Slope Indicator's VW strain gauge sensor; 2K RTD sensors (range -45 to 102 °C); 3K thermistors (range -5 to 35 °C).

Data Capacity: Stores 2,500 readings with time & date and calibration data for up to 500 sensors.

Displayed Units: Any engineering unit can be specified via a second-order polynomial or (indirectly) by a math macro.

Resolution: Depends on sensor type and engineering units selected. Frequency resolution is better than 0.005% FS. For other units, resolution is typically 0.01% FS.

Accuracy at -20 to 50 °C: ± 0.02% of frequency reading; ±1 °C of RTD reading.

Menu-Selected Functions:

- **AutoRead:** Automatically records data at interval specified in seconds, minutes, hours, or days. Enters low power mode between readings.
- **Manual Read:** Provides ordered or random access to sensors for recording. Can display previous readings for selected sensor. Reports overdue readings.
- **Communication:** Establishes link between PC and DataMate for data transfers.
- **Edit:** For field entry of sensor calibrations.
- **Utilities:** Displays battery charge, enables and disables beeper and back light, displays internal temperature & humidity, sets date & time, adjusts contrast/viewing angle of display, and reports remaining memory capacity.
- **Serial Print:** Prints formatted ASCII data to serial printer or to communications program.
- **View Data:** Displays all data in memory, ordered by date and time.

Math Macro Function: Applies arithmetic functions, power, square root, exponent, logarithm, average, and absolute value functions to readings, initial reading, or calculated data. Maximum macro length is 256 characters. Maximum number of macros depends on macro length & number of sensor calibrations in memory. Each macro decreases maximum number of sensor calibrations by one. Macros are created and transferred to the DataMate with Manager software.

Communication: Serial port with RS232 signals. Auto-selected baud rate. Uses error checking protocol with data transfers initiated by DataMate Manager software.

Operating Time: 30 hours continuous operation (pluck excitation, backlight off) at 20 °C. Operates up to 6 months in auto-read mode (or until memory is full). Backup battery keeps data secure for six months if main battery is discharged. A 10-minute auto-off timer prevents accidental battery drain.

Battery: Rechargeable 6 volt 6 Ah, gelled electrolyte, lead-acid battery. AC charger (included) provides 16 hour charge time for 80% of capacity. Memory backup battery is a 3 volt lithium cell.

Temp Limits: -20 to 50 °C (-4 to 122 °F).

Display: Backlit, 4 line x 40 column LCD with adjustable contrast and extended temperature rating.

Case: ABS plastic with double gasket seal. Waterproof when closed, splashproof when open.

Size: 356 x 267 x 165 mm (14 x 10.5 x 6.5 in).

Weight: 5.3 kg (11.6 lb).

Manager Software

General Description: Computer software required for full operation of VS DataMate. Transfers sensor calibration information and data between VS DataMate and PC via interface cable. Stores data in databases.

Computer Requirements: IBM® compatible PC, DOS 3.3 or higher, 640 KB of RAM, hard disk and 286 or higher processor recommended. Program occupies 600 KB of disk space.

Data Format: Creates dBase® III and IV compatible binary files (no memo fields). Can export comma delimited ASCII data.

IDAgraph Software

General Description: Computer software for generating reports and annotated graphs. Compatible with data files from the VS DataMate and all other data loggers and data acquisition systems from Slope Indicator.

Computer Requirements: IBM compatible PC with DOS 3.3 or higher, 286 or higher processor, 640 KB of RAM, hard disk, and mouse. EMS memory recommended. Requires 2 megabytes of disk space. Includes "software key" for operation on one computer.

Printer Requirements: Supports 300 printers and plotters. PostScript® and HP-GL® supported.

Functions

- **Selecting Channels:** Select up to 6 sensors (channels) for each graph. Specify begin & end date. Choose base line of hours, days, or dates. Data smoothing function averages data over minutes, hours, days, and weeks. 3 of the 6 channels can be calculated values similar to "math macros."
- **Graphing:** Initial graph is auto-scaled and plotted after channels are selected. User then modifies graph. Set X and Y scales (includes logarithmic scales). Specify grid type, line style, lines to show days, enable data point markers and size, set filters to exclude or average data, enter channel offsets (useful for simultaneous display of different types of data), correlate channels against a base channel, plot regression line. Enlarge any section of the graph.
- **Graph Annotation:** Complete drawing package with shapes and fill patterns (useful for soil profiles, etc). Size and place text anywhere. Save template with standardized annotation for use with next graph.
- **Graph Printing:** Select printer, set size, margins, orientation, etc. Print at screen resolution or at any resolution (dots per inch) supported by printer.
- **Generating Reports:** Specify design, save layout, set filters, print.
- **Database Management:** Create, edit, merge, and archive databases. Functions for advanced users include: create, display structure, modify structure, copy structure, append, copy, import, replace, delete, recall, sort, join, count, sum, etc. Archive function creates a compressed database of data selected by date, time, and sensor number.

Ordering Information

VS DataMate..... 52620900
Includes battery charger, interface cable with DB-9 connector & DB-25 adapter to connect DataMate to PC, jumper cable #52620957 for universal connector, and bare-wire adapter #57710950. Does not include Manager software (required) or IDAgraph (recommended). Specify charger voltage (100, 115, 220, or 240) and frequency (50 or 60 Hz).

Manager Software..... 52620920
Software required for full operation of VS DataMate.

IDAgraph Software..... 58710030
Recommended.

Products and specifications are subject to change without notice. For warranty information, please request "Terms of Sale."

SLOPE INDICATOR

Slope Indicator Company
A Boart Longyear group company

3450 Monte Villa Parkway, PO Box 3015
Bothell, WA 98041-3015 USA
Tel: 206-806-2200 Fax: 206-806-2250
Order Desk: 800-331-0703

SINCO 70001779-0196