ARCADIS Design & Consultancy for natural and built assets

Work Order No. 4600003011-WO01

MECCA Flow Equalization Basin Design Documentation Report

Task 2.1

Geotechnical Investigations

Subtask 2.1.1

Data Reporting

Deliverable 2.1.1.3

Initial Ground Water and Rainfall Monitoring Report

January 20, 2016

For the Period of: 12/01/2015 to 12/31/2015

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TABLE OF CONTENTS

1 Introduction 1

2 Project Location 1

3 Background Information 1

4 Purpose and Scope 1

5 Data Reporting 2

5.1 Ground Water Level Data 2

5.2 Ground Water Sampling 3

5.3 Rainfall Data Collection 3

TABLES

Table 1. Wells / Piezometers 2

FIGURES

Figure 1. Vicinity Map

Figure 2. Monitoring Locations

Figure 3. Monitoring Well Typical Detail

APPENDICES

Appendix A. Ground Water Monitoring Equipment

Appendix B. Ground Water Monitoring Well Installation Records

Appendix C. Ground Water Monitoring Well Photographs

Appendix D. Ground Water Monitoring Data and Graphs

Appendix E. Ground Water Sampling Logs

Appendix F. Rainfall Monitoring Equipment

Appendix G. Rainfall Monitoring Data and Graphs

1 INTRODUCTION

The South Florida Water Management District (District), in conjunction with Arcadis U.S., Inc. (Arcadis), has begun the geotechnical analysis for design of the Mecca Flow Equalization Basin (FEB) at the Mecca site in Palm Beach County, Florida. As included in the scope for the Design Documentation Report (DDR) Phase services, Arcadis has provided drilling, soil sampling, piezometer and well installation, geophysical, aquifer, and soil testing services to assist in design of the flow equalization basin. In addition, Arcadis will be providing ground water and rainfall monitoring data to establish pre-construction background conditions at the site and to support the design effort. This document describes the process for collecting the data on a monthly basis for a period of one year from December 2015 to November 2016.

2 PROJECT LOCATION

The proposed FEB will be located on property formerly known as Mecca Farms, and now owned by the District. The property is approximately 1,920 acres of former citrus grove, located on the east side of Seminole Pratt Whitney Road approximately one-half mile north of Northlake Boulevard in northern Palm Beach County. It is bounded to the south by the Indian Trails Improvement District, to the east by the future Avenir development, to the west by the JW Corbett Wildlife Management Area, and to the north by the Hungryland Slough Nature Preserve. The site location is presented on **Figure 1**.

3 BACKGROUND INFORMATION

The proposed FEB storage facility is intended to have a capacity of 7,200 acre-feet that will allow for the capture of up to 300 cubic feet per second (cfs) of excess flows from the C-18 western basin. The purpose of this water storage facility is to attenuate high flows and store excess runoff from the C-18 western basin. These flows will then be discharged back to the C-18 Canal and delivered to the Loxahatchee River when needed to support the recovery strategy for the reduction of Minimum Flow and Level Exceedances and Violations, and to better meet restoration target flows for this wild and scenic river. The FEB will be enclosed by earthen embankments with appurtenances such as an inflow pump station, seepage control pumps, an outflow discharge structure and emergency spillway structures as required by current District and other state, local and federal design requirements.

4 PURPOSE AND SCOPE

The Geotechnical Analyses and Design task for the project included field exploration and aquifer testing on the site and surrounding area, geophysical logging and laboratory testing of soil samples. The results of the geotechnical subsurface exploration and hydrogeological data collection were presented in the *Mecca Geotechnical Data Report*, dated November 2015. As part of the scope of work outlined in the *Geotechnical Exploration Work Plan*, dated June 2015, fifteen (15) on-site and nine (9) off-site monitoring wells were equipped with downhole data loggers for the continuous measuring of ground water levels. An automated weather station including a rain gauge with data logging capability was also installed.

Arcadis will collect hydrological data for the Mecca FEB project from December 2015 thru November 2016. This data will be collected and recorded to determine initial pre-construction site conditions and to support the design of the proposed FEB. This *Initial Ground Water and Rainfall Monitoring Report* will be updated and provided to the District on a monthly basis with the addition of the previous month's ground

water and rainfall monitoring data. The final report will comprise 12 months of collected data. The information from the monthly reports will be incorporated into the DDR and Preliminary, Intermediate and Final Design phase reports.

5 DATA REPORTING

5.1 Ground Water Level Data

Twenty-four monitoring wells, as listed in **Table 1**, have been installed throughout the project site and at off-site locations that will collect ground water elevation data for 365 days at 15-minute intervals using downhole data loggers. The locations of these wells are shown on **Figure 2**. Hydrogeological data for each of the monitoring wells was provided in the District's standard Microsoft Excel spreadsheet template that was included with the *Mecca Geotechnical Data Report*, dated November 2015.

Table 1. Wells / Piezometers

Well/ Piezometer Name	Associated Boring Number	Diameter of Well (inches)	Depth of Well (feet)	Screen Length of Well (feet)
MFEB1-GW1	MF-B-1	2	100	5
MFEB1-GW2	MF-B-1	2	45	5
MFEB1-GW3	MF-B-1	2	15	5
MFEB2-GW1	MF-B-20	2	100	5
MFEB2-GW2	MF-B-20	2	45	5
MFEB2-GW2	MF-B-20	2	15	5
MFEB3-GW1	MF-B-9	2	100	5
MFEB3-GW2	MF-B-9	2	45	5
MFEB3-GW3	MF-B-9	2	15	5
MFEB4-GW1	MF-B-12	2	100	5
MFEB4-GW2	MF-B-12	2	45	5
MFEB4-GW3	MF-B-12	2	15	5
MFEB5-GW1	MF-B-17	2	100	5
MFEB5-GW2	MF-B-17	2	45	5
MFEB5-GW3	MF-B-17	2	15	5
MFEB6-GW1	MF-B-22	2	100	5
MFEB6-GW2	MF-B-22	2	45	5
MFEB6-GW3	MF-B-22	2	15	5
MFEB7-GW1	MF-B-23	2	100	5
MFEB7-GW2	MF-B-23	2	45	5
MFEB7-GW3	MF-B-23	2	15	5

Table 1. Wells / Piezometers

Well/ Piezometer Name	Associated Boring Number	Diameter of Well (inches)	Depth of Well (feet)	Screen Length of Well (feet)
MFEB8-GW1	MF-B-24	2	100	5
MFEB8-GW2	MF-B-24	2	45	5
MFEB8-GW3	MF-B-24	2	15	5

The data logging equipment utilized for this project includes the Solinst Levellogger Junior Edge model 3001 data logger with Solinst locking well caps. An operator will utilize the Solinst Leveloader Gold hand-held data transfer unit to gather the data from the loggers and then transfer to a computer. Product information for this equipment is provided in **Appendix A**. Construction details for piezometer/monitoring wells are shown on **Figure 3**. Well Installation Records are provided in **Appendix B**. Photographs of each of the monitoring well clusters are provided in **Appendix C**.

After the levellogger data is collected in the field each month, it will be post-processed in the office to generate Ground water Elevation-versus-Time graphs for each well. These figures will be included in **Appendix D**, and will be updated each month as new data is obtained. In addition to the graphical plots, post-processed data for each well will be output in the District's standard comma-delimited format, and submitted as a separate digital txt file with each monthly monitoring report.

The horizontal and vertical control utilized for this project was established by the National Geodetic Survey District. The horizontal datum referenced for this project is based on the North American Datum of 1983, 1999 adjustment (NAD 83/99) and is presented in Florida East State Plane coordinates. The elevations referenced for this project are based on the vertical datum as established by the North American Vertical Datum of 1988 (NAVD 1988). To convert elevations from NAVD 1988 to National Geodetic Vertical Datum of 1929 (NGVD 1929), 1.45 feet is added to the NAVD 1988 elevations. This conversion is based on a survey report by Arcadis dated October 29, 2015.

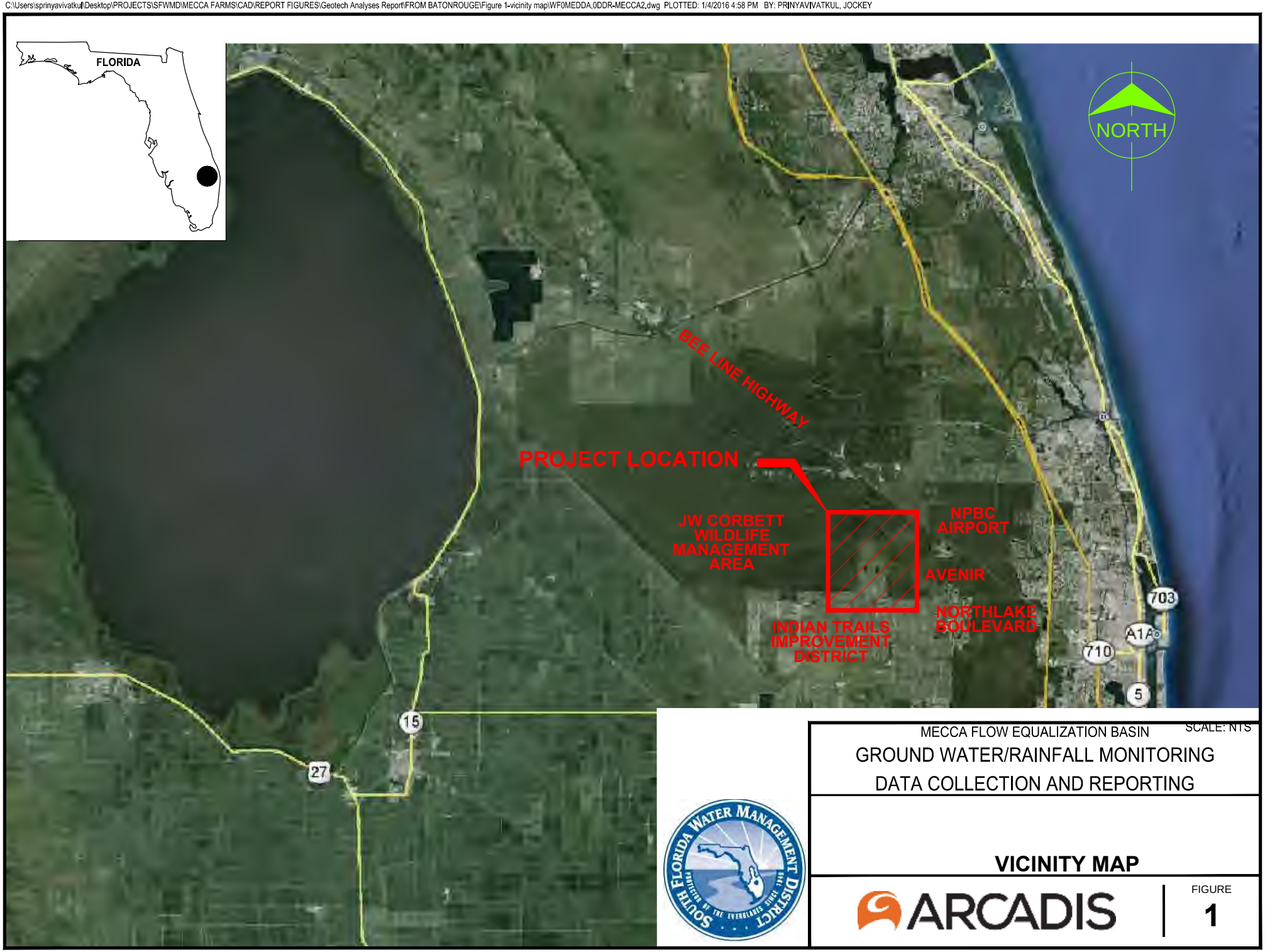
5.2 Ground Water Sampling

An initial ground water sampling event was performed for eight wells that have a depth of 100 feet as listed in **Table 1**. The following ion parameters were analyzed by a laboratory: bicarbonate, carbonate, sulfate, calcium, magnesium, sodium, potassium, and iron. Ground water sampling logs are provided in **Appendix E**.

5.3 Rainfall Data Collection

A weather station was installed central to the project site at the approximate location of boring MFEBBH17 as shown on **Figure 2**. The weather station is a Davis Instruments Vantage Pro2 Weather Station, details of which are provided in **Appendix F**. The rainfall and weather data collected will be provided in **Appendix G**.

DRAWN BY: S. MEN CHECKED BY: S. MALLA PROJECT MANAGER: T. MICHUDA
C:\Users\sprinyavivatkul\Desktop\PROJECTS\SFWMD\MECCA FARMS\CAD\REPORT FIGURES\Geotech Analyses Report\FROM BATONROUGE\Figure 1-vicinity map\WF0MEDDA.0DDR-MECCA2.dwg PLOTTED: 1/4/2016 4:58 PM BY: PRINYAVIVATKUL, JOCKEY



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MECCA FLOW EQUALIZATION BASIN

GROUND WATER/RAINFALL MONITORING
DATA COLLECTION AND REPORTING

VICINITY MAP

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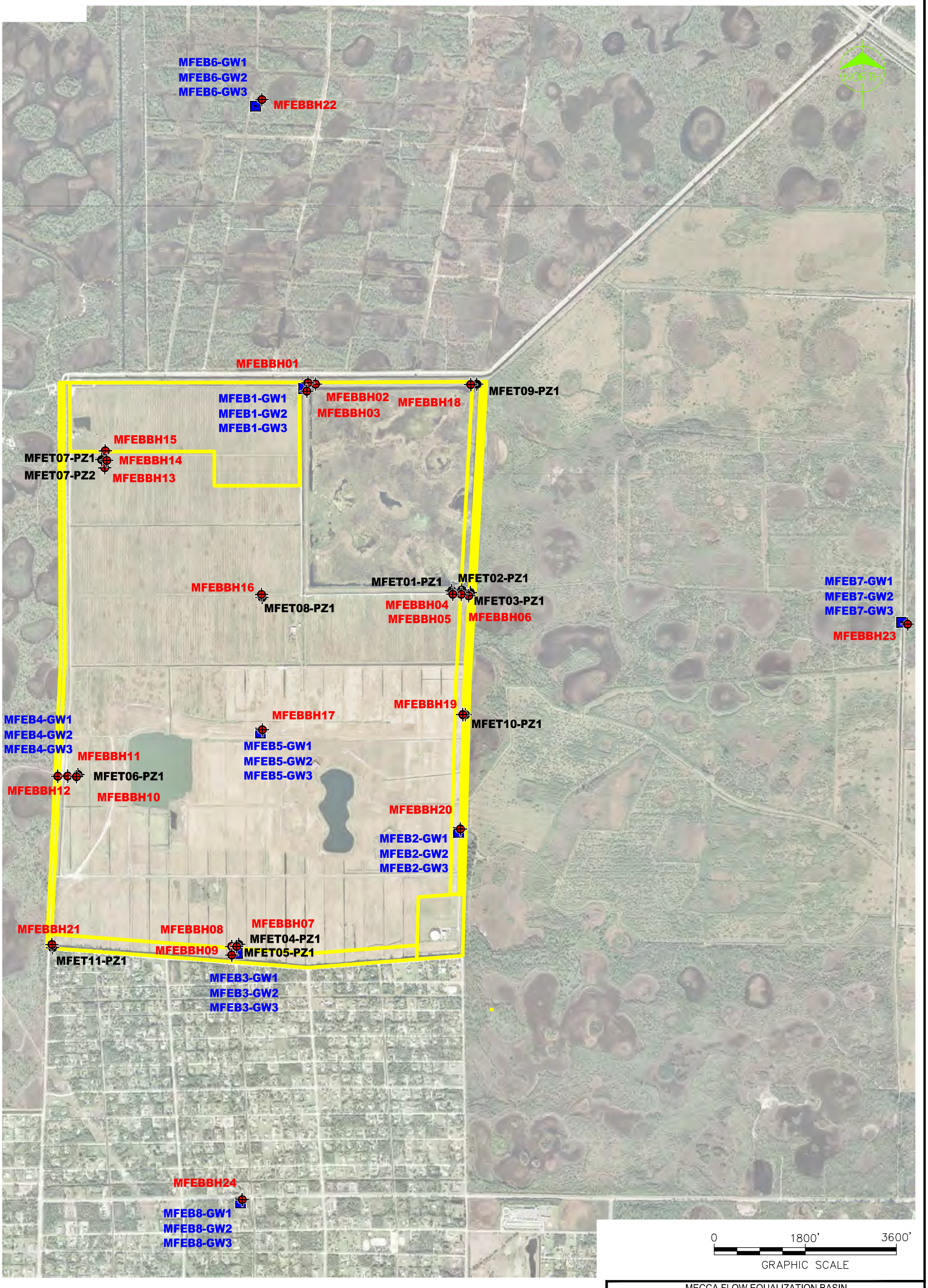
FIGURE
1



LEGEND

- MFEBBH01 — BORING LOCATION AND DESIGNATION
- MFEB1-GW1 — MONITOR WELL LOCATION AND DESIGNATION
- MFET01-PZ1 — PIEZOMETER LOCATION AND DESIGNATION
- PROPERTY LINE

MECCA FLOW EQUALIZATION BASIN

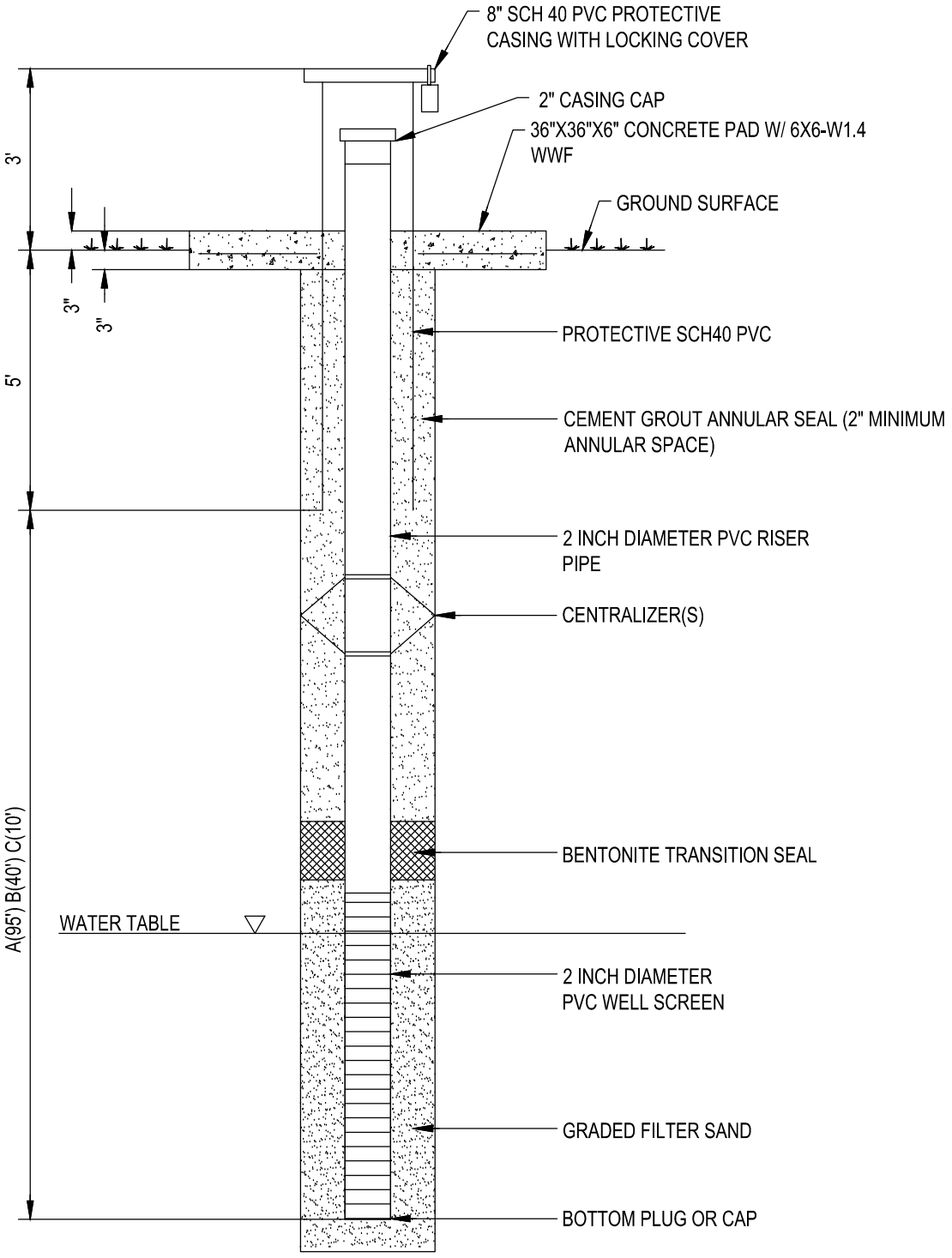
GROUND WATER/RAINFALL MONITORING

DATA COLLECTION AND REPORTING

MONITORING LOCATIONS

ARCADIS

FIGURE



MECCA FLOW EQUALIZATION BASIN

GROUND WATER/RAINFALL MONITORING

DATA COLLECTION AND REPORTING

PIEZOMETER/MONITORING WELL TYPICAL DETAIL

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FIGURE

3

DRAWN BY: S. MEN CHECKED BY: S. MALLA PROJECT MANAGER: T. MICHUDA
C:\Users\sprinyawiratkul\Desktop\PROJECTS\SFWMD\MECCA FARMS\CAD\REPORT FIGURES\Geotech Analyses Report\FROM BATONROUGE\Figure 3-well detail\WF0MEDDA.0DDR-MECCA3.dwg PLOTTED: 12/24/2015 12:20 PM BY: PRINYAM\WATKUL, JOCKEY

APPENDIX A

Ground Water Monitoring Equipment

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1 Introduction 1
1.1 Levelogger Series 2
1.1.1 Levelogger Edge 2
1.1.2 Barologger Edge 3
1.1.3 Levelogger Junior Edge 4
1.1.4 LTC Levelogger Junior 5
1.1.5 Rainlogger Edge 6
1.1.6 Leveloader Gold 6
1.1.7 Levelogger Gold 7
1.1.8 Barologger Gold 8
1.1.9 Levelogger Junior 9
1.1.10 Rainlogger 10
1.2 Measurement Parameters 11
1.2.1 Level 11
1.2.1.1 Pressure Calibration 11
1.2.2 Barometric Pressure 11
1.2.3 Temperature 12
1.2.4 Conductivity 12
1.2.4.1 Calibration of the Conductivity Sensor 12
1.2.5 Total Rainfall 12
1.3 Software Communication 13
1.3.1 Backwards Compatibility 14

2 System Requirements 15

3 Software Installation 15

4 Startup, Configurations and Settings 16
4.1 Startup 16
4.1.1 Software/Firmware Update Checks 16
4.1.2 Communicating with a USB Port 16
4.1.3 Installing USB Drivers for Levelogger 4 Software 17
4.1.3.1 USB Installation for Windows XP 17
4.1.3.2 Manual USB Installation 19
4.1.3.3 USB Installation for Windows 7 20
4.2 Configuration and Settings 23
4.2.1 Com Port Designation Set Up 23
4.2.2 Data Directory 23
4.2.3 File Name Settings 23
4.2.4 Default File Type 24

5 Levelogger Edge Series Setup 25
5.1 Datalogger Settings 25
5.1.1 Setting Up Channel Information 26
5.1.1.1 Level Channel (Ch1) 26
5.1.1.2 Temperature Channel (Ch2) 26
5.1.1.3 Conductivity Channel (Ch3) 27
5.1.1.4 Rainloggers 28
5.2 Datalogger Information 29
5.3 Datalogger Memory 29
5.4 Datalogger Time 29
5.5 Datalogger Sampling Mode 30
5.6 Datalogger Memory Mode 31
5.7 Saving and Retrieving Levelogger Settings Files 32

5.8 Starting and Stopping the Datalogger 32
5.9 Levelogger Gold Series Setup 34

6 Conductivity Calibration 37
6.1 Restore Factory LTC Levelogger Junior Calibration 42

7 Data Control 43
7.1 Downloading Options and Saving Data Files 44
7.1.1 Default File Format 44
7.1.2 Downloading Data 45
7.1.3 Saving Data 46
7.2 Graph Manipulation and Zoom Function 46
7.3 File Export and Print Function 49

8 Data Compensation 50
8.1 Data Wizard 50
8.1.1 Basic Compensation 52
8.1.2 Advanced Compensation 54
8.2 Manual Barometric Compensation 61

9 Real Time View 62

10 Installation and Maintenance of Leveloggers 63
10.1 Installation 63
10.1.1 Free Suspended Installations 64
10.1.1.1 Suspension Wire/Cord Installation 64
10.1.1.2 Direct Read Cable Assembly Installation 65
10.1.1.3 Model 3001 Well Cap Assembly 66
10.1.2 Fixed Installations 67
10.1.2.1 Artesian Monitoring 67
10.1.2.2 Vacuum Monitoring 67
10.1.3 Barologger Installation 68
10.1.3.1 Barometric Efficiency 68
10.1.4 Rainlogger Installation 70
10.1.5 Installation in Extreme Environments 71
10.1.5.1 Freezing or High Temperature Conditions 71
10.1.5.2 Marine or Brackish Installations 72
10.1.5.3 Biofouling Conditions 72
10.2 Levelogger Maintenance 73

11 Diagnostics Utility 74
11.1 Run Diagnostics 74
11.2 Read Memory Dump 75
11.3 Create Report 75
11.4 Email Report 76
11.5 LTC Calibration History Report 77
11.6 Software/Firmware Updates 77

12 Firmware Upgrade Utility 78

13 Trouble Shooting 79
13.1 Problems During Installation of Levelogger Software 79
13.2 Error During Software Uninstall Process 79
13.3 Problems During Installation of RS-232 to USB Converter 79
13.4 Data Has Been Erased Accidentally 79
13.5 Error Messages During Use of Software 80

1.1.5 Rainlogger Edge

The Rainlogger Edge is designed for use with most standard tipping-bucket rain gauges with a reed switch output. It records each tip time from the tipping-bucket, and outputs the amount of rainfall per programmed time period (based on rainfall calibration constant).

Rainlogger Edge Technical Specifications	
Battery Life:	10 years (logging 2 parameters/10 minutes)
Clock Accuracy:	± 1 minute/year
Operating Temperature:	-20˚C to 80˚C
Maximum # Readings:	Up to 60,000 tip times
Memory:	FRAM, Slate mode only
Communication:	Optical infra-red: USB, RS-232, SDI-12
Measurement:	Records each tip by the tipping-bucket rain gauge and outputs the amount of rainfall
Sampling Mode:	Event Based, Future Start, Real TIme View
Size:	7/8" x 5.5" (22 mm x 140 mm)
Weight:	1.6 oz (44 grams)
Materials:	ABS, Delrin®, Viton®

NOTE

Solinst recommends using the most recent firmware, Version 3.001, when using a Rainlogger Edge with Software Version 4.1.1.

1.1.6 Leveloader Gold

The Leveloader Gold is a data transfer device for use with all versions of Leveloggers. It can be used to download, store, and transfer data from Levelogger to PC, as well as, save settings files for transfer to a Levelogger. Also allows real time viewing of Levelogger readings. The Leveloader is used with Levelogger Software, see separate Leveloader Gold User Guide.

NOTE

Solinst recommends using the most recent firmware, Version 2.002, when using a Leveloader Gold with Software Version 4.1.1.

1.2.3 Temperature

Leveloggers record temperature compensated water levels. Groundwater and surface water temperature measurements are particularly important in situations where temperatures may fluctuate significantly, and when temperature is used in determining liquid level, viscosity and hydraulic conductivity. Temperature monitoring is vital in the calculation of certain temperature dependent contaminant reaction rates. A Platinum Resistance Temperature Detector is used to accurately compensate for temperature changes within the range of 0 to +50°C for the Levelogger Edge, -10°C to +50°C for the Barologger Edge, 0 to +40°C for the Levelogger Junior Edge, and +10 to +40 for the LTC Levelogger Junior. The Levelogger will record temperature in its thermal range of -20 to +80°C, but outside the range, compensation will be less accurate.

1.2.4 Conductivity

NOTE

For every degree change in temperature, there is approximately a 2% change in conductivity. To convert raw conductivity measurements to Specific Conductance measurements, you can use the following equation:

Specific Conductance = Conductivity / (1 + 0.02 * (temp(C) - 25))

You can also perform this calculation automatically using the Data Wizard.

The LTC Levelogger Junior provides the added feature of electrical conductivity measurement. It measures the actual conductivity at the current temperature. Conductivity measurement is particularly useful in monitoring saltwater intrusion, surface water infiltration and mixing, as well as the monitoring of certain pollutants and contaminant parameters. Conductivity is measured via a platinum 4-electrode sensor, which produces highly stable and consistent readings. Conductivity calibration is performed by using a liquid solution, with a known conductivity value, and the Calibration Wizard in the Levelogger Windows Software. The Data Wizard allows you to convert conductivity readings to Specific Conductance (at 25°C), or Salinity expressed in Practical Salinity Units (PSU). A Practical Salinity Unit (PSU) is a dimensionless descriptor for the Practical Salinity Scale (PSS). The PSS defines salinity as the ratio of a water sample's conductivity to that of a standard KCL solution. The Data Wizard uses the equation given in the UNESCO Technical Paper "Algorithms for computation of fundamental properties of seawater", to convert Conductivity readings to Salinity. For more information, see: Fofonoff, N. P. and R.C. Millard, Jr. Algorithms for computation of fundamental properties of seawater, UNESCO, Tech. Pap. Mar. Sci.,44.

1.2.4.1 Calibration of the Conductivity Sensor

The conductivity sensor of the LTC Levelogger Junior is a highly sensitive device requiring regular calibration by the user. The conductivity calibration frequency is dependent on the water quality of the Levelogger's monitoring environment. To determine whether an LTC Levelogger Junior should be re-calibrated, test the unit in a solution with a known electrical conductivity value at a reference temperature. In Real Time View, observe current readings by using the Read Now function. If this reading varies from the known Specific Conductance of the solution by greater than 2% of the Full Scale of Conductivity measurement, the unit should be re-calibrated using the Conductivity Calibration Wizard procedure outlined in Section 6. As a minimum, calibrate your LTC Levelogger Junior at least twice a year. Ensure that a conductivity calibration is performed when the LTC Levelogger Junior is being set up for its initial use and after long periods of dry storage.

1.2.5 Total Rainfall

Solinst Rainloggers are designed to record the number of tips of an external tipping-bucket rain gauge, and output the amount of rainfall per tip.

NOTE

It is always recommended to use the most recent version of software and firmware.

NOTE

For more information, visit www.solinst.com to view the 3001 Levelogger Series: Hardware Compatibility, which is located on the Downloads page.

1.3.1 Backwards Compatibility

The Levelogger Edge is not backwards compatible with previous versions of Levelogger Software. Only Levelogger Software Version 4 and up can be used to program the Levelogger Edge and Barologger Edge. The Levelogger Junior Edge is only compatible with Levelogger Software Version 4.0.2 and up. The Rainlogger Edge is only compatible with Software Version 4.1 and up.

The Levelogger Junior, LTC Levelogger Junior, Rainlogger, and Leveloader are compatible with Levelogger Software Version 4.1.1. If used with previous software versions, they will not have some of the features gained with the release of Version 4.1.1 Software. The Levelogger Gold and Barologger Gold are also compatible with Version 4.1.1. Software, and previous versions.

To use your Leveloggers with Version 4.1.1 Software, ensure your firmware is upgraded to the following versions:

Datalogger	Firmware Version
Levelogger Edge	3.003
Barologger Edge	3.003
Levelogger Junior Edge	3.003
LTC Levelogger Junior	2.005
Rainlogger Edge	3.001
Leveloader Gold	2.002
Levelogger Gold	2.007
Barologger Gold	2.007
Levelogger Junior	2.007
Rainlogger	2.000

For more information on previous software and firmware versions, visit www.solinst.com to view **3001 Levelogger Series: Hardware Compatibility**, located on the Downloads page.

2 System Requirements

The minimal hardware and software requirements for software installation and operation are:

Hardware	Software
Memory: 32 MB or more	OS: Windows XP or 7
Display: VGA: 800 x 600 pixels, 256 colour	
Ports: USB or RS-232 Serial Port	

Communication Port Setting for Levelogger Communications:

Bits per second	9600
Data bits	8
Stop bits	1
Flow control	None

3 Software Installation

Web Download

Download the newest version of Levelogger Software by visiting www.solinst.com/downloads/

CD Installation

1) Insert the software CD provided.
2) If the installer does not automatically start, to activate the software install click on the 'setup.exe' file located on the software CD.
3) The Software Installation Wizard will guide you through the remaining installation process. Figure 3-1 shows the Levelogger Installation Wizard.
4) Restart the computer after installation is completed. Default Directory is C:\Program Files\Solinst\Levelogger4_1

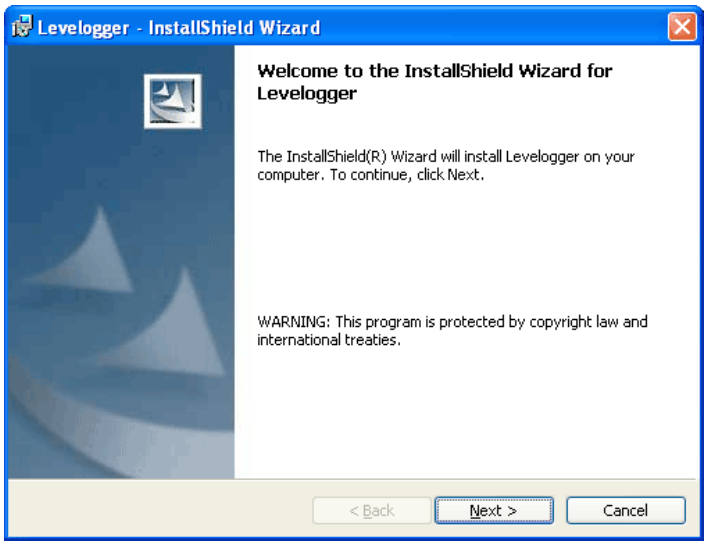


Figure 3-1 Software Installation Wizard

4 Startup, Configurations and Settings

4.1 Startup

If using a USB port, plug in the USB cable before starting the Levelogger Software. If plugging in the USB device for the first time, the driver for the device will have to be installed, see Section 4.1.3 for USB driver installation instructions.

To start the Levelogger Software, click , or click the Start button and select:

Programs > Solinst > Levelogger 4 > Levelogger 4.1.1

Once the program is started, you can set up the parameters for the Software.

4.1.1 Software/Firmware Update Checks

NOTE

Your PC must have an internet connection to check for software and firmware updates.

You can also check for updates using the Help menu.

Each time the software is opened, it automatically checks for software updates. If there is an update, "Software Update Available" will appear in the top right of the menu bar. When you click the message, it will open a web page where you can download the software update.

The Software also checks for firmware updates once you have retrieved settings from a connected Levelogger (see Section 5)."Firmware Update Available" will appear in the top right menu bar. Clicking the message will open a web page where you can download the firmware update. See Section 12 for firmware update instructions.

4.1.2 Communicating with a USB Port

NOTES

To check the Com port assigned to a USB device after installation, open the Device Manager. Expand "Ports (COM & LPT)" to show the Com Port that has been assigned. To change the assigned Port, see Section 4.2.1.

You may have to restart your computer after adding a new USB device, before that port will be detected by the Levelogger Software

USB port communication requires the installation of USB driver software and the setting up of a virtual com port. If communicating via a USB port, the user will either:

1) Connect a Levelogger Optical Reader or PC Interface Cable to the USB port
2) Use a USB to RS-232 Adapter

If 1, during the installation of Levelogger Software, the **Virtual Com Port Driver** will be installed automatically. The Levelogger Software Installation Wizard also copies a folder to the Levelogger folder containing all the Solinst USB drivers. When you plug in the Solinst USB device, check the com port designation after installing the device (see Section 4.2.1).

If 2, Solinst strongly recommends the use of either Keyspan™ or IO Gear™ USB to RS-232 Serial Adapters. These adapters have a sufficiently large buffer to accommodate the size of data bundle and bit transfer rate of the Levelogger. Follow the manufacturer's USB Driver and Com port setup installations found on the CD accompanying the adapter.

If you have installed another brand-name adapter, but cannot communicate with the Levelogger, in most cases the problem is that the adapter does not have a large enough internal memory buffer. The minimum buffer size should be 96 bytes.

NOTE

Do not install generic drivers that Windows will locate. Generic drivers are completely incompatible with Solinst USB devices.

NOTE

After plugging in the USB device, if the 'Found New Hardware Wizard' does not automatically appear, proceed to the Manual USB Installation instructions in Section 4.1.3.2

NOTE

Make sure you only select the USB Drivers folder when browsing for the driver location. Do not choose a sub file from the folder.

4.1.3 Installing USB Drivers for Levelogger 4 Software

Levelogger Software Version 4.1.1, for use with Solinst USB Optical Reader, PC Interface Cable and Leveloader, comes equipped with USB drivers for: Windows XP and 7.

4.1.3.1 USB Installation for Windows XP

1) Plug the USB device into the computer, and Windows will automatically detect the connected device. This will begin the 'Found New Hardware Wizard'.
2) The 'Wizard' will give the option to connect to Windows Update to search for software components, select: 'No, not at this time'.
3) Click 'Install from a list or specific location', then click the 'Next' Button. (Figure 4-1).

Figure 4-1 Found New Hardware Wizard Window

4) Select the installation option, 'Include this location in the search' (Figure 4-2), then click the 'Browse' button to search for the appropriate directory:

   C:\Program Files\Solinst\Levelogger4_1\USB Drivers

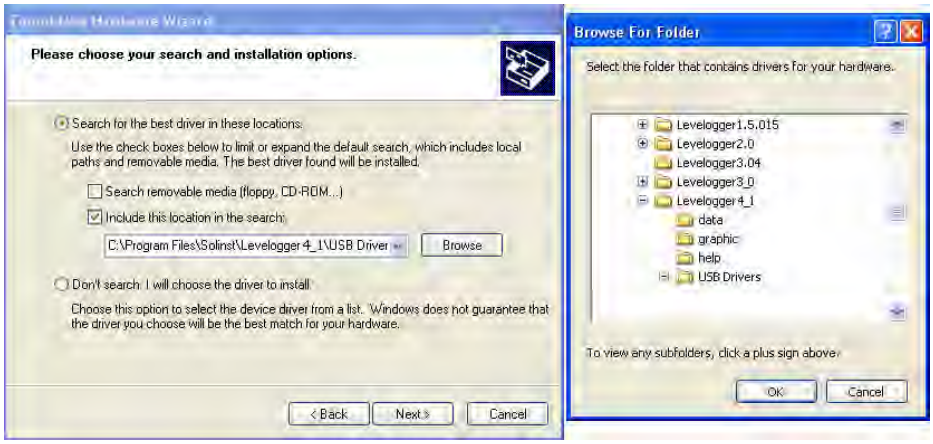


Figure 4-2 Found New Hardware Window and Figure 4-3 Browse for Folder Window

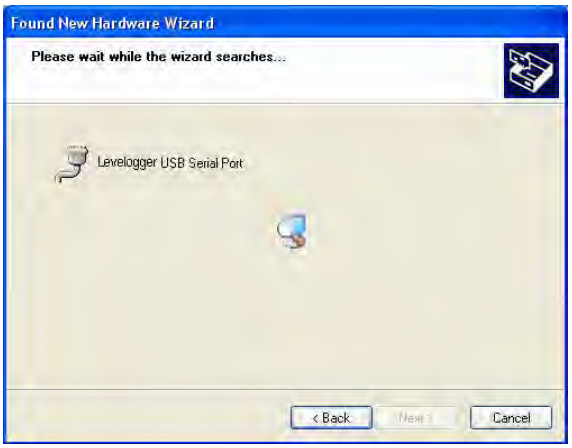


Figure 4-4 Found New Hardware Search Window

5) A warning message will then prompt that the software has not passed the Windows Logo Test. Select 'Continue Anyway' (Figure 4-5). This will complete the installation process. A system restart may be required. Repeat the steps if the installation fails the first time.

Figure 4-5 Hardware Installation Window

Figure 4-6 Found New Hardware Completed Window

4.1.3.2 Manual USB Installation

If your device is plugged in and the 'Found New Hardware Wizard' fails to start, then follow these steps:

1) Open the Device Manager. Typically this is found through the path:
   Start > Control Panel > System > Hardware > Device Manager

   Once the Device Manager is open, a version of the following list(s) will appear:

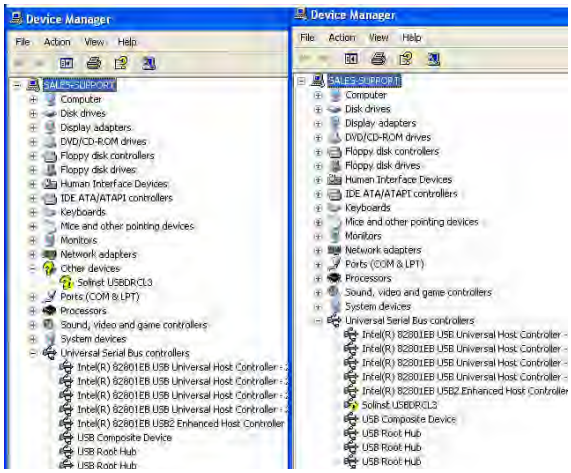


Figure 4-7 Device Manager

2) Identify the Solinst device from the list. The device will be categorized under 'Other Devices' or 'Universal Serial Bus Controllers'.

3) Highlight the device in the list and right click. You will see an option to 'Update the driver'. This will start the 'Hardware Update Wizard'. Now follow the instructions for your specific Windows version.

NOTE

If you are unsure which is the correct device in the list, with the screen visible, safely remove the device and then reconnect it. The list should automatically refresh accordingly.

NOTE

If you do not know the correct Com Port that was assigned to your device, re-open the Device Manager. Expand "Ports (COM & LPT)" to show the Com Port that has been assigned. To change the assigned Port, see Section 4.2.1.

NOTE

USB driver installation should be automatic when connecting a PC Interface Cable or Optical Reader.

NOTE

The 'Found New Hardware Wizard' may start automatically, beginning at step 3 below.

NOTE

If the USB driver does not install the first time, repeat the steps a second time. It often takes more than once to install the driver for Windows 7 systems.

NOTE

If you are unsure which is the correct device in the list, with the screen visible, safely remove the device and then reconnect it. The list should automatically refresh accordingly.

4.1.3.3 USB Installation for Windows 7

Plug the USB Device into the PC. The system will automatically detect the connected unit. Windows 7 should automatically install the driver for the device.

If no driver is automatically found, and the 'Found New Hardware Wizard' fails to start, the following steps should be taken:

1) Press the Windows start button to bring up the start menu, select 'Control Panel', then 'Hardware and Sound', then 'Device Manager'.
2) Under 'Other Devices' there will be a Solinst device shown with a yellow warning symbol. Right click on this device, and select 'Update Driver Software'.

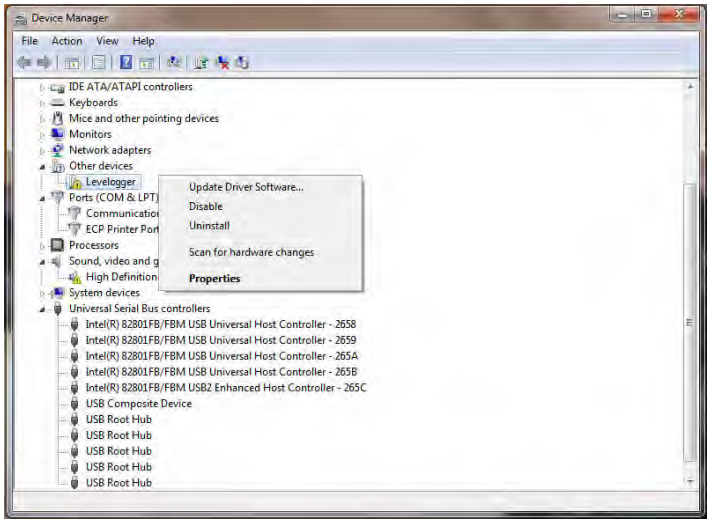


Figure 4-8 Windows 7 Device Manager

3) Select 'Browse my computer for driver software'.

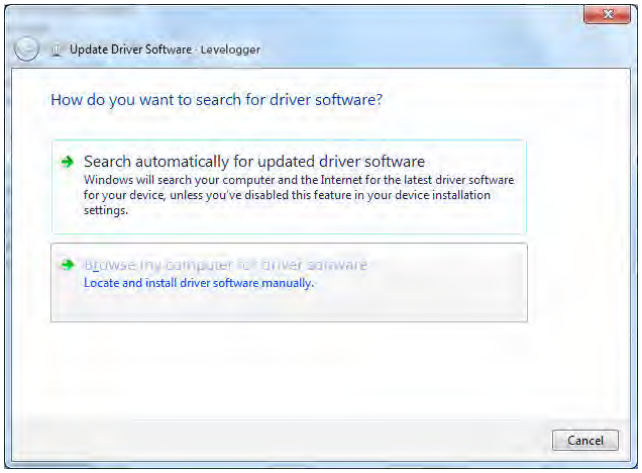


Figure 4-9 Update Driver Software

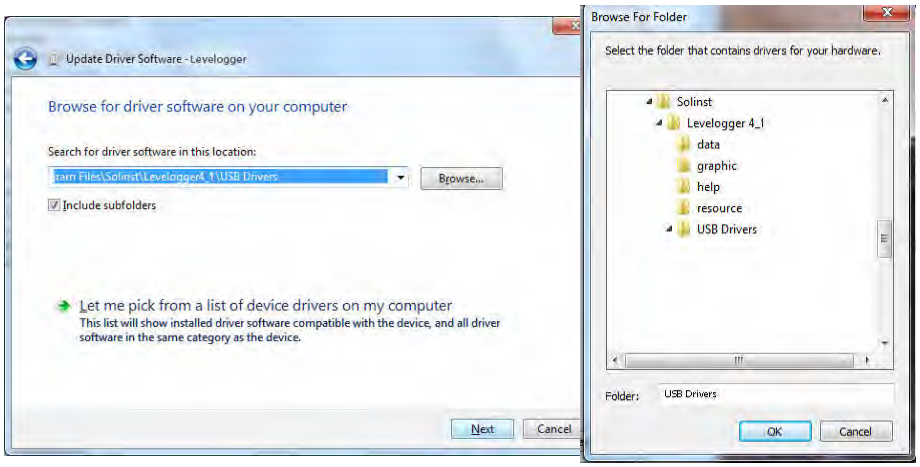


Figure 4-10 Browse for Driver Software

NOTE

Make sure you only select the USB Drivers folder when browsing for the driver location. Do not choose a sub file from the folder.

4) Click the Browse button and point the navigation window to the provided USB drivers located within the Levelogger4_1 folder. Default destination is:

   C:\Program Files\Solinst\Levelogger4_1\USB Drivers

   Select the actual USB Drivers folder, not a sub file from the folder.

5) Select Next. A window may appear stating 'Windows can't verify the publisher of this driver software', select 'Install this driver software anyway'.

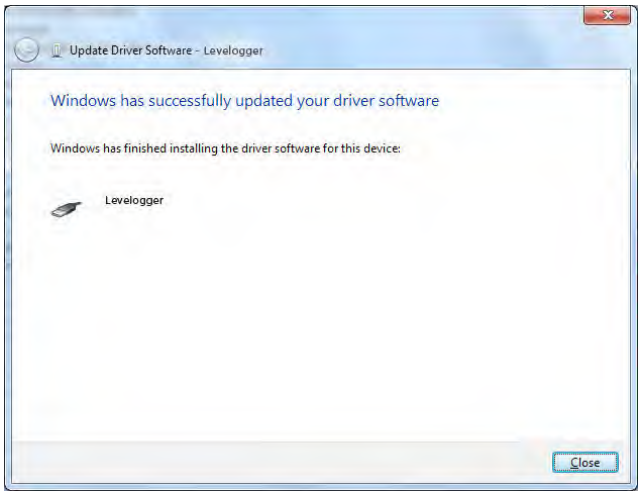


Figure 4-11 Update Complete

6) Windows will confirm when the installation is complete. Press Close to close the window, then go back to the 'Device Manager'.

NOTE

If you are unsure which is the correct device in the list, with the screen visible, safely remove the device and then reconnect it. The list should automatically refresh accordingly.

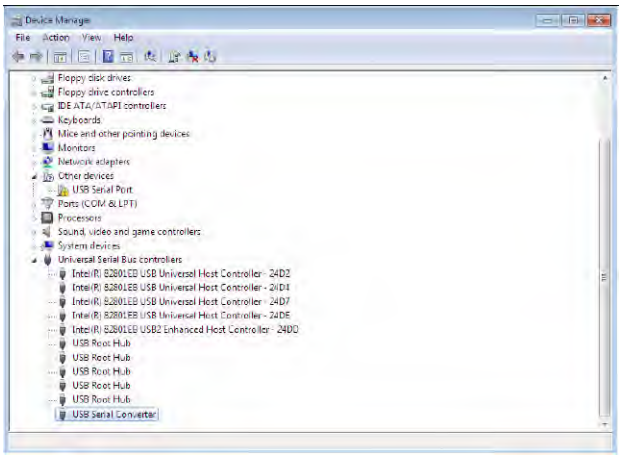


Figure 4-12 Update Serial Port

7) You may have to repeat steps 2-6 to update the USB Serial Port. This would be shown under 'Other Devices' with a yellow warning symbol.

8) Once installation is complete, a window will confirm the COM port assigned to the device.

4.2 Configuration and Settings

4.2.1 Com Port Designation Set Up

NOTES

To check the Com port assigned to a USB device after installation, open the Device Manager. Expand 'Ports (COM & LPT)' to show the Com Port that has been assigned.

You may have to restart your computer after adding a new USB device, before that port will be detected by the Levelogger Software

After installing a USB device, should the Com Port number assigned to the device conflict with your existing devices, it is possible to change the Com Port designation number:

1) Click Start > Settings > Control Panel
2) Click Systems to open the System Properties
3) Click the Hardware tab and click 'Device Manager'
4) Double Click the Ports Icon and select the 'USB Serial Port'
5) Right click and select Properties
6) Click the 'Port Settings' tab and click 'Advanced'
7) Select the Com Port Number and click 'OK'

Note: the path to the 'Port Settings' tab may be different for each Windows operating system. The above is just a guideline.

4.2.2 Data Directory

The program will save data downloaded to the following default directory: <C:\Program Files\Solinst\Levelogger4_1\Data> unless otherwise specified in the Default Directory field of the Application Settings window (Figure 4-13).

Click the Configuration menu at the top of the program window, select Application Settings and input or navigate to a different folder destination. After completing the Application Settings, click the OK button to confirm and save the settings.

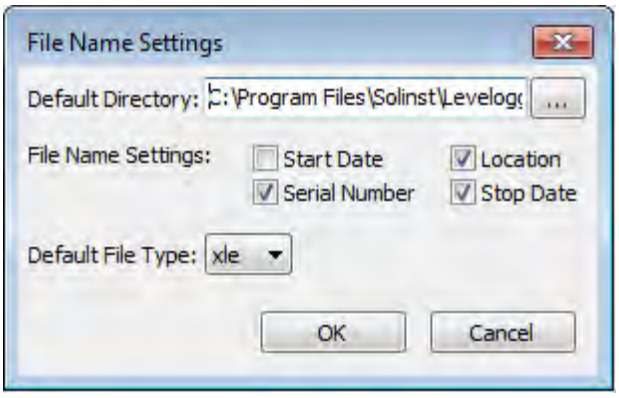


Figure 4-13 Application Setting Window

4.2.3 File Name Settings

From the Application Settings window in the Configuration menu, you can set what information will be included in your default file names of downloaded data (see Figure 4-13). You can include Start Date, Stop Date, Serial Number, and Location. Check-off the information you would like included.

After completing the Application Settings, click the OK button to confirm and save the settings.

4.2.4 Default File Type

From the Application Settings window in the Configuration menu, you can set what default file type you would like to use for downloaded, saved and exported data files. You can select between either *.xle (default) or *.lev file types (see Figure 4-13). For more information about the two file types, see Section 7.1.1.

After completing the Application Settings, click the OK button to confirm and save the settings.

NOTE

Depending on your Levelogger type, there will be different programming options.
See Table 1-1 for the major differences. See Section 5.9 for programming the Levelogger Gold, Barologger Gold, and Levelogger Junior.

NOTE

Click on (?) icons to get an explanation of that software feature.

NOTE

When first setting up a Barologger and Levelogger(s) that will be used for the same project, it is suggested to set them at the same sampling interval, and to use the Future Start and Stop options where possible. When the data sets have the same time stamps, and start and stop times, barometric compensation of the data will be most accurate. It is also useful to synchronize the clocks of the dataloggers. See Section 5.4.

NOTE

The Levelogger Edge, which is available in F6 (M2), F15 (M5), F30 (M10), F65 (M20), F100 (M30), F300 (M100), and F600 (M200) ranges has actual water level ranges of 6.6 ft (2 m), 16.40 ft (5 m), 32.80 ft (10 m), 65.60 ft (20 m), 98.40 ft (30 m), 328.0 ft (100 m), and 656.2 ft (200 m), respectively.

5 Levelogger Edge Series Setup

After you start the Levelogger Software, the main Levelogger Software window will appear, with the Datalogger Settings tab open.

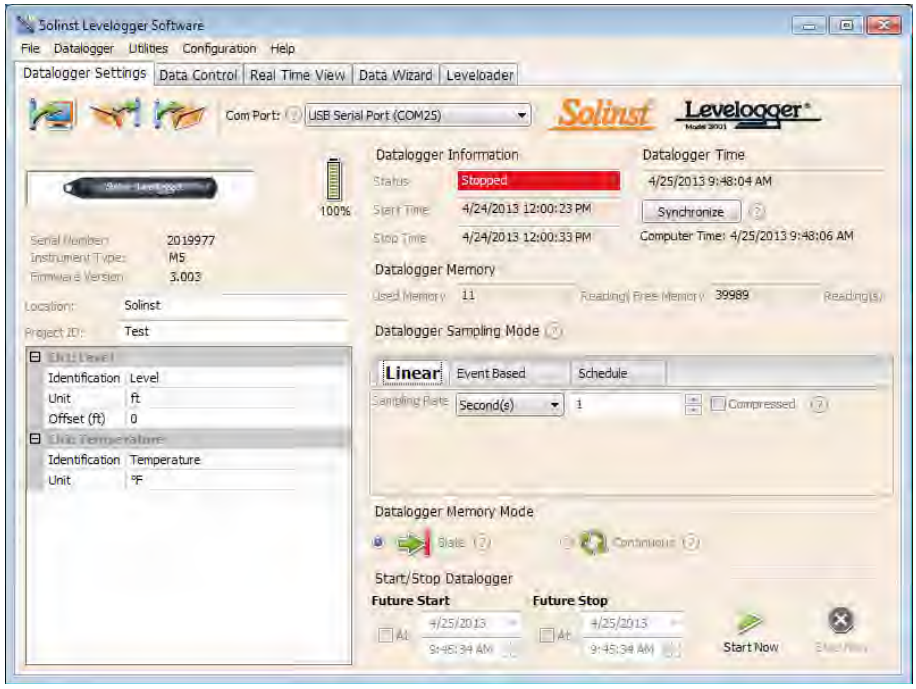


Figure 5-1 Datalogger Settings Tab

Select the appropriate COM or USB Port for the connected communications device from the centre drop-down menu.

Click to retrieve the current settings from the connected datalogger.

5.1 Datalogger Settings

After you have retrieved the settings of the connected datalogger, the Datalogger Settings tab will identify the Instrument Type, Serial Number, Firmware Version, Project ID, Location, and the Channel Settings.

- **Instrument Type**: will display the model of the attached datalogger, i.e.: F100/M30, Barologger, Rainlogger.
- **Serial Number:** the unique serial number of the attached datalogger will be displayed.
- **Firmware Version**: shows the firmware version of the attached datalogger.
- **Project ID:** input your own identification system. The Project ID is limited to 32 characters.
- **Location**: input specific site / location information. The location is limited to 32 characters.

5.1.1 Setting Up Channel Information

In the lower left portion of the Datalogger Settings tab is the area for setting channel parameters (level, temperature, conductivity, rainfall). The software will detect the available channels when the datalogger settings are retrieved.

5.1.1.1 Level Channel (Ch1)

- **Identification** describes the measurement parameter of the channel and has already been configured as 'LEVEL'. The channel can be re-named to suit each project. The channel monitors water column equivalent pressure. The Identification field will be the channel heading, data column heading and graph line name when viewing the data. Identification is limited to 32 characters.
- **Unit** refers to the channel's unit of measurement. There are six options when using a Levelogger Edge or Levelogger Junior Edge, m (default), cm, ft, kPa, bar, and psi. When using a Barologger Edge, the options are kPa (default), mbar, and psi.
- **Offset** refers to an adjustment, such as the distance between the tip of the Levelogger and the monitoring well cap or static water level. It is recommended that the value of 0.00 be used, as this keeps all subsequent readings relative to the tip of the Levelogger. The reference range is -1000 to 16,400 ft or -300 m to 5000 m.

Ch1: LEVEL	
Identification	LEVEL
Unit	m
Offset (m)	0
Ch2: TEMPERATURE	
Identification	TEMPERATURE
Unit	°C

Figure 5-2 Levelogger Edge Channel Setup

The LTC Levelogger Junior also has inputs for:

- **Altitude** in feet or meters above sea level, at which the logger is actually deployed, is input in the altitude field. You can enter an elevation between -1000 ft below sea level and 16,400 ft (or -300 m and 5000 m) above sea level. The readings will then be automatically compensated for elevation.
- **Density** is used to adjust the range of the Levelogger based on the sample fluid density. The range for the density adjustment is from 0.9 kg/L to 1.1 kg/L.

5.1.1.2 Temperature Channel (Ch2)

- **Identification** describes the measurement parameter of the channel and has already been configured as 'TEMPERATURE'. The channel can be re-named to suit each project. The Identification field will be the channel heading, data column heading and graph line name when viewing the data. Identification is limited to 32 characters.
- **Unit** refers to the channel's unit of measurement. For the Levelogger Edge, Barologger Edge, and Levelogger Junior Edge, the temperature channel can be set to °C (default) or °F.

NOTE

Readings can be converted to other units using the Data Wizard.

Readings can be corrected or offset with respect to a specific reference elevation or datum for a much wider spectrum of numeric offsets as part of the Data Wizard.

NOTE

There is no Offset input option for the Barologger Edge.

NOTE

Levelogger Edge, Barologger Edge, and Levelogger Junior Edge data can be adjusted for altitude and density post data collection using the Data Wizard.

NOTE

The LTC Levelogger Junior only measures in ºC

NOTE

For every degree change in temperature, there is approximately a 2% change in conductivity. To convert raw conductivity measurements to Specific Conductance measurements, you can use the following equation:

Specific Conductance = Conductivity / (1 + 0.02 * (temp(C) - 25))

You can also perform this calculation automatically using the Data Wizard.

You can also convert Conductivity readings to Salinity (expressed in Practical Salinity Units (PSU)) using the Data Wizard.

5.1.1.3 Conductivity Channel (Ch3)

- **Identification** describes the measurement parameter of the channel and has already been configured as 'CONDUCTIVITY'. The channel can be re-named to suit each project. The Identification field will be the channel heading, data column heading and graph line name when viewing the data. Identification is limited to 32 characters.
- **Unit** refers to the channel's unit of measurement. There are two units of measure available for the user to select: mS/cm or µS/cm.

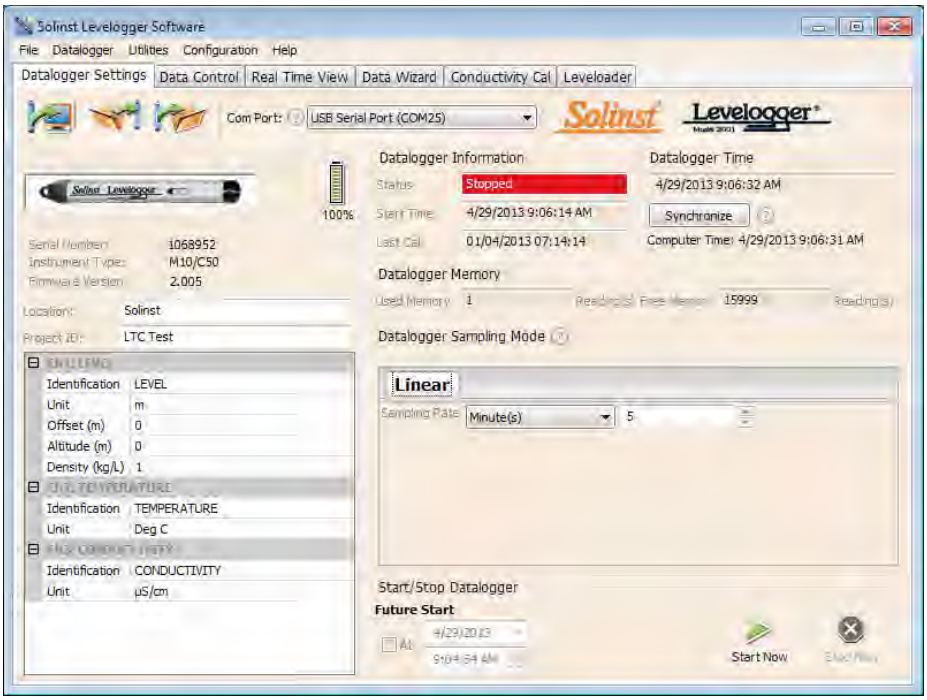


Figure 5-3 Conductivity Channel Setup

5.1.1.4 Rainloggers

There is one channel of measurement for the Rainlogger Edge and Rainlogger. The **RainFall** Channel records each tip time by the connected tipping-bucket and outputs the amount of rainfall per tip (input Rainfall Cal Constant).

- **Identification** describes the measurement parameter of the channel and has already been configured as 'RainFall'. The channel can be re-named to suit each project. The Identification field will be the channel heading, data column heading and graph line name when viewing the data. Identification is limited to 32 characters.
- **Units** refers to the channel's unit of measurement. There are two units of measure available for the user to select: mm or in.
- **The Rainfall Cal Constant** field allows you to enter the calibration factor for the tipping-bucket you will be using. The calibration factor is the amount of rainfall depth (mm, in) per tip. The calibration factor should be indicated on a label on the tipping-bucket device or in the manufacturer's documentation. Input the calibration factor in mm or inches.

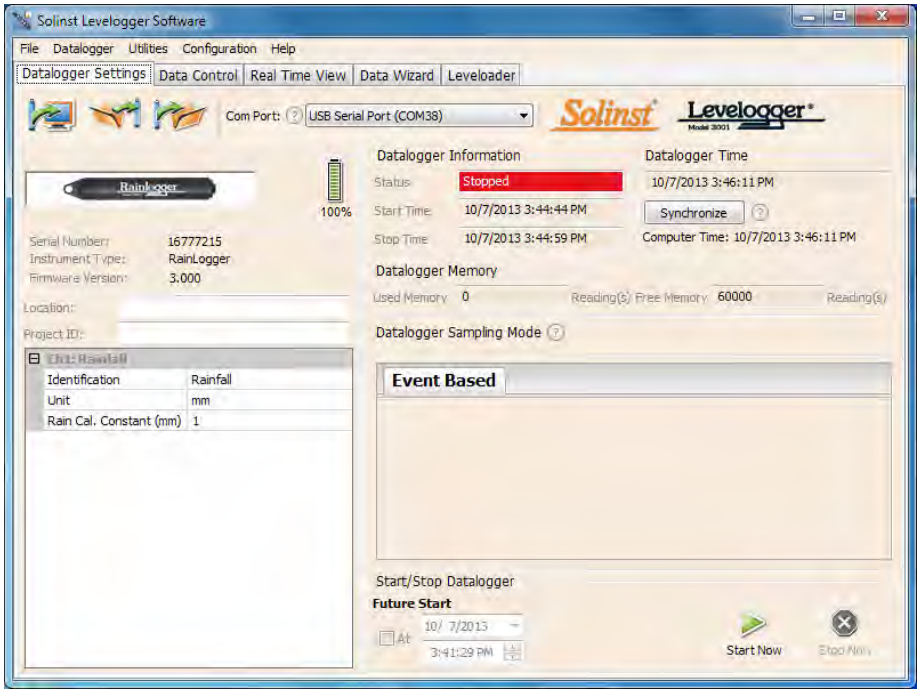


Figure 5-4 Rainlogger Channel Setup

5.2 Datalogger Information

The Datalogger Information section shows the Status of the attached datalogger (i.e.: Started, Stopped, Future Start) and the Start Time and Stop Time of the datalogger. When a Future Start and/or Stop time is set (see Section 5.8), the Start Time and Stop Time fields will fill in. The fields will update each time the datalogger is stopped and started.

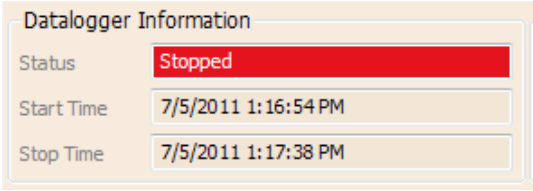


Figure 5-5 Datalogger Information

5.3 Datalogger Memory

The Datalogger Memory section shows the amount of memory used, and the amount of memory remaining (number of readings).

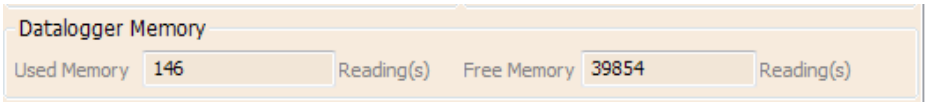


Figure 5-6 Datalogger Memory Remaining

If the Data Compression option is selected (see Section 5.5), the amount of free memory shown is approximated as a visual status bar.

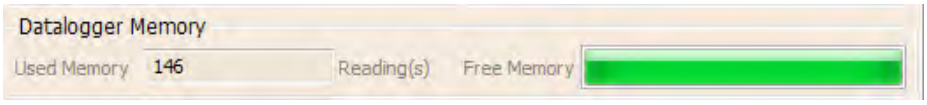


Figure 5-7 Datalogger Compressed Memory

5.4 Datalogger Time

The Datalogger Time section provides the controls for setting the datalogger clock. If you want to synchronize the datalogger's clock to the computer clock, click Synchronize to set the time in the datalogger.

If you start the datalogger without synchronizing the clock and the time difference between the datalogger and the PC is more than 3 seconds, the software will give you a message asking 'Do you want to synchronize the logger time to system time?'. Click Yes to synchronize the clock.

It can be very useful to synchronize the clocks of all the Leveloggers and Barologgers when it comes to Barometric Compensation.

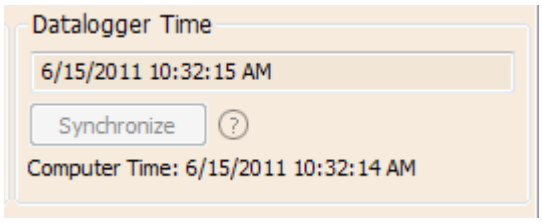


Figure 5-8 Datalogger Time

NOTE

It is very useful to synchronize the clocks of all the Leveloggers and Barologgers for use on the same project.

NOTE

To synchronize to a different time/ time zone you first must adjust the computer time using the Windows Operating System Date and Time Settings menu. Then re-start the Solinst Levelogger Software and synchronize your Dataloggers to the new time.

NOTES

The battery life of the Levelogger Edge is 10 Years, based on 1 reading per minute. More rapid readings will reduce the battery life. For example, if a Levelogger Edge is setup in Continuous Mode at a sampling rate of 1 second, the battery will be depleted in approximately 4 months.

If a Levelogger Junior Edge or LTC Levelogger Junior are used at a sampling rate of 5 seconds, the battery will be depleted in approximately 2.5 months.

NOTE

The LTC Levelogger Junior and Levelogger Junior Edge record using Linear sampling mode only.

The Levelogger Junior Edge has a sample rate of 0.5 seconds to 99 hours. The LTC Levelogger Junior has a sample rate of 5 seconds to 99 hours.

NOTES

In Event Based sampling mode, the Levelogger Edge has a total memory of 25,000 readings of level and temperature.

In Event Based sampling mode, battery consumption is mainly a function of sampling rate. Therefore, with a smaller sampling interval, battery power will be used up quickly whether readings are stored or not.

NOTE

Rainloggers record in Event Based mode only. They record the tip times of a connected tipping-bucket.

5.5 Datalogger Sampling Mode

The Datalogger Sampling Mode section allows you to choose the sampling measurement type. Options for the Levelogger Edge are Linear, Event Based and Schedule.

Linear refers to a set time interval between collection of readings. Sample Rate can be any number from 0.125 seconds to 99 hours for the Levelogger Edge. There is a data compression option available for the Levelogger Edge. This increases the memory capacity of the Levelogger Edge from 40,000 readings to up to a maximum of 120,000. Check the Data Compression box to allow data compression.

Data Compression works by only saving data changes in memory. For example, if you have linear sampling set to record each second, and your water level varies a little for 60 seconds, the memory will only record incremental values for the 60 seconds. When your data is exported, it will display all 60 intervals with the corresponding level data.

Figure 5-9 Linear Sampling Setup

Event Based sample collection is the most memory efficient means of data collection. In Event mode, the Levelogger will be activated at every defined 'Sample Rate' to check if readings have changed by the selected 'Change' from the last recorded reading.

For the Levelogger Edge, 'LEVEL' or 'TEMPERATURE' is the selected parameter where change is monitored. The Levelogger will record a new reading only if the specified change in the parameter has occurred, at the specific point in time, as defined by the 'Sample Rate'.

A default reading will also be stored in the datalogger memory, every 24 hours from the last recording, if no 'Change' occurs.

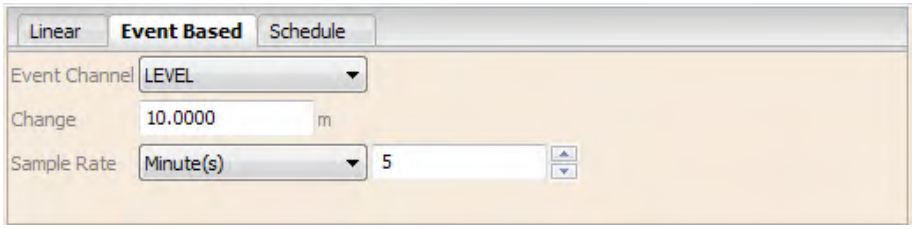


Figure 5-10 Event Based Sampling Setup

NOTE

A schedule can be saved and applied to other Leveloggers, or a Leveloader, by saving the Levelogger Settings file (see Section 5.7).

Schedule Sampling allows you to select a logarithmic style sampling schedule adapted to the needs of each application.

Schedule Sampling is set by using the plus and minus buttons to add or subtract line items in the Schedule window. The maximum number of line items in a schedule is 30, each with its own sampling interval of seconds, minutes or hours and duration of seconds, minutes, hours, days or weeks. A 'Pause' interval can also be selected, which stops the Levelogger from recording for the specified duration.

Running totals of the number of readings still available, from the total possible 40,000 or 120,000, and the run time to date are shown. If the number of readings selected exceeds the Leveloggers memory capacity an error message appears.

By checking Repeat, the Levelogger will continue to run through the schedule until its memory is full, or it is stopped.

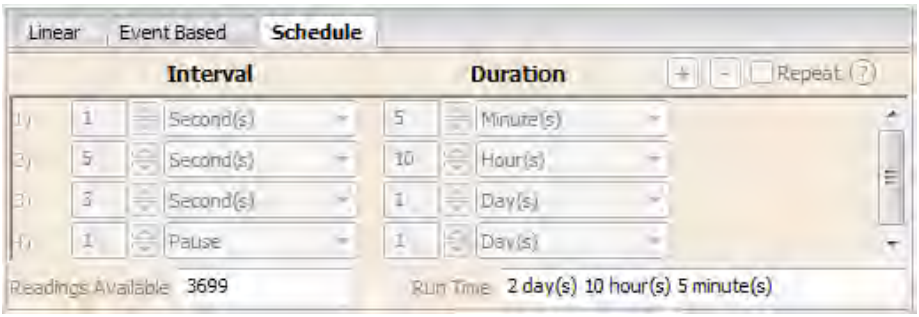


Figure 5-11 Schedule Sampling Setup

5.6 Datalogger Memory Mode

NOTE

Datalogger Memory Mode is only available for Levelogger Edge and Levelogger Gold units using Linear Sampling.

Levelogger Junior Edge and LTC Levelogger Junior operate in Slate logging mode only.

Datalogger Memory Mode selection will only appear when **Linear** sampling mode is selected. When using a Levelogger Edge in Linear Mode, there is a choice of **Continuous** Logging (wrap around) or **Slate** Logging .

Compressed Linear, Event Based and Schedule sampling modes can only use the Slate Mode option.

In Continuous Logging, the new log is started at the end of any previous log and continues logging, eventually recording over the first logged data. As one of the download options is to 'Append Data', Continuous Logging can be a preferred choice when logging long-term (see Section 7.1.2).

In Slate Logging, the new log is also started at the end of any previous log, but will stop recording after 40,000 readings (or up to 120,000 readings), so that the beginning of the current log will not be written over.

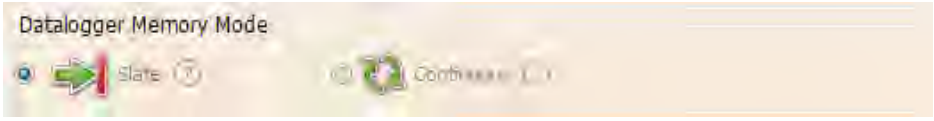


Figure 5-12 Datalogger Memory Mode

NOTE

Settings files created in Levelogger Software Version 3 or earlier (.lls or .sci files) can not be opened by Software Version 4. These settings files will need to be re-created and saved in Levelogger Software Version 4.

5.7 Saving and Retrieving Levelogger Settings Files

To store settings as defaults, click . It will store the settings of the Levelogger into an *.dtf file as a series of defaults. The *.dtf file will save the Project ID, Location, Sample Mode, Sample Rate, Channel ID, Unit, and Offset.

To retrieve settings from defaults, click from a selected *.dtf file. This is particularly useful if programming several Leveloggers with similar identical settings. Keep in mind that Project ID and Location identification information will be identical and should be distinguished from logger to logger or monitoring point to point.

5.8 Starting and Stopping the Datalogger

Starting the Datalogger

There are two ways to start logging: **Start Now** or by programming a **Future Start** time.

NOTES

If a setting has been changed, it will be highlighted in yellow as a reminder before the datalogger is started.

If a setting has been entered incorrectly, it will be highlighted in red.

Changed settings are applied to the datalogger automatically when the Start icon is selected.

To start logging immediately, do not fill in a Future Start time and click, . It should say Start Now below the icon to indicate an immediate start. Any changed settings will automatically be applied to the datalogger, and it will start logging. Datalogger Status will change from Stopped to Started.

After the datalogger is started, and begins collecting readings, the Start icon will be greyed out, and only the Stop icon and Future Stop settings will be active.

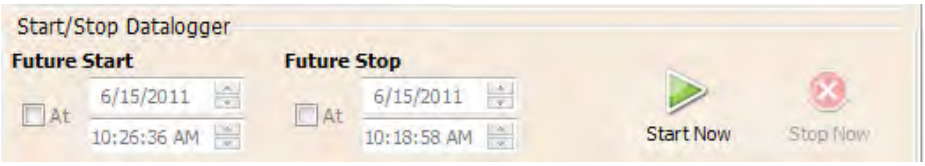


Figure 5-13 Starting the Datalogger Immediately

NOTE

Remember to download any data on the datalogger before starting a new session. When starting a new logging session, any data from previous recording sessions will be erased.

Check **Future Start** 'At' to set logging to start at a later date and/or time. This Start mode is referred to as Future Start in the Status field. Click to apply the Future Start time and any changes to the datalogger settings.

When the Future Start time is reached, the datalogger will start logging and the Status will change from Future Start to Started.

NOTE

Retrieve the Levelogger settings in order to refresh the status (i.e. when the status changes from Future Start to Started).

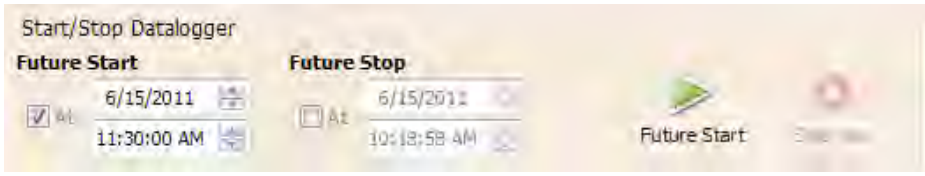


Figure 5-14 Future Start Setting

Stopping the Datalogger

There are two ways to stop logging: Stop Now or at a programmed Future Stop time for the Levelogger Edge and Barologger Edge.

To stop the datalogger immediately when it is logging, click , (it should say Stop Now below the icon).

NOTE

You can not set a Future Stop time for the Levelogger Junior Edge, LTC Levelogger Junior or a Rainlogger.

The Levelogger can be stopped at any time before it reaches the maximum reading capacity. **Starting again begins a new recording session and clears previously stored data readings.**

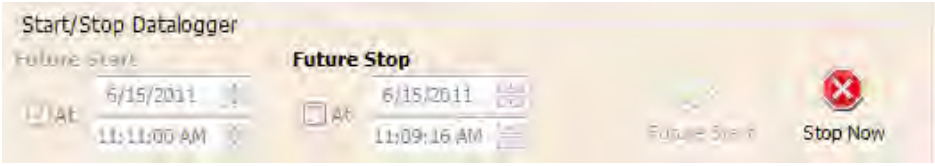


Figure 5-15 Stopping the Datalogger Immediately

NOTE

If you have set a Future Stop time, but wish to stop the datalogger immediately, uncheck the Future Stop 'At' box, and the Stop icon should say Stop Now. Click the icon to stop logging.

To program a **Future Stop** time for your datalogger, check Future Stop 'At' and fill in the desired stop time. The Future Stop time will be applied to the datalogger once is selected for an immediate or future start.

You can also program a Future Stop time after you have started the datalogger, by checking Future Stop 'At' and filling in the desired stop time. Select to apply the Future Stop time (it should say Future Stop below the icon). The Stop Time should be shown in the Datalogger Status section.

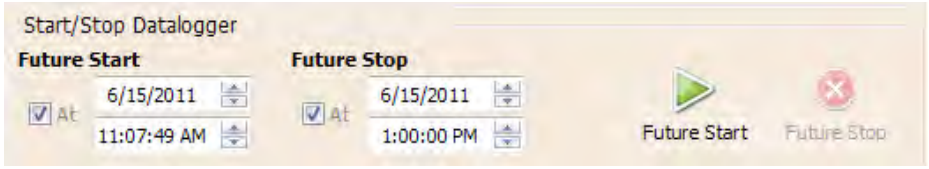


Figure 5-16 Future Stop Setting

It is critical to note that when Leveloggers log data in Slate mode, it means they will record data until stopped or their memory is full. When the memory fills, the datalogger will stop recording. For this reason, it is important to determine, based on your start time and sampling rate, the date and time at which the memory will be full and the datalogger will stop recording. Levelogger Edge units record in Slate mode if Event, Schedule, or Compressed logging, but in standard Linear mode they can be set to Slate or to Continuous logging.

5.9 Levelogger Gold Series Setup

This section briefly describes the Levelogger Gold, Barologger Gold and Levelogger Junior setup.

NOTE

Click on ? icons to get an explanation of that software feature.

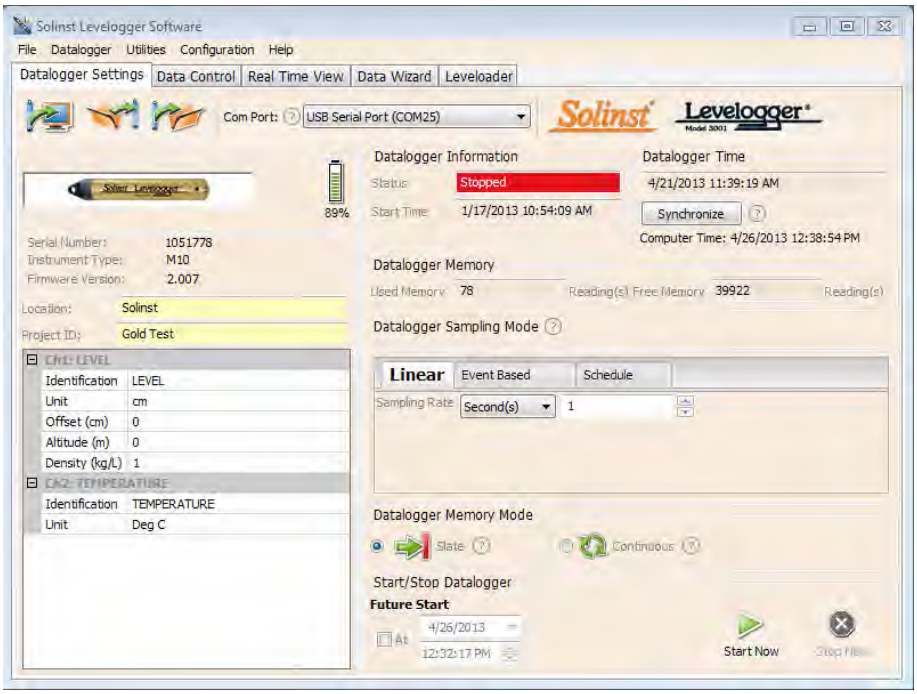


Figure 5-17 Levelogger Gold Settings

Select the appropriate COM or USB Port for the connected communications device from the centre drop-down menu.

Click to retrieve the current settings from the connected datalogger.

Channel Information

Level Channel (Ch1)

- **Identification** describes the measurement parameter of the channel and has already been configured as 'LEVEL'. The channel can be renamed to suit each project. The channel monitors water column equivalent pressure. The Identification field will be the channel heading, data column heading and graph line name when viewing the data. The Identification is limited to 32 characters.
- **Units** refers to the channel's units of measurement. There are three units of measure available for the user to select: cm, m or ft. When the user changes the unit, the value of the range and altitude will change according to the Unit Conversion formula. Note that when a metric unit is used, the unit of altitude is meters. When feet are the level channel units, feet are the units of altitude.

- **Offset** refers to an offset correction, such as the distance between the tip of the Levelogger and the monitoring well cap or static water level. It is recommended that the value of 0.00 be used for offset as this keeps all subsequent readings relative to the tip of the Levelogger. The offset range for Levelogger Gold and Barologger Gold units is -1000 to 16400 ft or -300 m to 5000 m.
- **Altitude** in feet or meters above sea level, at which the logger is actually deployed, is input in the altitude field. Water column equivalent pressure decreases with altitude at a rate of approximately 1.2:1000 in the lower atmosphere below 5000 m. You can compensate for this by entering an elevation between -1000 ft below sea level and 16,400 ft (or -300 m and 5000 m) above sea level. The readings will then be automatically compensated for elevation.
- **Density Adjustment** is used to adjust the range of the Levelogger based on the sample fluid density. The range for the density adjustment is from 0.9 kg/L to 1.1 kg/L.

Temperature Channel (Ch2)

- **Identification** describes the measurement parameter of the channel and has already been configured as 'TEMPERATURE'. The channel can be re-named to suit each project. The Identification field will be the channel heading, data column heading and graph line name when viewing the data. Identification is limited to 32 characters.
- **Unit** refers to the channel's unit of measurement. The Levelogger Gold and Barologger Gold measure in °C only.

Sample and Memory Modes

Sample Mode, allows you to choose the sampling measurement type. Options are Linear, Event Based and Schedule.

- **Linear** refers to a set time interval between collection of readings. Sample Rate can be any number from 0.5 seconds to 99 hours. The Levelogger Gold and Barologger Gold can store 40,000 readings of level and temperature.
- **Event Based** sample collection is the most memory efficient means of data collection. In Event mode, the Levelogger will activate every sampling interval defined and check if readings have changed by the selected threshold (Change) from the last recorded reading. For the Levelogger Gold, 'LEVEL' or 'TEMPERATURE' is the selected parameter where change is monitored. The Levelogger will record a new reading only if the specified change in the parameter has occurred.
- **Schedule Sampling** allows you to select a logarithmic style sampling schedule adapted to the needs of each application. Schedule Sampling is set by using the plus and minus buttons to add or subtract line items in the Schedule window. The maximum number of line items in a schedule is 30, each with its own sampling interval of seconds, minutes or hours and duration of seconds, minutes, hours, days or weeks.

NOTE

The Levelogger Junior records using Linear sampling mode only.

NOTE

In Event Based sampling mode, the Levelogger Gold has a total memory of 25,000 readings of level and temperature

NOTE

An important reminder for Event Based sampling is that, although actual memory usage in stable water level conditions may be relatively small, battery power consumption is partially a function of the sample reading rate. Therefore, a small sample reading interval will consume battery power at a higher rate whether readings are stored or not.

Memory Mode selection will be grayed-out if not in Linear Mode sampling. When using a Levelogger Gold in Linear Mode, there is a choice of **Continuous** logging (wrap around) or **Slate** logging. In Continuous logging the new log is started at the end of any previous log and continues logging, eventually recording over the first logged data. As one of the download options is to 'Append Data', Continuous logging can be a preferred choice when logging long-term. In Slate logging the new log is also started at the end of any previous log, but will stop recording after 40,000 readings, so that the beginning of the current log will not be written over.

Starting and Stopping the Levelogger

There are two ways to start logging: **Start Now** or by programming a **Future Start** time.

To start logging immediately, do not fill in a Future Start time and click, . It should say Start Now below the icon to indicate an immediate start. Any changed settings will automatically be applied to the datalogger, and it will start logging. Datalogger Status will change from Stopped to Started.

After the datalogger is started, and begins collecting readings, the Start icon will be greyed out, and only the Stop icon and Future Stop settings will be active.

Check **Future Start** 'At' to set logging to start at a later date and/or time. This Start mode is referred to as Future Start in the Status field. Click to apply the Future Start time and any changes to the datalogger settings.

When the Future Start time is reached, the datalogger will start logging and the Status will change from Future Start to Started.

To stop the datalogger immediately when it is logging, click , (it should say Stop Now below the icon).

The Levelogger can be stopped at any time before it reaches the maximum reading capacity. **Starting again begins a new recording session and clears previously stored data readings.**

It is critical to note that when Leveloggers log data in Slate mode, it means they will record data until stopped or their memory is full. When the memory fills, the datalogger will stop recording. For this reason, it is important to determine, based on your start time and sampling rate, the date and time at which the memory will be full and the datalogger will stop recording. Levelogger Gold units record in Slate mode if using Event, or Schedule sampling mode, but in standard Linear mode they can be set to Slate or to Continuous logging.

1) **Setting the Temperature Coefficient:** The default setting for the Temperature Coefficient is 2.00. If the conductivity solution you are using to calibrate the LTC Levelogger Junior states a different temperature coefficient on the label, please input that number into the Temperature Coefficient field.

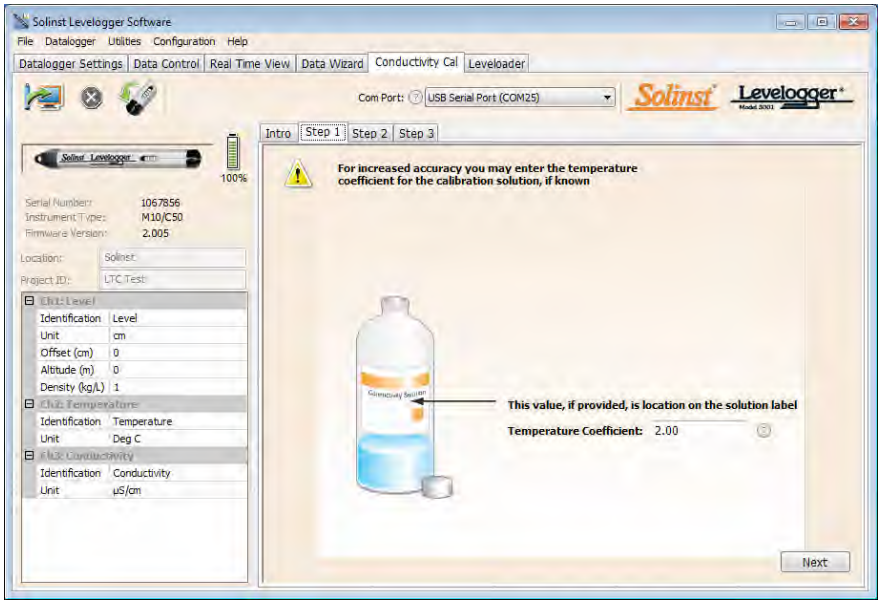


Figure 6-3 LTC Levelogger Junior Calibration Wizard Step 1

2) **Setup:** The Levelogger Software requires the user to choose the calibration solutions. You can choose up to three solutions for a multipoint calibration of the LTC Levelogger Junior. Ensure the solutions are ready in the calibration beaker or container. Start the calibration by selecting Next.

NOTE

To obtain the highest accuracy, choose the calibration solution(s) closest to your expected conductivity.

Use a two point calibration for waters between 1,413 µS/cm and 12,880 µS/cm.

Use a one point 1,413 µS/cm calibration for waters less than 1,413 µS/cm.

Use a one point 12,880 µS/cm calibration for waters greater than 12,880 µS/cm.

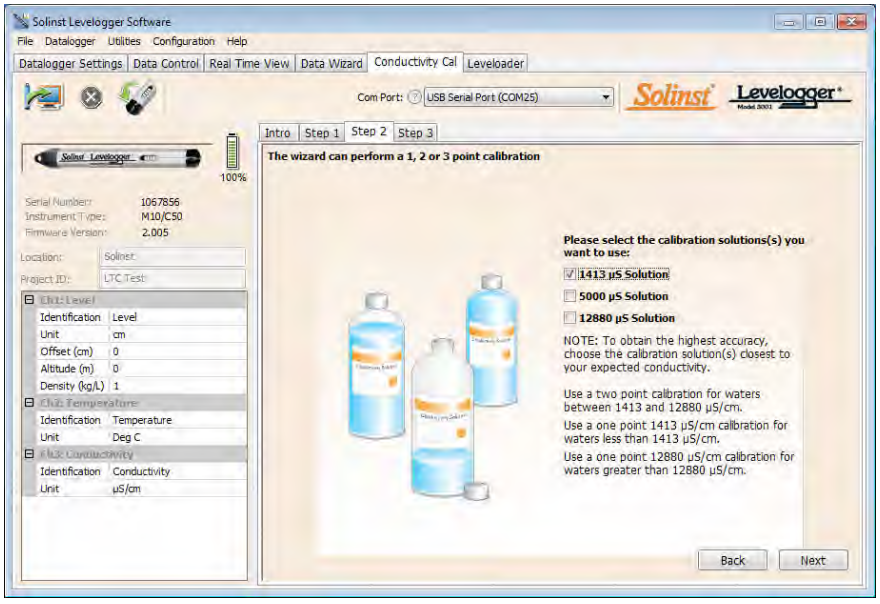


Figure 6-4 LTC Levelogger Junior Calibration Wizard Step 2

3) **LTC Levelogger Junior Rinsing Process:** Use DI water to rinse the LTC Levelogger Junior first and then rinse the LTC Levelogger Junior with the displayed calibration solution. Use fresh solution for calibration, and immerse the LTC Levelogger Junior. Lightly tap the Levelogger to remove any bubbles from the sensor. Allow 2-3 minutes to stabilize, then select next to calibrate.

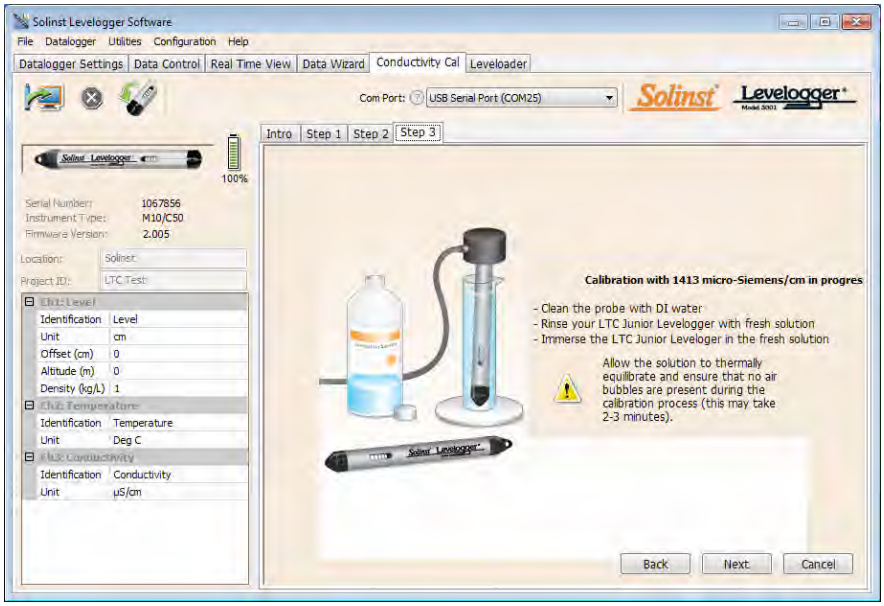


Figure 6-5 LTC Levelogger Junior Calibration Wizard Step 3
(example of window calibrating with 1413 µS/cm solution)

NOTE

Always remember to use fresh solution, remove all bubbles from the sensor pins, and allow for thermal equilibration of the sensor before proceeding.

Calibration: Since most standard calibration solutions state conductivity at a standard temperature of 25°C, the LTC Levelogger Junior can account for temperature differences between 10 to 30°C when you calibrate the unit. The LTC Levelogger Junior will compare the current temperature and conductivity readings against the temperature corrected standard solution.

NOTE

Once the calibration is complete for the first solution of a multipoint calibration, the Calibration Wizard will then go back to the beginning of Step 3 to start the rinsing process for the next solution selected.

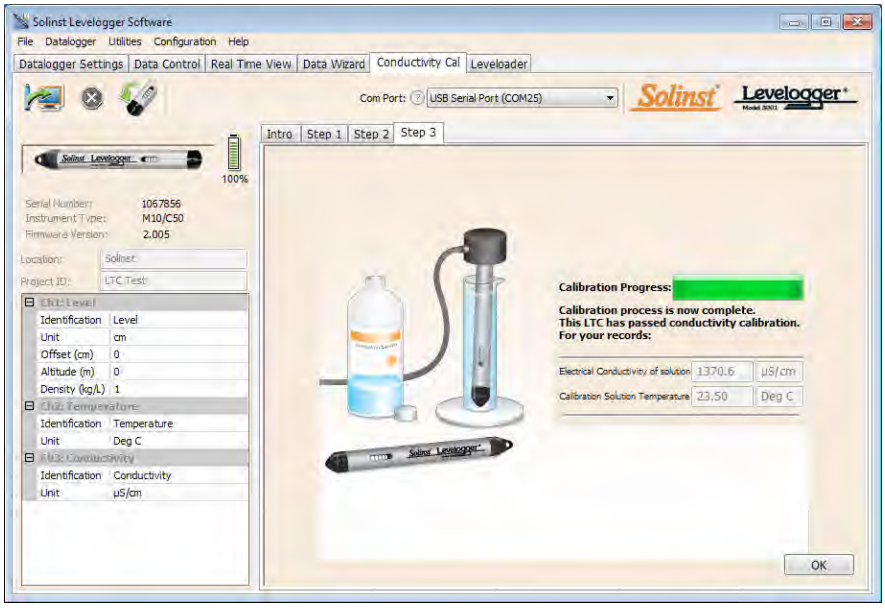


Figure 6-6 LTC Levelogger Junior Calibration Successful

When a single-point calibration is successful, the process is complete. Once the calibration is complete for the first solution of a multipoint calibration, a message will appear stating that the calibration was successful. When you select 'Okay', the Calibration Wizard will go back to the beginning of Step 3 to start the rinsing process for the next solution selected. The calibration process will proceed automatically until completed for all solutions.

If a failure occurs at any point during calibration, a message will appear asking you to clean and check your probe, then start the calibration process over for that current solution by selecting 'Yes' (Figure 6-7). If performing a multipoint calibration, any previous successful calibration points will remain.

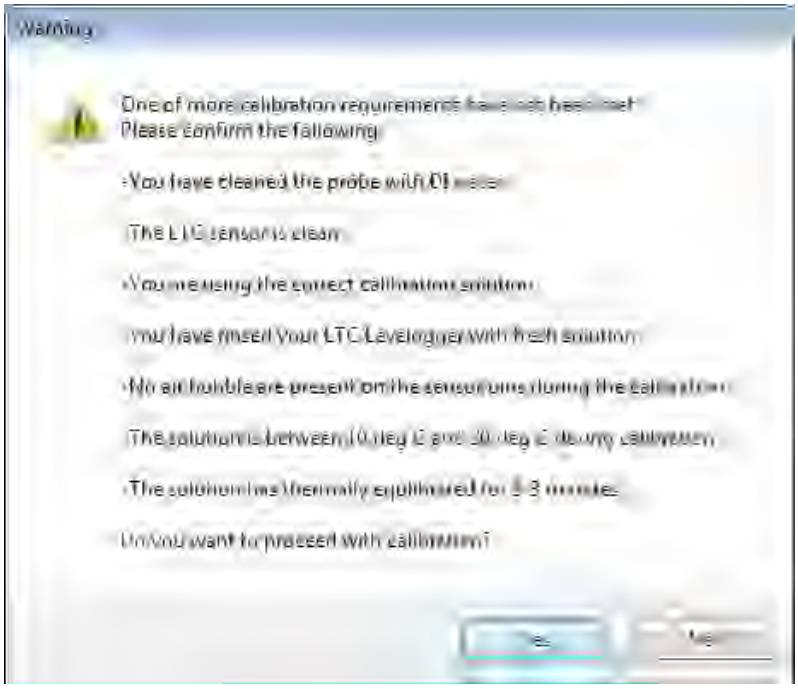


Figure 6-7 LTC Levelogger Junior Calibration Warning 1

If a second failure occurs during calibration, a warning message will appear indicating that your probe may still be dirty, or damaged. This may occur if your LTC Levelogger Junior conductivity sensor has been affected by dirt, mineral build-up, etc., so it no longer responds like it did when it was first factory calibrated. This step allows your sensor to be calibrated within a wider range of the standard solution value.

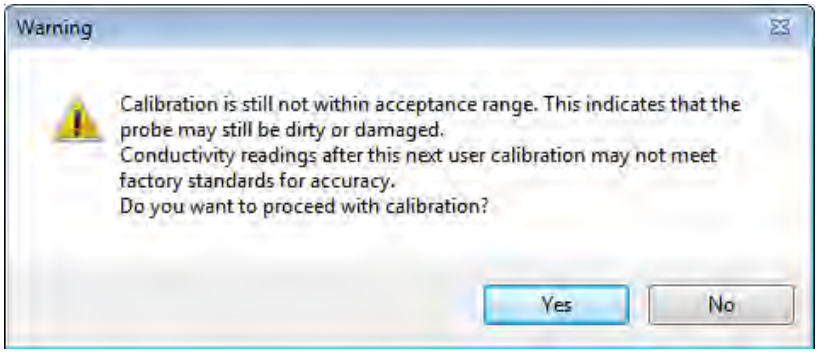


Figure 6-8 LTC Levelogger Junior Calibration Warning 2

If you select 'Yes' to accept the larger tolerance, the calibration process will start over for that current solution (Figure 6-8). If performing a multipoint calibration, any previous successful calibration points will still remain. If you select 'No', the LTC Levelogger Junior will default back to the last pre-calibrated state. You can retry the calibration using the normal tolerance range.

If a third calibration error occurs, or the results of the calibration are outside the error tolerance range, a warning message will appear asking you to contact Solinst for more options (Figure 6-9).

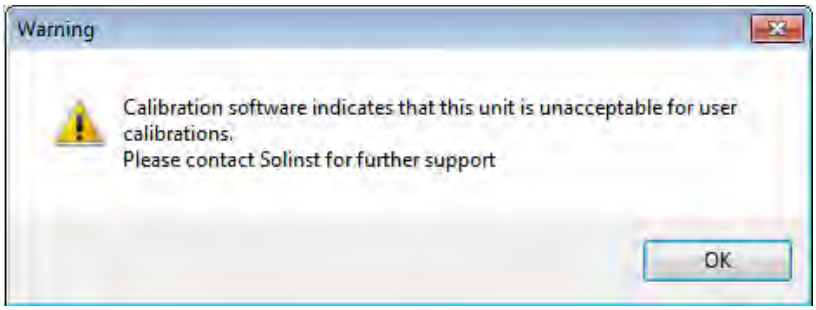


Figure 6-9 LTC Levelogger Junior Calibration Warning 3

6.1 Restore Factory LTC Levelogger Junior Calibration

An LTC Levelogger Junior can be set back to original factory calibration settings for conductivity at any time, using this function. If you suspect that user calibrations are not working properly, you can restore the LTC Levelogger Junior to its original factory settings and then perform a "first-time" conductivity user calibration to maximize accuracy.

To execute this function, simply click the Restore Factory LTC Calibration button, with the LTC Levelogger Junior connected to the PC.

7 Data Control
(Downloading and Viewing Data)

Click the Data Control tab on the Main window. From the Data Control tab you can download data from a Levelogger, display data in tabular or graphic format, and save and export data files.

NOTE

When you click on a data point in the graph, the corresponding data point will be highlighted in the table. You can also highlight a section of data in the graph.

Figure 7-1 Data Control Tab

Click to open a *.xle or *.lev file. Multiple files can be opened at the same time and are available for viewing by clicking the File Name Tab on top of the data table.

All the Levelogger settings and the channel information effective during data collection are shown on the top left of the window.

The bottom left sections of the window are used to display information after a data compensation has been performed. The middle section displays information from a Barologger, if a barometric compensation is performed, and the bottom section includes information from other conversions, such as offsets or conductivity conversions (see Section 8).

NOTE

As there is only one channel of data for Rainloggers, there are no graphing options.

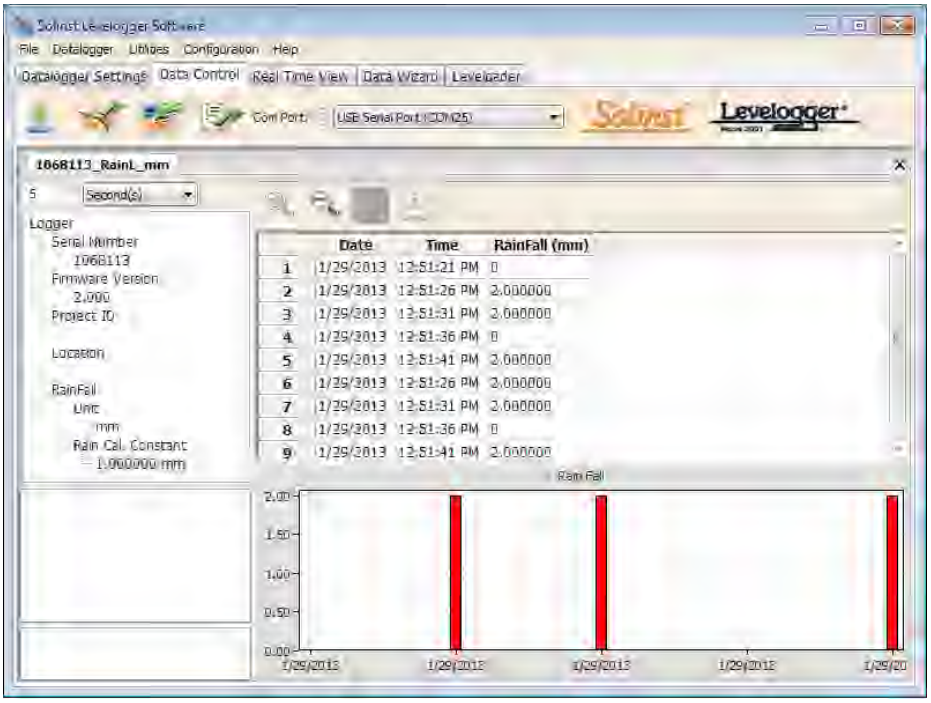


Figure 7-2 Rainlogger Data

When you view data downloaded from a Rainlogger, the RainFall data will be shown in a table and in a bar graph. A drop-down menu appears that allows you to select the time interval at which you would like the data shown, from 1 to 99 seconds, minutes, hours, days, or weeks (this acts like a zoom function). Figure 7-2 shows the data every 5 seconds from the start date and time.

7.1 Downloading Options and Saving Data Files

7.1.1 Default File Format

NOTE

The default file type is *.xle, unless changed in the Application Settings (see Section 4.2.4).

The default file type for Levelogger Software Version 4 and up is *.xle, unless changed to *.lev in the Application Settings (see Section 4.2.4). Previous Levelogger Software used *.lev files as the default. The *.xle file type is a *.xml format, which allows for enhanced functionality. The *.xle files can be exported as *.xml files, which can be integrated into external database programs.

The *.lev files of previous Levelogger downloads are compatible with Levelogger Software Version 4 and up, however, *.xle files are not compatible with previous software versions. To ensure compatibility, all Levelogger Software versions allow data to be exported as *.csv files for use in external spreadsheet programs. See Section 7.3 for Export options.

NOTE

Before downloading data you must select the COM Port that the datalogger is connected to and retrieve the settings from the attached datalogger by clicking in Datalogger Settings tab.

7.1.2 Downloading Data

Click from the Data Control tab to download data from a connected datalogger. There are four options for downloading data. They are: **All Data, Append Download, Partial Download and Recover Previous Log**.

If you select **All Data**, the program will download all the data from the current logging session of a datalogger into a *.xle file.

The default directory for saved data is in the 'Data' folder: <C:\Program\Files\Solinst\Levelogger4_1\Data>.

If you select **Append Download**, the program will append the data in an opened *.xle file from the datalogger. The opened *.xle file and the attached datalogger should have the same serial number and start time, otherwise an error will occur.

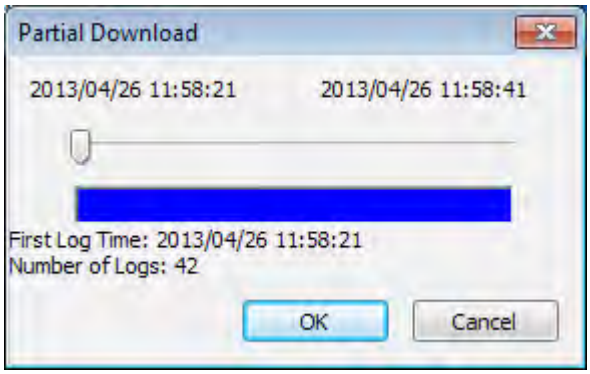


Figure 7-3 Partial Download Window

If you select **Partial Download**, a Partial Download Selection Window will open. The window shows the time stamp of the first and last reading in the logging session. Use the slider to select the time interval you would like data from. Once you click OK, all the data within that time will be downloaded to a *.xle file.

If you select **Recover Previous Log**, the software will try to recover the data from the previous log session and download the data to a *.xle file.

Once the data is downloaded from a Levelogger, it is automatically saved in a temporary file.

7.1.3 Saving Data

Click to save the data in a specific *.xle file.

The default directory for saved data is in the 'Data' folder: <C:\Program\Files\Solinst\Levelogger4_1\Data>.

However, the default directory for saved files can be changed by clicking the Configuration menu at the top of the program window, selecting 'Application Settings' and inputting or navigating to a different folder destination. If an error is experienced in saving your first data file such as depicted in Figure 7-4, you may not have file writing privileges to the default directory. In this case, create and set as the default file save folder, a new Levelogger data folder within the My Documents folder and attempt the file save procedure again.

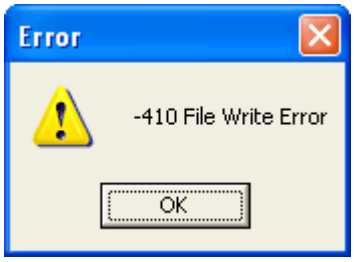


Figure 7-4 File Write Error Message

7.2 Graph Manipulation and Zoom Function

To perform the Zoom In function on the graph, click .

To perform a Zoom Out function on the graph click . Click to undo all the zoom functions.

The Zoom functions can also be used for data selections in the graph.

Click to open the Graph Option Dialog. The Graph Dialog is shown in Figure 7-5.

NOTE

As there is only one channel of data for Rainloggers, there are no graphing options.

NOTE

Right click, and drag the mouse to scan the data graph.

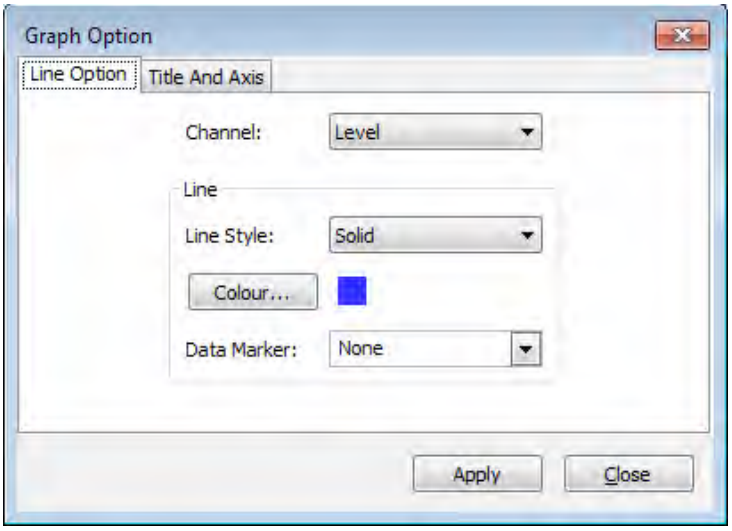


Figure 7-5 Line Option Window

The Line Option is used to adjust the style and colour of the line in the graph for each channel. The user can also select the shape of the data marker or remove the data marker.

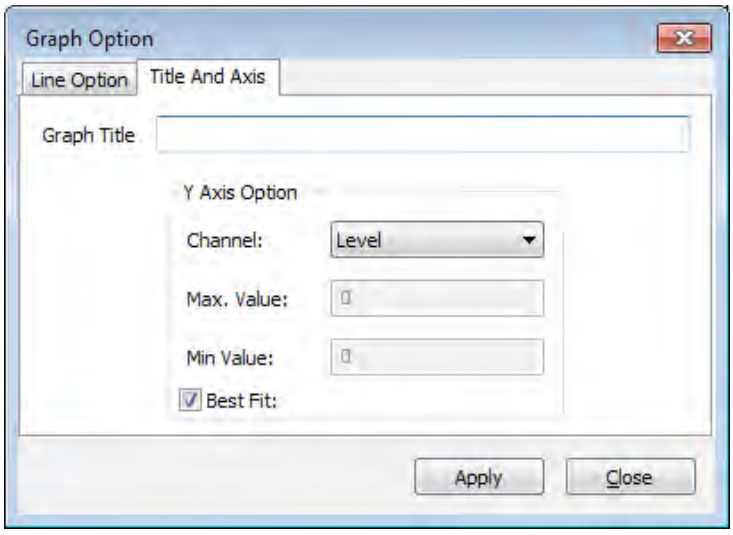


Figure 7-6 Title and Axis Option Window

The Title and Axis Option is used to enter the title of the graph and change the Y axis label or user selected scale. Check the Best Fit box to enable the software to determine the best fit scale. If the Best Fit box is not checked, the user has to enter a maximum and minimum value of the selected channel. The X axis is logging time.

There is the option to show Combined Plot graphs or Separated Plot graphs of the data. Choosing a Combined Plot will show the data from each of the channels in one graph. The Separated Plot option will show a separate graph for each data channel.

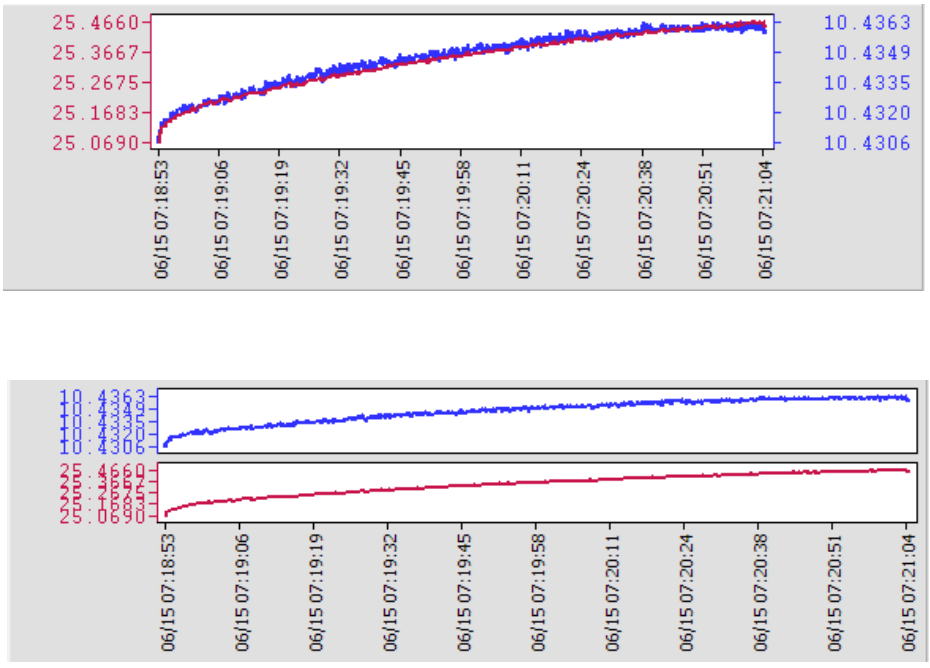


Figure 7-7 Combined and Separated Plot Graphs

There is also the option to view more than one graph at a time. Click and drag a File Name Tab and drop it when you see a shaded area on the window to open a separate graph of that data file. You can view any number of graphs at one time by re-sizing your window as required.

Figure 7-8 Viewing Two Graphs

7.3 File Export and Print Function

Data can be exported in *.csv (comma separated value) file format or *.xml (extensible markup language) file format by clicking File > Export > Data or

The *.csv and *.xml file formats are supported and can be imported by most spreadsheet and database programs.

Also, the data graph can be exported to a *.bmp file or a *.png file by clicking File > Export > Graph.

The Datalogger Settings, data table and data graph can be printed. Click File > Print Preview, to open the Print Preview window. Figure 7-9 shows the print preview of the Datalogger Settings. The Datalogger Settings are always on the first page of the document. The data graph is on the second page of the document and the rest of the document is the data table.

Click Print…, to open the print dialog. You can choose to print the entire document or just a selection. You can also click File > Print, to open the print dialog.

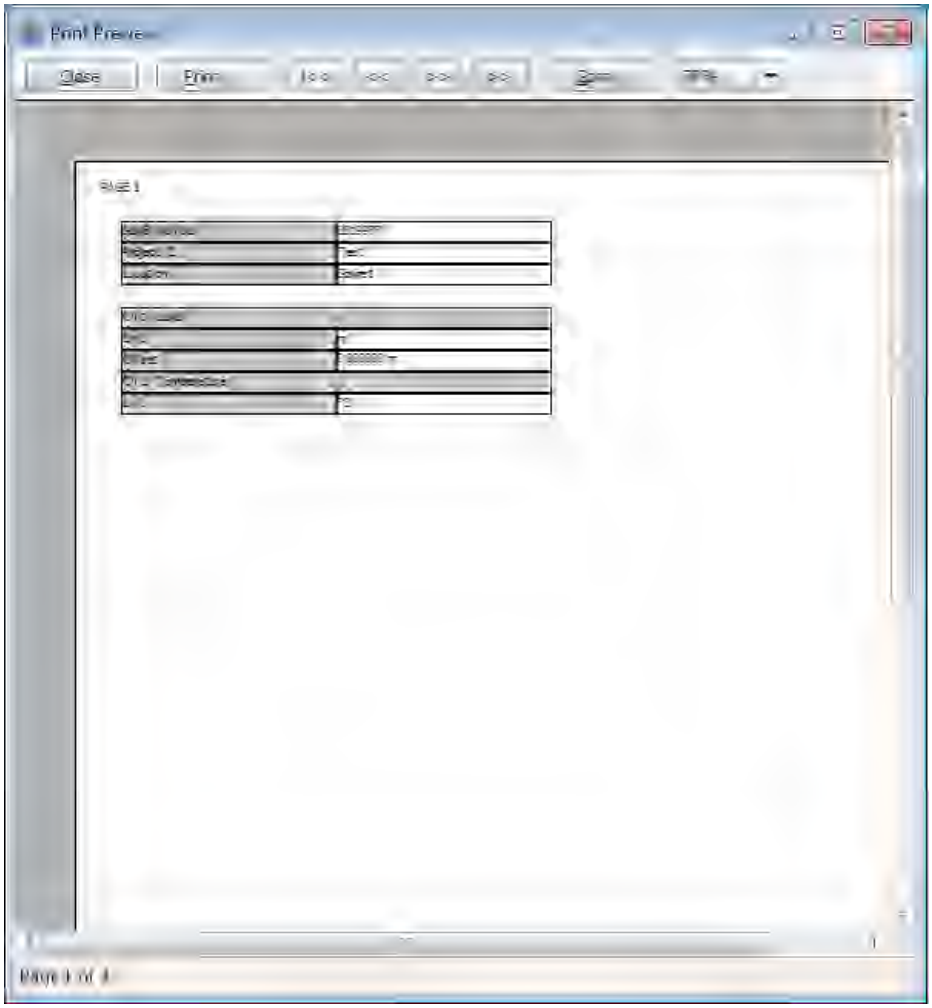


Figure 7-9 Print Preview Window

8 Data Compensation

Data Compensations, such as Barometric Compensation, Manual Data Adjustments and Parameter Adjustments can be performed automatically using the Levelogger Software Data Wizard, or manually, by exporting data to an external spreadsheet program.

8.1 Data Wizard

Open the Data Wizard tab. The first step is to select your Data Compensation Path. The choices are **Basic** or **Advanced**.

Choosing **Basic** allows you to do a simple Barometric Compensation of Levelogger data only.

The **Advanced** option allows you to perform Barometric Compensation, Manual Data Adjustments and Parameter Adjustments, including adjustments to Rainlogger data.

NOTE

Multiple datalogger files can be compensated at once.

Figure 8-1 Data Wizard

NOTE

Advanced compensation provides the option of performing one, two, or all three data compensation types, in any combination.

NOTE

Manual Data Adjustment, and Parameter Adjustments are useful for correcting Levelogger data files to make data consistent across a project.

NOTE

Parameter Adjustments is the only option for compensating Rainlogger data.

NOTE

Additional Adjustments appear when ">>" is selected. These are application specific, for advanced users.

Barometric Compensation simply subtracts the barometric reading from the corresponding Levelogger reading(s), to give true water level measurements.

Manual Data Adjustment allows you to enter a manual water level measurement or reference point as a field zero, which all Levelogger water level readings can then be adjusted to. There is the option to convert readings to Depth to Water Level measurements (e.g. from the top of a well casing to water level), or Elevation of Water Level measurements (e.g. above sea level).

Parameter Adjustments allow you to change Levelogger, Barologger or Rainlogger data to different units of measurements, add an offset, correct data for elevation differences, convert conductivity to Salinity or Specific Conductance, adjust density, or adjust barometric efficiency. Only the options available for your opened datalogger file types will be active (e.g. Conductivity Conversion is only available for LTC Levelogger Junior data files).

Standard Adjustments:

- **Unit** conversion allows you to convert level readings in a Levelogger file to different units (m, cm, ft, kPa, bar or psi), a Barologger file to kPa, mbar, or psi, temperature readings to °C or °F, conductivity readings to µS/cm or mS/cm, or rainfall values to mm or inches.
- **Offset** allows you to enter any value, positive or negative, which will be added to each reading in the selected Levelogger file to be offset by that amount. It is recommended to stay with the default zero value, unless a known offset has been determined (e.g. to correct for pressure sensor drift. See Solinst Technical Bulletin: Understanding Pressure Sensor Drift).
- **Elevation** is used to correct for altitude differences between Levelogger or Barologger locations. Water column equivalent pressure decreases with altitude at a ratio of approximately 1.21/1000 in the lower atmosphere below 5000 m. You can compensate for this by entering an elevation between -1000 ft below sea level and 16,400 ft (or -300 m and 5000 m) above sea level.
- **Conductivity Conversion** allows you to convert raw Conductivity readings from an LTC Levelogger Junior, to Specific Conductivity (conductivity that is temperature compensated to the standard of 25°C). The Temperature Coefficient default for Specific Conductivity is 2.00. The Temperature Coefficient should not be adjusted, unless you know the value specific to the solution you are measuring. You can also convert Conductivity readings to Salinity expressed in Practical Salinity Units (PSU) (See Section 1.2.4).
- **Rainfall Cal. Constant** allows you to enter a different rainfall calibration constant for a Rainlogger Edge or Rainlogger data file (amount of rainfall per tip of the tipping-bucket rain gauge).

Additional Adjustments:

- **Density Adjustment** corrects the range of the level channel in the Levelogger data file based on a user input adjustment of fluid density. The range of the density adjustment is from 0.9 kg/L to 1.1 kg/L.
- **Barometric Efficiency** adjustment is used to proportionally adjust Barologger data in relation to a particular Levelogger. Barometric efficiency is often expressed as a percentage or proportion. The input field is proportional and has a default value of 1.00. For more information about Barometric Efficiency, see Section 10.1.3.1. The barometric efficiency can be set from 0.01 to 3.00.

8.1.1 Basic Compensation

When you choose **Basic** compensation, the next step is to select the Barologger file you want to use for compensation, then select the Levelogger file(s) you want to compensate. You can only select one Barologger file to compensate multiple Levelogger files.

For best accuracy, the Levelogger file(s) and Barologger file should have the same start time and logging interval. (The Future Start option in the Datalogger Settings tab is a convenient way to start all of your loggers at the same time.) If there is an inconsistency of the time stamp between the Barometric file and the Levelogger file(s), a linear approximation on the barometric data will be performed.

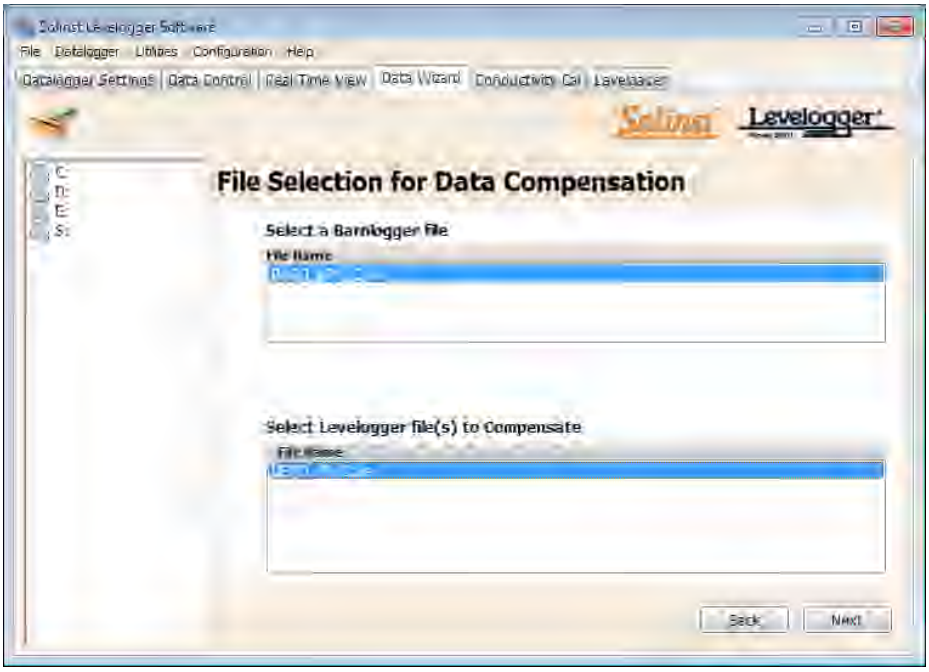


Figure 8-2 Selecting Files for Barometric Compensation

NOTE

One Barologger can be used to compensate all Leveloggers in a 20 mile (30 km) radius and/or with every 1000 ft. (300 m) change in elevation.

NOTE

Both a Barologger file and a Levelogger file must be selected to complete a Barometric Compensation.

NOTE

All data files are saved to the default location: <C:\Program Files\Solinst\Levelogger4_1\Data>. However, the default directory for saved files can be changed by clicking the Configuration menu at the top of the program window, selecting 'Application Settings' and inputting or navigating to a different folder destination.

Any files you have open in the Data Control tab will be listed.

Use the directory on the left of the window or click to open any other Levelogger data files you would like to compensate. Ensure the files you want to compensate are highlighted in the list. **Both the Barologger file and Levelogger file(s) must be highlighted.** Do this by clicking the file name. To de-select a file, click it again. Multiple Levelogger files can be selected at once.

Select Next to complete the compensation.

The compensated data will automatically be saved in a new *.xle file. The default file name will be the <original Levelogger file name> with the word <compensated> added to the file name prefix. Alternatively, the user can rename the compensated file by saving it in the Data Control tab. Do not change or delete the file extension. All data files are saved to the default location: <C:\Program Files\Solinst\Levelogger4_1\Data>.

The next window will show the results of the compensation. If the compensation was unsuccessful, there will be an explanation in the Reason column (e.g. time stamp of Levelogger and Barologger files were not close enough to perform an accurate compensation). You can still view the compensated file in the Data Control tab by clicking 'Open' in the Action column. If the compensation is successful, select 'Open' to view the compensated file in the Data Control tab.

Figure 8-3 Barometric Compensation Results

From the Data Control tab, you can view the data, save the compensated file with a new filename and/or export the data (see Section 7).

All the original Levelogger settings and the channel information effective during data collection are shown on the top left of the window. The bottom left sections of the window are used to display the compensation information. The middle section displays information from the Barologger.

Figure 8-4 Viewing Compensated Files in the Data Control Tab

8.1.2 Advanced Compensation

When you select **Advanced** compensation, the Data Compensation Options window will open.

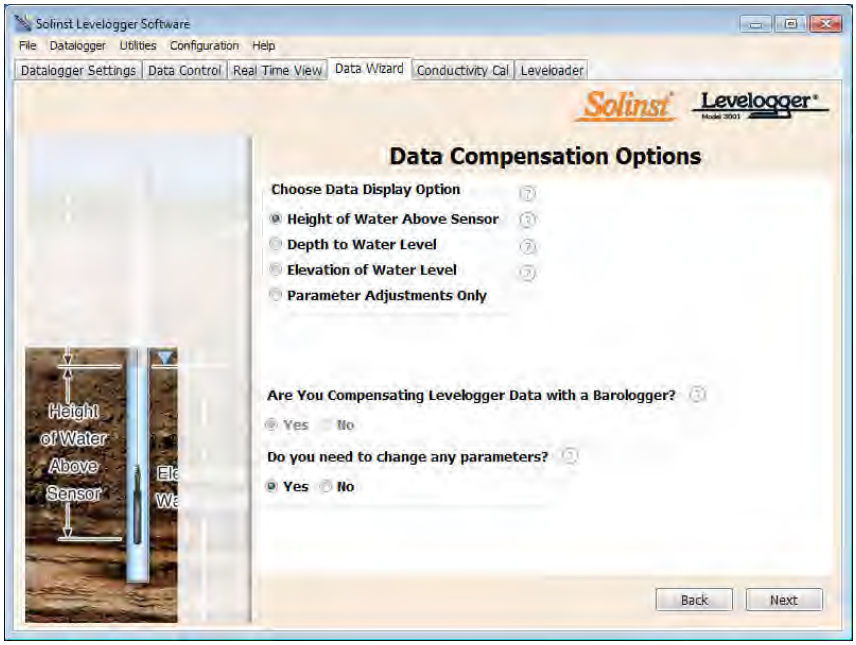


Figure 8-5 Advanced Data Compensation Options

First, you will select how you want your data displayed (Manual Data Adjustment):

- **Height of Water Above Sensor** is the default display option. Select this option to perform a Barometric Compensation and/or Parameter Adjustments to one or more data files, while keeping the sensor diaphragm (zero point) as the reference point.
- **Depth to Water Level** adjusts water level data to represent depth to water level readings (from the top of a well casing or other reference point) by entering a field zero, such as a manual depth to water level measurement. Adjustments can be made to one or more data files.
- **Elevation of Water Level** adjusts water level data to represent elevation of water level readings (above sea level or other reference point) by entering a measuring point elevation, and a field zero, such as a staff gauge measurement from that point. Adjustments can be made to one or more data files.
- **Parameter Adjustments Only** allows you to adjust one or more data files to different units, elevation, etc., while keeping the sensor diaphragm (zero point) as the reference point for Leveloggers. It also allows you to change Rainlogger data file parameters.

NOTE

Parameter Adjustments Only, is the only option for compensating Rainlogger data.

Next, you will select Yes or No to **Barometrically Compensating** the data (will not be active if you selected Parameter Adjustments Only).

Next, you will select Yes or No to performing any **Parameter Adjustments** on the data files (will not be active if you selected Parameter Adjustments Only).

Click Next, after you have selected all of your Data Compensation options.

NOTE

See Section 8.1.1 for more information on selecting files for Barometric compensation.

In the next window, you will choose the Levelogger file(s), Rainlogger file(s), and Barologger file(s) you would like to use in the compensation. Any files you have open in the Data Control tab will be listed.

Use the directory on the left of the window or click to open any other data files you would like to compensate. Ensure the files you want to compensate are highlighted in the list. **If doing a Barometric Compensation, ensure the Barologger file is highlighted.** Do this by clicking the file name. To de-select a file, click again. Select Next to continue.

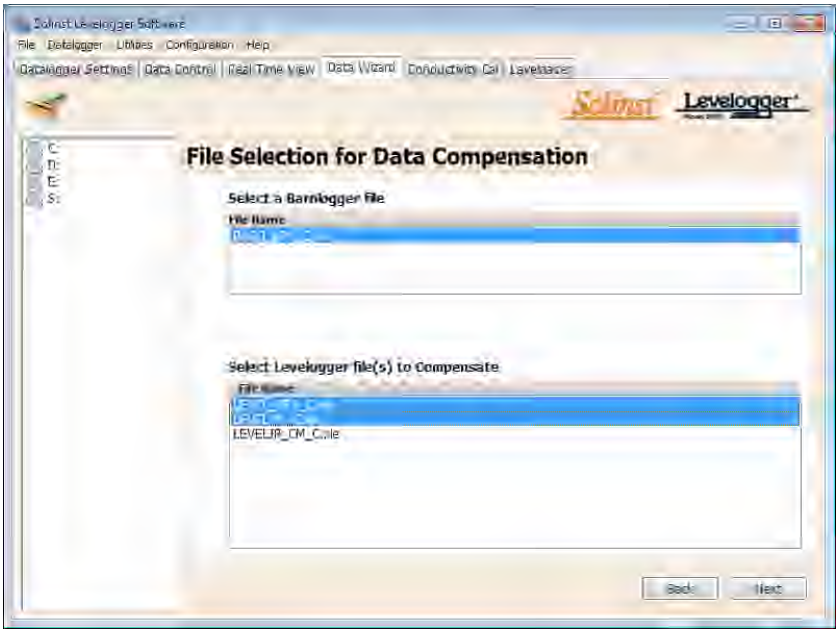


Figure 8-6 Selecting Files for Compensation

NOTE

When adjusting Units for Levelogger files or Rainlogger files, If you select apply to all, the same unit change will be applied to all of the files being compensated at that time.

If you have selected yes to **Parameter Adjustments**, or selected the **Parameter Adjustments Only** option, in the next window you will enter these. You can expand the window by clicking ">>" to show additional adjustment options. If you did not select to change any parameters, this window will not be shown.

NOTE

To show Additional Parameters that can be adjusted, click on the ">>" icon.

Figure 8-7 Parameter Adjustments

NOTE

The date and time of measurement of the Field Zero must be recorded to complete the adjustment. The Field Zero must replace an actual reading the Levelogger file. I.e. take a manual measurement immediately after starting the Levelogger, and note that time.

Next, for each selected Levelogger file, you will enter the Field Zero(s) you would like to use to manually adjust your Levelogger data. (If you have selected **Height of Water Above the Sensor or Parameter Adjustments Only**, this window will not be shown.)

For **Depth to Water Level** adjustments, enter a **Field Zero (A)**. If the static water level is below your Field Zero measurement, the Field Zero is input as a positive value (e.g. a manual water level meter measurement taken from the top of a well casing. See Example 8.1). If the static water level is above your Field Zero, the Field Zero is input as a negative value (such as in an artesian condition).

The Time the Field Zero measurement was taken must replace an actual reading in the Levelogger file. This is selected from the drop-down menu showing all time stamps in the Levelogger file. Click 'Add' to apply the adjustment. If you need to change a Field Zero, click 'Update' after any edits.

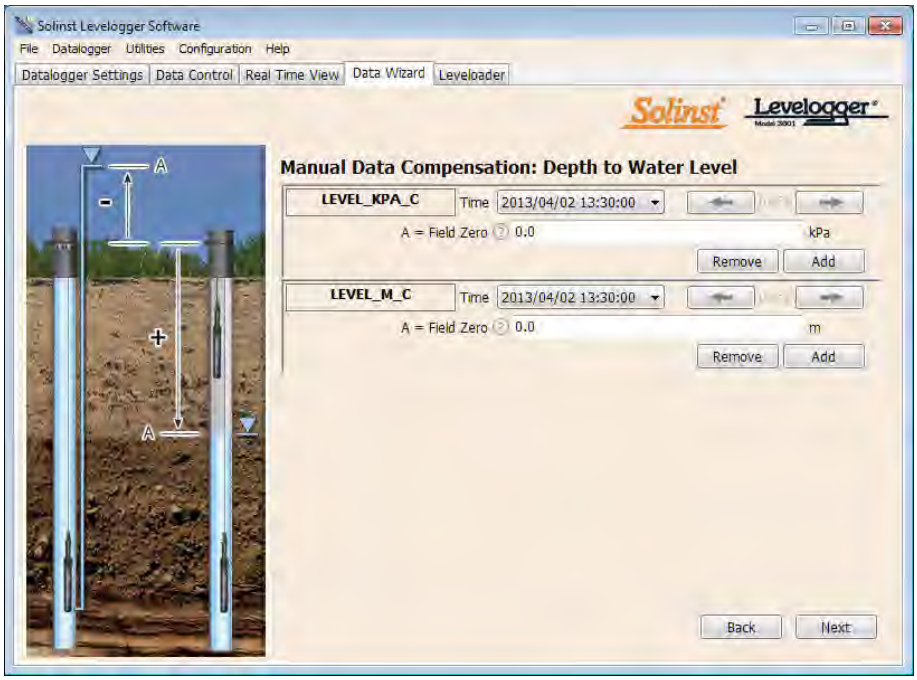
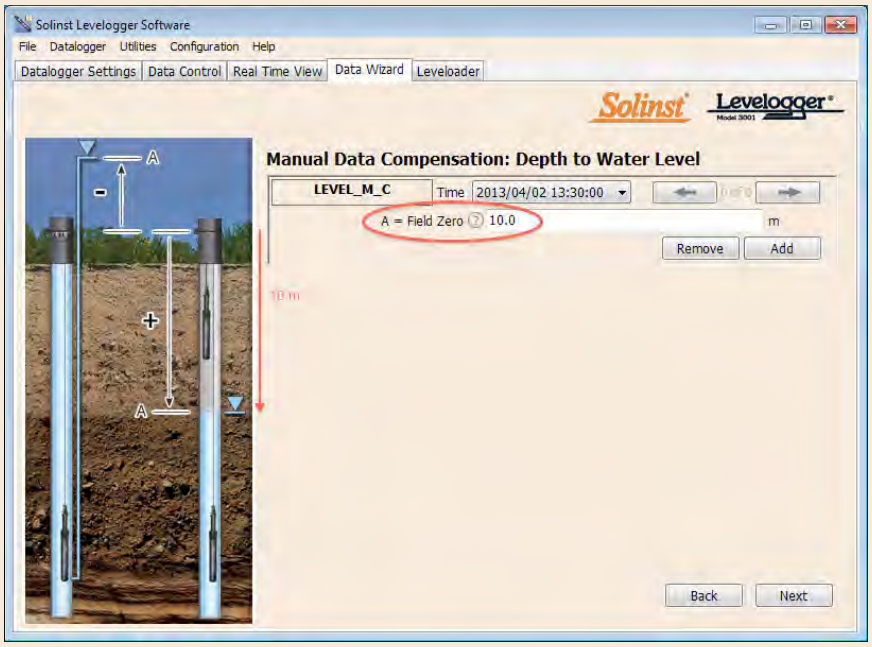


Figure 8-8 Manual Data Adjustment - Depth to Water Level



Example 8.1 Depth to Water Level Adjustment

When using a manual depth to water measurement taken from the top of a well casing as a Field Zero, enter it as a positive value (e.g. 10 m).

In your adjusted data file, your readings will increase in value as the water level decreases. This is because the depth to static water level from the top of the well casing is increasing. The adjusted readings will decrease in value as the static water level rises.

Original Levelogger Data (barometrically compensated height of water above sensor)	8.75 m	8.50 m	8.75 m	9.0 m	9.25 m
Adjusted Levelogger Data (depth to water)	**(A)** 10.0 m	10.25 m	10.0 m	9.25 m	9.0 m

For **Elevation of Water Level** adjustments, enter a **Measuring Point Elevation (A)** and a **Field Zero (B)** from that Measuring Point.

If the static water level is below your Measuring Point, the Field Zero is input as a positive value (e.g. if you are using a manual depth to water measurement as a Field Zero, from the top of a well casing as the Measuring Point).

If the static water level is above your Measuring Point, the Field Zero is input as a negative value (such as an artesian condition). The Measuring Point elevation may also be entered as a negative value.

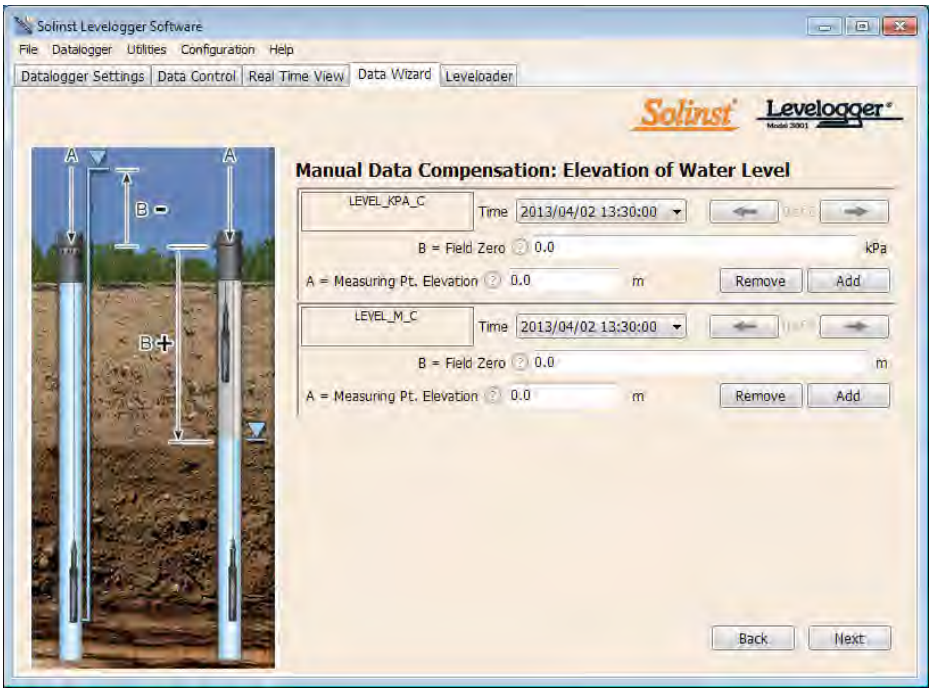


Figure 8-9 Manual Data Adjustment - Elevation of Water Level

NOTE

The date and time of measurement of the Field Zero must be recorded to complete the adjustment.
The Field Zero must replace an actual reading the Levelogger file. I.e. take a manual measurement immediately after starting the Levelogger, and note that time.

The Time the Field Zero measurement was taken, must replace an actual reading in the Levelogger file, and is selected from the drop-down menu showing all time stamps in the Levelogger file. Click 'Add' to apply the adjustment. If you need to change a Field Zero, click 'Update' after any edits.

You can make multiple adjustments to one data file by selecting 'Add' again to enter another Field Zero. All readings after this Time, will be adjusted to this second measurement. You can add as many adjustments to one Levelogger data file as you would like (as long as it doesn't exceed the total number of readings in that file).

Select Next to complete the compensation.

NOTE

All data files are saved to the default location: <C:\Program Files\Solinst\Levelogger4_1\Data>. However, the default directory for saved files can be changed by clicking the Configuration menu at the top of the program window, selecting 'Application Settings' and inputting or navigating to a different folder destination.

The compensated data will automatically be saved in a new *.xle file. The default file name will be the <original Levelogger file name> with the word <compensated> added to the file name prefix. Alternatively, the user can rename the compensated file by saving it in the Data Control tab. Do not change or delete the file extension. All data files are saved to the default location: <C:\Program Files\Solinst\Levelogger4_1\Data>.

The next window will show the results of the compensation. If the compensation was unsuccessful, there will be an explanation in the Reason column (e.g. time stamp of Levelogger and Barologger files were not close enough to perform an accurate compensation). You can still view the compensated file in the Data Control tab, by clicking 'Open' in the Action column. If the compensation is successful, select 'Open', to view the compensated data file in the Data Control tab.

Figure 8-10 Advanced Data Compensation Results

From the Data Control tab, you can view the data, save the compensated file with a new filename and/or export the data (see Section 7).

All the original Levelogger settings and the channel information effective during data collection are shown on the top left of the window. The bottom left sections of the window are used to display the compensation information. The middle section displays information from the Barologger, and the bottom section includes information about manual data and parameter adjustments.

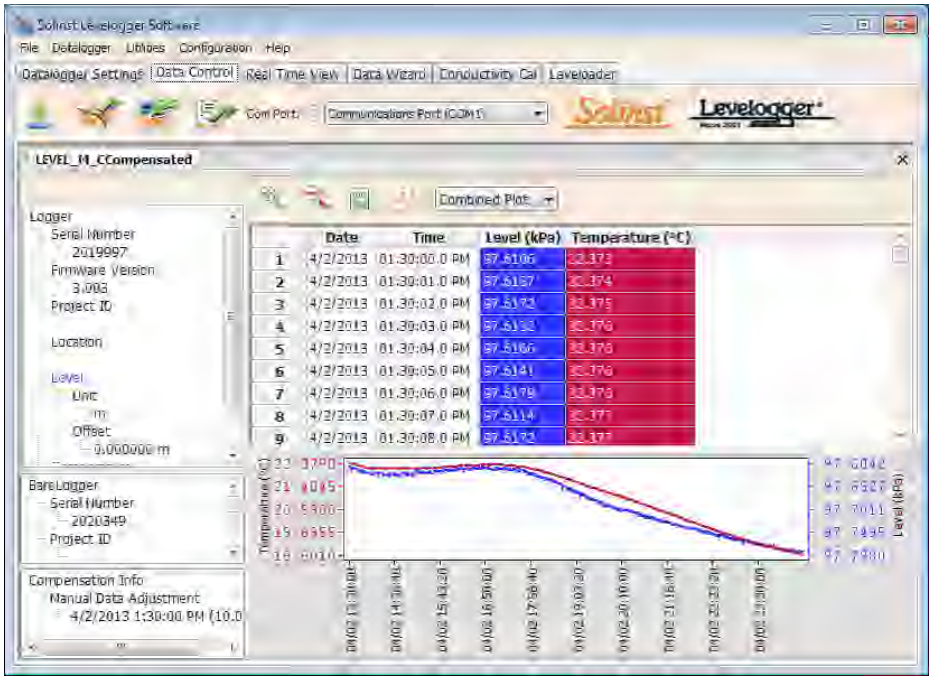


Figure 8-11 Viewing Compensated Files in the Data Control Tab

NOTE

When analyzing barometric data it is important to keep in mind that storm events commonly reduce total atmospheric pressure by about 1.7% from pre-existing high pressure conditions. 1.7% converts to approximately 0.6 ft or 0.2 m of water level equivalent barometric fluctuation.

NOTE

For Manual Barometric Compensation instructions for the Levelogger Gold and Levelogger Junior, visit: www.solinst.com and see the Levelogger Software Version 3.4.1 User Guide in the Downloads Section.
Or view " Automatic or Manual Barometric Compensation of Your Levelogger Data" in the Technical Bulletin Section at: http://www.solinst.com/Prod/3001/Datalogger-Technical-Bulletins.html

NOTE

You can also convert the Levelogger Edge data units to match the Barometric units using the Data Wizard.

NOTE

It is important to remember that weather station barometric data will often contain an offset or normalization (i.e. normalization to sea level). Manual data conversation and barometric compensation should account for any variation of the normalization or offset used between the barometric data sourced and Solinst Leveloggers.

8.2 Manual Barometric Compensation

This section describes how to perform manual barometric compensation on Levelogger Edge and Levelogger Junior Edge data files when a Barologger was not dedicated as a barometric recorder.

For short term tests during which the barometric pressure varies insignificantly, the collection of continuous barometric data may be unnecessary. In this event, take a reading from an open air exposed Levelogger prior to running the short term test and record this level. This level represents the barometric pressure. Similarly, at the end of your test, take another barometric reading and record this measurement. After the submerged Levelogger data has been exported to a spreadsheet program, compensate your submerged Levelogger data files for barometric pressure. If no appreciable change in barometric reading occurred, you may write in the first cell of a new column, a simple calculation that subtracts your barometric reading from the submerged data file, then copy and paste this calculation to all the cells in that new column. The new column will represent the barometrically compensated liquid level.

Barometric data can be collected on site using a recording barometer or from a local weather station. To accomplish an accurate manual barometric compensation, the atmospheric pressure station should not be greater than 20 miles (30 km) away and within an elevation change of 1000 ft (300 m). In addition, the date and time of the barometric data should cover the range of data collected by the Levelogger. If setting up the barometer, set the recording interval to that of the Levelogger sampling interval or some multiple of the Levelogger interval. To compensate submerged Levelogger data using barometric data collected from an on site barometric datalogger or a nearby weather station, these steps must be taken:

1) Export both the Levelogger data file and the barometric file to a spreadsheet.
2) In the spreadsheet, ensure both files are using the same units. If your Levelogger data was recorded in m, cm, or ft, convert the barometric data column from its barometric measurement units (typically atm, mm Hg, psi, mbar or kPa) to feet or meters of water column equivalent using the conversion factors in Table 8-1. (There is also the option to initially set up your Levelogger Edge or Levelogger Junior Edge to record in psi, kPa, or bar. This makes compensation using other atmospheric pressure devices easier.)

Table 8-1

Common barometric units to water column equivalent conversions

Barometric unit	Water column equivalent (ft)	Water column equivalent (m)
1 psi	2.307	0.703
1 kPa	0.335	0.102
1 mbar	0.033	0.0102

Table 8-1 Common Barometric Units to Water column Equivalent Conversions

3) Once the units for each column are the same, subtract the barometric column from the Levelogger data to get the true net water level recorded by the Levelogger Edge.

NOTE

Datalogger settings can not be changed in the Real Time tab. Changes must be made in the Datalogger Settings tab. The changes are applied when the Real Time readings are started.

9 Real Time View

Click the Real Time View tab from the main software window (Figure 9-1). The purpose of this tab is to provide on-screen measurement as data is being recorded by the connected datalogger. The data is displayed in tabular and graphical format. All the channel information and Levelogger settings are displayed on the left of the window.

First, select a non-logged view rate

. This rate can be set independently of the logging period of the Levelogger and does not interfere with any logging taking place in the Levelogger itself.

Checking, **Enable Manual Data Adjustment**, allows you to enter a datum/ field zero (e.g. depth to water level) to which the change in Real Time View level measurements are then adjusted against. This is only available when you are taking readings in m, cm, or ft.

NOTE

You can also view Real Time readings from a Rainlogger Edge or Rainlogger using firmware version 2.000 or higher.

Real Time View readings can be displayed as a graph or in tabular format. The same graphing options as the Data Control tab are available for Real Time View readings. Real Time View readings are being recorded within the Levelogger Software and prior to closing the window, they can be saved by exporting the data into a *.csv file, by choosing the file export option .

To start the current readings, click . Immediately the readings will be displayed.

To take a reading at any specific time, click the button and that reading will be added to the displayed data. To turn the Real Time View monitoring off, decide if you want to save the data as described above, and simply click .

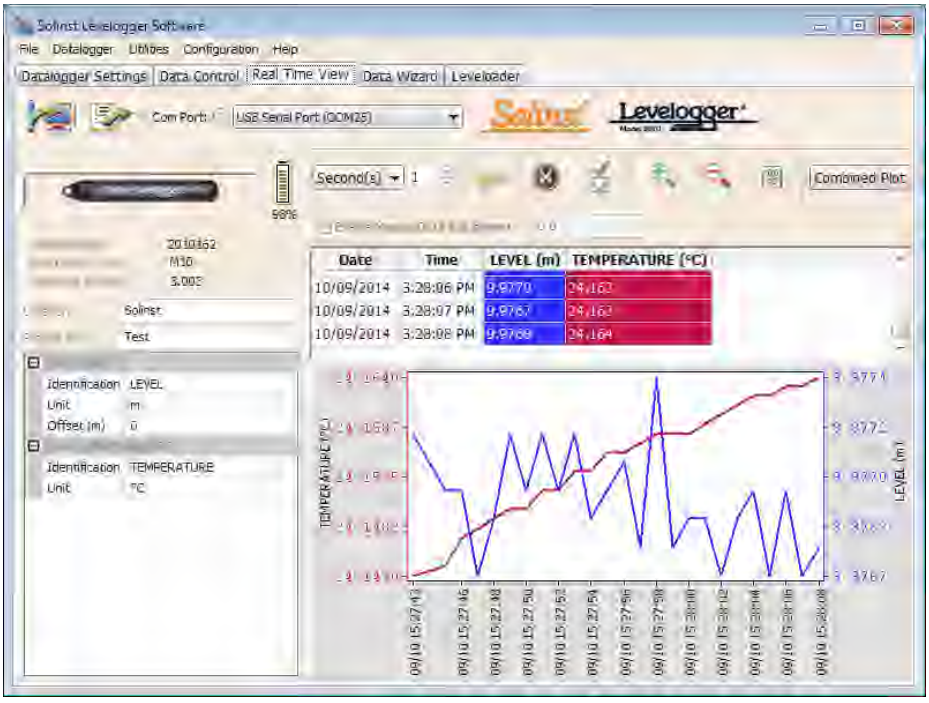


Figure 9-1 Real Time View Window

10 Installation and Maintenance of Leveloggers

10.1 Installation

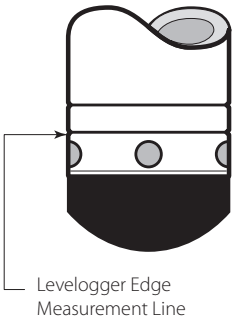


Figure 10-1

Many options exist for installation of the Levelogger, but essentially these installation methods can be classified into two broad categories: free suspended or fixed installations.

1) In free suspended installations, the Levelogger is hung via suspension wire or Direct Read Cable from a well cap, or some fixed tie-off location, at the well head.
2) In fixed installations the Levelogger is fixed in place by a compression fitting, a clamping mechanism or simple metal straps.

It is recommended that the Levelogger be installed in a vertical orientation. However, inclined or horizontal installation is acceptable. The level sensor in the Levelogger is indicated by the machined line about the body of the logger just above the pressure access holes. The pressure transducer is oriented in a plane normal to the long axis of the body and detects pressure directed along the plane of the long axis (Figure 10-1). In vertical orientations, the sensor detects pressure above the pressure transducer line, where as in non-vertical orientations, the pressure zero point is proportional to the angle of inclination.

Care should be taken to avoid dropping the Levelogger against a hard surface. Leveloggers should always be installed with the installation cap on (if not using a Direct Read Cable), whether it is being suspended by it or not. This prevents unnecessary battery drainage and protects the optical eyes.

Make sure you properly estimate the maximum and minimum expected water levels during the monitoring period. You need to install your Levelogger so it remains submerged at all times, and ensure that its maximum submergence depth throughout the monitoring period remains within its specified range. The pressure transducer can be damaged if the datalogger is over-pressurized by submergence greater than its level range. The Levelogger Edge and Levelogger Junior Edge are warranted to pressures up to 200% of their full scale level range (150% for the Levelogger Gold, Levelogger Junior and LTC Levelogger Junior Models), however accuracy can not be guaranteed beyond its full scale.

Other important considerations when installing the Levelogger in pressurized or intermittently pressurized locations such as pressure vessels, pressurized pipes, pulse flow conditions, drop structures or near hydraulics works, is to keep in mind the potential effect of water or steam hammer and hydraulic jump. Water hammer is caused by an abrupt alteration of flow direction resulting in pressure surges. Steam hammer occurs when steam enters a cold pipe partially filled with water. The hammer effect has the potential to significantly increase hydraulic pressure possibly exposing the pressure sensor to pressures beyond its maximum rating. Hydraulic jump is a phenomenon that occurs when water is 'lifted' or 'ramped' by velocity or flow obstructions. Hydraulic jump causes turbulence and creates non-representative head conditions in the water column. Care should be taken to avoid logger installation at points susceptible to hydraulic jump.

Figure 10-12 Levelogger and Barologger in Well

NOTE

The Barologger Edge should not be used to monitor water, as the internal mathematics for temperature compensation are based on air rather than water.

10.1.3 Barologger Installation

The Barologger is a Levelogger with a small range adequate to monitor the fluctuations that occur in barometric pressure. The Barologger's readings are used to barometrically compensate Levelogger readings. As a rule of thumb, a Barologger can be used to compensate all the Leveloggers in a 20 mile (30 km) radius and/or with every 1000 ft. (300 m) change in elevation.

To monitor barometric pressure correctly, the Barologger should never be submerged. In well installations, it is recommended that the Barologger be suspended in one of the monitored wells above the high water point (the well must be vented). For best reading accuracy, the Barologger should be installed in a similar thermal environment to that of the Levelogger. In groundwater wells, the Barologger should be suspended beyond the frost line and deep enough to avoid large temperature fluctuations. In surface water applications, the Barologger is best deployed in a dry well – a well embedded in the bottom of the water body, but sealed at the base from water entry and vented to the atmosphere. If a dry well cannot be installed, the Barologger can be installed on a float in the stilling well. Further information on the Barologger and barometric pressure can be found in Section 8.2.

10.1.3.1 Barometric Efficiency

The influence of barometric pressure on a groundwater surface can follow three scenarios. In confined aquifers with capillary or vadose head space, increased atmospheric pressure can tighten the pore spaces in the overlying soil and produce a capillary effect as the water level rises in response to having nowhere else to go but up. Second, some deeper aquifer systems can be quite barometrically isolated from the relatively small change in level that barometric influences can produce. The third scenario occurs in an unconfined aquifer, with high barometric efficiency, in which a barometric pressure change results in an equivalent or highly proportional drop or rise in groundwater pressure. In essence, depending on the aquifer type and depth, increased barometric pressure can result in either increased, static or decreased water levels. Barometric efficiency, the relationship of a barometric change on groundwater pressure, in confined aquifers generally ranges from 20 to 75%, whereas in unconfined aquifers the efficiency can range from 80 - 100%.

A second important element of Barometric efficiency is time lag – the time differential between a unit change in barometric at the surface to the time of transmission of that change to the aquifer. Calculating general barometric efficiency should not be done on a single barometric event, but rather on a statistically significant number of events. As a result, it may take a month or more of submerged Levelogger and Barologger data to determine barometric efficiency and time lag. As Barometric pressure fluctuates over time in excess of 60 cm water column equivalent pressure and as barometric efficiency can be such an important factor in accurately monitoring groundwater levels, it is vital that barometric compensation of the Levelogger data be performed.

The absolute pressure method used in the Levelogger and Barologger provide the user with the data necessary to determine barometric efficiency and time lag. If a barometric efficiency value has been determined from the Levelogger and Barologger data, that value can be applied to Barologger data in the Data Wizard.

Wells puncturing an aquifer have a negligible to non-existent effect on directly transmitting barometric changes to the larger aquifer. Barometric pressure is transmitted through overlying layers. To obtain the best and most accurate long term water level readings from Leveloggers, the user must first understand how the Levelogger calculates a depth of water above the transducer and second whether barometric efficiency should be considered in barometric compensation.

10.1.5.2 Marine or Brackish Installations

When installing the Levelogger in salt or brackish water or in a liquid having a specific gravity (density) different than fresh water, the density difference is compensated for by inputting the density of the monitored fluid in the Datalogger Settings window for the LTC Levelogger Junior and the Levelogger Gold Series (see Section 5.1). Also, see Section 8 for details in compensating the Levelogger Edge and Levelogger Junior Edge for fluid density differences.

The Levelogger Edge can be used for monitoring in salt or brackish water. However, long term use of the stainless steel body Levelogger Junior Edge, LTC Levelogger Junior, Levelogger Junior and first generation LTC and LT Leveloggers in salt or brackish water is not recommended, as the salt or other pollutants may cause pitting which can lead to perforation of the Levelogger's casing. To minimize this effect, regularly lift the Levelogger from the liquid; within seconds a thin protective layer will be formed by oxidation. Again, this precaution applies to the Levelogger Junior Edge, LTC Levelogger Junior, Levelogger Junior, and first generation LTC and LT Leveloggers.

If using these dataloggers in a continuous salt/brackish monitoring scenario, the stainless steel body of the datalogger can be protected in a manner similar to the freezing protection method described in Section 10.1.5.1. The Levelogger can be placed in balloons and the balloons filled with non-corrosive/ non-toxic fluid. As pressure changes, the fluid encasing the loggers will transmit the pressure differential to the datalogger's pressure transducer. Care must be taken in the selection of the balloon material or filling fluid such that the balloon material prevents diffusion of salts across the concentration gradient or that the filling fluid is comprised of polymeric molecules too large to diffuse out of the balloon material.

10.1.5.3 Biofouling Conditions

Biofouling is the unwanted buildup of microorganisms, plants, algae, or organisms such as barnacles and muscles on a wetted surface. When a Levelogger is deployed for an extended period of time, especially in a saltwater environment, there is the risk of biofouling. Biofouling on the pressure sensor and conductivity cell can compromise the accuracy of the measurements.

A Solinst Biofoul Screen can be used to protect the Levelogger from biofouling. The copper-coiled Delrin screen naturally reduces biofouling, and lengthens the time a Levelogger can be deployed before maintenance is required. The Biofoul Screen simply slips onto the sensor end of the Levelogger where it is held in place with its compression fitting. It adds about 3/4" (19 mm) to the length of the Levelogger. It allows water to freely enter the conductivity cell, as well as the pressure transducer inlets. It is replaced as required.

Figure 10-17 Biofoul Screen Dimensions

Figure 10-18 Solinst Biofoul Screen for the Levelogger

NOTE

It is important to ensure the installation cap or a Direct Read Cable is attached to the Levelogger during storage to prevent unnecessary battery drain and to protect the optical eyes.

NOTE

To clean the optical infrared eyes on a Levelogger, use a clean, soft cloth or cotton swab to gently wipe away any debris and dry the eyes. Avoid soap or cleaners, as it may leave a residue. Compressed air may also be used to clear away any debris.

NOTE

The Levelogger installation cap should be left on when you are soaking a Levelogger.

10.2 Levelogger Maintenance

Levelogger maintenance consists of cleaning the outside casing, the circulation holes and the optical infrared eyes. The required frequency of cleaning is dependent on several aspects of the monitored water quality. In freshwater with good to excellent water quality, the Levelogger cleaning requirements will be very minimal; amounting to a seasonal or even annual maintenance inspection.

In most cases cleaning can be accomplished by rinsing the Levelogger and using mild, non-residual, non-abrasive household cleaners using a very soft-plastic, bristled, pipe-cleaner type brush. Do not insert any object through the circulation holes at the sensor end of the Levelogger.

In some cases simple cleaners are insufficient to properly clean the Levelogger. Several commonly occurring water conditions require specific maintenance methods, these include hard water, high suspended solids loading, biological or chemical fouling and salt or brackish water conditions.

Hard water monitoring can result in the precipitation of calcium and magnesium deposits on the pressure transducer as well as other components of the Levelogger. These deposits can be safely dissolved using a diluted solution (typically ≤ 10% strength) of acetic or phosphoric acid. Commercially available products for dissolving hard water scaling are also available and can be used if designed for household use. Some industrial strength hard water scaling removers are much higher strength and are not recommended for cleaning the Levelogger.

High suspended solids load may block the circulation ports or clog the internal pressure cell of the Levelogger. The potential clogging effect of solids deposition can be minimized by placing the Levelogger in zones of flow. To remove solids build up, rinse the Levelogger under a low flow of tap water until particles have been washed away.

Bacteriological or chemical fouling can be an important consideration in many ground and surface water monitoring projects. Sessile bacteria will often utilize installed instrumentation as an attachment substrate. Chemical deposit can be the result of electrical charge differential between the instrumentation of the monitored liquid or the result of biological or algal activity. Both forms of fouling can result in difficult to remove deposits on the Levelogger transducer, the conductivity wires and the Levelogger casing. To remove fouling use a diluted (≤ 10%) solution of sulfuric acid. Persistent material may require soaking for several hours.

Cleaning LTC Levelogger Junior sensor pins is recommended before calibrating the unit prior to starting a project. The pins of the LTC Levelogger Junior sensor are platinum-coated, therefore they should not be roughly cleaned or touched with any metal. They can be cleaned with a soft bristle brush, Q-tip, or cloth. Almost any acid solution can be selected to clean the sensor, provided it is highly diluted (generally less than 10% acid). The "soaking" time should be monitored and kept to a minimum.

11 Diagnostics Utility

The Levelogger Diagnostics Utility can be used for troubleshooting Leveloggers and obtaining information about that Levelogger that can assist the Solinst Technical Support representative to identify and fix any problems you may encounter with your Levelogger. The Diagnostics Utility can be launched from the Utilities menu at the top of the software. The utility can be used to run a self-test, do a Memory Dump and create and email reports.

11.1 Run Diagnostics

The Run Diagnostics function reads the following information from the Levelogger:

1) Serial Number
2) Model Number
3) Firmware Version
4) Battery Voltage
5) Charge Level
6) Current Level Reading
7) Current Temperature Reading
8) Max/Min Pressure Reading
9) Max/Min Temperature Reading
10) Max/Min Conductivity Reading
11) Total Number of Logs

! NOTE

If an LTC Levelogger Junior fails the Conductivity Sensor Test, this could mean that you have not calibrated your LTC in a while (~1 year). It is recommended that you perform a conductivity calibration, then 'Run Diagnostics' again.

This information can be used to identify firmware, battery and/or temperature/pressure/conductivity sensor problems. This function also performs a series of self-tests on the Levelogger to check for problems with the battery, memory, pressure/temperature/conductivity sensors. If an LTC Levelogger Junior fails the Conductivity Sensor Test, this could mean that you have not calibrated your LTC in a while (~1 year). It is recommended that you perform a conductivity calibration, then 'Run Diagnostics' again. If any of these tests fail then a report should be created and emailed to Solinst Technical Support. To execute this function simply click the 'Run Diagnostics' button.

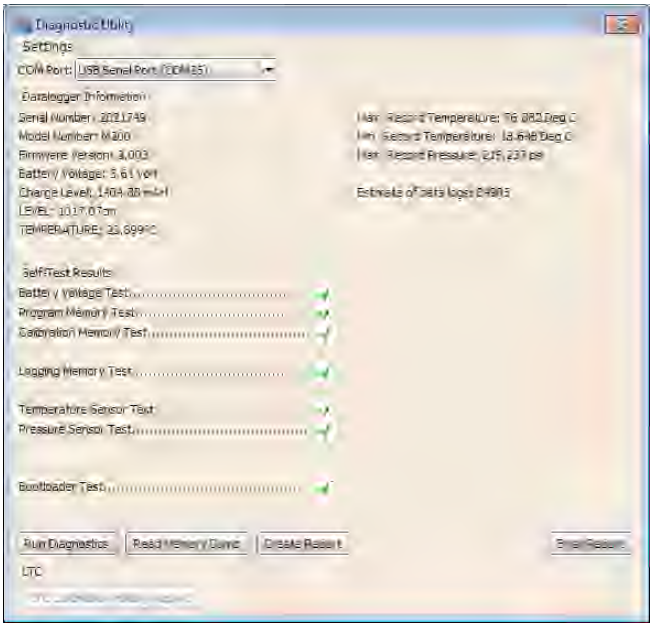


Figure 11-1 Run Diagnostics

NOTE

It is recommended that, before attempting to use this function, you use the 'Create Report' function to send a report to the Solinst Technical Support.

11.2 Read Memory Dump

This function creates a complete dump of the Levelogger's memory, which can then be sent to Solinst Technical Support for analyzing.

To execute this function simply click the Read Memory Dump button. Performing a memory dump will create a *.xle file of the data to save.

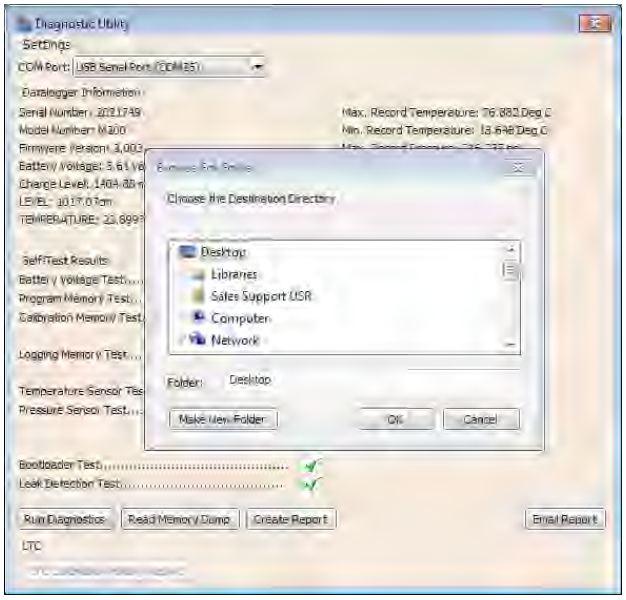


Figure 11-2 Read Memory Dump

11.3 Create Report

NOTE

The 'Email Report' option automatically creates a report and attaches it to an email to send to Solinst - all in one step.

This function simply creates a text file containing the information obtained from the Run Diagnostics function. When you click the Create Report button, a window will pop up asking you to fill out your company information. Simply fill this out and the resulting report can be saved or sent to Solinst Technical Support for troubleshooting. If creating a report for an LTC Levelogger Junior, the LTC Calibration History Report will be included.

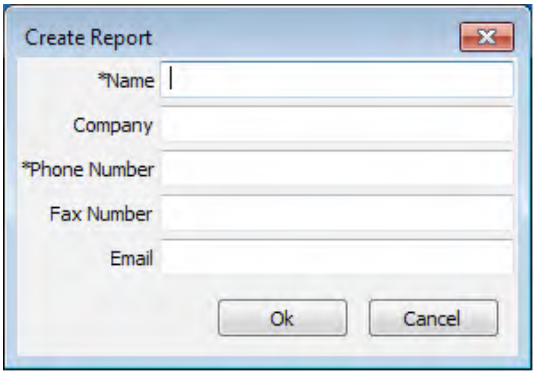


Figure 11-3 Customer Info Input Window

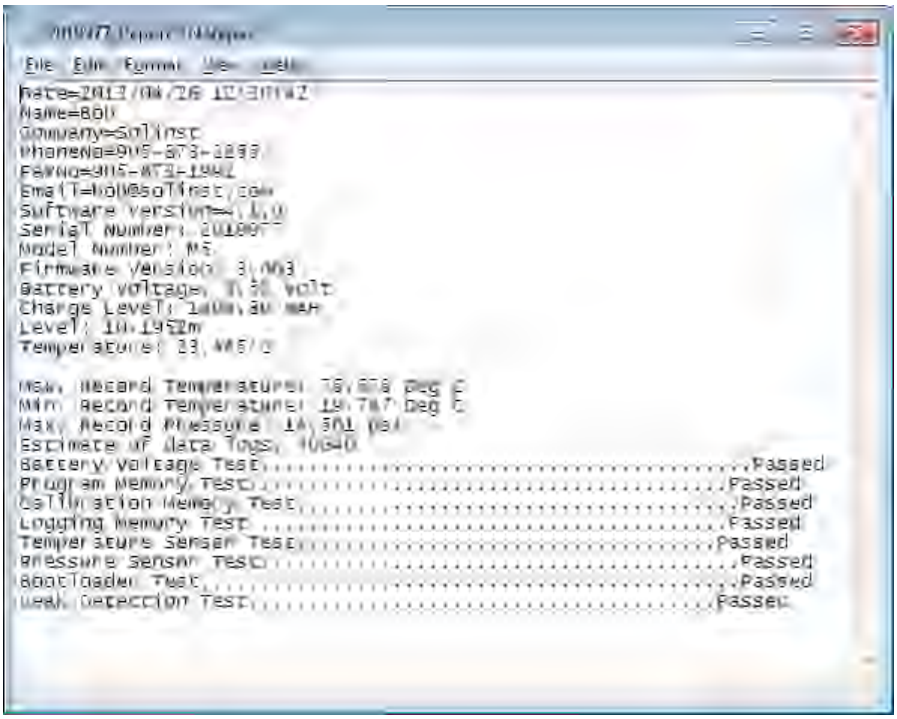


Figure 11-4 Report Example

11.4 Email Report

Clicking Email Report will guide you through the process of creating a Diagnostics Report, and it will automatically attach the report to an email to send to Solinst Technical Staff for troubleshooting. If you are emailing a report for an LTC Levelogger Junior, the LTC Calibration History Report will be included.

11.5 LTC Calibration History Report

This function creates a report of all previous user calibrations performed on the LTC Levelogger Junior. Use it to send a history report to Solinst for analysis if the LTC Levelogger Junior readings are irregular and/or the unit does not maintain its calibration. To execute this function simply click the LTC Calibration History Report button. This creates a text file that can be sent to Solinst Technical Support.

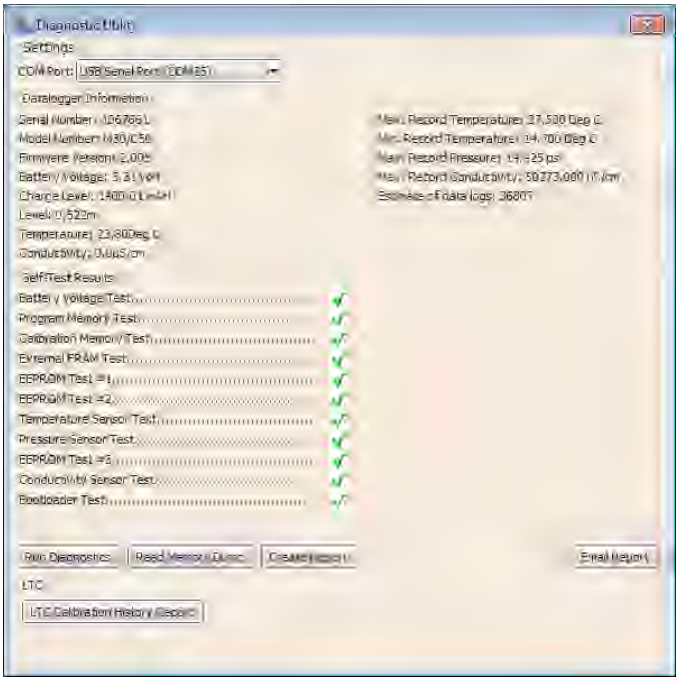


Figure 11-5 LTC Calibration History Report

11.6 Software/Firmware Updates

Each time the Diagnostic Utility is opened, it automatically checks for software updates. If there is an update, "Software Update Available" will appear in the top right of the window. When you click the message, a web page will open, allowing you to download the software update.

The Utility also checks for firmware updates. "Firmware Update Available" will appear in the top right of the window. Clicking the message will open a web page where you can download the firmware update. See Section 12 for firmware update instructions.

NOTE

Your Computer must have an Internet connection to check for software and firmware updates.

You can also check for updates using the Help menu.

NOTE

To check for firmware updates using Levelogger Software, retrieve settings from the connected datalogger (see Section 5). "Firmware Update Available" will appear in the top right menu bar if there is an update available. Clicking the message will open a web page where you can download the firmware update. You can also use the Software's Help menu.

NOTE

It is important that the communication between the PC and the Levelogger is not interrupted during a firmware/ calibration upload so please make sure to close any other running programs, including screen savers, and do not disconnect the Levelogger before the upload is finished.

12 Firmware Upgrade Utility

The Firmware Upgrade Utility is used to upload new firmware files to a Levelogger. The zipped firmware file can be obtained from: http://www.solinst.com/downloads/

Make sure to unzip the firmware file after you have downloaded it, so you can access the *.ssf file.

To upload new firmware to a Levelogger, follow these steps:

1) Open the Solinst Firmware Upgrade Utility from the Utilities menu in the main Levelogger Software. Pick the Com Port to which the Levelogger is connected and make sure the Baud Rate is set to 9600.
2) Click the 'Open' button, which should open a file dialog asking for the firmware file (*.ssf) to upload. Navigate to the directory where the firmware file was saved on your PC, then click on the file and click 'Open'.
3) Check the 'Firmware File Information' box to make sure that the opened file is the right one.
4) Click the 'Upload Firmware' button, to start the firmware upload process.
5) If a communication error occurs and is indicated in the Levelogger Information Window (Figure 12-1) either before the 'Verified Program Checksum' message or after the 'Program Information Section', then restart the upgrade process.
6) If, however, a communication error occurs between the 'Verified Program Checksum' and the 'Program Information Section' messages, then please contact Solinst. You will need to give the Levelogger Serial Number and explain the exact positioning of the error message.

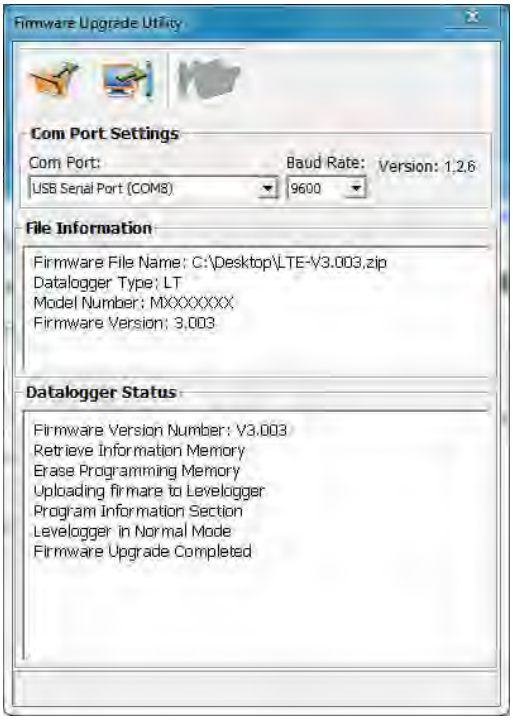


Figure 12-1
Firmware Upgrade Utility Window

13 Trouble Shooting

13.1 Problems During Installation of Levelogger Software

'Class not Registered' or 'DLL not found' or 'Access violation'

1) You may not have Administrator Rights to install the software in the Windows XP/7 environment.
   - Ask your System Administrator for assistance.
2) Some files got corrupted during installation of the Levelogger software. Use 'Add/Remove Programs' to uninstall then re-install Levelogger software.

13.2 Error During Software Uninstall Process

The 'Add/Remove Program' cannot locate the Levelogger <setup.exe> file of the software or the link between the software and the 'Add/Remove Program' is damaged.

The record in the Registry Table must be removed:

1) Ask your System Administrator to remove this.
2) Refer to the following link from Microsoft Website for instructions: http://support.microsoft.com/default.aspx?scid=kb;en-us;247501

13.3 Problems During Installation of RS-232 to USB Converter

Unable to install the RS-232/USB converter from Keyspan or IO Gear

1) After plugging in the RS-232/USB Converter, a Hardware Installation Wizard will open. Follow the instruction from the Wizard and make sure to select the RS-232/USB Converter Driver from the Keyspan or IO Gear Installation CD.
2) If the Hardware Installation Wizard does not open after plugging in the RS-232/USB Converter, follow the steps below to open the Hardware Installation Wizard:
   a. Select Control Panels
   b. Double click on System
   c. Select the Device Manager Tab
   d. Double click on Other devices
   e. Right click on USB Serial Converter
   f. Select Update Driver...

NOTE

Solinst recommends Keyspan or IO Gear. For problems with converters from other manufacturers, please contact the manufacturer.

13.4 Data Has Been Erased Accidentally

If Levelogger has been restarted and old data has not been saved, go to Download Options and choose Data Recovery. It downloads the immediately previous log.

13.5 Error Messages During Use of Software

'Communication Time Out' or 'Communication Error' or 'The Command that is sent to the Levelogger Edge is not defined'

1) Try communicating with another Levelogger, Optical Reader or Direct Read Cable. The communication cable, Optical Reader or Levelogger may be damaged.
2) Clean the optical 'eyes' on the Levelogger and the cable, with a soft cloth.
3) Check that the communication cable is connected to the same Com Port that is chosen in the upper middle of the Main Window of the Levelogger software.
4) Check the Com port settings. They should be as follows:
   - Bits per second: 9600
   - Data bits: 8
   - Parity: None
   - Stop bits: 1
   - Flow control: None
     (This may have been set to Xon/Xoff – change it to None, Select [OK] and back out of this pathway.)

The route to view your Com port settings is as follows:

   a. Select Control Panels
   b. Double click on System
   c. Select the Device Manager Tab
   d. Double click on Ports
   e. Double click on Communications Port(s)
   f. Choose the Port Settings Tab

5) Try using a different computer, to see if this is the cause of the problem.
6) If using a laptop (especially in conjunction with a Direct Read Cable) your Com Port may not be powered adequately to receive/transmit data. Try using a desktop computer to test this, or contact Solinst to obtain a PC Interface Booster Cable.
7) If problem persists, contact Solinst.

'Port Cannot Open'

1) If using a USB device, ensure you plugged it in before starting the Levelogger Software.
2) Ensure the correct Com Port is selected in the upper middle of the Main Window of the Levelogger software.
3) If the correct Com Port is not available, a USB Driver installation or update may be required.
4) Check if some other software is using the same Com Port in the background. Shut that software down or choose another Com Port if available. Such background software may be anti-virus software or PDA software.

5) Make sure your Com Port has been enabled:
    a. Select Control Panel
    b. Double click on System
    c. Select the Device Manager Tab
    d. Double click on Ports
    e. Double click on Communications Port(s)
    f. Choose General
    g. Uncheck 'Disable in this hardware profile box'
6) If you are using a virtual Com Port, like a USB optical reader or USB/RS-232 converter, refer to the 'Problems During Installation of RS-232 to USB Converter' section to make sure they are installed properly.

'File Create Error' and 'File Write Error'

1) If you do not have file-writing privileges to the Levelogger default data folder, change the folder as follows: in the Levelogger software, click 'Configuration' then 'Application Settings'. Under 'Default Directory', enter a new destination folder, to which you have file writing privileges, e.g. 'My Documents'. Follow the same procedure if you have the same problem when you export the data file in csv format.
2) Ask your System Administrator for assistance.

'File Open Error' and 'File Read Error'

1) Shut down or disable any other software that is active and using the same file.
2) In Notepad or Wordpad, open the <*.xle> or <*.lls> file to check for corruptions in the file. How are the Levelogger files ended?
3) If problems persist contact Solinst for assistance.

'Time Span Error, some data cannot be compensated'

1) Find another barometric data file that has the same time stamp as the Levelogger.
2) Perform the compensation (a simple subtraction) in a spreadsheet program for any missing time stamps.

'A different type of Levelogger is detected'

Try clicking the Retrieve Settings icon again, or replace the Levelogger currently in the Optical Reader with the one that was previously being worked on, and complete the operation.

'The selected file is not a barometer'

Select a Barologger for the compensation process.

'Data Corrupted'

Contact Solinst for assistance. Use Levelogger Diagnostic Utility to do a memory dump and sent the dump file to Solinst for further analysis.

'Internal Error'

Contact Solinst for assistance.

'Fail to append data - A different Levelogger has been detected!' or 'Fail to append data - A different start time has been detected!' or 'Fail to append data - New data is not available in the Levelogger!'

The Levelogger software can only append data to a file that has the same serial number and start time as the connected Levelogger. Find the correct file, or use 'All Data' to download the complete file.

'Only Levelogger Gold/Edge supports this function'

The 'Append Data', 'Partial Download' and 'Data Recovery' functions are only supported by the Levelogger Gold/Edge loggers, not previous version Leveloggers.

'Schedule cannot be empty'

When using the 'Schedule' sampling option in a Levelogger Gold/Edge, the schedule must contain at least one item.

'Readings in schedule exceed the maximum'

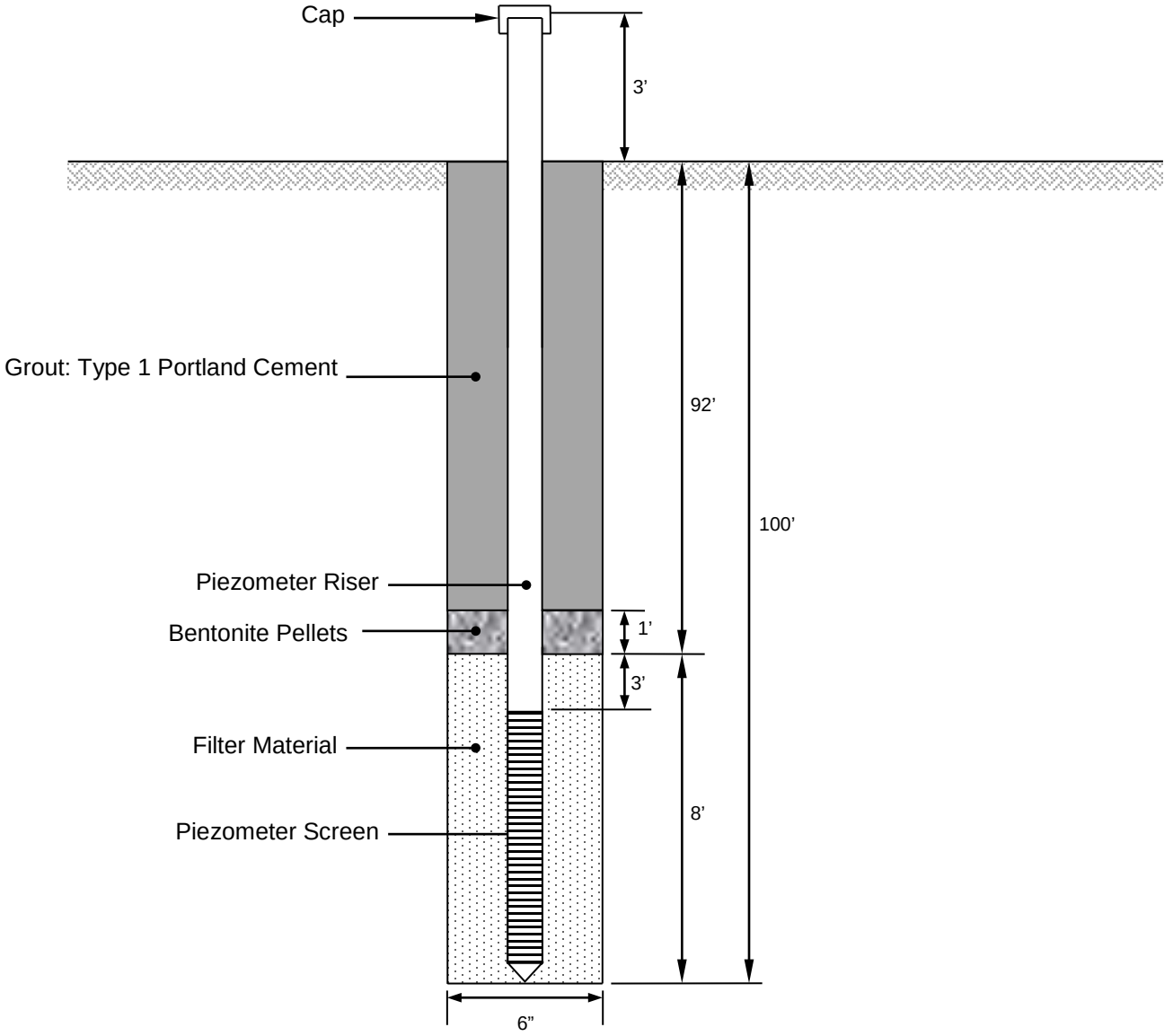
The number of readings in a schedule should not result in more than 40,000 (or up to 120,000) individual readings.

APPENDIX B

Ground Water Monitoring Well Installation Records

WELL INSTALLATION RECORD

JOB NAME	**Mecca Flow Equalization Basin**	JOB NUMBER	**WF0MECCA.0DDR**
WELL#	**MFEB1-GW1**	BORING# **MFEBBH01**	INSTALLATION DATE **8/27/2015**
LOCATION (FL State Plane, East Zone, NAD83)	**N26°51'13.6" E80°16'40.9"**	TOP OF CASING (TOC) ELEVATION	**32.45 feet NAVD88**
RISER/SCREEN MATERIAL	**2-inch diameter PVC**	GROUNDWATER DEPTH	**12.95 feet below top of casing(btoc)**
SCREEN SLOT SIZE	**0.010 inch**	GROUNDWATER ELEVATION	**19.50 feet NAVD88**
DRILLING METHOD	**Mud Rotary**	FILTER MATERIAL	**20/30 Sand**
BOREHOLE DIAMETER	**6.00 inches**	DRILLING CONTRACTOR	**Nutting Engineers**
SUBSURFACE MATERIAL AT FILTER ZONE	**Sand with silt and abundant fine shell fragments, fine to very fine, light gray, some cemented sand**		
NOTES	**Drilling fluid: bentonite; groundwater depth is obtained from constant head permeability test; development duration: pumped until free of visible sediments**		



"NOT TO SCALE"

South Florida Water Management District	ARCADIS	WELL INSTALLATION RECORD	PALM BEACH COUNTY, FL

WELL INSTALLATION RECORD

JOB NAME **Mecca Flow Equalization Basin** JOB NUMBER **WF0MECCA.0DDR**

WELL# **MFEB1-GW2** BORING# **MFEBBH01** INSTALLATION DATE **8/27/2015**

LOCATION (FL State Plane, East Zone, NAD83) **N26°51'13.7" E80°16'40.5"** TOP OF CASING (TOC) ELEVATION **32.96 feet NAVD88**

RISER/SCREEN MATERIAL **2-inch diameter PVC** GROUNDWATER DEPTH **13.56 feet below top of casing (btoc)**

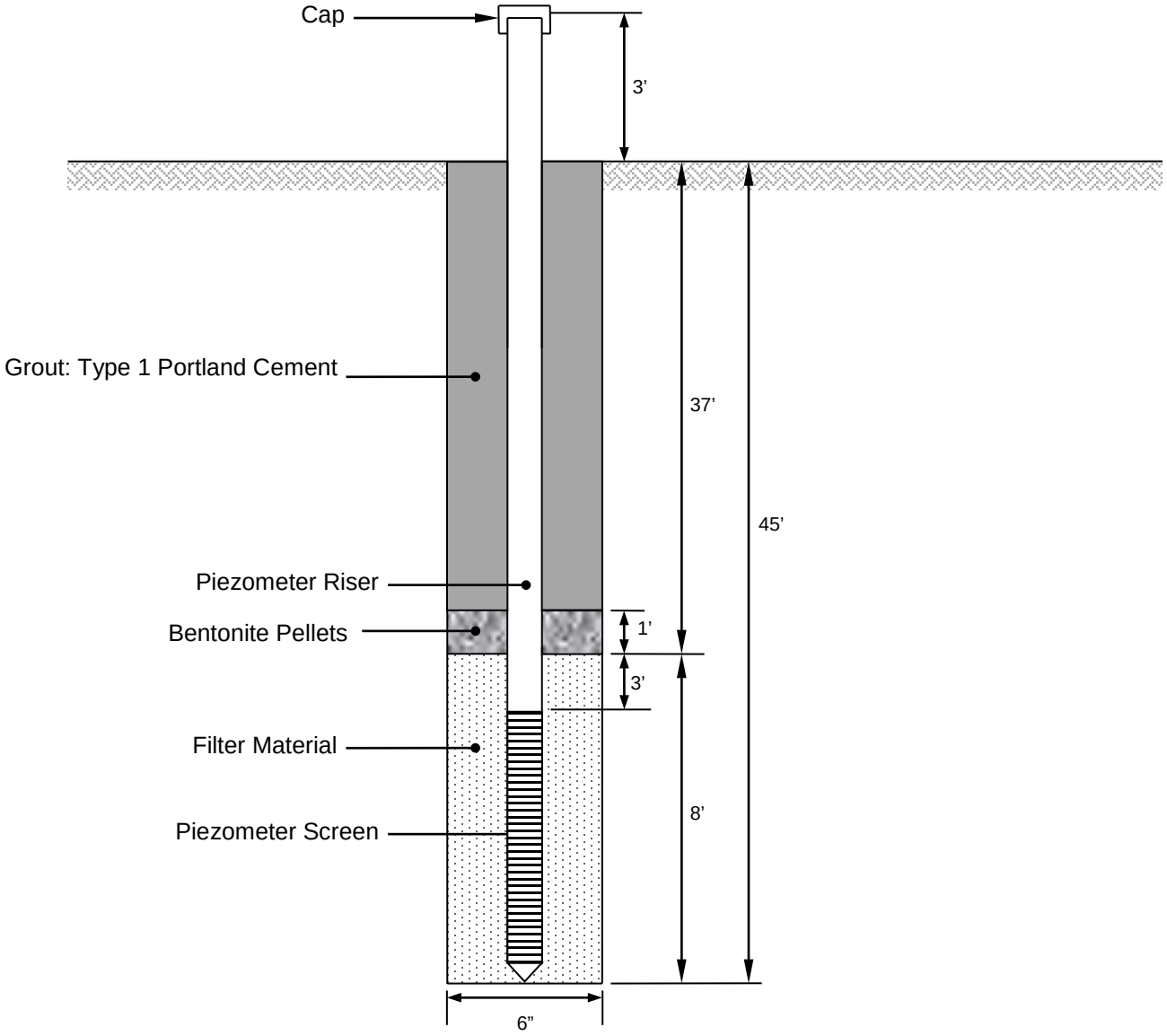
SCREEN SLOT SIZE **0.010 inch** GROUNDWATER ELEVATION **19.40 feet NAVD88**

DRILLING METHOD **Mud Rotary** FILTER MATERIAL **20/30 Sand**

BOREHOLE DIAMETER **6.00 inches** DRILLING CONTRACTOR **Nutting Engineers**

SUBSURFACE MATERIAL AT FILTER ZONE **Sand with silt, fine to very fine, dark gray, slightly cemented**

NOTES **Drilling fluid: bentonite; groundwater depth is obtained from constant head permeability test; development duration: pumped until free of visible sediments**



"NOT TO SCALE"

South Florida Water Management District	ARCADIS	WELL INSTALLATION RECORD	PALM BEACH COUNTY, FL

WELL INSTALLATION RECORD

JOB NAME **Mecca Flow Equalization Basin** JOB NUMBER **WF0MECCA.0DDR**

WELL# **MFEB1-GW3** BORING# **MFEBBH01** INSTALLATION DATE **8/27/2015**

LOCATION (FL State Plane, East Zone, NAD83) **N26°51'13.7" E80°16'40.7"** TOP OF CASING (TOC) ELEVATION **32.68 feet NAVD88**

RISER/SCREEN MATERIAL **2-inch diameter PVC** GROUNDWATER DEPTH **14.10 feet below top of casing (btoc)**

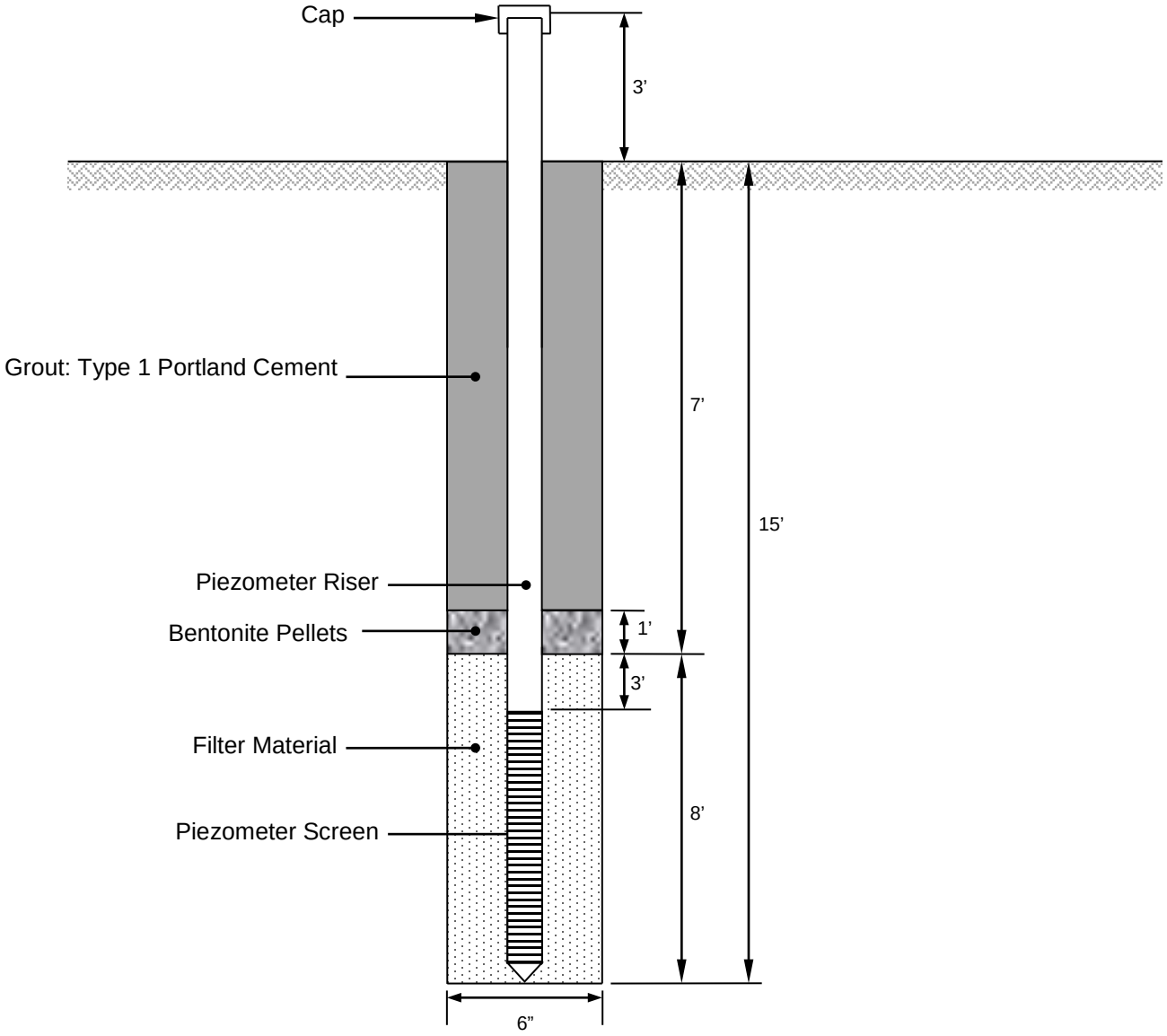
SCREEN SLOT SIZE **0.010 inch** GROUNDWATER ELEVATION **18.58 feet NAVD88**

DRILLING METHOD **Mud Rotary** FILTER MATERIAL **20/30 Sand**

BOREHOLE DIAMETER **6.00 inches** DRILLING CONTRACTOR **Nutting Engineers**

SUBSURFACE MATERIAL AT FILTER ZONE **Sand with silt, fine to very fine, gray cemented**

NOTES **Drilling fluid: bentonite; groundwater depth is obtained from constant head permeability test; development duration: pumped until free of visible sediments**



"NOT TO SCALE"

South Florida Water Management District	ARCADIS	WELL INSTALLATION RECORD	PALM BEACH COUNTY, FL

WELL INSTALLATION RECORD

JOB NAME **Mecca Flow Equalization Basin** JOB NUMBER **WF0MECCA.0DDR**

WELL# **MFEB2-GW1** BORING# **MFEBBH20** INSTALLATION DATE **10/22/2015**

LOCATION (FL State Plane, East Zone, NAD83) **N26°49'51.0" E80°16'09.8"** TOP OF CASING (TOC) ELEVATION **24.95 feet NAVD88**

RISER/SCREEN MATERIAL **2-inch diameter PVC** GROUNDWATER DEPTH **7.24 feet below top of casing (btoc)**

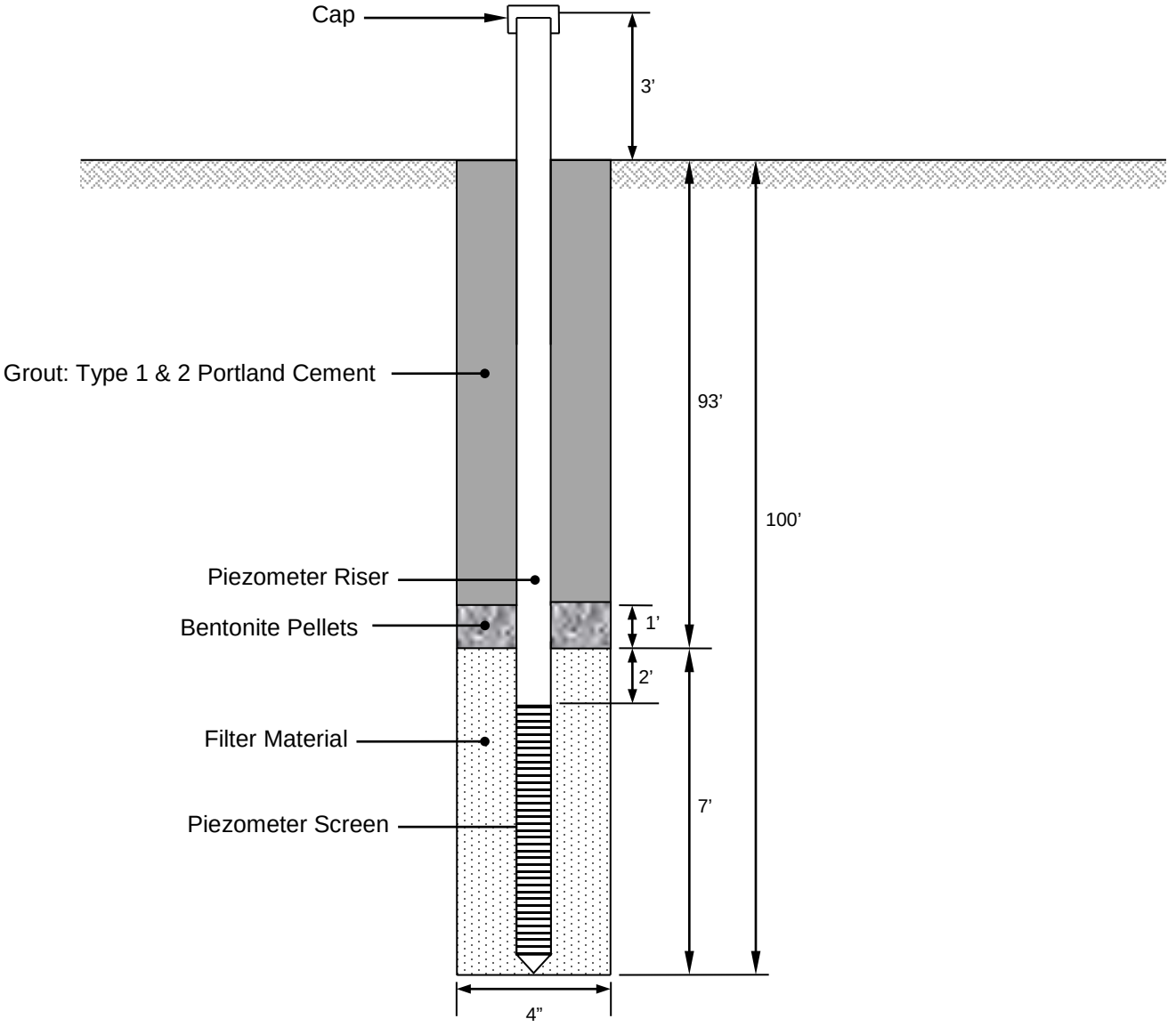
SCREEN SLOT SIZE **0.010 inch** GROUNDWATER ELEVATION **17.71 feet NAVD88**

DRILLING METHOD **Mud Rotary** FILTER MATERIAL **20/30 Sand**

BOREHOLE DIAMETER **4.00 inches** DRILLING CONTRACTOR **Nutting Engineers**

SUBSURFACE MATERIAL AT FILTER ZONE **Sand with silt and abundant fine to medium shell fragments, fine to very fine, medium dense, light gravish-brown**

NOTES **Drilling fluid: bentonite; groundwater depth is obtained from constant head permeability test; development duration: pumped until free of visible sediments**



"NOT TO SCALE"

South Florida Water Management District	ARCADIS	WELL INSTALLATION RECORD	PALM BEACH COUNTY, FL

WELL INSTALLATION RECORD

JOB NAME **Mecca Flow Equalization Basin** JOB NUMBER **WF0MECCA.0DDR**

WELL# **MFEB2-GW2** BORING# **MFEBBH20** INSTALLATION DATE **10/19/2015**

LOCATION (FL State Plane, East Zone, NAD83) **N26°49'51.1" E80°16'09.8"** TOP OF CASING (TOC) ELEVATION **24.87 feet NAVD88**

RISER/SCREEN MATERIAL **2-inch diameter PVC** GROUNDWATER DEPTH **7.28 feet below top of casing (btoc)**

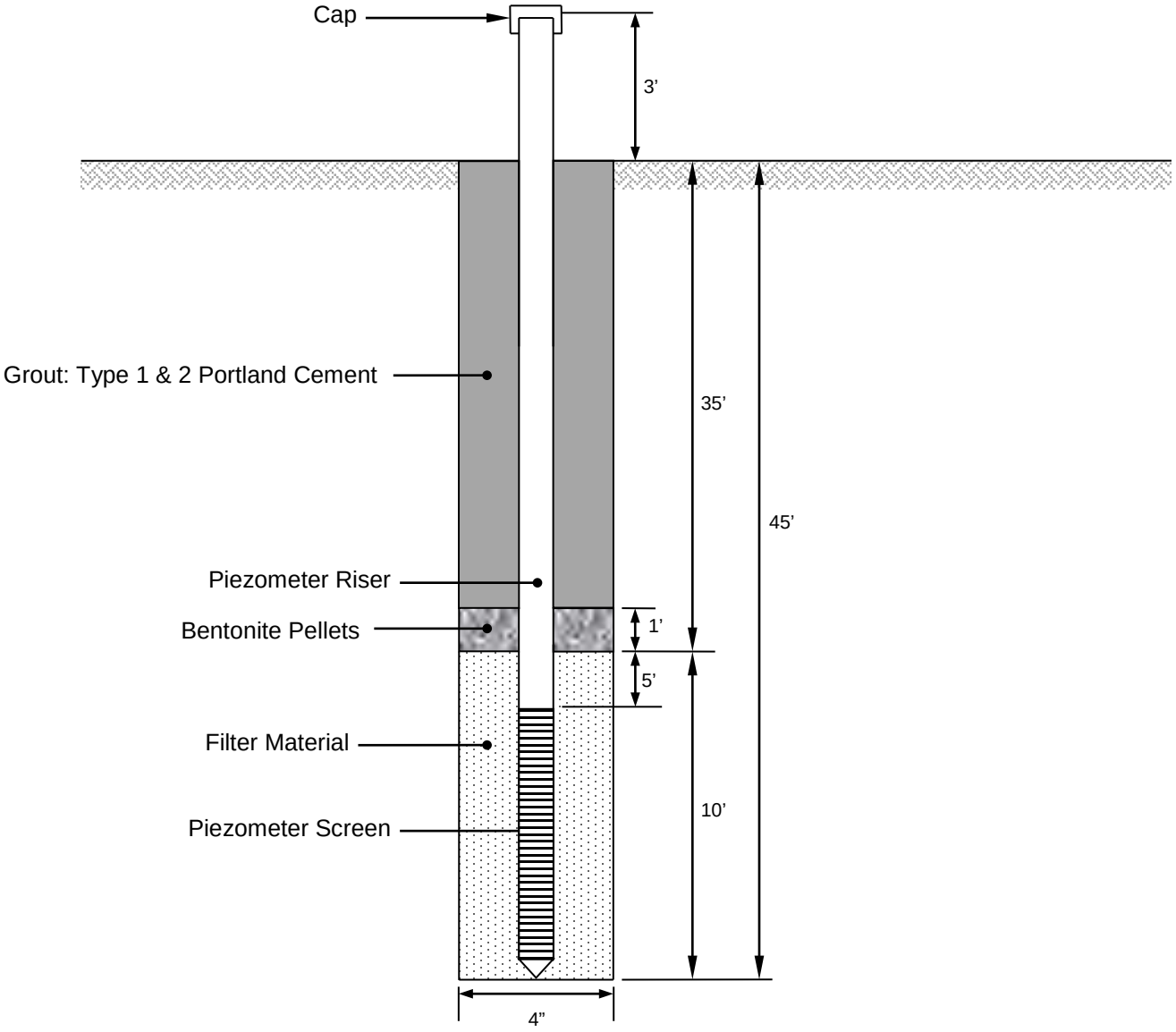
SCREEN SLOT SIZE **0.010 inch** GROUNDWATER ELEVATION **17.59 feet NAVD88**

DRILLING METHOD **Mud Rotary** FILTER MATERIAL **20/30 Sand**

BOREHOLE DIAMETER **4.00 inches** DRILLING CONTRACTOR **Nutting Engineers**

SUBSURFACE MATERIAL AT FILTER ZONE **Sand with silt and abundant fine to medium shell fragments, fine to very fine, medium dense, light grayish brown**

NOTES **Drilling fluid: bentonite; groundwater depth is obtained from constant head permeability test; development duration: pumped until free of visible sediments**



"NOT TO SCALE"

South Florida Water Management District	ARCADIS	WELL INSTALLATION RECORD	PALM BEACH COUNTY, FL

WELL INSTALLATION RECORD

JOB NAME **Mecca Flow Equalization Basin** JOB NUMBER **WF0MECCA.0DDR**

WELL# **MFEB2-GW3** BORING# **MFEBBH20** INSTALLATION DATE **10/19/2015**

LOCATION (FL State Plane, East Zone, NAD83) **N26°49'51.2" E80°16'09.8"** TOP OF CASING (TOC) ELEVATION **25.12 feet NAVD88**

RISER/SCREEN MATERIAL **2-inch diameter PVC** GROUNDWATER DEPTH **7.42 feet below top of casing (btoc)**

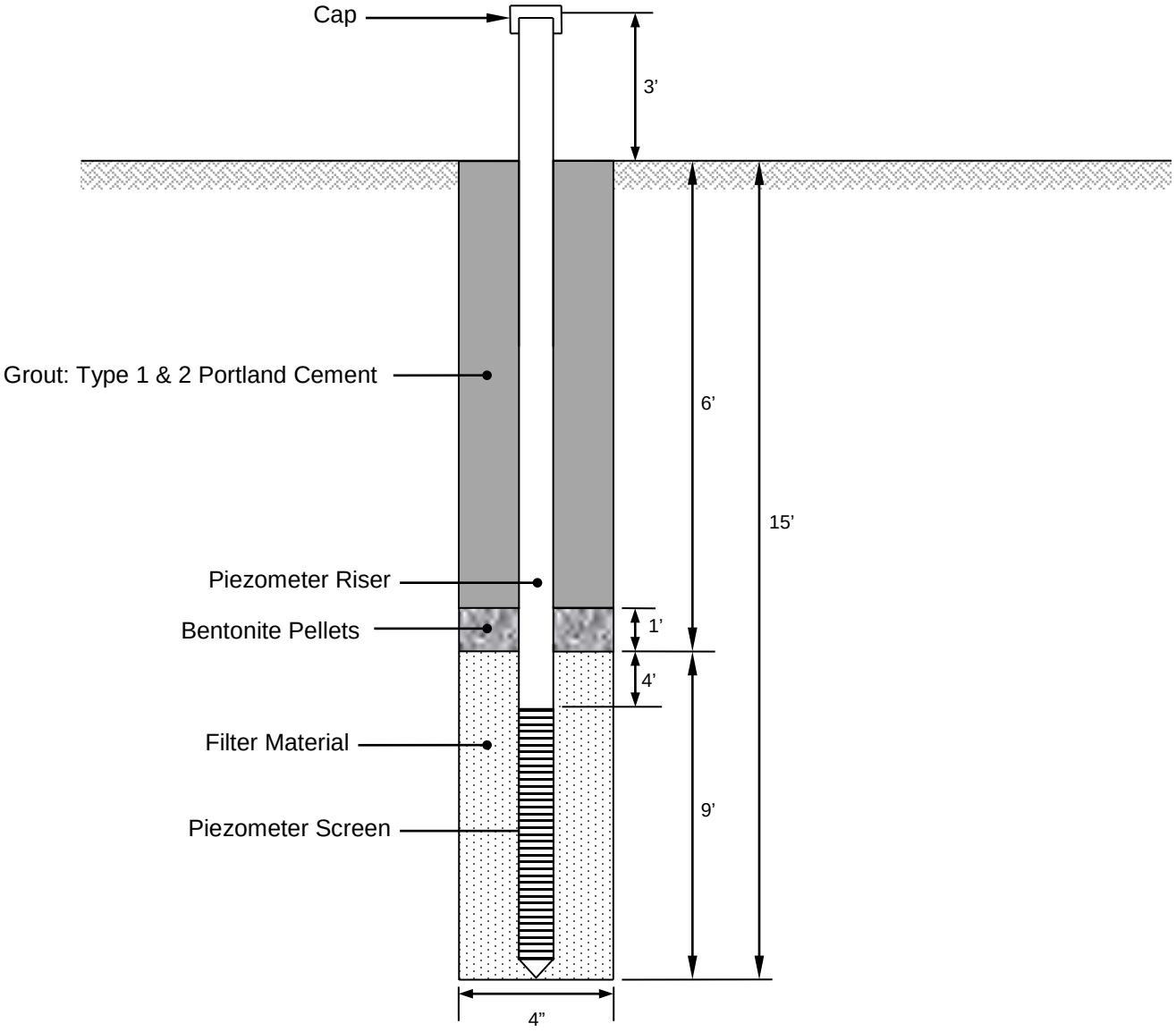
SCREEN SLOT SIZE **0.010 inch** GROUNDWATER ELEVATION **17.70 feet NAVD88**

DRILLING METHOD **Mud Rotary** FILTER MATERIAL **20/30 Sand**

BOREHOLE DIAMETER **4.00 inches** DRILLING CONTRACTOR **Nutting Engineers**

SUBSURFACE MATERIAL AT FILTER ZONE **Sand with clay, fine gray, pale brown**

NOTES **Drilling fluid: bentonite; groundwater depth is obtained from constant head permeability test; development duration: pumped until free of visible sediments**



"NOT TO SCALE"

South Florida Water Management District	ARCADIS	WELL INSTALLATION RECORD	PALM BEACH COUNTY, FL

WELL INSTALLATION RECORD

JOB NAME **Mecca Flow Equalization Basin** JOB NUMBER **WF0MECCA.0DDR**

WELL# **MFEB3-GW1** BORING# **MFEBBH09** INSTALLATION DATE **9/11/2015**

LOCATION (FL State Plane, East Zone, NAD83) **N26°49'29.4" E80°16'57"** TOP OF CASING (TOC) ELEVATION **21.95 feet NAVD88**

RISER/SCREEN MATERIAL **2-inch diameter PVC** GROUNDWATER DEPTH **4.88 feet below top of casing (btoc)**

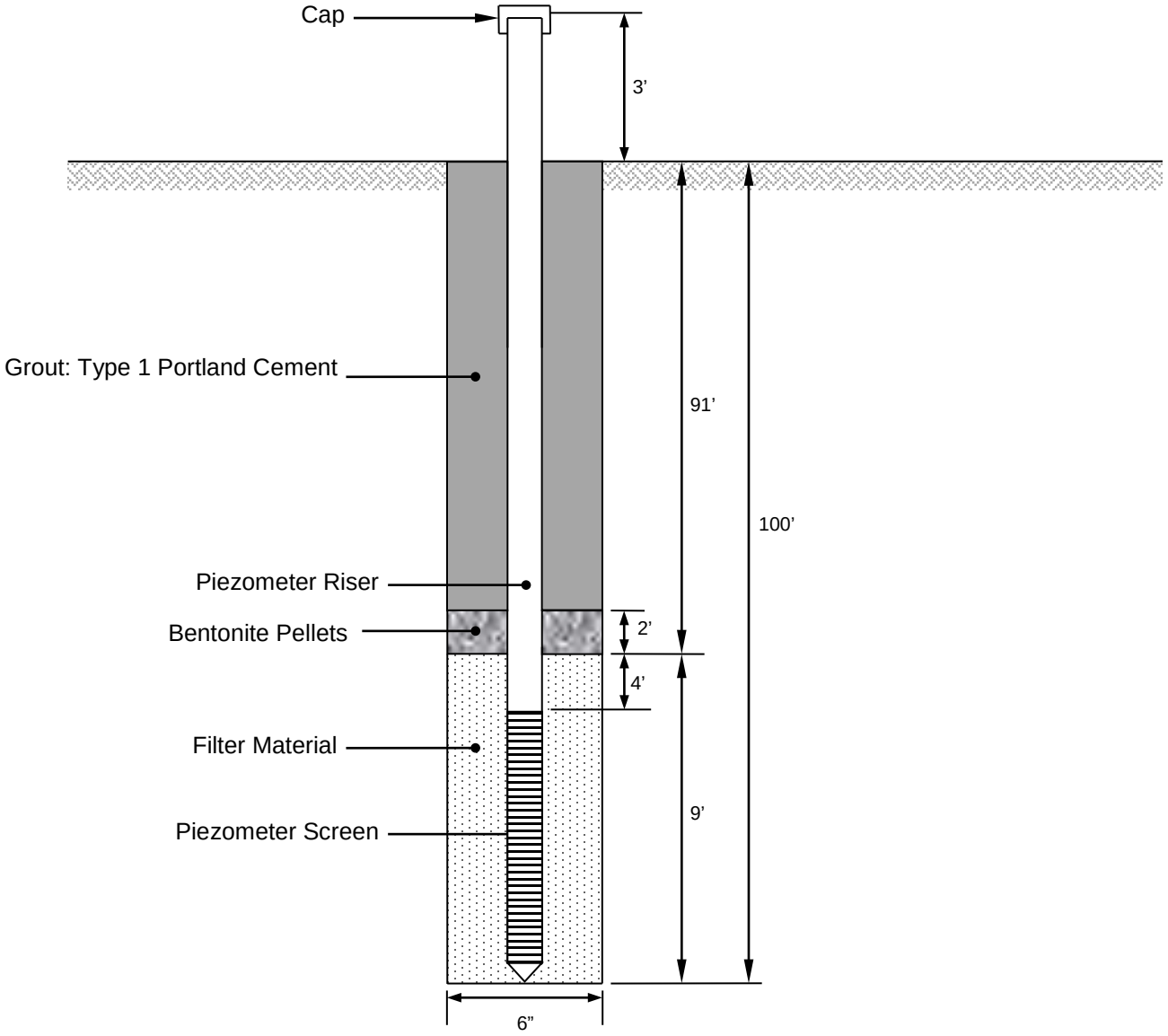
SCREEN SLOT SIZE **0.010 inch** GROUNDWATER ELEVATION **17.07 feet NAVD88**

DRILLING METHOD **Mud Rotary** FILTER MATERIAL **20/30 Sand**

BOREHOLE DIAMETER **6.00 inches** DRILLING CONTRACTOR **Nutting Engineers**

SUBSURFACE MATERIAL AT FILTER ZONE **Sand with silt and fine to medium shell fragments, very fine, gray**

NOTES **Drilling fluid: bentonite; groundwater depth is obtained from constant head permeability test; development duration: pumped until free of visible sediments**



"NOT TO SCALE"

South Florida Water Management District	ARCADIS	WELL INSTALLATION RECORD	PALM BEACH COUNTY, FL

WELL INSTALLATION RECORD

JOB NAME **Mecca Flow Equalization Basin** JOB NUMBER **WF0MECCA.0DDR**

WELL# **MFEB3-GW2** BORING# **MFEBBH09** INSTALLATION DATE **9/4/2015**

LOCATION (FL State Plane, East Zone, NAD83) **N26°49'29.4" E80°16'57"** TOP OF CASING (TOC) ELEVATION **22.04 feet NAVD88**

RISER/SCREEN MATERIAL **2-inch diameter PVC** GROUNDWATER DEPTH **5.05 feet below top of casing (btoc)**

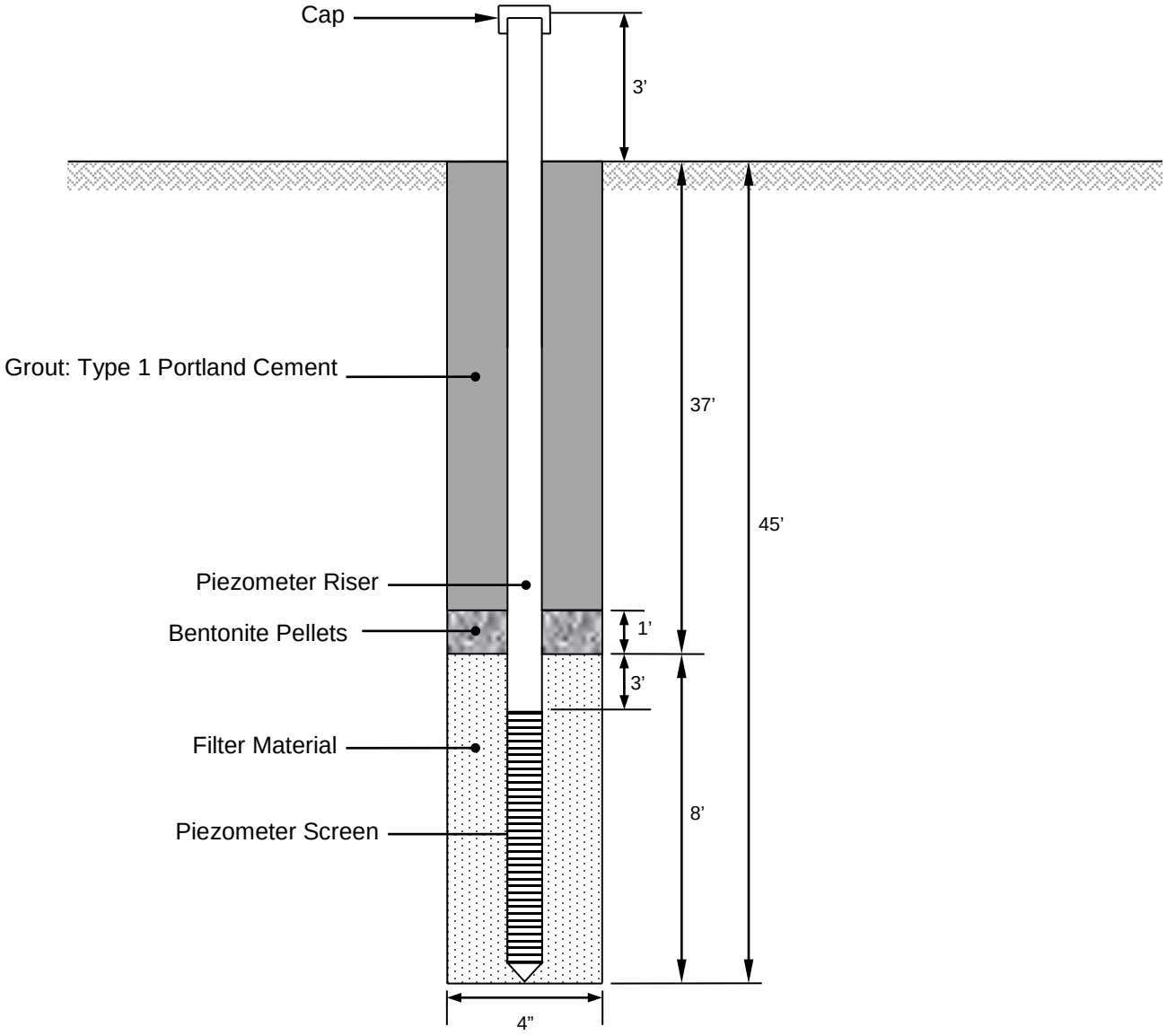
SCREEN SLOT SIZE **0.010 inch** GROUNDWATER ELEVATION **16.99 feet NAVD88**

DRILLING METHOD **Mud Rotary** FILTER MATERIAL **20/30 Sand**

BOREHOLE DIAMETER **4.00 inches** DRILLING CONTRACTOR **Nutting Engineers**

SUBSURFACE MATERIAL AT FILTER ZONE **Silty sand and abundant fine to medium shell fragments and traces of clay, brown**

NOTES **Drilling fluid: bentonite; centralizers: 39, 29, 19 feet; groundwater depth is obtained from constant head permeability test; development duration: pumped until free of visible sediments**



"NOT TO SCALE"

South Florida Water Management District	ARCADIS	WELL INSTALLATION RECORD	PALM BEACH COUNTY, FL

WELL INSTALLATION RECORD

JOB NAME **Mecca Flow Equalization Basin** JOB NUMBER **WF0MECCA.0DDR**

WELL# **MFEB3-GW3** BORING# **MFEBBH09** INSTALLATION DATE **9/4/2015**

LOCATION (FL State Plane, East Zone, NAD83) **N26°49'29.3" E80°16'57"** TOP OF CASING (TOC) ELEVATION **22.18 feet NAVD88**

RISER/SCREEN MATERIAL **2-inch diameter PVC** GROUNDWATER DEPTH **5.17 feet below top of casing (btoc)**

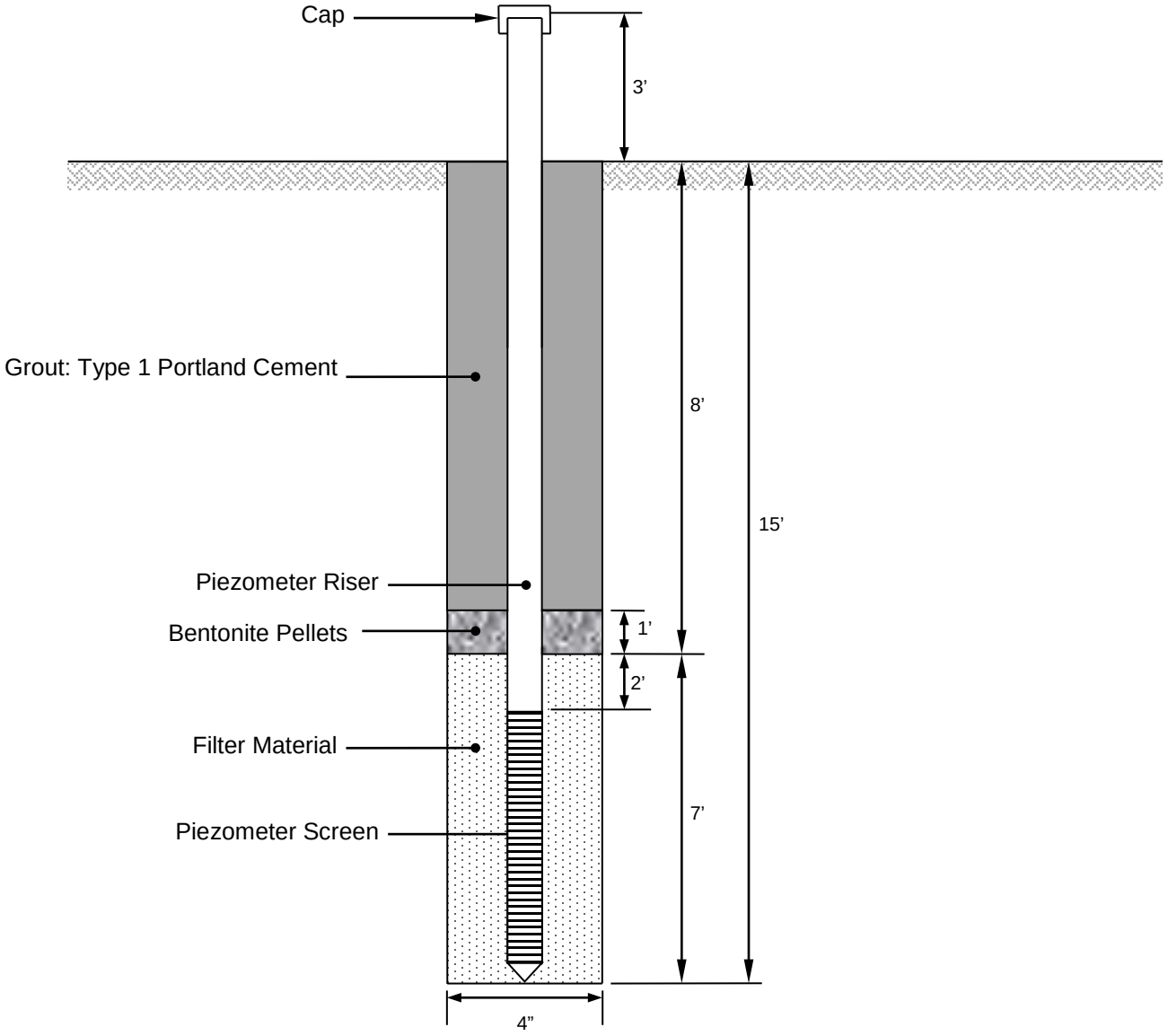
SCREEN SLOT SIZE **0.010 inch** GROUNDWATER ELEVATION **17.01 feet NAVD88**

DRILLING METHOD **Mud Rotary** FILTER MATERIAL **20/30 Sand**

BOREHOLE DIAMETER **4.00 inches** DRILLING CONTRACTOR **Nutting Engineers**

SUBSURFACE MATERIAL AT FILTER ZONE **Sand with silt, trace of clay, very fine, gray**

NOTES **Drilling fluid: bentonite; groundwater depth is obtained from constant head permeability test; development duration: pumped until free of visible sediments**



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South Florida Water Management District	ARCADIS	WELL INSTALLATION RECORD	PALM BEACH COUNTY, FL

WELL INSTALLATION RECORD

JOB NAME **Mecca Flow Equalization Basin** JOB NUMBER **WF0MECCA.0DDR**

WELL# **MFEB4-GW1** BORING# **MFEBBH12** INSTALLATION DATE **8/28/2015**

LOCATION (FL State Plane, East Zone, NAD83) **N26°50'01.51" E80°17'32.2"** TOP OF CASING (TOC) ELEVATION **26.21 feet NAVD88**

RISER/SCREEN MATERIAL **2-inch diameter PVC** GROUNDWATER DEPTH **7.18 feet below top of casing (btoc)**

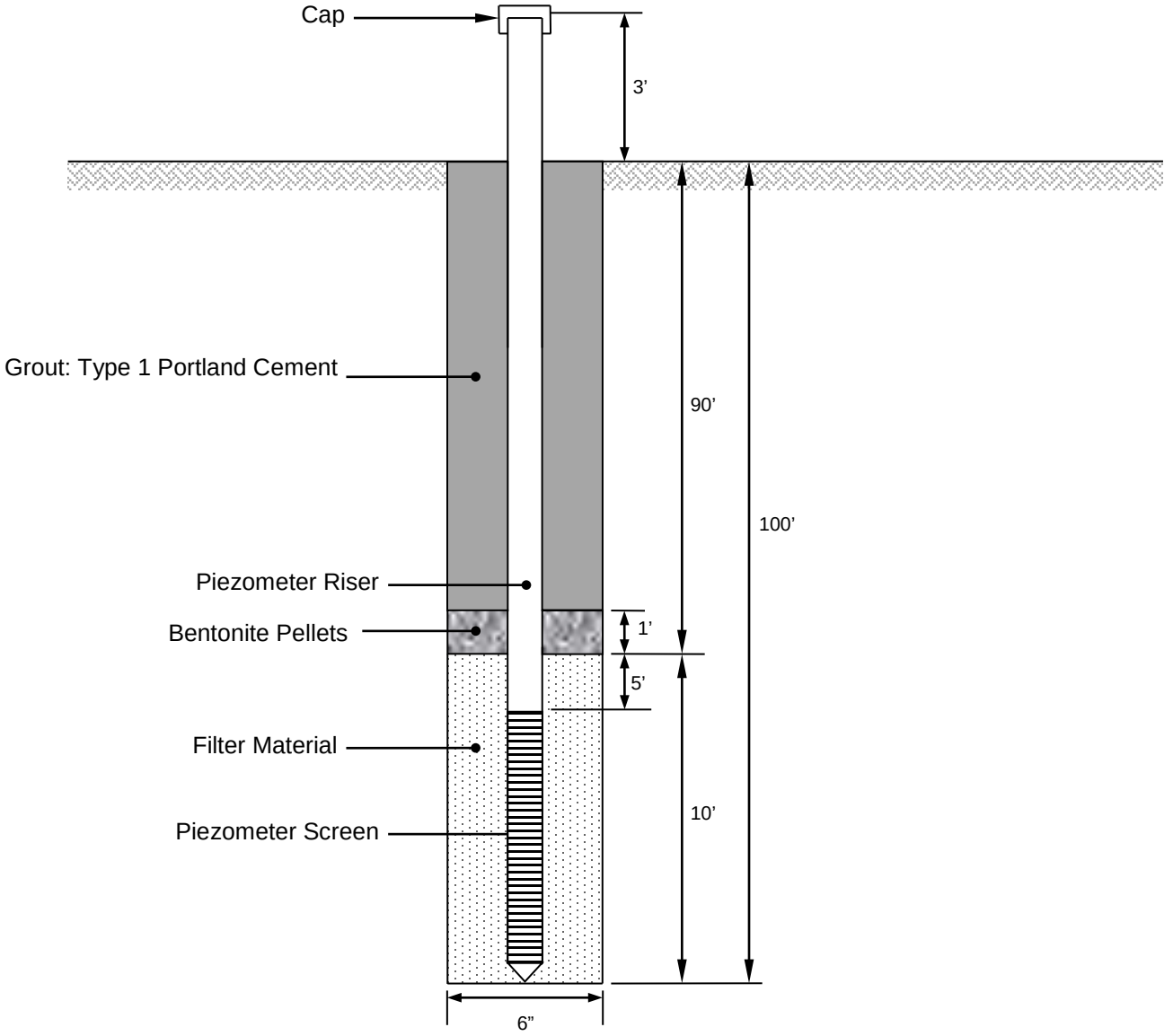
SCREEN SLOT SIZE **0.010 inch** GROUNDWATER ELEVATION **19.03 feet NAVD88**

DRILLING METHOD **Mud Rotary** FILTER MATERIAL **20/30 Sand**

BOREHOLE DIAMETER **6.00 inches** DRILLING CONTRACTOR **Nutting Engineers**

SUBSURFACE MATERIAL AT FILTER ZONE **Sand with silt and some limestone fragments, fine, dense, light gray**

NOTES **Drilling fluid: bentonite; groundwater depth is obtained from constant head permeability test; development duration: pumped until free of visible sediments**



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South Florida Water Management District	ARCADIS	WELL INSTALLATION RECORD	PALM BEACH COUNTY, FL

WELL INSTALLATION RECORD

JOB NAME **Mecca Flow Equalization Basin** JOB NUMBER **WF0MECCA.0DDR**

WELL# **MFEB4-GW2** BORING# **MFEBBH12** INSTALLATION DATE **8/28/2015**

LOCATION (FL State Plane, East Zone, NAD83) **N26°50'01.4" E80°17'32.2"** TOP OF CASING (TOC) ELEVATION **25.97 feet NAVD88**

RISER/SCREEN MATERIAL **2-inch diameter PVC** GROUNDWATER DEPTH **7.16 feet below top of casing (btoc)**

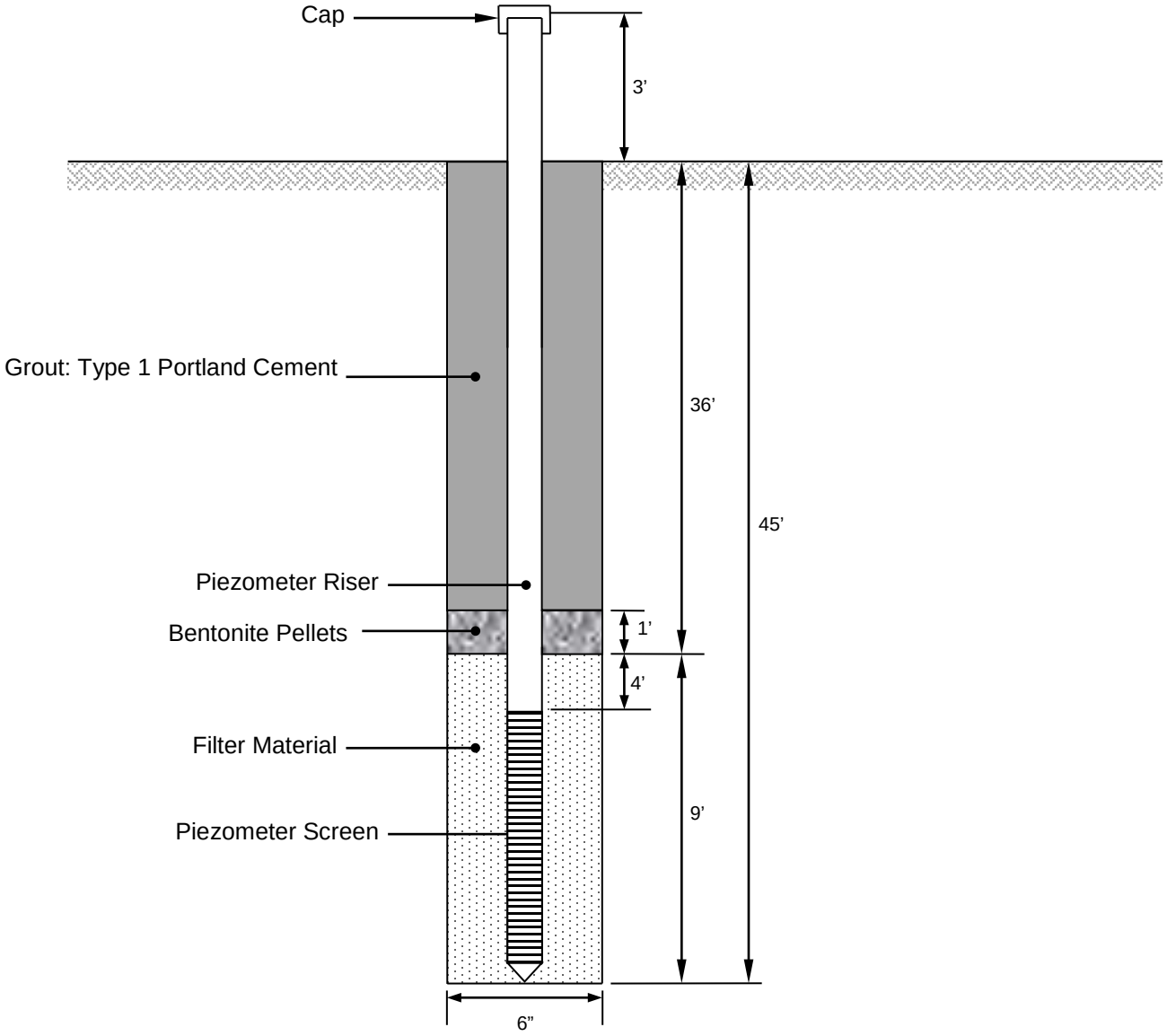
SCREEN SLOT SIZE **0.010 inch** GROUNDWATER ELEVATION **18.81 feet NAVD88**

DRILLING METHOD **Mud Rotary** FILTER MATERIAL **20/30 Sand**

BOREHOLE DIAMETER **6.00 inches** DRILLING CONTRACTOR **Nutting Engineers**

SUBSURFACE MATERIAL AT FILTER ZONE **Sand with silt, light gray**

NOTES **Drilling fluid: bentonite; groundwater depth is obtained from constant head permeability test; development duration: pumped until free of visible sediments**



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South Florida Water Management District	ARCADIS	WELL INSTALLATION RECORD	PALM BEACH COUNTY, FL

WELL INSTALLATION RECORD

JOB NAME **Mecca Flow Equalization Basin** JOB NUMBER **WF0MECCA.0DDR**

WELL# **MFEB4-GW3** BORING# **MFEBBH12** INSTALLATION DATE **8/28/2015**

LOCATION (FL State Plane, East Zone, NAD83) **N26°50'01.3" E80°17'32.1"** TOP OF CASING (TOC) ELEVATION **25.75 feet NAVD88**

RISER/SCREEN MATERIAL **2-inch diameter PVC** GROUNDWATER DEPTH **6.75 feet below top of casing (btoc)**

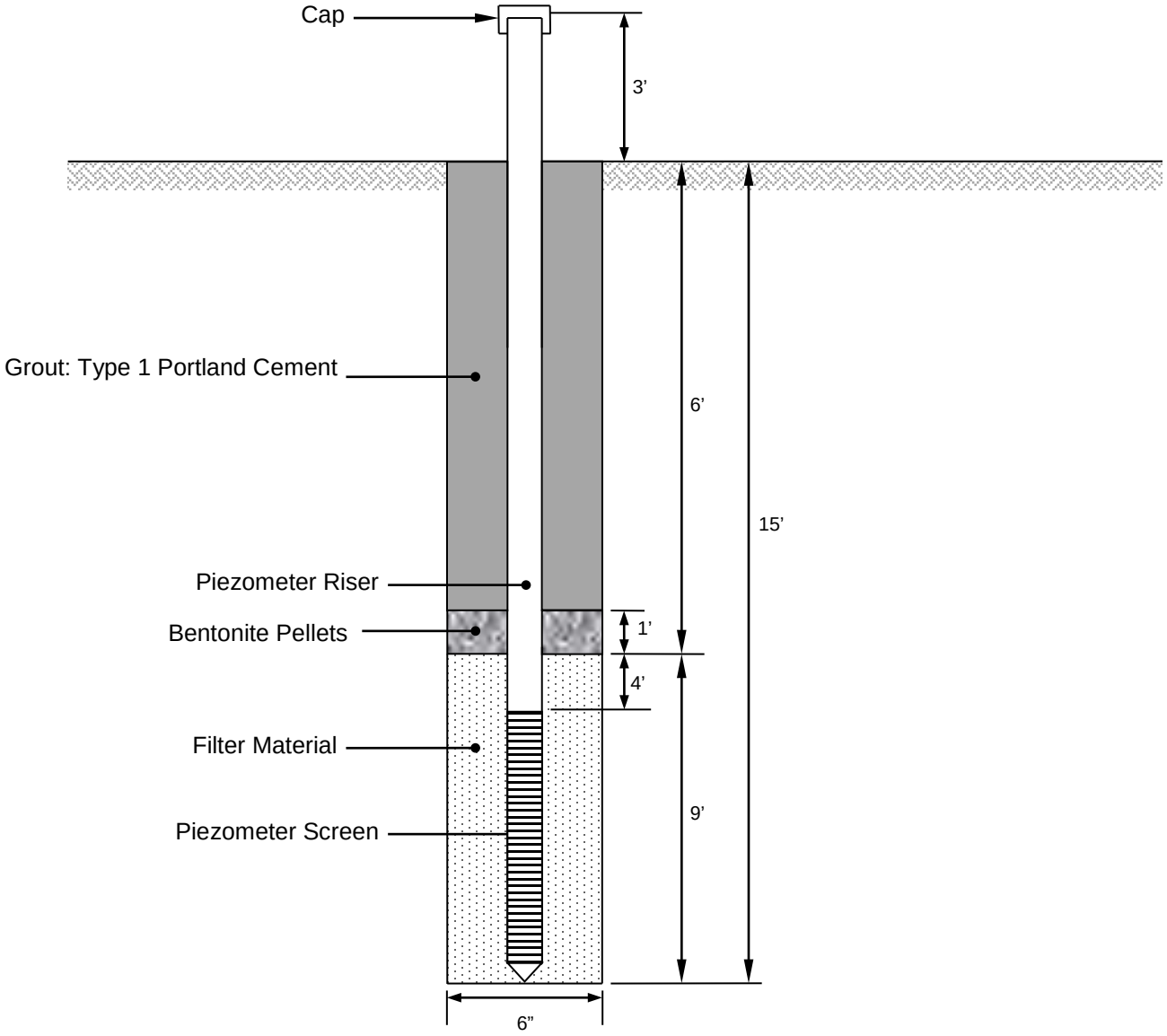
SCREEN SLOT SIZE **0.010 inch** GROUNDWATER ELEVATION **19.00 feet NAVD88**

DRILLING METHOD **Mud Rotary** FILTER MATERIAL **20/30 Sand**

BOREHOLE DIAMETER **6.00 inches** DRILLING CONTRACTOR **Nutting Engineers**

SUBSURFACE MATERIAL AT FILTER ZONE **Sand with silt, cemented, fine, gray**

NOTES **Drilling fluid: bentonite; groundwater depth is obtained from constant head permeability test; development duration: pumped until free of visible sediments**



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South Florida Water Management District	ARCADIS	WELL INSTALLATION RECORD	PALM BEACH COUNTY, FL

WELL INSTALLATION RECORD

JOB NAME **Mecca Flow Equalization Basin** JOB NUMBER **WF0MECCA.0DDR**

WELL# **MFEB5-GW1** BORING# **MFEBBH17** INSTALLATION DATE **8/5/2015**

LOCATION (FL State Plane, East Zone, NAD83) **N26°50'09.5" E80°16'50.8"** TOP OF CASING (TOC) ELEVATION **25.75 feet NAVD88**

RISER/SCREEN MATERIAL **2-inch diameter PVC** GROUNDWATER DEPTH **7.85 feet below top of casing (btoc)**

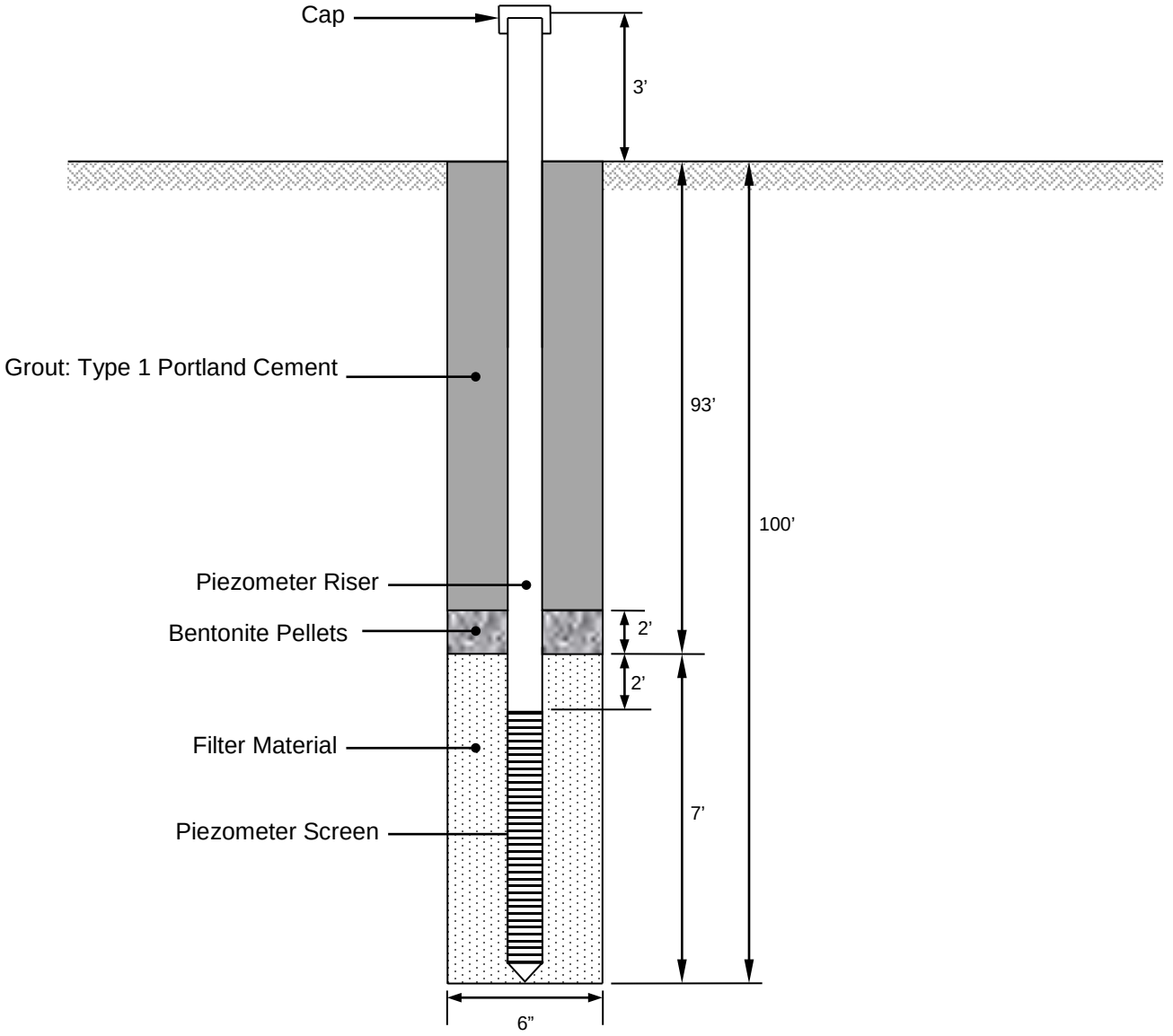
SCREEN SLOT SIZE **0.010 inch** GROUNDWATER ELEVATION **17.90 feet NAVD88**

DRILLING METHOD **Mud Rotary** FILTER MATERIAL **20/30 Sand**

BOREHOLE DIAMETER **6.00 inches** DRILLING CONTRACTOR **Nutting Engineers**

SUBSURFACE MATERIAL AT FILTER ZONE **Sand with silt and numerous shell fragments and some coral fragments, fine, cemented**

NOTES **Drilling fluid: bentonite - high yield; fluid loss during drilling: < 10 gallons; groundwater depth is obtained from constant head permeability test; development duration: pumped until free of visible sediments**



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South Florida Water Management District	ARCADIS	WELL INSTALLATION RECORD	PALM BEACH COUNTY, FL

WELL INSTALLATION RECORD

JOB NAME **Mecca Flow Equalization Basin** JOB NUMBER **WF0MECCA.0DDR**

WELL# **MFEB5-GW2** BORING# **MFEBBH17** INSTALLATION DATE **8/6/2015**

LOCATION (FL State Plane, East Zone, NAD83) **N26°50'09.6" E80°16'50.7"** TOP OF CASING (TOC) ELEVATION **25.72 feet NAVD88**

RISER/SCREEN MATERIAL **2-inch diameter PVC** GROUNDWATER DEPTH **7.54 feet below top of casing (btoc)**

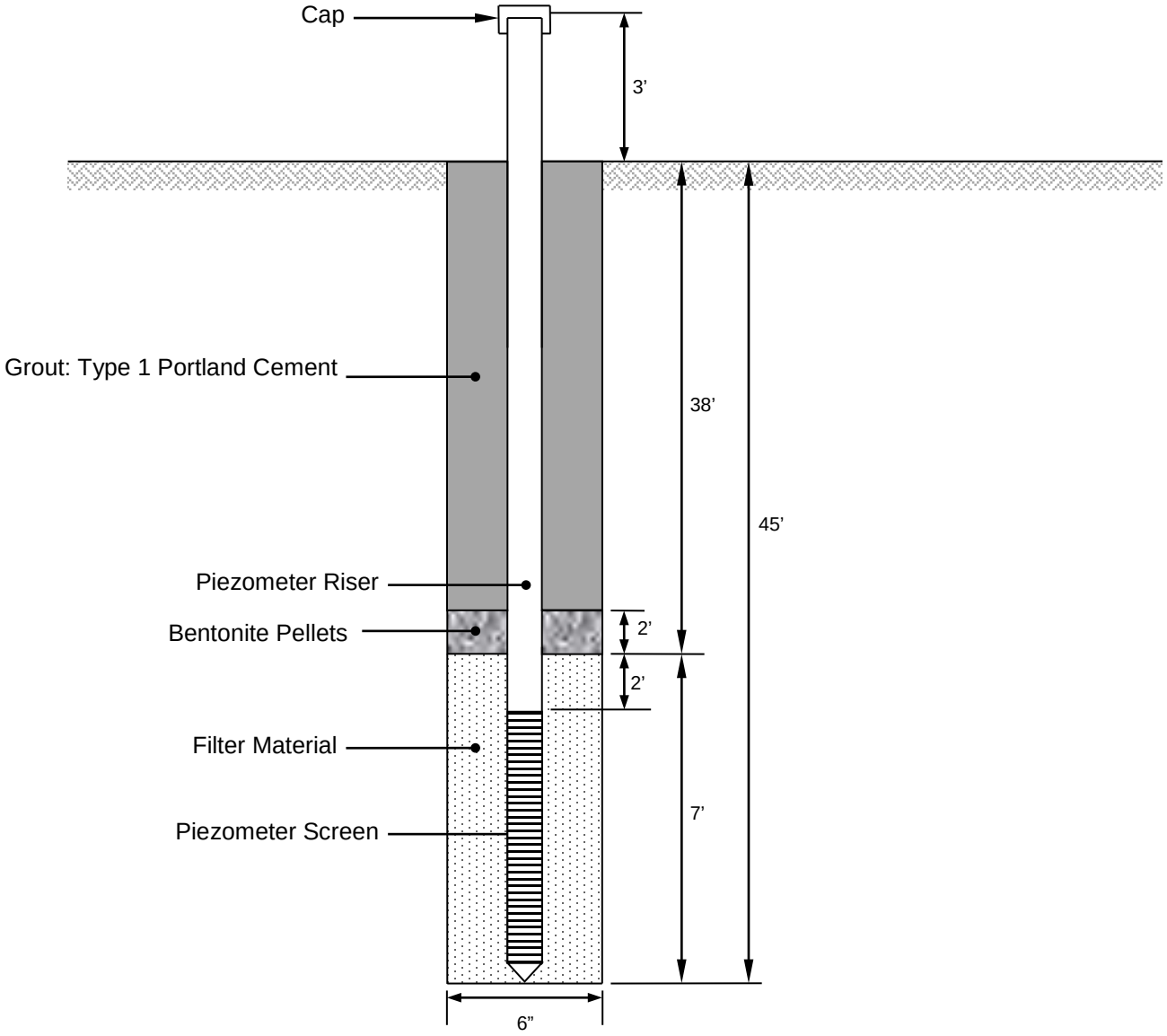
SCREEN SLOT SIZE **0.010 inch** GROUNDWATER ELEVATION **18.18 feet NAVD88**

DRILLING METHOD **Mud Rotary** FILTER MATERIAL **20/30 Sand**

BOREHOLE DIAMETER **6.00 inches** DRILLING CONTRACTOR **Nutting Engineers**

SUBSURFACE MATERIAL AT FILTER ZONE **Sand with silt and shell fragments, fine to very fine, medium dense, gray**

NOTES **Drilling fluid: bentonite - high yield; groundwater depth is obtained from constant head permeability test; development duration: pumped until free of visible sediments**



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South Florida Water Management District	ARCADIS	WELL INSTALLATION RECORD	PALM BEACH COUNTY, FL

WELL INSTALLATION RECORD

JOB NAME **Mecca Flow Equalization Basin** JOB NUMBER **WF0MECCA.0DDR**

WELL# **MFEB5-GW3** BORING# **MFEBBH17** INSTALLATION DATE **8/6/2015**

LOCATION (FL State Plane, East Zone, NAD83) **N26°50'09.5" E80°16'50.7"** TOP OF CASING (TOC) ELEVATION **26.04 feet NAVD88**

RISER/SCREEN MATERIAL **2-inch diameter PVC** GROUNDWATER DEPTH **7.25 feet below top of casing (btoc)**

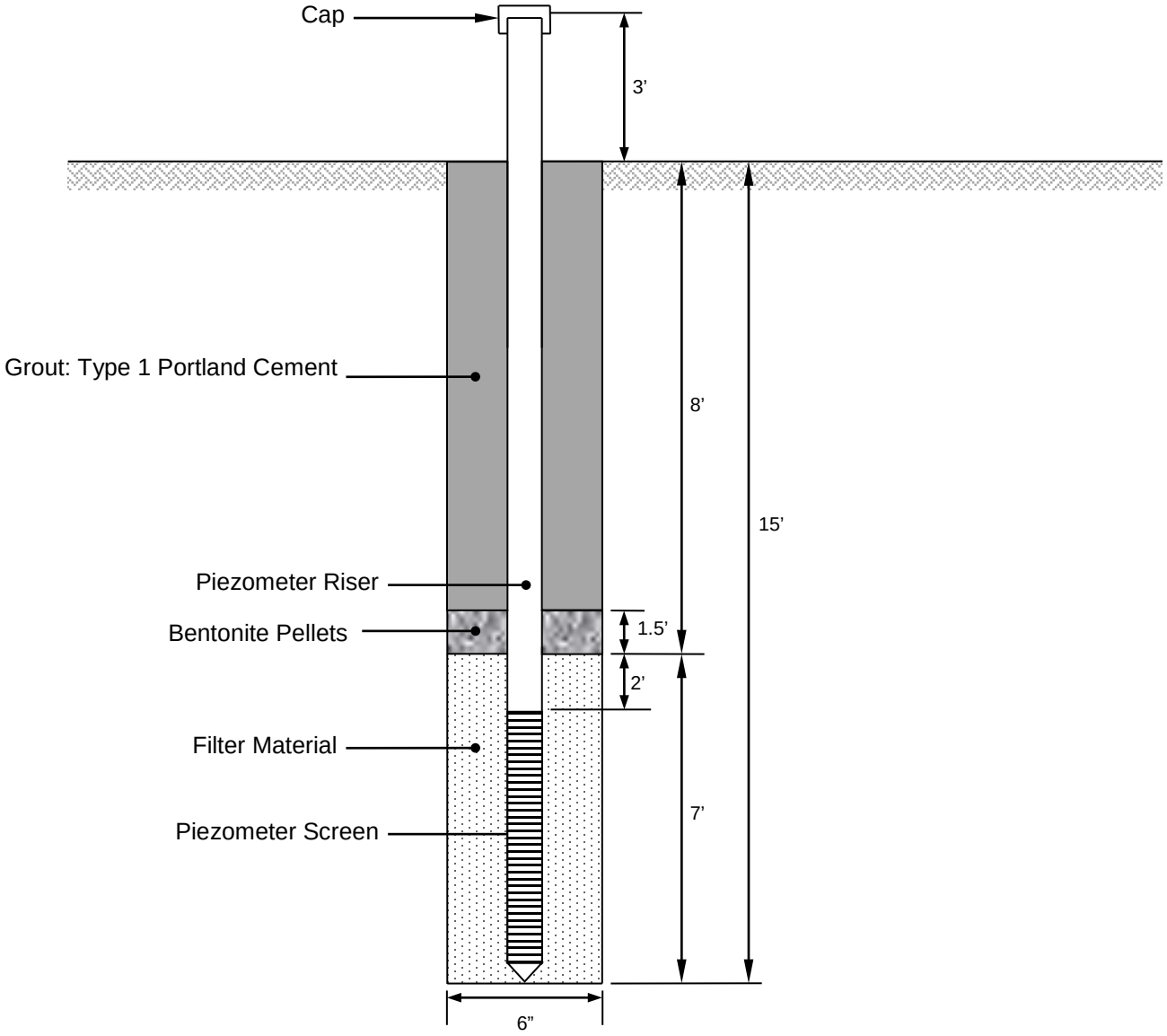
SCREEN SLOT SIZE **0.010 inch** GROUNDWATER ELEVATION **18.79 feet NAVD88**

DRILLING METHOD **Mud Rotary** FILTER MATERIAL **20/30 Sand**

BOREHOLE DIAMETER **6.00 inches** DRILLING CONTRACTOR **Nutting Engineers**

SUBSURFACE MATERIAL AT FILTER ZONE **Sand with clay, gray**

NOTES **Drilling fluid: bentonite - high yield; groundwater depth is obtained from constant head permeability test; development duration: pumped until free of visible sediments**



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South Florida Water Management District	ARCADIS	WELL INSTALLATION RECORD	PALM BEACH COUNTY, FL

WELL INSTALLATION RECORD

JOB NAME **Mecca Flow Equalization Basin** JOB NUMBER **WF0MECCA.0DDR**

WELL# **MFEB6-GW1** BORING# **MFEBBH22** INSTALLATION DATE **8/24/2015**

LOCATION (FL State Plane, East Zone, NAD83) **N26°52'06.4" E80°16'49.8"** TOP OF CASING (TOC) ELEVATION **23.5 feet NAVD88**

RISER/SCREEN MATERIAL **2-inch diameter PVC** GROUNDWATER DEPTH **3.20 feet below top of casing (btoc)**

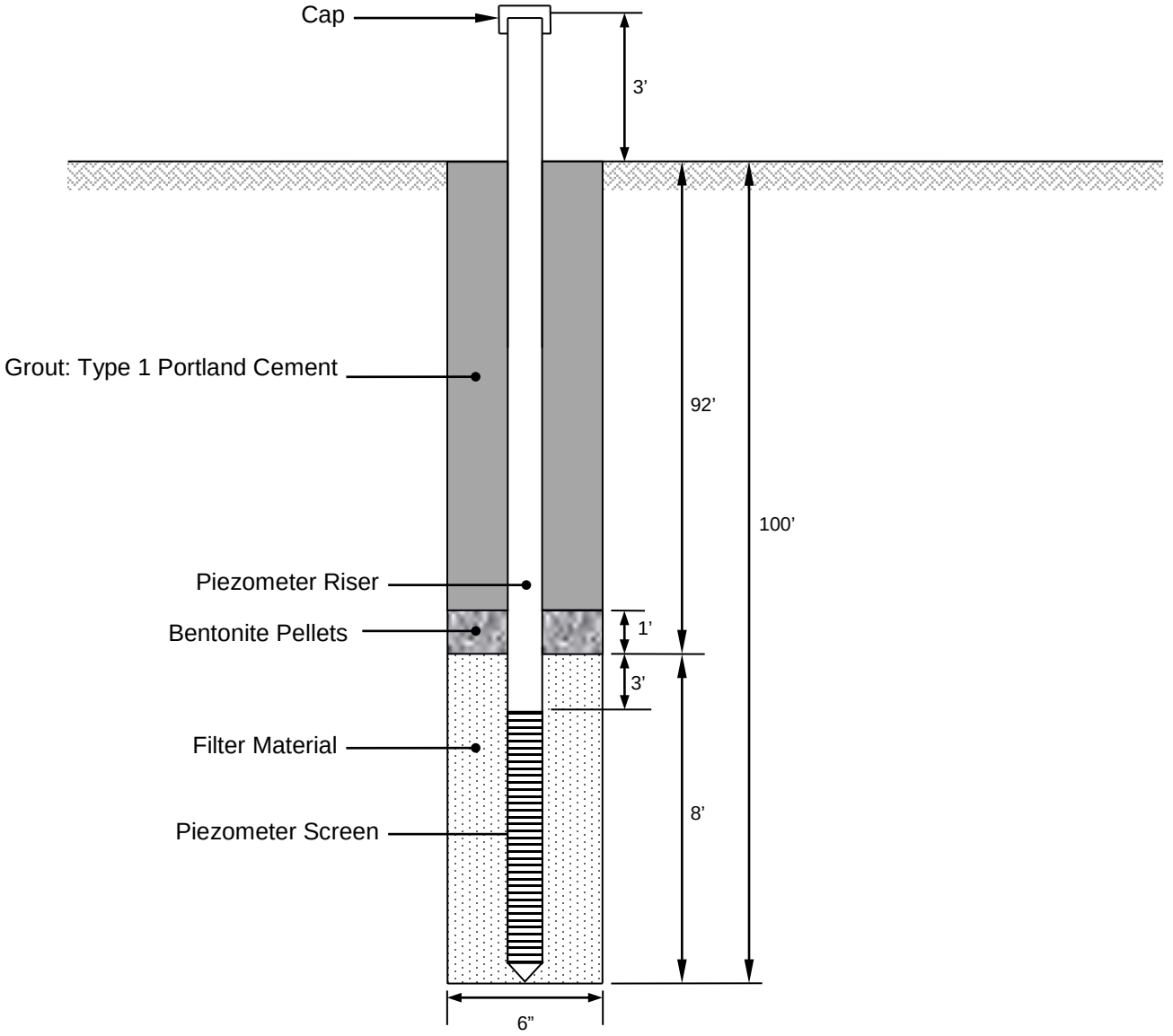
SCREEN SLOT SIZE **0.010 inch** GROUNDWATER ELEVATION **20.30 feet NAVD88**

DRILLING METHOD **Mud Rotary/Standard Penetration Test** FILTER MATERIAL **20/30 Sand**

BOREHOLE DIAMETER **6.00 inches** DRILLING CONTRACTOR **Nutting Engineers**

SUBSURFACE MATERIAL AT FILTER ZONE **Sand with silt and fine to coarse shell fragments, fine to medium, gray**

NOTES **Drilling fluid: bentonite; fluid loss during drilling: 100 gallons; centralizers: 94, 74, 54, 34, 14 feet; groundwater depth is obtained from constant head permeability test; development duration: pumped until free of visible sediments**



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South Florida Water Management District	ARCADIS	WELL INSTALLATION RECORD	PALM BEACH COUNTY, FL

WELL INSTALLATION RECORD

JOB NAME **Mecca Flow Equalization Basin** JOB NUMBER **WF0MECCA.0DDR**

WELL# **MFEB6-GW2** BORING# **MFEBBH22** INSTALLATION DATE **8/17/2015**

LOCATION (FL State Plane, East Zone, NAD83) **N26°52'06.4" E80°16'49.7"** TOP OF CASING (TOC) ELEVATION **23.31 feet NAVD88**

RISER/SCREEN MATERIAL **2-inch diameter PVC** GROUNDWATER DEPTH **2.45 feet below top of casing (btoc)**

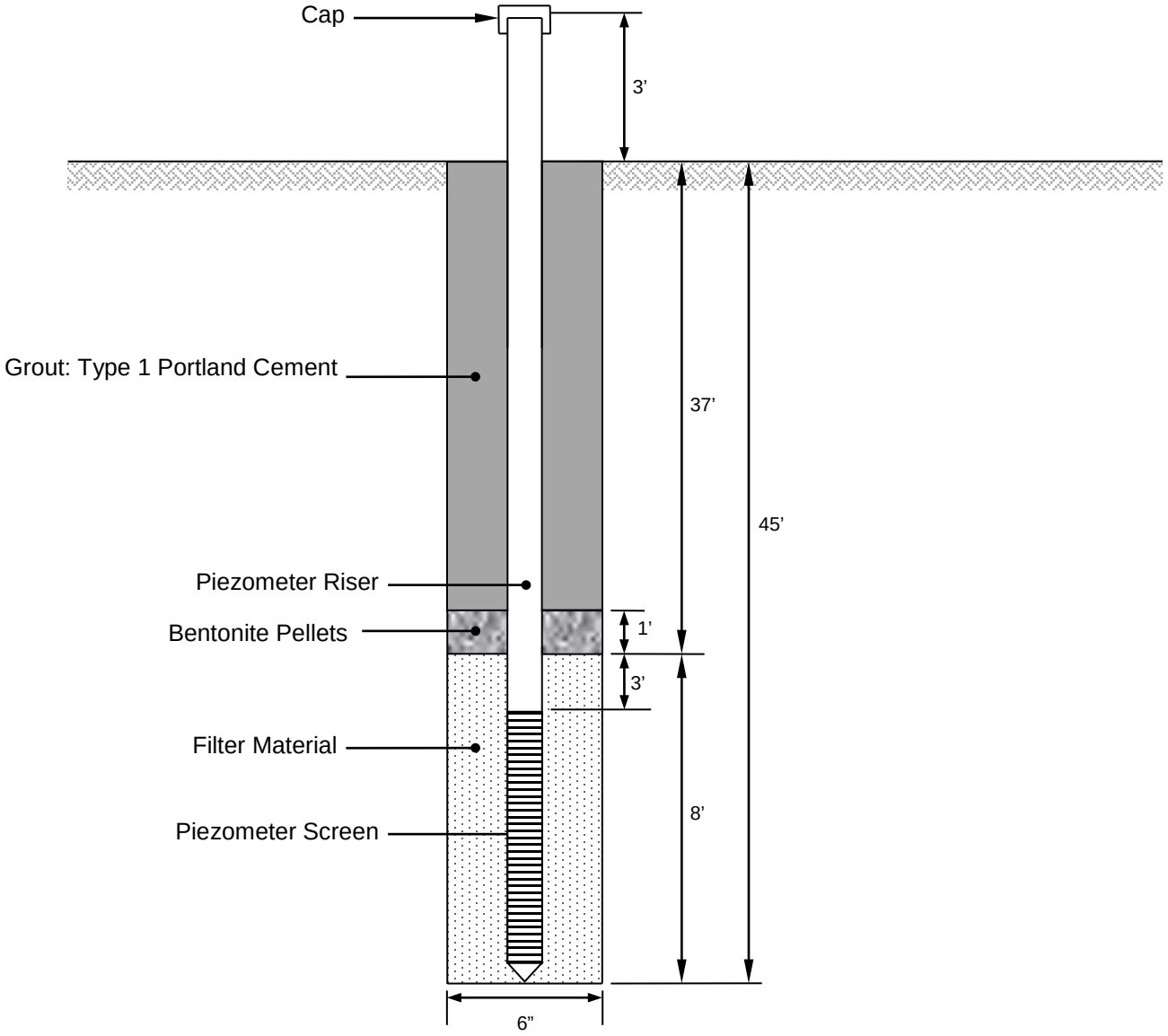
SCREEN SLOT SIZE **0.010 inch** GROUNDWATER ELEVATION **20.86 feet NAVD88**

DRILLING METHOD **Mud Rotary** FILTER MATERIAL **20/30 Sand**

BOREHOLE DIAMETER **6.00 inches** DRILLING CONTRACTOR **Nutting Engineers**

SUBSURFACE MATERIAL AT FILTER ZONE **Sand with silt, very fine, gray; with cemented sand and limestone, friable, well indurated**

NOTES **Drilling fluid: bentonite-high yield; fluid loss during drilling: 50 gallons; groundwater depth is obtained from constant head permeability test; development duration: pumped until free of visible sediments**



"NOT TO SCALE"

South Florida Water Management District	ARCADIS	WELL INSTALLATION RECORD	PALM BEACH COUNTY, FL

WELL INSTALLATION RECORD

JOB NAME **Mecca Flow Equalization Basin** JOB NUMBER **WF0MECCA.0DDR**

WELL# **MFEB6-GW3** BORING# **MFEBBH22** INSTALLATION DATE **8/25/2015**

LOCATION (FL State Plane, East Zone, NAD83) **N26°52'06.5" E80°16'49.8"** TOP OF CASING (TOC) ELEVATION **23.47 feet NAVD88**

RISER/SCREEN MATERIAL **2-inch diameter PVC** GROUNDWATER DEPTH **2.58 feet below top of casing (btoc)**

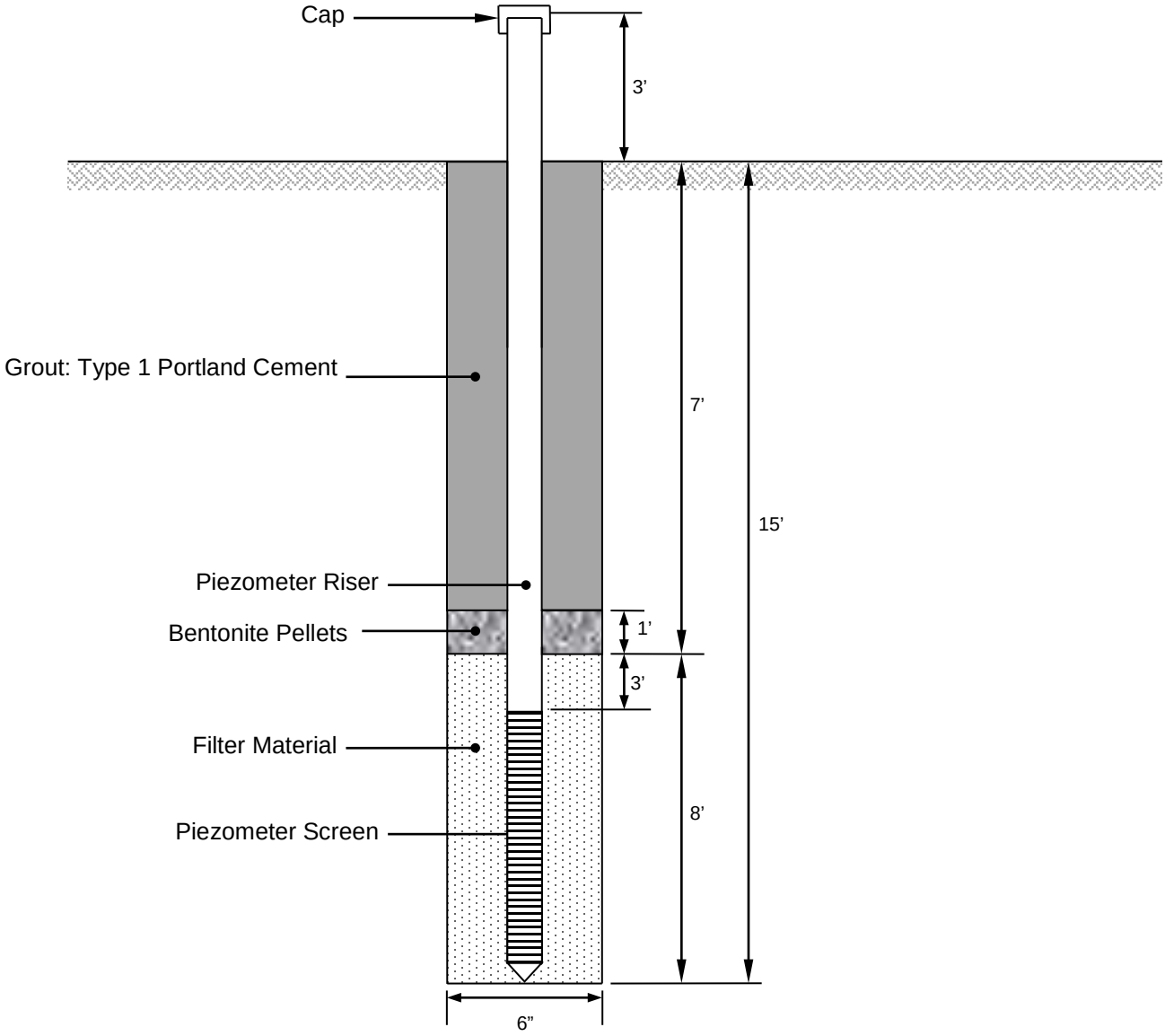
SCREEN SLOT SIZE **0.010 inch** GROUNDWATER ELEVATION **20.89 feet NAVD88**

DRILLING METHOD **Mud Rotary** FILTER MATERIAL **20/30 Sand**

BOREHOLE DIAMETER **6.00 inches** DRILLING CONTRACTOR **Nutting Engineers**

SUBSURFACE MATERIAL AT FILTER ZONE **Sand with clay and traces of shell, very fine, gray**

NOTES **Drilling fluid: bentonite - high yield; groundwater depth is obtained from constant head permeability test; development duration: pumped until free of visible sediments**



"NOT TO SCALE"

South Florida Water Management District	ARCADIS	WELL INSTALLATION RECORD	PALM BEACH COUNTY, FL

WELL INSTALLATION RECORD

JOB NAME **Mecca Flow Equalization Basin** JOB NUMBER **WF0MECCA.0DDR**

WELL# **MFEB7-GW1** BORING# **MFEBBH23** INSTALLATION DATE **10/28/2015**

LOCATION (FL State Plane, East Zone, NAD83) **N26°50'28.7" E80°14'37.4"** TOP OF CASING (TOC) ELEVATION **22.46 feet NAVD88**

RISER/SCREEN MATERIAL **2-inch diameter PVC** GROUNDWATER DEPTH **5.40 feet below top of casing (btoc)**

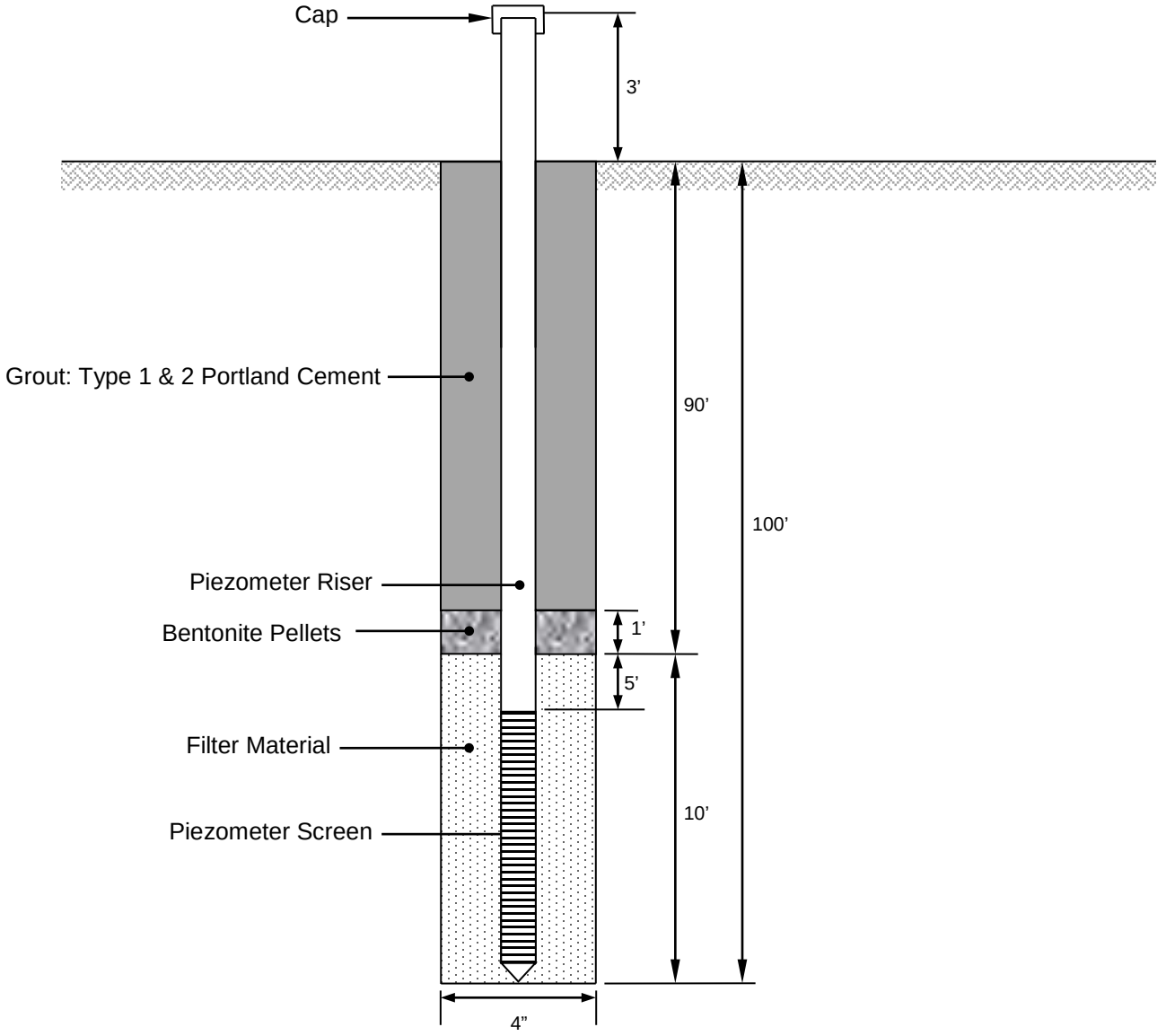
SCREEN SLOT SIZE **0.010 inch** GROUNDWATER ELEVATION **17.06 feet NAVD88**

DRILLING METHOD **Mud Rotary** FILTER MATERIAL **20/30 Sand**

BOREHOLE DIAMETER **4.00 inches** DRILLING CONTRACTOR **Nutting Engineers**

SUBSURFACE MATERIAL AT FILTER ZONE **Sand with silt and abundant fine shells, fine to very fine, dark gray**

NOTES **Drilling fluid: bentonite; groundwater depth is obtained from constant head permeability test; development duration: pumped until free of visible sediments**



"NOT TO SCALE"

South Florida Water Management District	ARCADIS	WELL INSTALLATION RECORD	PALM BEACH COUNTY, FL

WELL INSTALLATION RECORD

JOB NAME **Mecca Flow Equalization Basin** JOB NUMBER **WF0MECCA.0DDR**

WELL# **MFEB7-GW2** BORING# **MFEBBH23** INSTALLATION DATE **10/26/2015**

LOCATION (FL State Plane, East Zone, NAD83) **N26°50'28.6" E80°14'37.4"** TOP OF CASING (TOC) ELEVATION **22.49 feet NAVD88**

RISER/SCREEN MATERIAL **2-inch diameter PVC** GROUNDWATER DEPTH **5.38 feet below top of casing (btoc)**

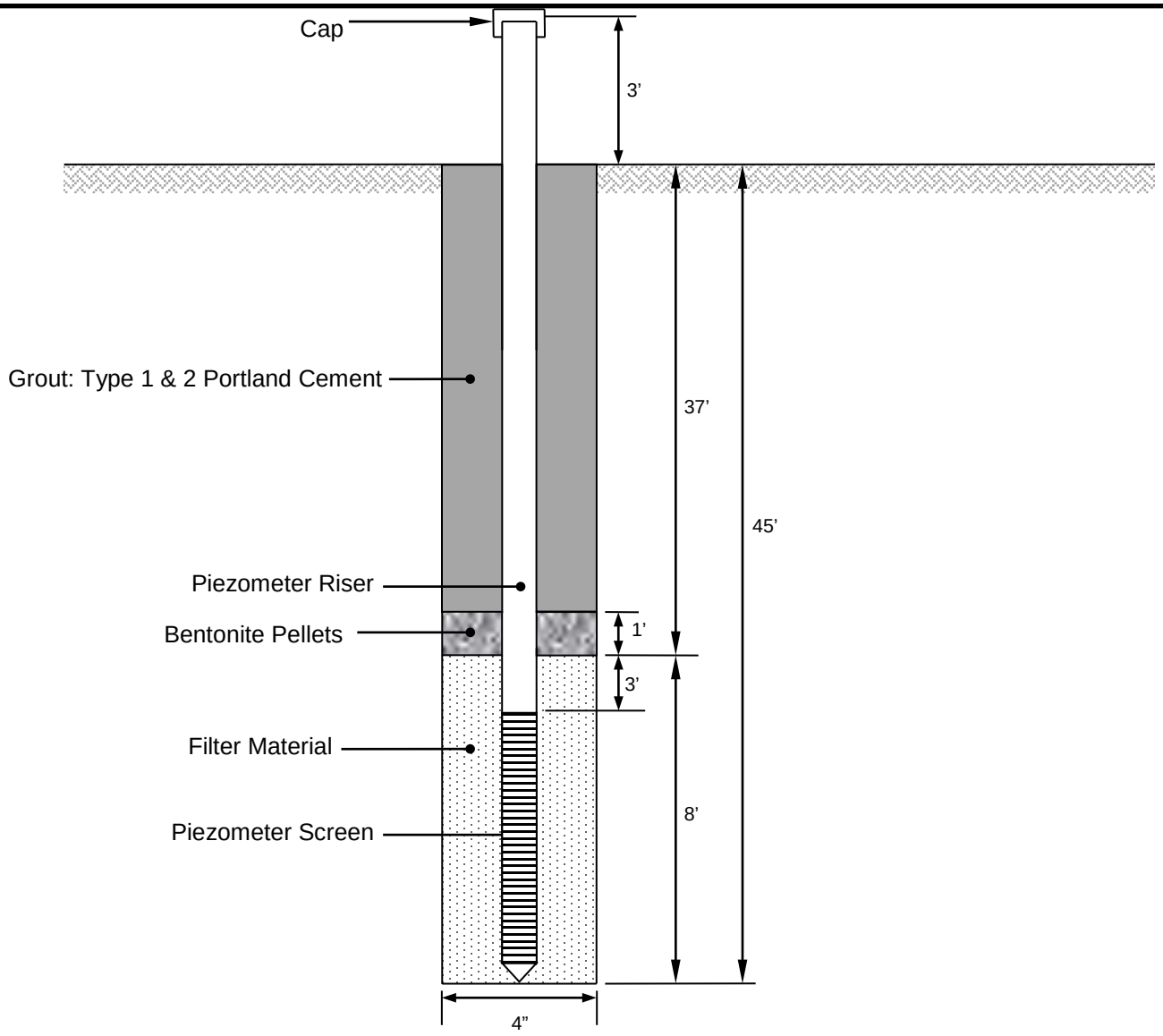
SCREEN SLOT SIZE **0.010 inch** GROUNDWATER ELEVATION **17.11 feet NAVD88**

DRILLING METHOD **Mud Rotary** FILTER MATERIAL **20/30 Sand**

BOREHOLE DIAMETER **4.00 inches** DRILLING CONTRACTOR **Nutting Engineers**

SUBSURFACE MATERIAL AT FILTER ZONE **Limestone, indurated, vuggy, gray (40 feet to 42 feet); sand with some limestone fragments very fine, brown (42 feet to 45 feet)**

NOTES **Drilling fluid: bentonite; groundwater depth is obtained from constant head permeability test; development duration: pumped until free of visible sediments**



"NOT TO SCALE"

South Florida Water Management District	ARCADIS	WELL INSTALLATION RECORD	PALM BEACH COUNTY, FL

WELL INSTALLATION RECORD

JOB NAME **Mecca Flow Equalization Basin** JOB NUMBER **WF0MECCA.0DDR**

WELL# **MFEB7-GW3** BORING# **MFEBBH23** INSTALLATION DATE **10/29/2015**

LOCATION (FL State Plane, East Zone, NAD83) **N26°50'28.5" E80°14'37.5"** TOP OF CASING (TOC) ELEVATION **22.30 feet NAVD88**

RISER/SCREEN MATERIAL **2-inch diameter PVC** GROUNDWATER DEPTH **5.72 feet below top of casing (btoc)**

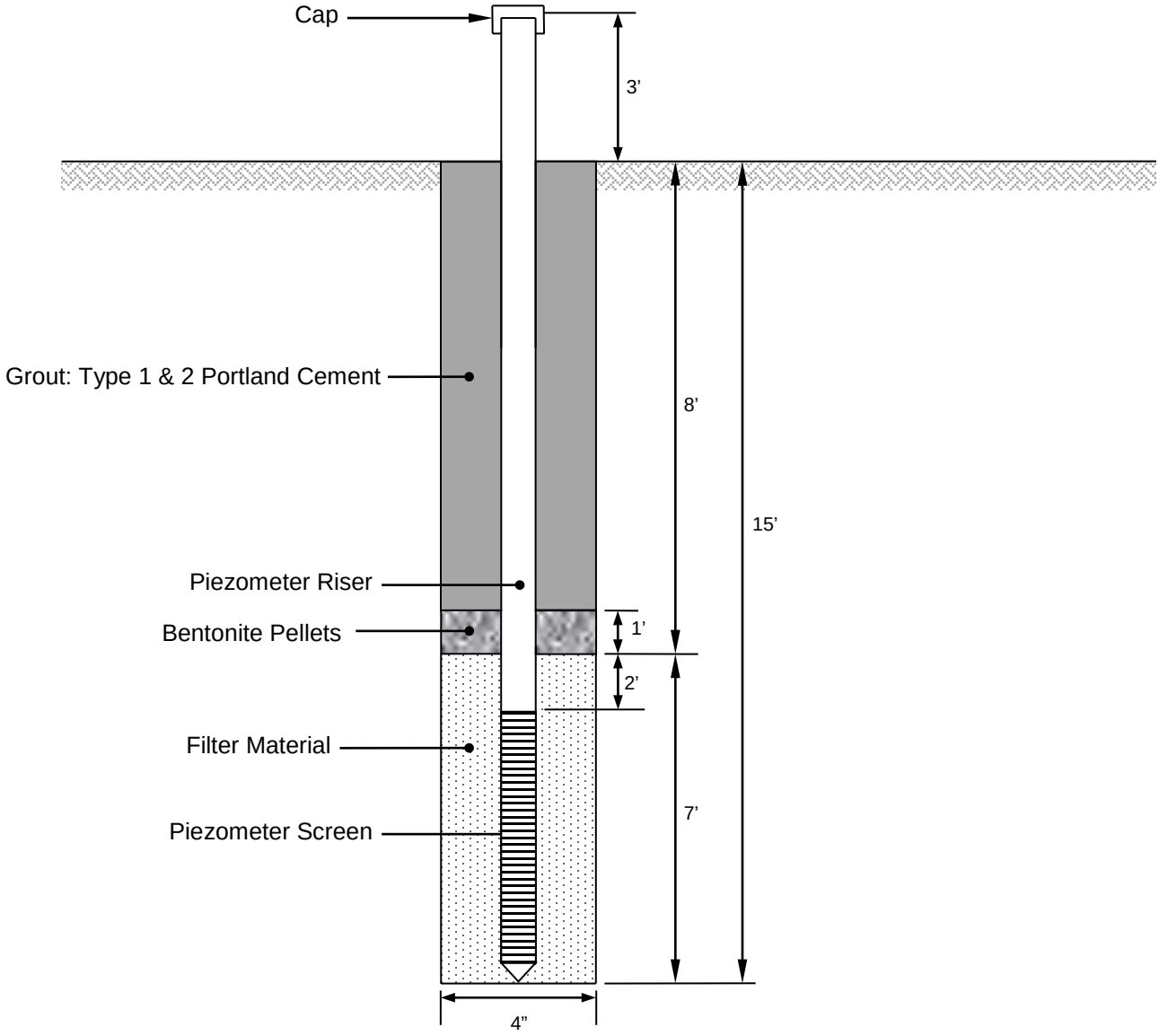
SCREEN SLOT SIZE **0.010 inch** GROUNDWATER ELEVATION **16.58 feet NAVD88**

DRILLING METHOD **Mud Rotary** FILTER MATERIAL **20/30 Sand**

BOREHOLE DIAMETER **4.00 inches** DRILLING CONTRACTOR **Nutting Engineers**

SUBSURFACE MATERIAL AT FILTER ZONE **Sand with silt and some organics, very fine, dark grayish brown**

NOTES **Drilling fluid: bentonite; groundwater depth is obtained from constant head permeability test; development duration: pumped until free of visible sediments**



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South Florida Water Management District	ARCADIS	WELL INSTALLATION RECORD	PALM BEACH COUNTY, FL

WELL INSTALLATION RECORD

JOB NAME **Mecca Flow Equalization Basin** JOB NUMBER **WF0MECCA.0DDR**

WELL# **MFEB8-GW1** BORING# **MFEBBH24** INSTALLATION DATE **10/7/2015**

LOCATION (FL State Plane, East Zone, NAD83) **N26°48'42.6" E80°16'55.0"** TOP OF CASING (TOC) ELEVATION **23.47 feet NAVD88**

RISER/SCREEN MATERIAL **2-inch diameter PVC** GROUNDWATER DEPTH **7.10 feet below top of casing (btoc)**

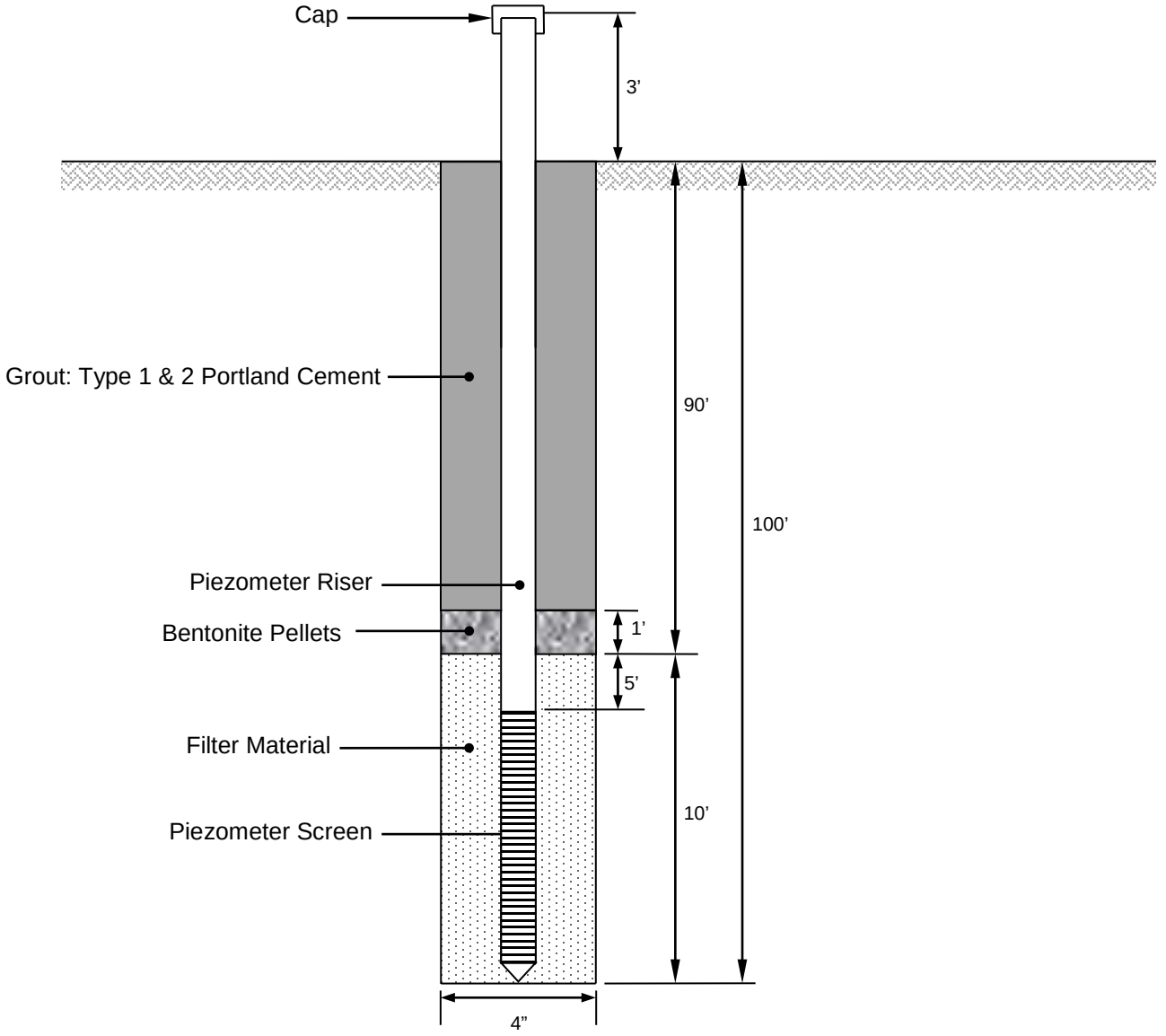
SCREEN SLOT SIZE **0.010 inch** GROUNDWATER ELEVATION **16.37 feet NAVD88**

DRILLING METHOD **Mud Rotary** FILTER MATERIAL **20/30 Sand**

BOREHOLE DIAMETER **4.00 inches** DRILLING CONTRACTOR **Nutting Engineers**

SUBSURFACE MATERIAL AT FILTER ZONE **Sand with silt and few shell fragments, fine to very fine, gray, slightly cemented**

NOTES **Drilling fluid: bentonite; fluid loss during drilling: 25 gallons; groundwater depth is obtained from constant head permeability test; development duration: pumped until free of visible sediments**



"NOT TO SCALE"

South Florida Water Management District	ARCADIS	WELL INSTALLATION RECORD	PALM BEACH COUNTY, FL

WELL INSTALLATION RECORD

JOB NAME **Mecca Flow Equalization Basin** JOB NUMBER **WF0MECCA.0DDR**

WELL# **MFEB8-GW2** BORING# **MFEBBH24** INSTALLATION DATE **10/2/2015**

LOCATION (FL State Plane, East Zone, NAD83) **N26°48'42.6" E80°16'55.0"** TOP OF CASING (TOC) ELEVATION **23.69 feet NAVD88**

RISER/SCREEN MATERIAL **2-inch diameter PVC** GROUNDWATER DEPTH **7.29 feet below top of casing (btoc)**

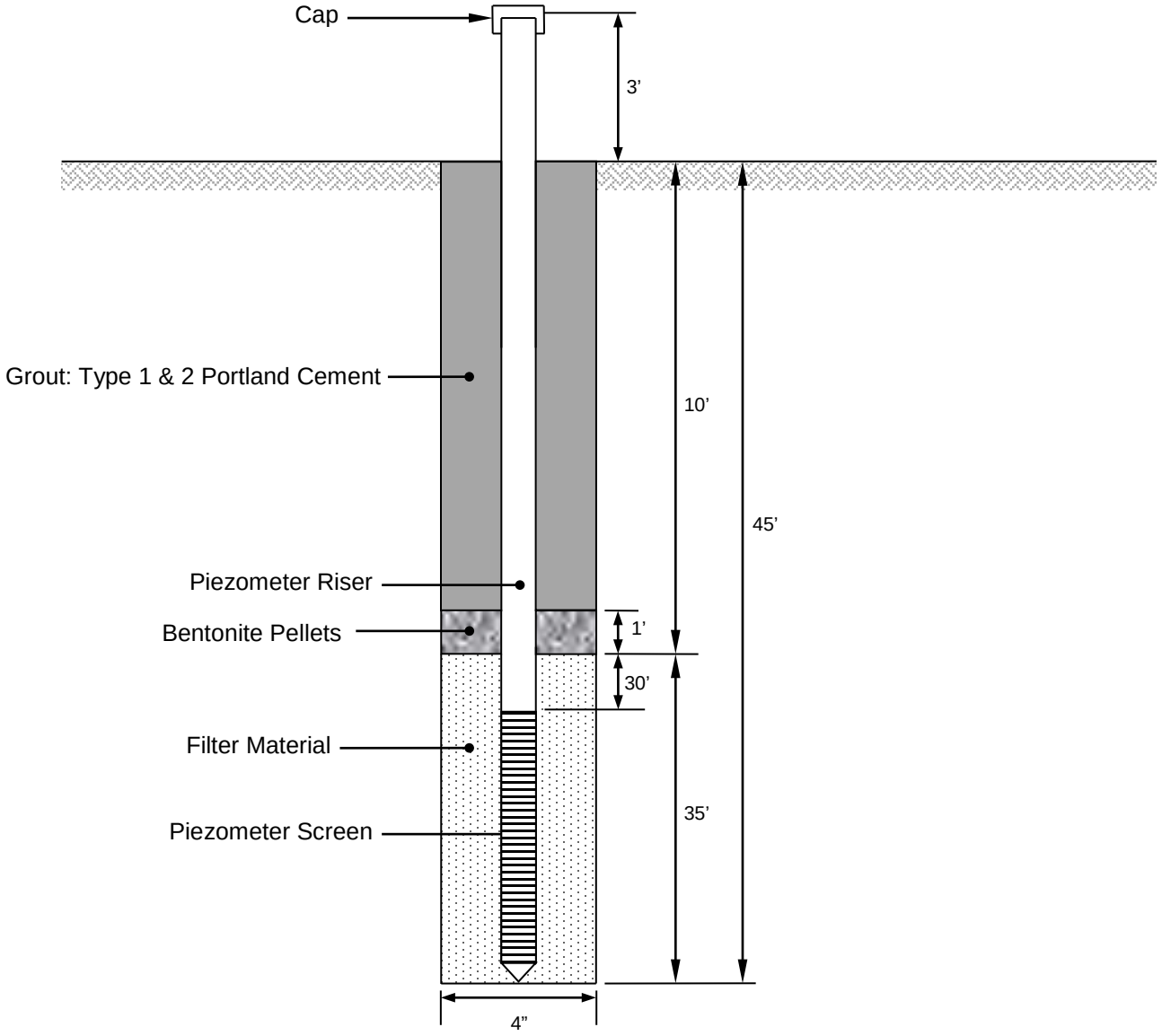
SCREEN SLOT SIZE **0.010 inch** GROUNDWATER ELEVATION **16.40 feet NAVD88**

DRILLING METHOD **Mud Rotary** FILTER MATERIAL **20/30 Sand**

BOREHOLE DIAMETER **4.00 inches** DRILLING CONTRACTOR **Nutting Engineers**

SUBSURFACE MATERIAL AT FILTER ZONE **Sand with silt and abundant coarse shell fragments**

NOTES **Drilling fluid: bentonite; fluid loss during drilling: 20 gallons; groundwater depth is obtained from constant head permeability test; development duration: pumped until free of visible sediments**



"NOT TO SCALE"

South Florida Water Management District	ARCADIS	WELL INSTALLATION RECORD	PALM BEACH COUNTY, FL

WELL INSTALLATION RECORD

JOB NAME **Mecca Flow Equalization Basin** JOB NUMBER **WF0MECCA.0DDR**

WELL# **MFEB8-GW3** BORING# **MFEBBH24** INSTALLATION DATE **10/2/2015**

LOCATION (FL State Plane, East Zone, NAD83) **N26°48'42.6" E80°16'54.9"** TOP OF CASING (TOC) ELEVATION **23.45 feet NAVD88**

RISER/SCREEN MATERIAL **2-inch diameter PVC** GROUNDWATER DEPTH **7.12 feet below top of casing (btoc)**

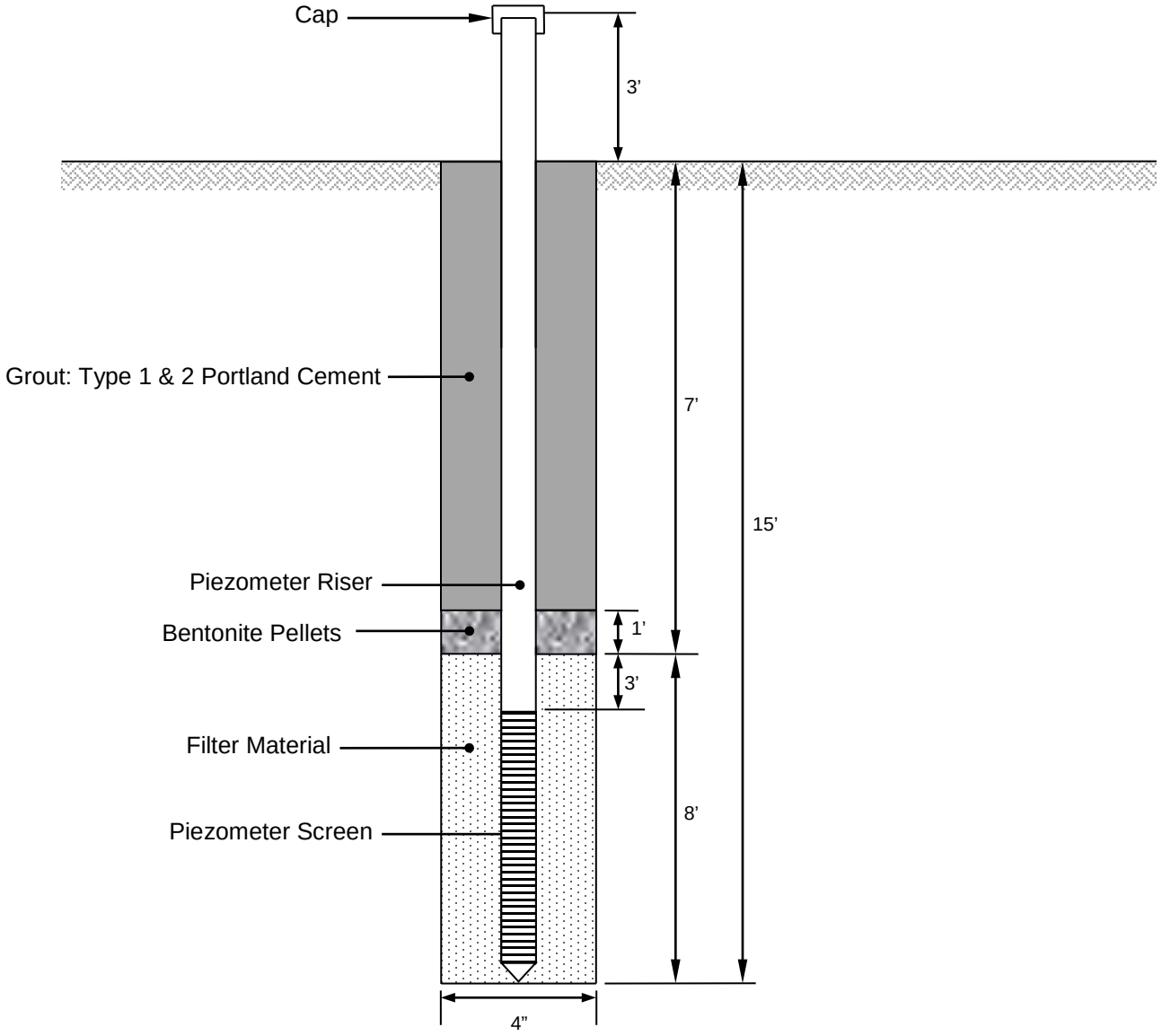
SCREEN SLOT SIZE **0.010 inch** GROUNDWATER ELEVATION **16.33 feet NAVD88**

DRILLING METHOD **Mud Rotary** FILTER MATERIAL **20/30 Sand**

BOREHOLE DIAMETER **4.00 inches** DRILLING CONTRACTOR **Nutting Engineers**

SUBSURFACE MATERIAL AT FILTER ZONE **Sand with clay, fine to very fine, light greenish gray (10 feet to 12 feet); sand with silt, fine to very fine, light grayish brown (12 feet to 15 feet)**

NOTES **Drilling fluid: bentonite; fluid loss during drilling: 20 gallons; groundwater depth is obtained from constant head permeability test; development duration: pumped until free of visible sediments**



"NOT TO SCALE"

South Florida Water Management District	ARCADIS	WELL INSTALLATION RECORD	PALM BEACH COUNTY, FL

APPENDIX C

Ground Water Monitoring Well Photographs

Photo 1: MFEB1-GW1, GW2 & GW3

Photo 2: MFEB2-GW1, GW2 & GW3

Photo 3: MFEB3-GW1, GW2 & GW3

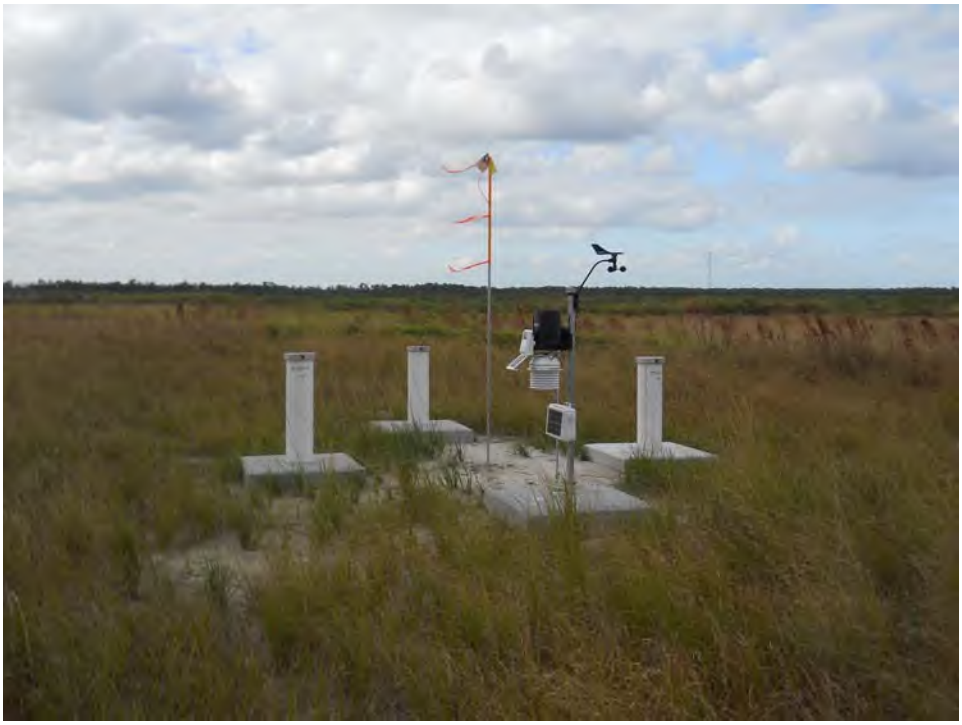


Photo 4: MFEB4-GW1, GW2 & GW3 & Weather Station

Photo 5: MFEB5-GW1, GW2 & GW3

Photo 6: MFEB6-GW1, GW2 & GW3

Photo 7: MFEB7-GW1, GW2 & GW3

Photo 8: MFEB8-GW1, GW2 & GW3

APPENDIX D

Ground Water Monitoring Data and Graphs

Site Worksheet

Site Name:	Mecca FEB	Arrival Time	01/08/16 0844
Sensor:	GW-1A / MFEB1-GW1	Departure Time	1/8/2016 0853
Tech:	M. Ott		
Initial RTU stage (NGVD29) Ft =	8.21	RTU stage time	10/19/15 1245
Reference Elevation (NGVD29) Ft =	34.05		
DTW (Distance To Water) Ft =	13.17	DTW time	1/08/16 0844
Stage Value (NGVD29) Ft =	20.88		
* Calibrated Value (NGVD29) Ft =	NA	Cable Length	25.84
** Lift Test Performed (Yes/No) =	Yes		

Notes: Reference Elevation from black well cap

1' = 0.4329 psi

* Sensor shall be calibrated to the measured stage value when there is a difference greater than +-.03 feet.

** Sensor should be lifted by 1 foot and Rtu value should reflect a 1 foot change in stage.

Site Worksheet

Site Name:	Mecca FEB	Arrival Time	01/08/16 0906
Sensor:	GW-1B / MFEB1-GW2	Departure Time	01/08/16 0915
Tech:	M. Ott		
Initial RTU stage (NGVD29) Ft =	8.69	RTU stage time	10/19/15 1245
Reference Elevation (NGVD29) Ft =	34.55		
DTW (Distance To Water) Ft =	13.91	DTW time	01/08/16 0906
Stage Value (NGVD29) Ft =	20.64		
* Calibrated Value (NGVD29) Ft =	NA	Cable Length	25.86
** Lift Test Performed (Yes/No) =	Yes		

Notes: Reference Elevation from black well cap

1' = 0.4329 psi

* Sensor shall be calibrated to the measured stage value when there is a difference greater than +-.03 feet.

** Sensor should be lifted by 1 foot and Rtu value should reflect a 1 foot change in stage.

Site Worksheet

Site Name:	Mecca FEB	Arrival Time	01/08/16 0853
Sensor:	GW-1C / MFEB1-GW3	Departure Time	1/8/2016 0905
Tech:	M. Ott		
Initial RTU stage (NGVD29) Ft =	17.49	RTU stage time	10/19/15 1245
Reference Elevation (NGVD29) Ft =	34.29		
DTW (Distance To Water) Ft =	14.94	DTW time	1/8/2016 0853
Stage Value (NGVD29) Ft =	19.35		
* Calibrated Value (NGVD29) Ft =	NA		
** Lift Test Performed (Yes/No) =	Yes	Cable Length	16.8

Notes: Reference Elevation from black well cap

1' = 0.4329 psi

* Sensor shall be calibrated to the measured stage value when there is a difference greater than +-.03 feet.

** Sensor should be lifted by 1 foot and Rtu value should reflect a 1 foot change in stage.

Site Worksheet

Site Name:	Mecca FEB	Arrival Time	1/5/16 1034
Sensor:	GW-2A / MFEB3-GW1	Departure Time	1/5/2016
Tech:	M. Ott		
Initial RTU stage (NGVD29) Ft =	-2.30	RTU stage time	10/19/15 1430
Reference Elevation (NGVD29) Ft =	23.55		
DTW (Distance To Water) Ft =	6.62	DTW time	1/5/16 1035
Stage Value (NGVD29) Ft =	16.93		
* Calibrated Value (NGVD29) Ft =	NA		
** Lift Test Performed (Yes/No) =	Yes		

Notes: Reference Elevation from black well cap

1' = 0.4329 psi

* Sensor shall be calibrated to the measured stage value when there is a difference greater than +-.03 feet.

** Sensor should be lifted by 1 foot and Rtu value should reflect a 1 foot change in stage.

Site Worksheet

Site Name:	Mecca FEB	Arrival Time	1/5/16 1027
Sensor:	GW-2B / MFEB3-GW2	Departure Time	1/5/16 1032
Tech:	M. Ott		
Initial RTU stage (NGVD29) Ft =	-2.15	RTU stage time	10/19/15 1430
Reference Elevation (NGVD29) Ft =	23.65		
DTW (Distance To Water) Ft =	6.65	DTW time	1/5/16 1030
Stage Value (NGVD29) Ft =	17		
* Calibrated Value (NGVD29) Ft =	NA		
** Lift Test Performed (Yes/No) =	Yes		

Notes: Reference Elevation from black well cap

1' = 0.4329 psi

* Sensor shall be calibrated to the measured stage value when there is a difference greater than +-.03 feet.

** Sensor should be lifted by 1 foot and Rtu value should reflect a 1 foot change in stage.

Site Worksheet

Site Name:	Mecca FEB	Arrival Time	1/5/16 1019
Sensor:	GW-2C / MFEB3-GW3	Departure Time	1/5/2016 1025
Tech:	M. Ott		
Initial RTU stage (NGVD29) Ft =	6.53	RTU stage time	10/19/15 1430
Reference Elevation (NGVD29) Ft =	23.63		
DTW (Distance To Water) Ft =	6.61	DTW time	1/5/16 1023
Stage Value (NGVD29) Ft =	17.02		
* Calibrated Value (NGVD29) Ft =	NA		
** Lift Test Performed (Yes/No) =	Yes		

Notes: Reference Elevation from well TOC

1' = 0.4329 psi

* Sensor shall be calibrated to the measured stage value when there is a difference greater than +-.03 feet.

** Sensor should be lifted by 1 foot and Rtu value should reflect a 1 foot change in stage.

Site Worksheet

Site Name:	Mecca FEB	Arrival Time	01/08/16 0941
Sensor:	GW-3A / MFEB4-GW1	Departure Time	01/08/16 0951
Tech:	M. Ott		
Initial RTU stage (NGVD29) Ft =	1.89	RTU stage time	10/19/15 1130
Reference Elevation (NGVD29) Ft =	27.80		
DTW (Distance To Water) Ft =	7.83	DTW time	01/08/16 0943
Stage Value (NGVD29) Ft =	19.97		
* Calibrated Value (NGVD29) Ft =	NA	Cable Length	25.91
** Lift Test Performed (Yes/No) =	Yes		

Notes: Reference Elevation from black well cap

1' = 0.4329 psi

* Sensor shall be calibrated to the measured stage value when there is a difference greater than +-.03 feet.

** Sensor should be lifted by 1 foot and Rtu value should reflect a 1 foot change in stage.

Site Worksheet

Site Name:	Mecca FEB	Arrival Time	01/08/16 0951
Sensor:	GW-3B / MFEB4-GW2	Departure Time	1/8/2016 1000
Tech:	M. Ott		
Initial RTU stage (NGVD29) Ft =	1.80	RTU stage time	10/19/15 1130
Reference Elevation (NGVD29) Ft =	27.57		
DTW (Distance To Water) Ft =	7.76	DTW time	01/08/16 0951
Stage Value (NGVD29) Ft =	19.81		
* Calibrated Value (NGVD29) Ft =	NA	Cable Length	25.77
** Lift Test Performed (Yes/No) =	Yes		

Notes: Reference Elevation from black well cap

1' = 0.4329 psi

* Sensor shall be calibrated to the measured stage value when there is a difference greater than +-.03 feet.

** Sensor should be lifted by 1 foot and Rtu value should reflect a 1 foot change in stage.

Site Worksheet

Site Name:	Mecca FEB	Arrival Time	01/08/16 1002
Sensor:	GW-3C / MFEB4-GW3	Departure Time	01/08/16 1023
Tech:	M. Ott		

Initial RTU stage (NGVD29) Ft =	10.15	RTU stage time	10/19/15 1200
Reference Elevation (NGVD29) Ft =	27.35		
DTW (Distance To Water) Ft =	7.48	DTW time	01/08/16 1002
Stage Value (NGVD29) Ft =	19.87		
* Calibrated Value (NGVD29) Ft =	NA	Cable length for data collected 10/19/15 - 01/08/16	18.35
** Lift Test Performed (Yes/No) =	Yes	New Cable Length starting 01/08/16 1030	17.20'

Notes: Reference Elevation from black well cap

1' = 0.4329 psi

* Sensor shall be calibrated to the measured stage value when there is a difference greater than +-.03 feet.

** Sensor should be lifted by 1 foot and Rtu value should reflect a 1 foot change in stage.

Site Worksheet

Site Name:	Mecca FEB	Arrival Time	1/5/16 800
Sensor:	GW-4A / MFEB5-GW1	Departure Time	1/5/16 0808
Tech:	M. Ott		
Initial RTU stage (NGVD29) Ft =	1.57	RTU stage time	10/19/15 1345
Reference Elevation (NGVD29) Ft =	27.37		
DTW (Distance To Water) Ft =	7.54	DTW time	1/5/16 0804
Stage Value (NGVD29) Ft =	19.83		
* Calibrated Value (NGVD29) Ft =	NA		
** Lift Test Performed (Yes/No) =	Yes		

Notes: Reference Elevation from black well cap

1' = 0.4329 psi

* Sensor shall be calibrated to the measured stage value when there is a difference greater than +-.03 feet.

** Sensor should be lifted by 1 foot and Rtu value should reflect a 1 foot change in stage.

Site Worksheet

Site Name:	Mecca FEB	Arrival Time	1/5/16 0735
Sensor:	GW-4B / MFEB5-GW2	Departure Time	1/5/16 0800
Tech:	M. Ott		

Initial RTU stage (NGVD29) Ft =	1.46	RTU stage time	10/19/15 1345
Reference Elevation (NGVD29) Ft =	27.33		
DTW (Distance To Water) Ft =	7.34	DTW time	1/5/16 0755
Stage Value (NGVD29) Ft =	19.99		
* Calibrated Value (NGVD29) Ft =	NA		
** Lift Test Performed (Yes/No) =	Yes		

Notes: Reference Elevation from black well cap

1' = 0.4329 psi

* Sensor shall be calibrated to the measured stage value when there is a difference greater than +-.03 feet.

** Sensor should be lifted by 1 foot and Rtu value should reflect a 1 foot change in stage.

Site Worksheet

Site Name:	Mecca FEB	Arrival Time	1/5/16 0810
Sensor:	GW-4C / MFEB5-GW3	Departure Time	1/5/16 0820
Tech:	M. Ott		
Initial RTU stage (NGVD29) Ft =	9.89	RTU stage time	10/19/15 1350
Reference Elevation (NGVD29) Ft =	27.49		
DTW (Distance To Water) Ft =	7.31	DTW time	1/5/16 0814
Stage Value (NGVD29) Ft =	20.18		
* Calibrated Value (NGVD29) Ft =	NA		
** Lift Test Performed (Yes/No) =	Yes		

Notes: Reference Elevation from well TOC

1' = 0.4329 psi

* Sensor shall be calibrated to the measured stage value when there is a difference greater than +-.03 feet.

** Sensor should be lifted by 1 foot and Rtu value should reflect a 1 foot change in stage.

Site Worksheet

Site Name:	Mecca FEB	Arrival Time	1/8/16 0740
Sensor:	GW-5A / MFEB2-GW1	Departure Time	1/8/2016 0748
Tech:	M. Ott		
Initial RTU stage (NGVD29) Ft =	0.61	RTU stage time	11/25/15 0945
Reference Elevation (NGVD29) Ft =	26.49		
DTW (Distance To Water) Ft =	6.89	DTW time	1/8/16 0742
Stage Value (NGVD29) Ft =	19.6		
* Calibrated Value (NGVD29) Ft =	NA	Cable Length	25.88
** Lift Test Performed (Yes/No) =	Yes		

Notes: Reference Elevation from black well cap

1' = 0.4329 psi

* Sensor shall be calibrated to the measured stage value when there is a difference greater than +-.03 feet.

** Sensor should be lifted by 1 foot and Rtu value should reflect a 1 foot change in stage.

Site Worksheet

Site Name:	Mecca FEB	Arrival Time	01/08/16 0750
Sensor:	GW-5B / MFEB2-GW2	Departure Time	01/08/16 0755
Tech:	M. Ott		
Initial RTU stage (NGVD29) Ft =	0.55	RTU stage time	11/25/15 0945
Reference Elevation (NGVD29) Ft =	26.51		
DTW (Distance To Water) Ft =	7.11	DTW time	1/08/16 750
Stage Value (NGVD29) Ft =	19.4		
* Calibrated Value (NGVD29) Ft =	NA	Cable Length	25.96
** Lift Test Performed (Yes/No) =	Yes		

Notes: Reference Elevation from black well cap

1' = 0.4329 psi

* Sensor shall be calibrated to the measured stage value when there is a difference greater than +-.03 feet.

** Sensor should be lifted by 1 foot and Rtu value should reflect a 1 foot change in stage.

Site Worksheet

Site Name:	Mecca FEB	Arrival Time	1/8/2016 0755
Sensor:	GW-5C / MFEB2-GW3	Departure Time	1/8/2016 0800
Tech:	M. Ott		
Initial RTU stage (NGVD29) Ft =	9.50	RTU stage time	11/25/15 0950
Reference Elevation (NGVD29) Ft =	26.57		
DTW (Distance To Water) Ft =	7.17	DTW time	01/08/16 0756
Stage Value (NGVD29) Ft =	19.4		
* Calibrated Value (NGVD29) Ft =	NA	Cable Length	17
** Lift Test Performed (Yes/No) =	Yes		

Notes: Reference Elevation from well TOC

1' = 0.4329 psi

* Sensor shall be calibrated to the measured stage value when there is a difference greater than +-.03 feet.

** Sensor should be lifted by 1 foot and Rtu value should reflect a 1 foot change in stage.

Site Worksheet

Site Name:	Mecca FEB	Arrival Time	1/5/16 0927
Sensor:	GW-6A / MFEB6-GW1	Departure Time	1/5/16 0932
Tech:	M. Ott		

Initial RTU stage (NGVD29) Ft =	0.07	RTU stage time	11/25/15 1115
Reference Elevation (NGVD29) Ft =	25.07		
DTW (Distance To Water) Ft =	3.38	DTW time	1/5/16 0931
Stage Value (NGVD29) Ft =	21.69		
* Calibrated Value (NGVD29) Ft =	NA		
** Lift Test Performed (Yes/No) =	Yes		

Notes: Reference Elevation from black well cap

1' = 0.4329 psi

* Sensor shall be calibrated to the measured stage value when there is a difference greater than +-.03 feet.

** Sensor should be lifted by 1 foot and Rtu value should reflect a 1 foot change in stage.

Site Worksheet

Site Name:	Mecca FEB	Arrival Time	1/5/16 0920
Sensor:	GW-6B / MFEB6-GW2	Departure Time	1/5/16 0925
Tech:	M. Ott		

Initial RTU stage (NGVD29) Ft =	-0.11	RTU stage time	11/25/15 1115
Reference Elevation (NGVD29) Ft =	24.89		
DTW (Distance To Water) Ft =	2.73	DTW time	1/5/16 0924
Stage Value (NGVD29) Ft =	22.16		
* Calibrated Value (NGVD29) Ft =	NA		
** Lift Test Performed (Yes/No) =	Yes		

Notes: Reference Elevation from black well cap

1' = 0.4329 psi

* Sensor shall be calibrated to the measured stage value when there is a difference greater than +-.03 feet.

** Sensor should be lifted by 1 foot and Rtu value should reflect a 1 foot change in stage.

Site Worksheet

Site Name:	Mecca FEB	Arrival Time	1/5/16 0934
Sensor:	GW-6C / MFEB6-GW3	Departure Time	1/5/16 0938
Tech:	M. Ott		
Initial RTU stage (NGVD29) Ft =	7.92	RTU stage time	11/25/15 1115
Reference Elevation (NGVD29) Ft =	24.92		
DTW (Distance To Water) Ft =	2.71	DTW time	1/5/16 0937
Stage Value (NGVD29) Ft =	22.21		
* Calibrated Value (NGVD29) Ft =	NA		
** Lift Test Performed (Yes/No) =	Yes		

Notes: Reference Elevation from well TOC

1' = 0.4329 psi

* Sensor shall be calibrated to the measured stage value when there is a difference greater than +-.03 feet.

** Sensor should be lifted by 1 foot and Rtu value should reflect a 1 foot change in stage.

Site Worksheet

Site Name:	Mecca FEB	Arrival Time	1/5/16 1141
Sensor:	GW-7A / MFEB7-GW1	Departure Time	1/5/2016 1145
Tech:	M. Ott		
Initial RTU stage (NGVD29) Ft =	-0.99	RTU stage time	11/25/15 0730
Reference Elevation (NGVD29) Ft =	24.01		
DTW (Distance To Water) Ft =	6.47	DTW time	1/5/2016 1143
Stage Value (NGVD29) Ft =	17.54		
* Calibrated Value (NGVD29) Ft =	NA		
** Lift Test Performed (Yes/No) =	Yes		

Notes: Reference Elevation from black well cap

1' = 0.4329 psi

* Sensor shall be calibrated to the measured stage value when there is a difference greater than +-.03 feet.

** Sensor should be lifted by 1 foot and Rtu value should reflect a 1 foot change in stage.

Site Worksheet

Site Name:	Mecca FEB	Arrival Time	1/5/16 1146
Sensor:	GW-7B / MFEB7-GW2	Departure Time	1/5/2016 1148
Tech:	M. Ott		
Initial RTU stage (NGVD29) Ft =	-0.93	RTU stage time	11/25/15 0740
Reference Elevation (NGVD29) Ft =	24.07		
DTW (Distance To Water) Ft =	6.50	DTW time	1/5/2016 1146
Stage Value (NGVD29) Ft =	17.57		
* Calibrated Value (NGVD29) Ft =	NA		
** Lift Test Performed (Yes/No) =	Yes		

Notes: Reference Elevation from black well cap

1' = 0.4329 psi

* Sensor shall be calibrated to the measured stage value when there is a difference greater than +-.03 feet.

** Sensor should be lifted by 1 foot and Rtu value should reflect a 1 foot change in stage.

Site Worksheet

Site Name:	Mecca FEB	Arrival Time	1/5/16 1150
Sensor:	GW-7C / MFEB7-GW3	Departure Time	1/5/2016 1156
Tech:	M. Ott		
Initial RTU stage (NGVD29) Ft =	6.75	RTU stage time	11/25/15 0745
Reference Elevation (NGVD29) Ft =	23.75		
DTW (Distance To Water) Ft =	6.87	DTW time	1/5/2016 1152
Stage Value (NGVD29) Ft =	16.88		
* Calibrated Value (NGVD29) Ft =	NA		
** Lift Test Performed (Yes/No) =	Yes		

Notes: Reference Elevation from well TOC

1' = 0.4329 psi

* Sensor shall be calibrated to the measured stage value when there is a difference greater than +-.03 feet.

** Sensor should be lifted by 1 foot and Rtu value should reflect a 1 foot change in stage.

Site Worksheet

Site Name:	Mecca FEB	Arrival Time	01/08/16 1035
Sensor:	GW-8A / MFEB8-GW1	Departure Time	01/08/16 1045
Tech:	M. Ott		
Initial RTU stage (NGVD29) Ft =	-0.69	RTU stage time	11/25/15 0845
Reference Elevation (NGVD29) Ft =	25.11		
DTW (Distance To Water) Ft =	6.60	DTW time	1/08/16 1037
Stage Value (NGVD29) Ft =	18.51		
* Calibrated Value (NGVD29) Ft =	NA	Cable Length	25.80
** Lift Test Performed (Yes/No) =	Yes		

Notes: Reference Elevation from black well cap

1' = 0.4329 psi

* Sensor shall be calibrated to the measured stage value when there is a difference greater than +-.03 feet.

** Sensor should be lifted by 1 foot and Rtu value should reflect a 1 foot change in stage.

Site Worksheet

Site Name:	Mecca FEB	Arrival Time	01/08/16 1055
Sensor:	GW-8B / MFEB8-GW2	Departure Time	01/08/16 1110
Tech:	M. Ott		
Initial RTU stage (NGVD29) Ft =	-0.56	RTU stage time	11/25/15 0845
Reference Elevation (NGVD29) Ft =	25.29		
DTW (Distance To Water) Ft =	7.05	DTW time	1055
Stage Value (NGVD29) Ft =	18.24		
* Calibrated Value (NGVD29) Ft =	NA	Cable Length	25.85
** Lift Test Performed (Yes/No) =	Yes		

Notes: Reference Elevation from black well cap

1' = 0.4329 psi

* Sensor shall be calibrated to the measured stage value when there is a difference greater than +-.03 feet.

** Sensor should be lifted by 1 foot and Rtu value should reflect a 1 foot change in stage.

Site Worksheet

Site Name:	Mecca FEB	Arrival Time	01/08/16 1046
Sensor:	GW-8C / MFEB8-GW3	Departure Time	01/08/16 1055
Tech:	M. Ott		
Initial RTU stage (NGVD29) Ft =	7.59	RTU stage time	11/25/15 0845
Reference Elevation (NGVD29) Ft =	24.90		
DTW (Distance To Water) Ft =	6.72	DTW time	01/08/16 1046
Stage Value (NGVD29) Ft =	18.18		
* Calibrated Value (NGVD29) Ft =	NA	Cable Length	17.31
** Lift Test Performed (Yes/No) =	Yes		

Notes: Reference Elevation from well TOC

1' = 0.4329 psi

* Sensor shall be calibrated to the measured stage value when there is a difference greater than +-.03 feet.

** Sensor should be lifted by 1 foot and Rtu value should reflect a 1 foot change in stage.

Individual Well Record

Client:	SFWM District	Well No:	**MFEB1-GW1**	Location:	Mecca Farms
Project Name:	MECCA FARMS				
Project Location:	West Palm Beach, FL	Ground Surface Elevation (ft NGVD 1929):	**31.45**		
Project Number:	WF0MECCA.0DDR			Page: 1	of 1

Date	Depth of Water From Top of Black Cap (ft)	Groundwater Elevation (ft NGVD 1929)	Groundwater Depth Below Ground Surface (ft)	Remarks	Top of Black Cap Elevation (ft NGVD 1929):
10/19/15	13.48	20.57	10.88	Datalogger installed.	34.05
01/08/16	13.17	20.88	10.57	Datalogger downloaded.	34.05
Average		20.73	10.73		

Remarks:

Individual Well Record

Client:	SFWM District	Well No:	**MFEB1-GW2**	Location:	Mecca Farms
Project Name:	MECCA FARMS				
Project Location:	West Palm Beach, FL	Ground Surface Elevation (ft NGVD 1929):	**31.75**		
Project Number:	WF0MECCA.0DDR			Page: 1	of 1

Date	Depth of Water From Top of Black Cap (ft)	Groundwater Elevation (ft NGVD 1929)	Groundwater Depth Below Ground Surface (ft)	Remarks	Top of Black Cap Elevation (ft NGVD 1929):
10/19/15	14.18	20.37	11.38	Datalogger installed.	34.55
01/08/16	13.91	20.64	11.11	Datalogger downloaded.	34.55
Average		20.51	11.25		

Remarks:

Individual Well Record

Client:	SFWM District	Well No:	**MFEB1-GW3**	Location:	Mecca Farms
Project Name:	MECCA FARMS				
Project Location:	West Palm Beach, FL	Ground Surface Elevation (ft NGVD 1929):	**31.65**		
Project Number:	WF0MECCA.0DDR			Page: 1	of 1

Date	Depth of Water From Top of Black Cap (ft)	Groundwater Elevation (ft NGVD 1929)	Groundwater Depth Below Ground Surface (ft)	Remarks	Top of Black Cap Elevation (ft NGVD 1929):
10/19/15	14.71	19.58	12.07	Datalogger installed.	34.29
01/08/16	14.94	19.35	12.30	Datalogger downloaded.	34.29
Average		19.47	12.19		

Remarks:

Individual Well Record

Client:	SFWM District	Well No:	**MFEB2-GW1**	Location:	Mecca Farms
Project Name:	MECCA FARMS				
Project Location:	West Palm Beach, FL	Ground Surface Elevation (ft NGVD 1929):	**23.35**		
Project Number:	WF0MECCA.0DDR			Page: 1	of 1

Date	Depth of Water From Top of Black Cap (ft)	Groundwater Elevation (ft NGVD 1929)	Groundwater Depth Below Ground Surface (ft)	Remarks	Top of Black Cap Elevation (ft NGVD 1929):
11/25/15	7.14	19.35	4.00	Datalogger installed.	26.49
01/08/16	6.89	19.60	3.75	Datalogger downloaded.	26.49
Average		19.48	3.88		

Remarks:

Individual Well Record

Client:	SFWM District	Well No:	**MFEB2-GW2**	Location:	Mecca Farms
Project Name:	MECCA FARMS				
Project Location:	West Palm Beach, FL	Ground Surface Elevation (ft NGVD 1929):	**23.45**		
Project Number:	WF0MECCA.0DDR			Page: 1	of 1

Date	Depth of Water From Top of Black Cap (ft)	Groundwater Elevation (ft NGVD 1929)	Groundwater Depth Below Ground Surface (ft)	Remarks	Top of Black Cap Elevation (ft NGVD 1929):
11/25/15	7.21	19.30	4.15	Datalogger installed.	26.51
01/08/16	7.11	19.40	4.05	Datalogger downloaded.	26.51
Average		19.35	4.10		

Remarks:

Individual Well Record

Client:	SFWM District	Well No:	**MFEB2-GW3**	Location:	Mecca Farms
Project Name:	MECCA FARMS				
Project Location:	West Palm Beach, FL	Ground Surface Elevation (ft NGVD 1929):	**23.55**		
Project Number:	WF0MECCA.0DDR			Page: 1	of 1

Date	Depth of Water From Top of Black Cap (ft)	Groundwater Elevation (ft NGVD 1929)	Groundwater Depth Below Ground Surface (ft)	Remarks	Top of Black Cap Elevation (ft NGVD 1929):
11/25/15	7.25*	19.32*	4.23*	Datalogger installed.	26.57*
01/08/16	7.17*	19.40*	4.15*	Datalogger downloaded.	26.57*
Average		19.36	4.19		

Remarks: *Please note measurements are referenced from top of casing because black cap elevation is not available yet.

Individual Well Record

Client:	SFWM District	Well No:	**MFEB3-GW1**	Location:	Mecca Farms
Project Name:	MECCA FARMS				
Project Location:	West Palm Beach, FL	Ground Surface Elevation (ft NGVD 1929):	**21.05**		
Project Number:	WF0MECCA.0DDR			Page: 1	of 1

Date	Depth of Water From Top of Black Cap (ft)	Groundwater Elevation (ft NGVD 1929)	Groundwater Depth Below Ground Surface (ft)	Remarks	Top of Black Cap Elevation (ft NGVD 1929):
10/19/15	5.40	18.15	2.90	Datalogger installed.	23.55
01/05/16	6.62	16.93	4.12	Datalogger downloaded.	23.55
Average		17.54	3.51		

Remarks:

Individual Well Record

Client:	SFWM District	Well No:	**MFEB3-GW2**	Location:	Mecca Farms
Project Name:	MECCA FARMS				
Project Location:	West Palm Beach, FL	Ground Surface Elevation (ft NGVD 1929):	**21.25**		
Project Number:	WF0MECCA.0DDR			Page: 1	of 1

Date	Depth of Water From Top of Black Cap (ft)	Groundwater Elevation (ft NGVD 1929)	Groundwater Depth Below Ground Surface (ft)	Remarks	Top of Black Cap Elevation (ft NGVD 1929):
10/19/15	5.55	18.10	3.15	Datalogger installed.	23.65
01/05/16	6.65	17.00	4.25	Datalogger downloaded.	23.65
Average		17.55	3.70		

Remarks:

Individual Well Record

Client:	SFWM District	Well No:	**MFEB3-GW3**	Location:	Mecca Farms
Project Name:	MECCA FARMS				
Project Location:	West Palm Beach, FL	Ground Surface Elevation (ft NGVD 1929):	**21.25**		
Project Number:	WF0MECCA.0DDR			Page: 1	of 1

Date	Depth of Water From Top of Black Cap (ft)	Groundwater Elevation (ft NGVD 1929)	Groundwater Depth Below Ground Surface (ft)	Remarks	Top of Black Cap Elevation (ft NGVD 1929):
10/19/15	5.53*	18.10*	3.15*	Datalogger installed.	23.63*
01/05/16	6.61*	17.02*	4.23*	Datalogger downloaded.	23.63*
Average		17.56	3.69		

Remarks: *Please note measurements are referenced from top of casing because black cap elevation is not available yet.

Individual Well Record

Client:	SFWM District	Well No:	**MFEB4-GW1**	Location:	Mecca Farms
Project Name:	MECCA FARMS				
Project Location:	West Palm Beach, FL	Ground Surface Elevation (ft NGVD 1929):	**25.35**		
Project Number:	WF0MECCA.0DDR			Page: 1	of 1

Date	Depth of Water From Top of Black Cap (ft)	Groundwater Elevation (ft NGVD 1929)	Groundwater Depth Below Ground Surface (ft)	Remarks	Top of Black Cap Elevation (ft NGVD 1929):
10/19/15	8.26	19.54	5.81	Datalogger installed.	27.80
01/08/16	7.83	19.97	5.38	Datalogger downloaded.	27.80
Average		19.76	5.60		

Remarks:

Individual Well Record

Client:	SFWM District	Well No:	**MFEB4-GW2**	Location:	Mecca Farms
Project Name:	MECCA FARMS				
Project Location:	West Palm Beach, FL	Ground Surface Elevation (ft NGVD 1929):	**25.05**		
Project Number:	WF0MECCA.0DDR			Page: 1	of 1

Date	Depth of Water From Top of Black Cap (ft)	Groundwater Elevation (ft NGVD 1929)	Groundwater Depth Below Ground Surface (ft)	Remarks	Top of Black Cap Elevation (ft NGVD 1929):
10/19/15	8.15	19.42	5.63	Datalogger installed.	27.57
01/08/16	7.76	19.81	5.24	Datalogger downloaded.	27.57
Average		19.62	5.44		

Remarks:

Individual Well Record

Client:	SFWM District	Well No:	**MFEB4-GW3**	Location:	Mecca Farms
Project Name:	MECCA FARMS				
Project Location:	West Palm Beach, FL	Ground Surface Elevation (ft NGVD 1929):	**24.95**		
Project Number:	WF0MECCA.0DDR			Page: 1	of 1

Date	Depth of Water From Top of Black Cap (ft)	Groundwater Elevation (ft NGVD 1929)	Groundwater Depth Below Ground Surface (ft)	Remarks	Top of Black Cap Elevation (ft NGVD 1929):
10/19/15	7.87	19.48	5.47	Datalogger installed.	27.35
01/08/16	7.48	19.87	5.08	Datalogger downloaded.	27.35
Average		19.68	5.28		

Remarks:

Individual Well Record

Client:	SFWM District	Well No:	**MFEB5-GW1**	Location:	Mecca Farms
Project Name:	MECCA FARMS				
Project Location:	West Palm Beach, FL	Ground Surface Elevation (ft NGVD 1929):	**24.75**		
Project Number:	WF0MECCA.0DDR			Page: 1	of 1

Date	Depth of Water From Top of Black Cap (ft)	Groundwater Elevation (ft NGVD 1929)	Groundwater Depth Below Ground Surface (ft)	Remarks	Top of Black Cap Elevation (ft NGVD 1929):
10/19/15	8.65	18.72	6.03	Datalogger installed.	27.37
01/05/16	7.54	19.83	4.92	Datalogger downloaded.	27.37
Average		19.28	5.48		

Remarks:

Individual Well Record

Client:	SFWM District	Well No:	**MFEB5-GW2**	Location:	Mecca Farms
Project Name:	MECCA FARMS				
Project Location:	West Palm Beach, FL	Ground Surface Elevation (ft NGVD 1929):	**24.75**		
Project Number:	WF0MECCA.0DDR			Page: 1	of 1

Date	Depth of Water From Top of Black Cap (ft)	Groundwater Elevation (ft NGVD 1929)	Groundwater Depth Below Ground Surface (ft)	Remarks	Top of Black Cap Elevation (ft NGVD 1929):
10/19/15	8.51	18.82	5.93	Datalogger installed.	27.33
01/05/16	7.34	19.99	4.76	Datalogger downloaded.	27.33
Average		19.41	5.35		

Remarks:

Individual Well Record

Client:	SFWM District	Well No:	**MFEB5-GW3**	Location:	Mecca Farms
Project Name:	MECCA FARMS				
Project Location:	West Palm Beach, FL	Ground Surface Elevation (ft NGVD 1929):	**24.75**		
Project Number:	WF0MECCA.0DDR			Page: 1	of 1

Date	Depth of Water From Top of Black Cap (ft)	Groundwater Elevation (ft NGVD 1929)	Groundwater Depth Below Ground Surface (ft)	Remarks	Top of Black Cap Elevation (ft NGVD 1929):
10/19/15	8.32*	19.17*	5.58*	Datalogger installed.	27.49*
01/05/16	7.31*	20.18*	4.57*	Datalogger downloaded.	27.49*
Average		19.68	5.08		

Remarks: *Please note measurements are referenced from top of casing because black cap elevation is not available yet.

Individual Well Record

Client:	SFWM District	Well No:	**MFEB6-GW1**	Location:	Mecca Farms
Project Name:	MECCA FARMS				
Project Location:	West Palm Beach, FL	Ground Surface Elevation (ft NGVD 1929):	**21.55**		
Project Number:	WF0MECCA.0DDR			Page: 1	of 1

Date	Depth of Water From Top of Black Cap (ft)	Groundwater Elevation (ft NGVD 1929)	Groundwater Depth Below Ground Surface (ft)	Remarks	Top of Black Cap Elevation (ft NGVD 1929):
11/25/15	3.69	21.38	0.17	Datalogger installed.	25.07
01/05/16	3.38	21.69	-0.14	Datalogger downloaded.	25.07
Average		21.54	0.02		

Remarks:

Individual Well Record

Client:	SFWM District	Well No:	**MFEB6-GW2**	Location:	Mecca Farms
Project Name:	MECCA FARMS				
Project Location:	West Palm Beach, FL	Ground Surface Elevation (ft NGVD 1929):	**21.45**		
Project Number:	WF0MECCA.0DDR			Page: 1	of 1

Date	Depth of Water From Top of Black Cap (ft)	Groundwater Elevation (ft NGVD 1929)	Groundwater Depth Below Ground Surface (ft)	Remarks	Top of Black Cap Elevation (ft NGVD 1929):
11/25/15	2.98	21.91	-0.46	Datalogger installed.	24.89
01/05/16	2.73	22.16	-0.71	Datalogger downloaded.	24.89
Average		22.04	-0.59		

Remarks:

Individual Well Record

Client:	SFWM District	Well No:	**MFEB6-GW3**	Location:	Mecca Farms
Project Name:	MECCA FARMS				
Project Location:	West Palm Beach, FL	Ground Surface Elevation (ft NGVD 1929):	**21.45**		
Project Number:	WF0MECCA.0DDR			Page: 1	of 1

Date	Depth of Water From Top of Black Cap (ft)	Groundwater Elevation (ft NGVD 1929)	Groundwater Depth Below Ground Surface (ft)	Remarks	Top of Black Cap Elevation (ft NGVD 1929):
11/25/15	2.95*	21.97*	-0.52*	Datalogger installed.	24.92*
01/05/16	2.71*	22.21*	-0.76*	Datalogger downloaded.	24.92*
Average		22.09	-0.64		

Remarks: *Please note measurements are referenced from top of casing because black cap elevation is not available yet.

Individual Well Record

Client:	SFWM District	Well No:	**MFEB7-GW1**	Location:	Mecca Farms
Project Name:	MECCA FARMS				
Project Location:	West Palm Beach, FL	Ground Surface Elevation (ft NGVD 1929):	**20.85**		
Project Number:	WF0MECCA.0DDR			Page: 1	of 1

Date	Depth of Water From Top of Black Cap (ft)	Groundwater Elevation (ft NGVD 1929)	Groundwater Depth Below Ground Surface (ft)	Remarks	Top of Black Cap Elevation (ft NGVD 1929):
11/25/15	4.91	19.10	1.75	Datalogger installed.	24.01
01/05/16	6.47	17.54	3.31	Datalogger downloaded.	24.01
Average		18.32	2.53		

Remarks:

Individual Well Record

Client:	SFWM District	Well No:	**MFEB7-GW2**	Location:	Mecca Farms
Project Name:	MECCA FARMS				
Project Location:	West Palm Beach, FL	Ground Surface Elevation (ft NGVD 1929):	**20.85**		
Project Number:	WF0MECCA.0DDR			Page: 1	of 1

Date	Depth of Water From Top of Black Cap (ft)	Groundwater Elevation (ft NGVD 1929)	Groundwater Depth Below Ground Surface (ft)	Remarks	Top of Black Cap Elevation (ft NGVD 1929):
11/25/15	4.95	19.12	1.73	Datalogger installed.	24.07
01/05/16	6.50	17.57	3.28	Datalogger downloaded.	24.07
Average		18.35	2.51		

Remarks:

Individual Well Record

Client:	SFWM District	Well No:	**MFEB7-GW3**	Location:	Mecca Farms
Project Name:	MECCA FARMS				
Project Location:	West Palm Beach, FL	Ground Surface Elevation (ft NGVD 1929):	**20.85**		
Project Number:	WF0MECCA.0DDR			Page: 1	of 1

Date	Depth of Water From Top of Black Cap (ft)	Groundwater Elevation (ft NGVD 1929)	Groundwater Depth Below Ground Surface (ft)	Remarks	Top of Black Cap Elevation (ft NGVD 1929):
11/25/15	5.33*	18.42*	2.43*	Datalogger installed.	23.75*
01/05/16	6.87*	16.88*	3.97*	Datalogger downloaded.	23.75*
Average		17.65	3.20		

Remarks: *Please note measurements are referenced from top of casing because black cap elevation is not available yet.

Individual Well Record

Client:	SFWM District	Well No:	**MFEB8-GW1**	Location:	Mecca Farms
Project Name:	MECCA FARMS				
Project Location:	West Palm Beach, FL	Ground Surface Elevation (ft NGVD 1929):	**22.45**		
Project Number:	WF0MECCA.0DDR			Page: 1	of 1

Date	Depth of Water From Top of Black Cap (ft)	Groundwater Elevation (ft NGVD 1929)	Groundwater Depth Below Ground Surface (ft)	Remarks	Top of Black Cap Elevation (ft NGVD 1929):
11/25/15	7.31	17.80	4.65	Datalogger installed.	25.11
01/08/16	6.60	18.51	3.94	Datalogger downloaded.	25.11
Average		18.16	4.30		

Remarks:

Individual Well Record

Client:	SFWM District	Well No:	**MFEB8-GW2**	Location:	Mecca Farms
Project Name:	MECCA FARMS				
Project Location:	West Palm Beach, FL	Ground Surface Elevation (ft NGVD 1929):	**22.55**		
Project Number:	WF0MECCA.0DDR			Page: 1	of 1

Date	Depth of Water From Top of Black Cap (ft)	Groundwater Elevation (ft NGVD 1929)	Groundwater Depth Below Ground Surface (ft)	Remarks	Top of Black Cap Elevation (ft NGVD 1929):
11/25/15	7.45	17.84	4.71	Datalogger installed.	25.29
01/08/16	7.05	18.24	4.31	Datalogger downloaded.	25.29
Average		18.04	4.51		

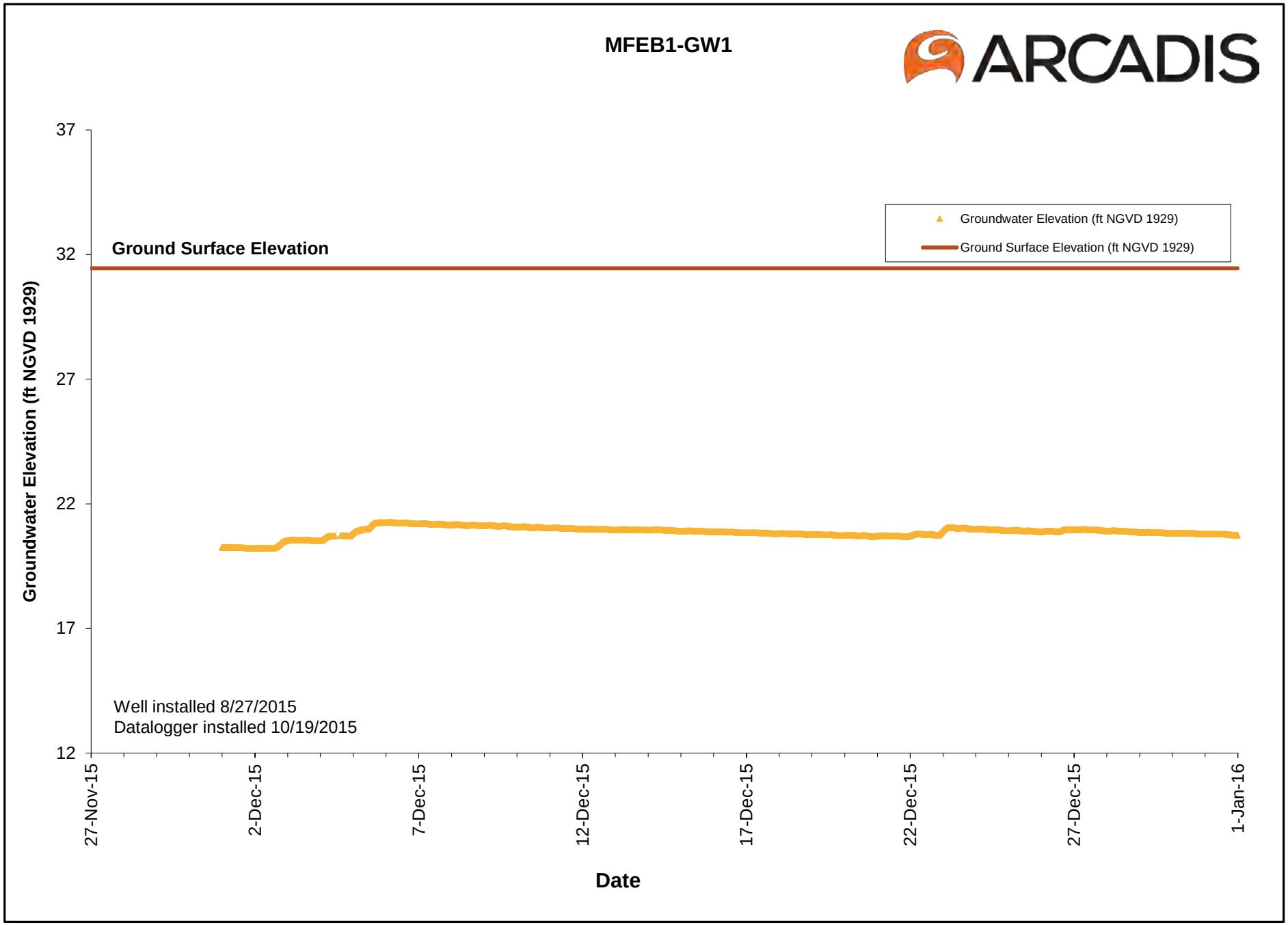
Remarks:

Individual Well Record

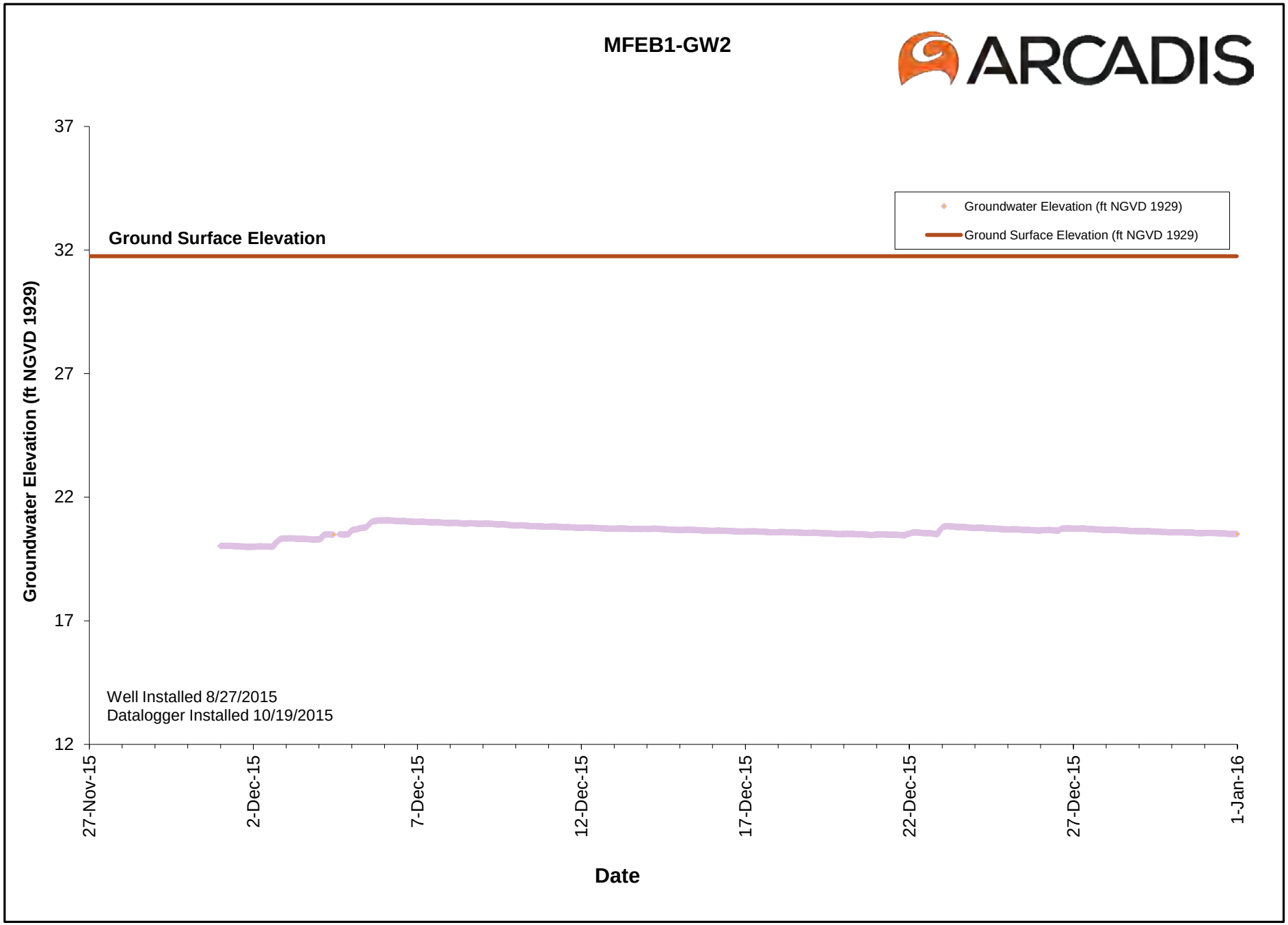
Client:	SFWM District	Well No:	**MFEB8-GW3**	Location:	Mecca Farms
Project Name:	MECCA FARMS				
Project Location:	West Palm Beach, FL	Ground Surface Elevation (ft NGVD 1929):	**22.45**		
Project Number:	WF0MECCA.0DDR			Page: 1	of 1

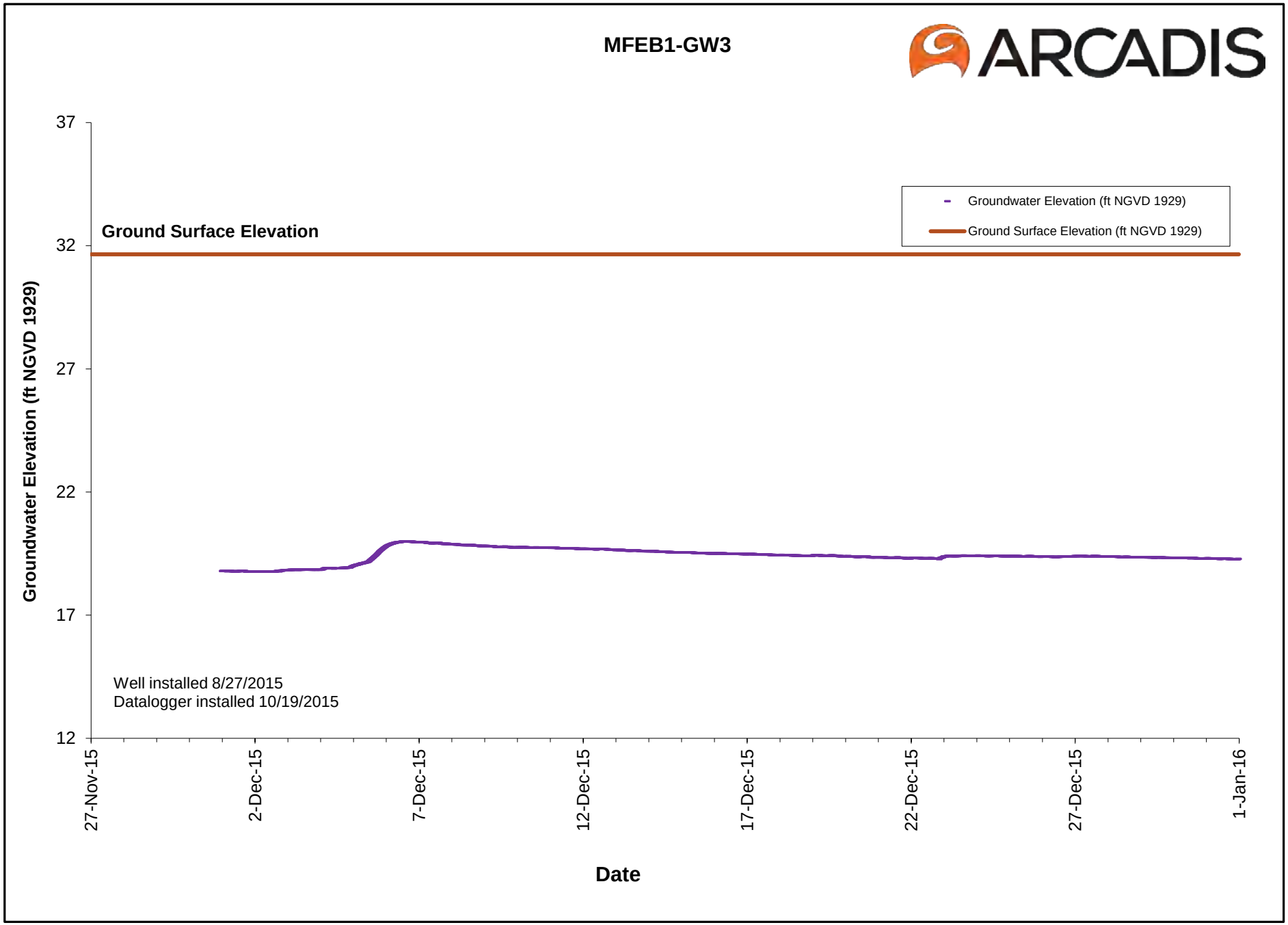
Date	Depth of Water From Top of Black Cap (ft)	Groundwater Elevation (ft NGVD 1929)	Groundwater Depth Below Ground Surface (ft)	Remarks	Top of Black Cap Elevation (ft NGVD 1929):
11/25/15	7.02*	17.88*	4.57*	Datalogger installed.	24.9*
01/08/16	6.72*	18.18*	4.27*	Datalogger downloaded.	24.9*
Average		18.03	2.97		

Remarks: *Please note measurements are referenced from top of casing because black cap elevation is not available yet.

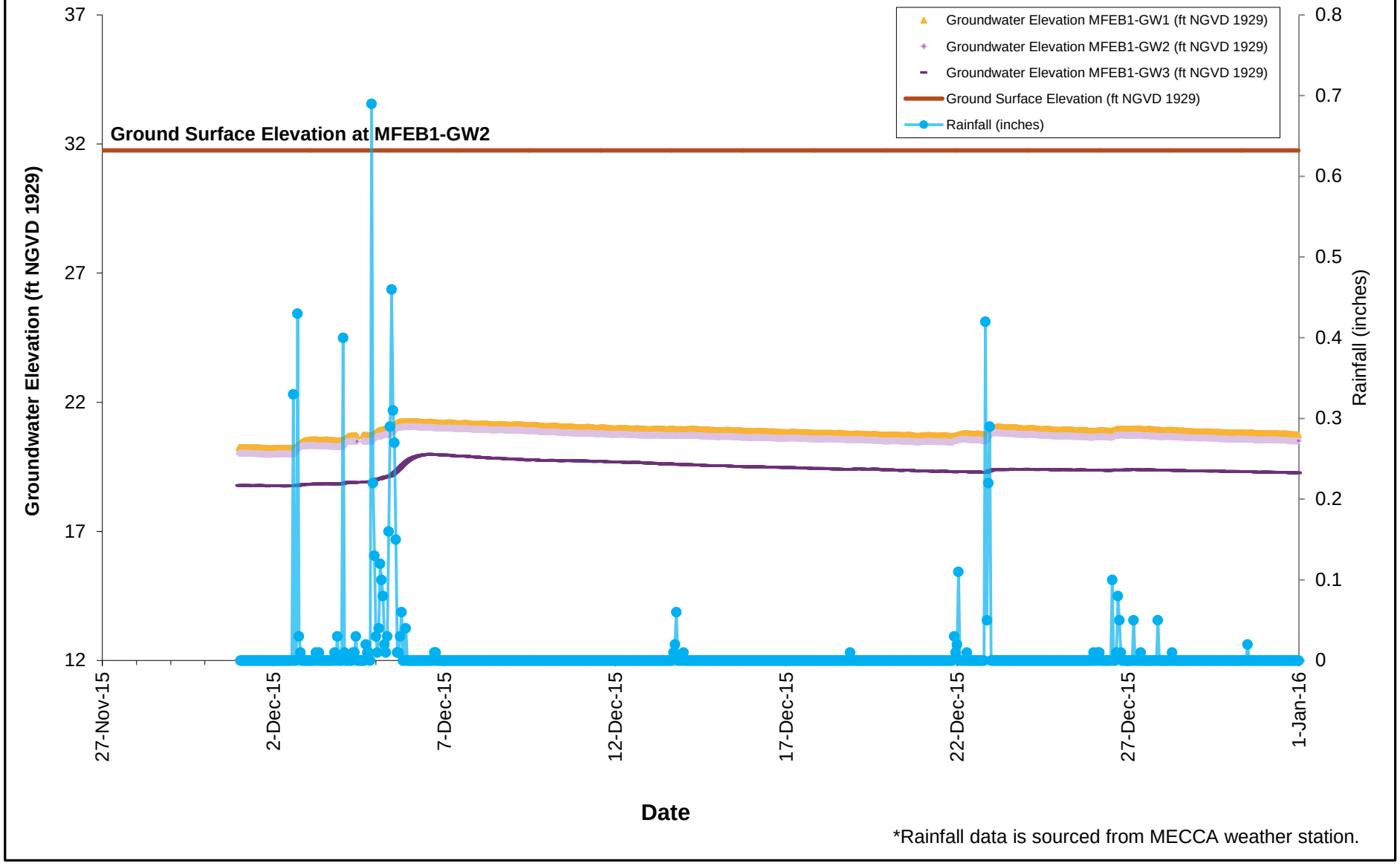

MFEB1-GW1
ARCADIS
Groundwater Elevation (ft NGVD 1929)
Ground Surface Elevation (ft NGVD 1929)
Ground Surface Elevation
37
32
27
22
17
12
Groundwater Elevation (ft NGVD 1929)
Well installed 8/27/2015
Datalogger installed 10/19/2015
27-Nov-15
2-Dec-15
7-Dec-15
12-Dec-15
17-Dec-15
22-Dec-15
27-Dec-15
1-Jan-16
Date

MFEB1-GW2


Groundwater Elevation (ft NGVD 1929)
Ground Surface Elevation (ft NGVD 1929)
Ground Surface Elevation
37
32
27
22
17
12
Well Installed 8/27/2015
Datalogger Installed 10/19/2015
27-Nov-15
2-Dec-15
7-Dec-15
12-Dec-15
17-Dec-15
22-Dec-15
27-Dec-15
1-Jan-16
Date

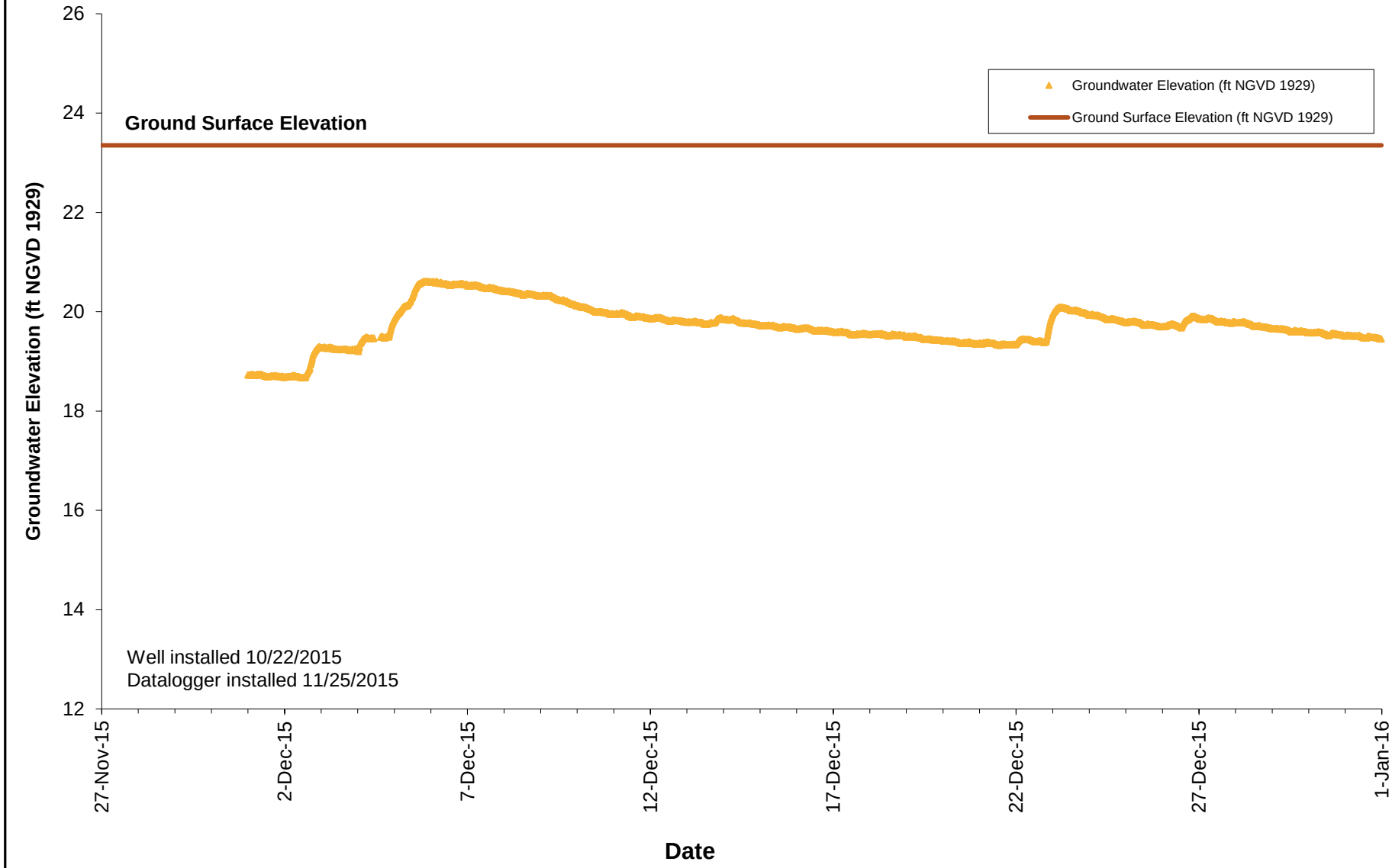

MFEB1-GW3
ARCADIS
Groundwater Elevation (ft NGVD 1929)
Ground Surface Elevation (ft NGVD 1929)
Ground Surface Elevation
37
32
27
22
17
12
Well installed 8/27/2015
Datalogger installed 10/19/2015
27-Nov-15
2-Dec-15
7-Dec-15
12-Dec-15
17-Dec-15
22-Dec-15
27-Dec-15
1-Jan-16
Date

MFEB1 Cluster



*Rainfall data is sourced from MECCA weather station.

MFEB2-GW1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Ground Surface Elevation (ft NGVD 1929)
Ground Surface Elevation
Groundwater Elevation (ft NGVD 1929)
26
24
22
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18
16
14
12
Well installed 10/22/2015
Datalogger installed 11/25/2015
27-Nov-15
2-Dec-15
7-Dec-15
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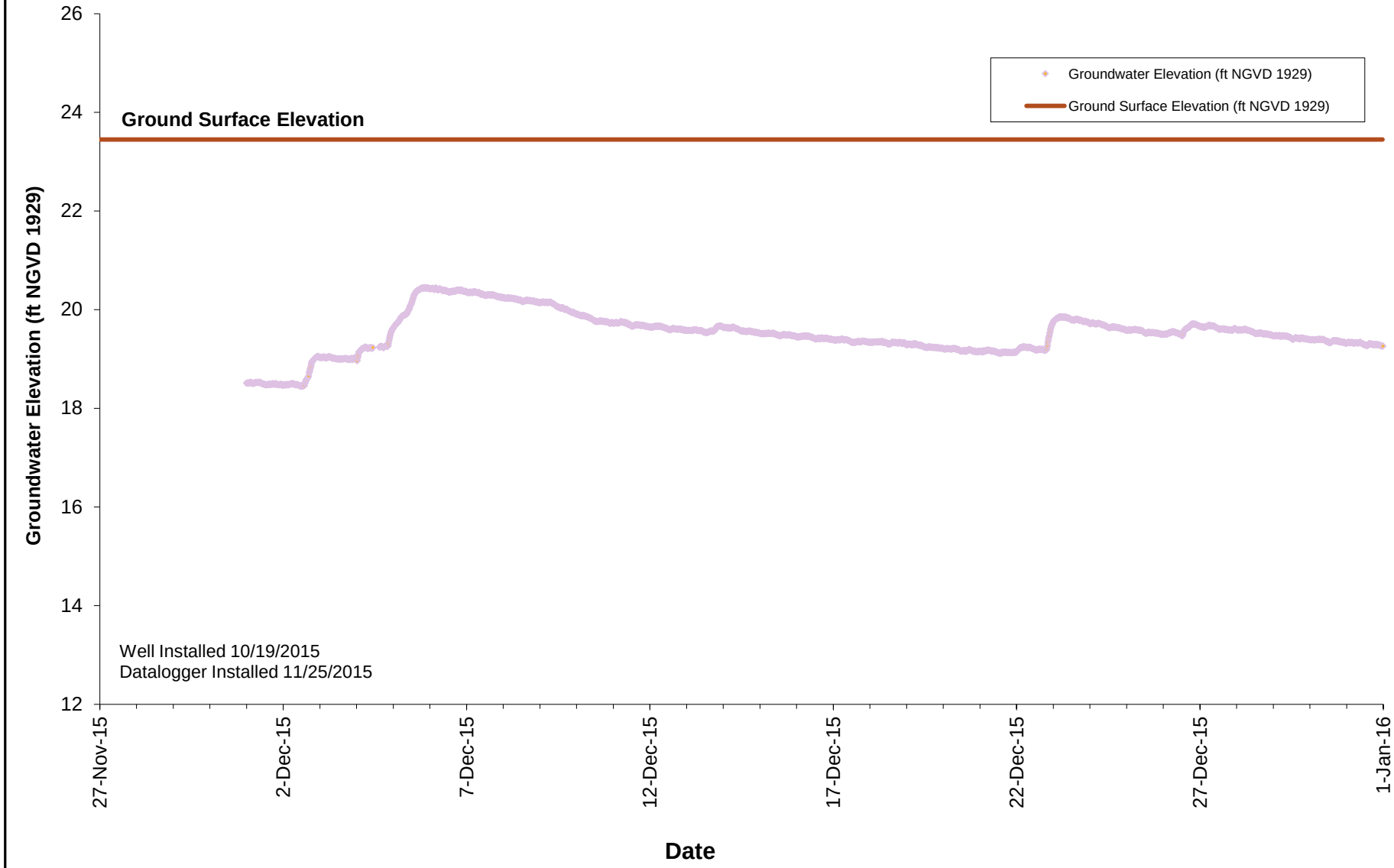
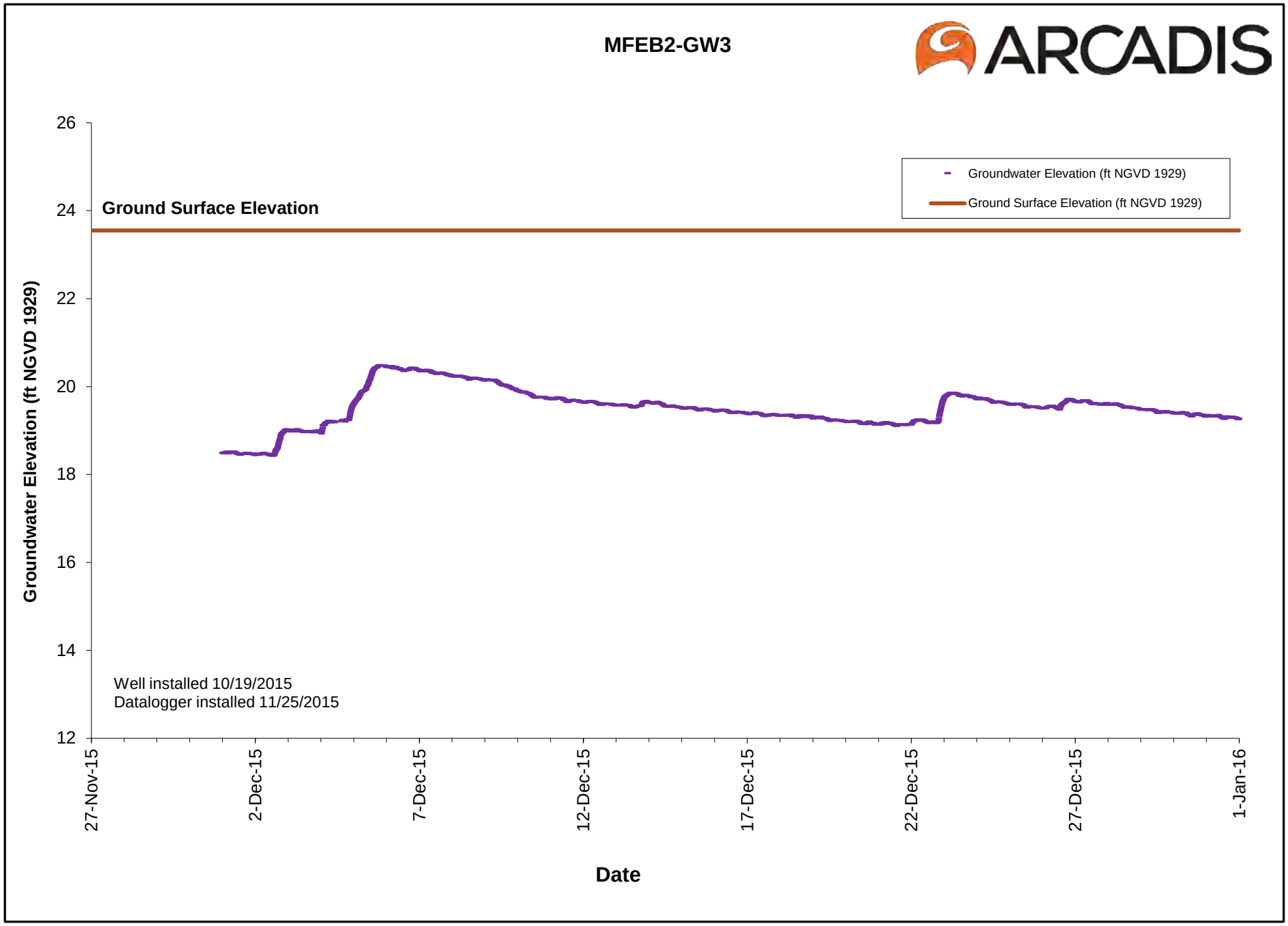
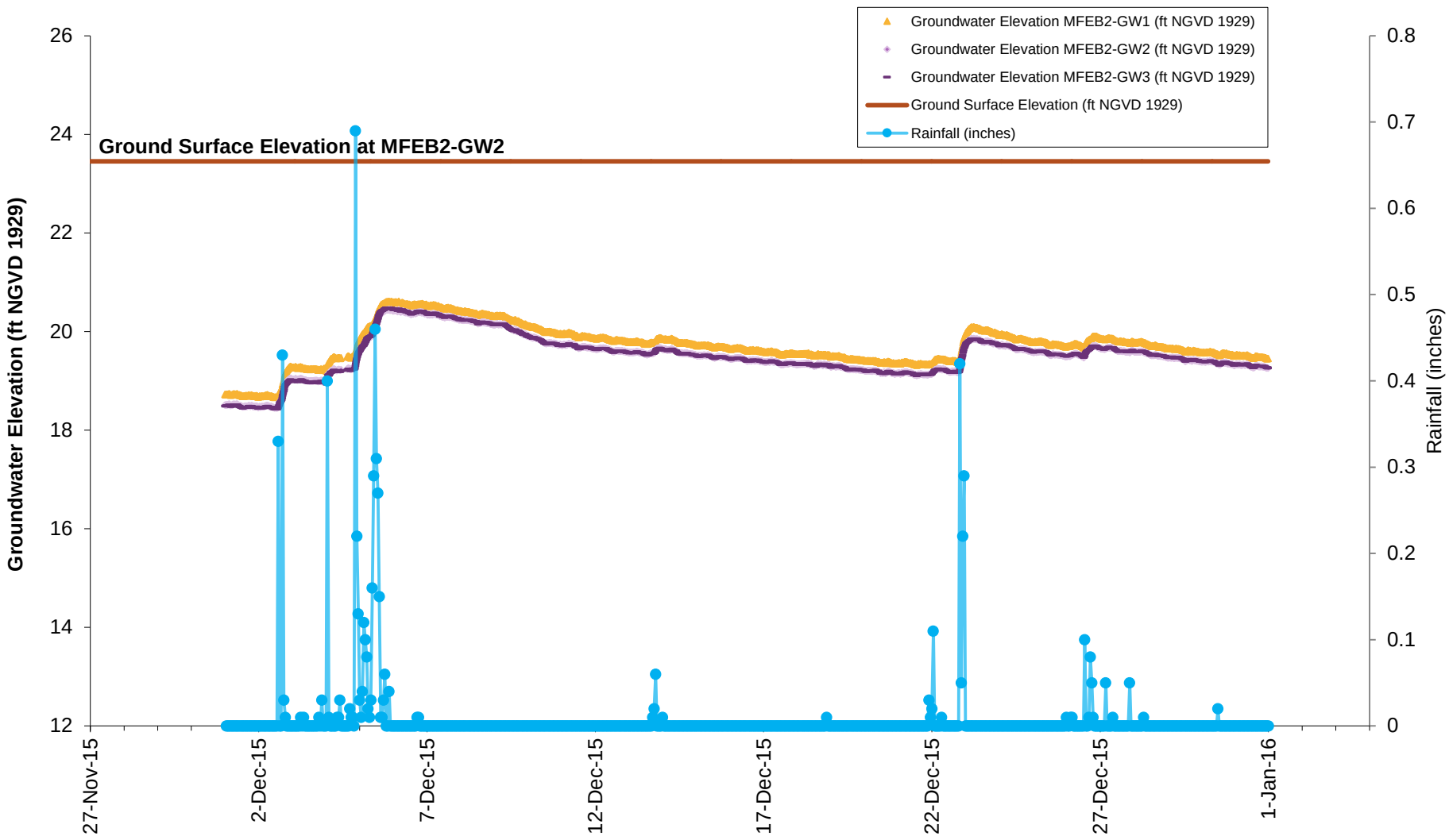
17-Dec-15
22-Dec-15
27-Dec-15
1-Jan-16
Date

MFEB2-GW2


Groundwater Elevation (ft NGVD 1929)
Ground Surface Elevation (ft NGVD 1929)
Ground Surface Elevation
Groundwater Elevation (ft NGVD 1929)
26
24
22
20
18
16
14
12
Well Installed 10/19/2015
Datalogger Installed 11/25/2015
27-Nov-15
2-Dec-15
7-Dec-15
12-Dec-15
17-Dec-15
22-Dec-15
27-Dec-15
1-Jan-16
Date

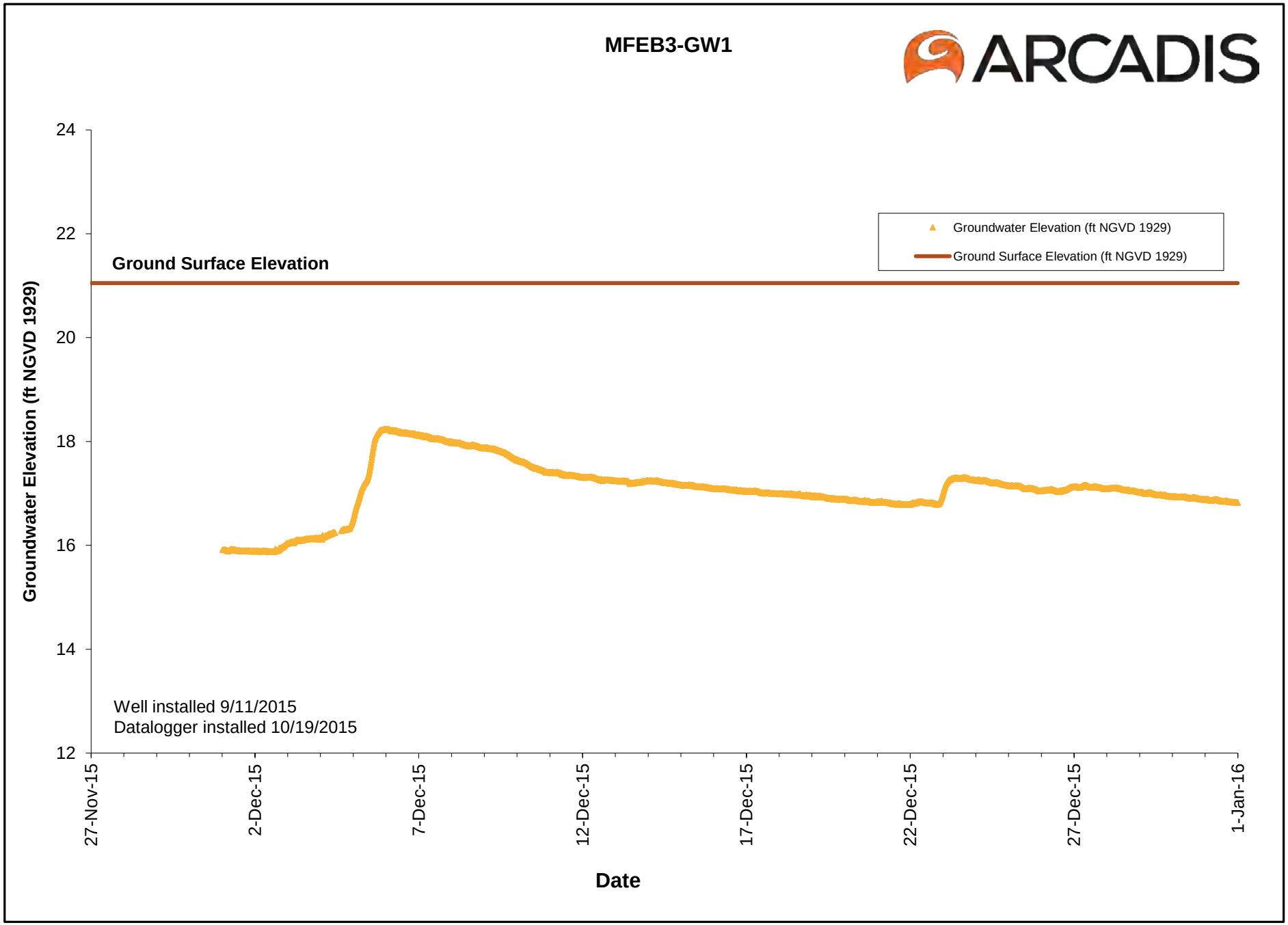

MFEB2-GW3
ARCADIS
Groundwater Elevation (ft NGVD 1929)
Ground Surface Elevation (ft NGVD 1929)
Ground Surface Elevation
Groundwater Elevation (ft NGVD 1929)
26
24
22
20
18
16
14
12
Well installed 10/19/2015
Datalogger installed 11/25/2015
27-Nov-15
2-Dec-15
7-Dec-15
12-Dec-15
17-Dec-15
22-Dec-15
27-Dec-15
1-Jan-16
Date

MFEB2 Cluster

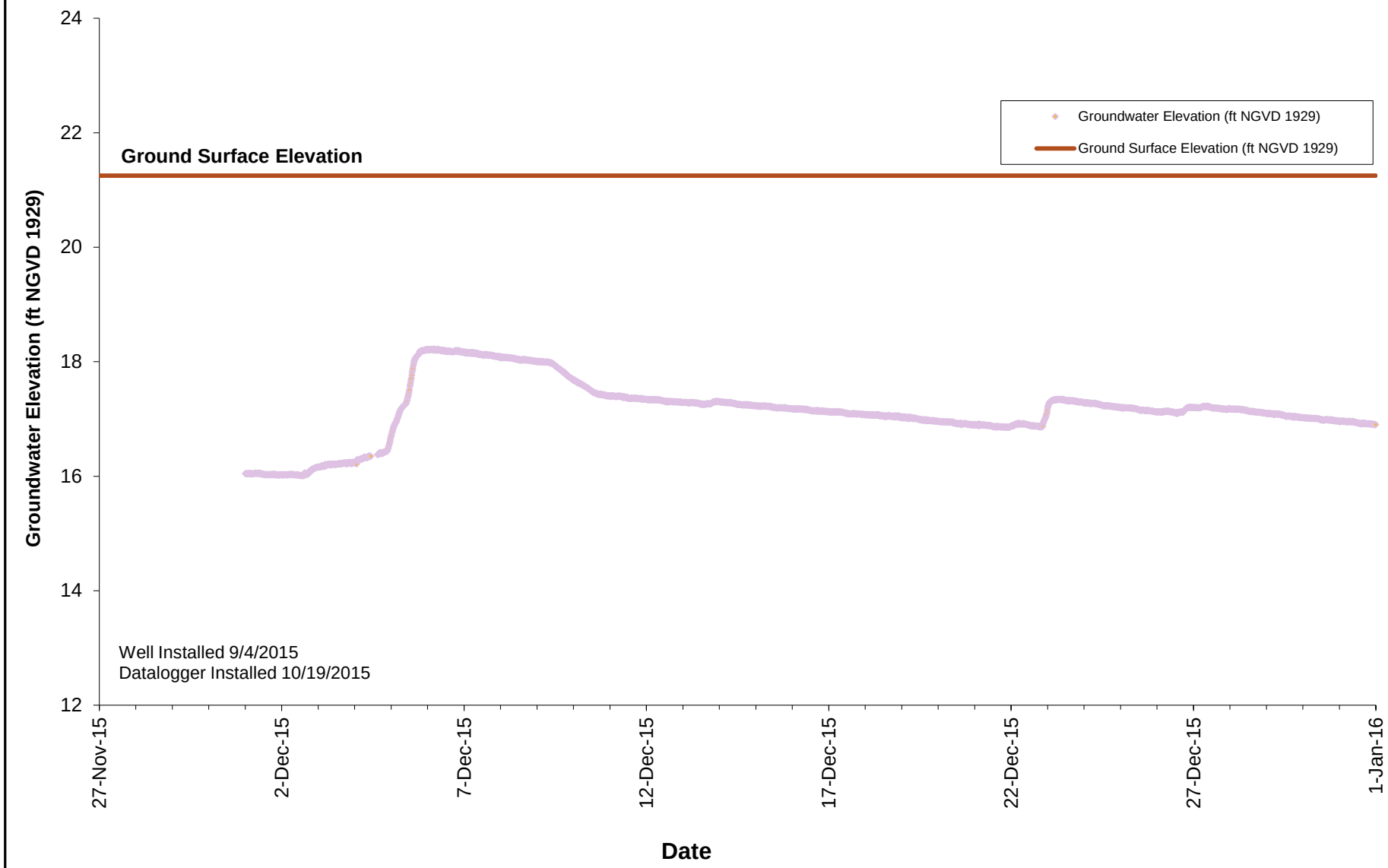


*Rainfall data is sourced from MECCA weather station.

MFEB3-GW1


Groundwater Elevation (ft NGVD 1929)
Ground Surface Elevation (ft NGVD 1929)
Ground Surface Elevation
Groundwater Elevation (ft NGVD 1929)
24
22
20
18
16
14
12
Well installed 9/11/2015
Datalogger installed 10/19/2015
27-Nov-15
2-Dec-15
7-Dec-15
12-Dec-15
17-Dec-15
22-Dec-15
27-Dec-15
1-Jan-16
Date

MFEB3-GW2


Groundwater Elevation (ft NGVD 1929)
Ground Surface Elevation (ft NGVD 1929)
Ground Surface Elevation
Groundwater Elevation (ft NGVD 1929)
24
22
20
18
16
14
12
Well Installed 9/4/2015
Datalogger Installed 10/19/2015
27-Nov-15
2-Dec-15
7-Dec-15
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17-Dec-15
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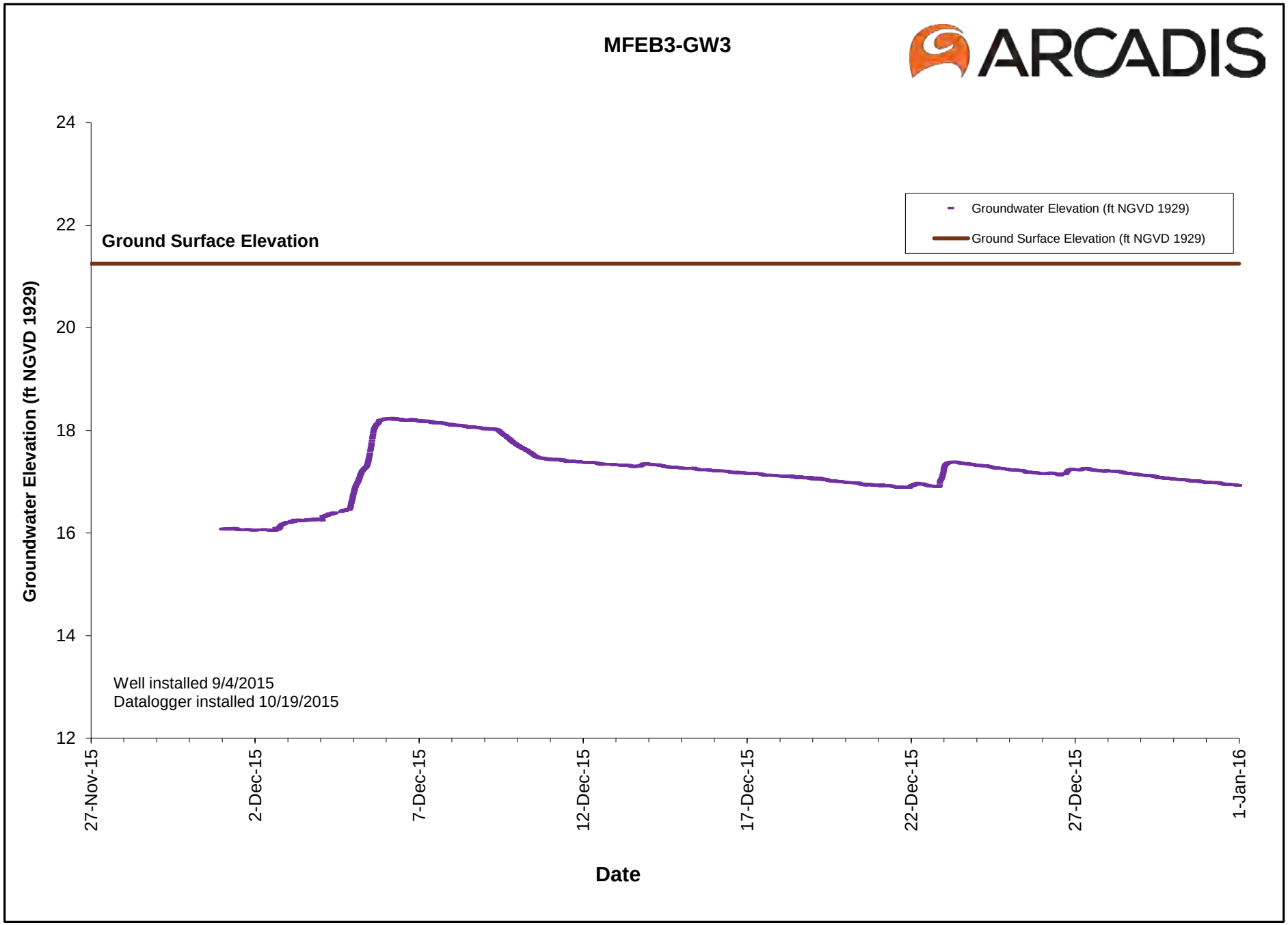
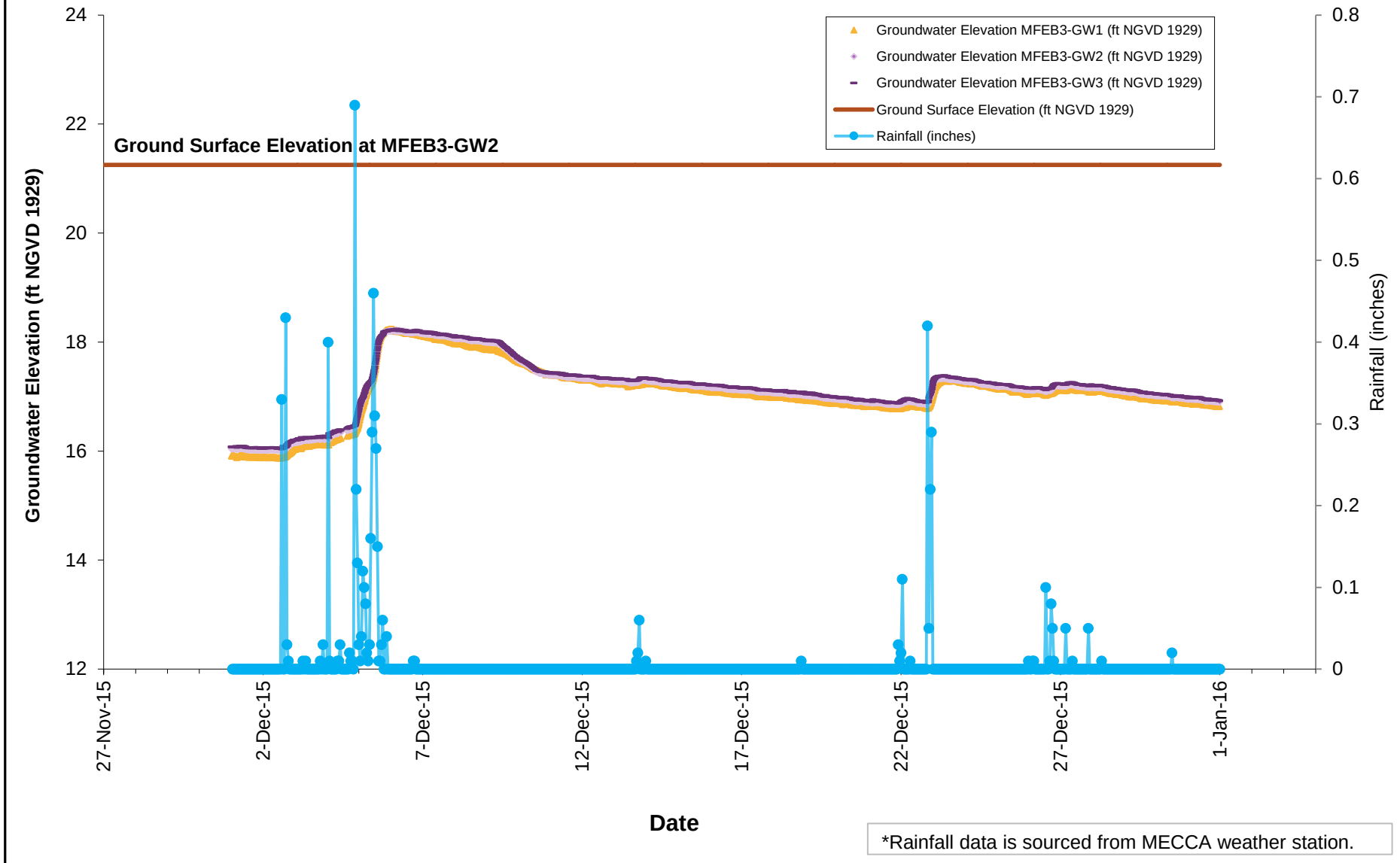
1-Jan-16
Date

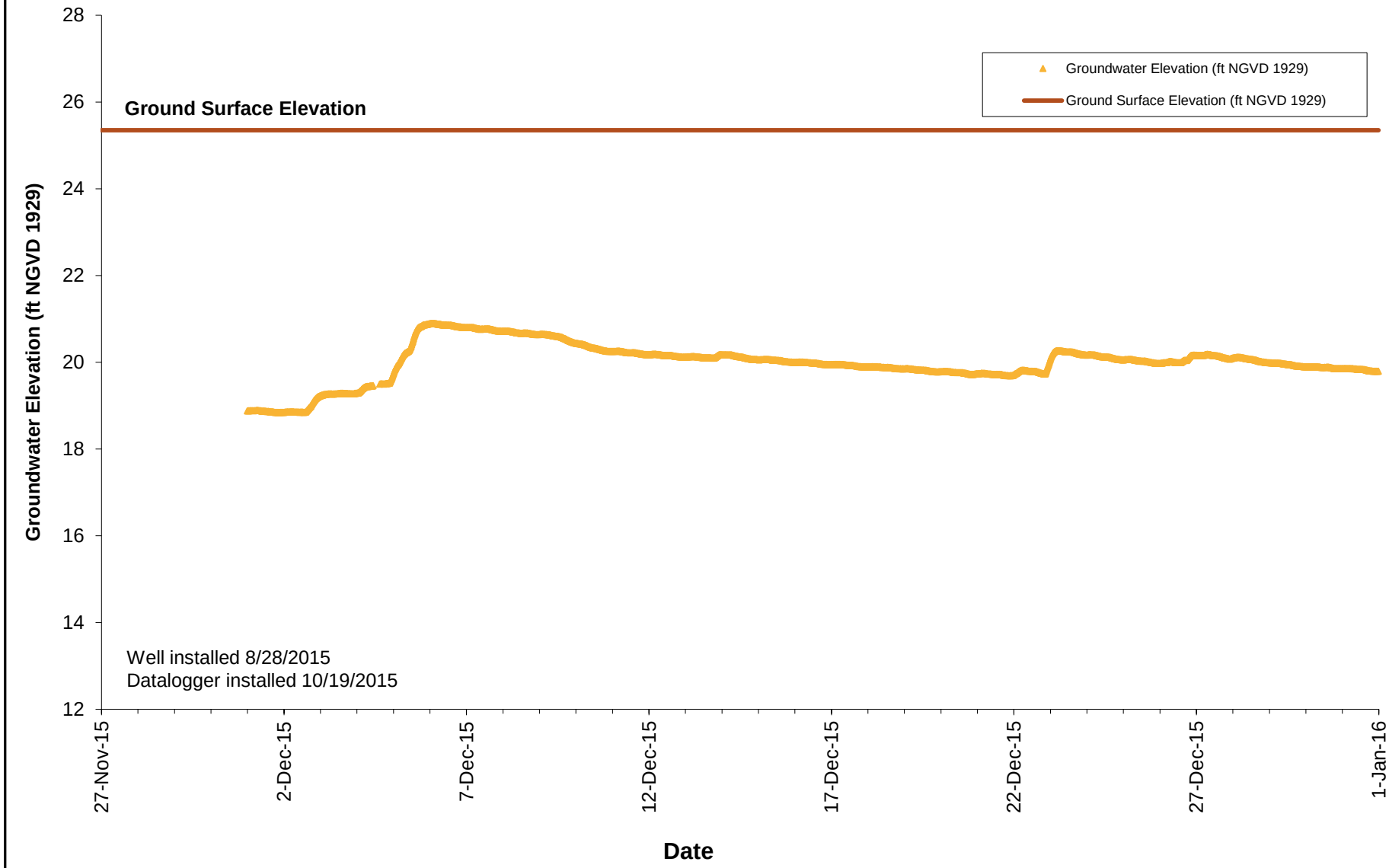

MFEB3-GW3
ARCADIS
Groundwater Elevation (ft NGVD 1929)
Ground Surface Elevation (ft NGVD 1929)
Ground Surface Elevation
Groundwater Elevation (ft NGVD 1929)
24
22
20
18
16
14
12
Well installed 9/4/2015
Datalogger installed 10/19/2015
27-Nov-15
2-Dec-15
7-Dec-15
12-Dec-15
17-Dec-15
22-Dec-15
27-Dec-15
1-Jan-16
Date

MFEB3 Cluster

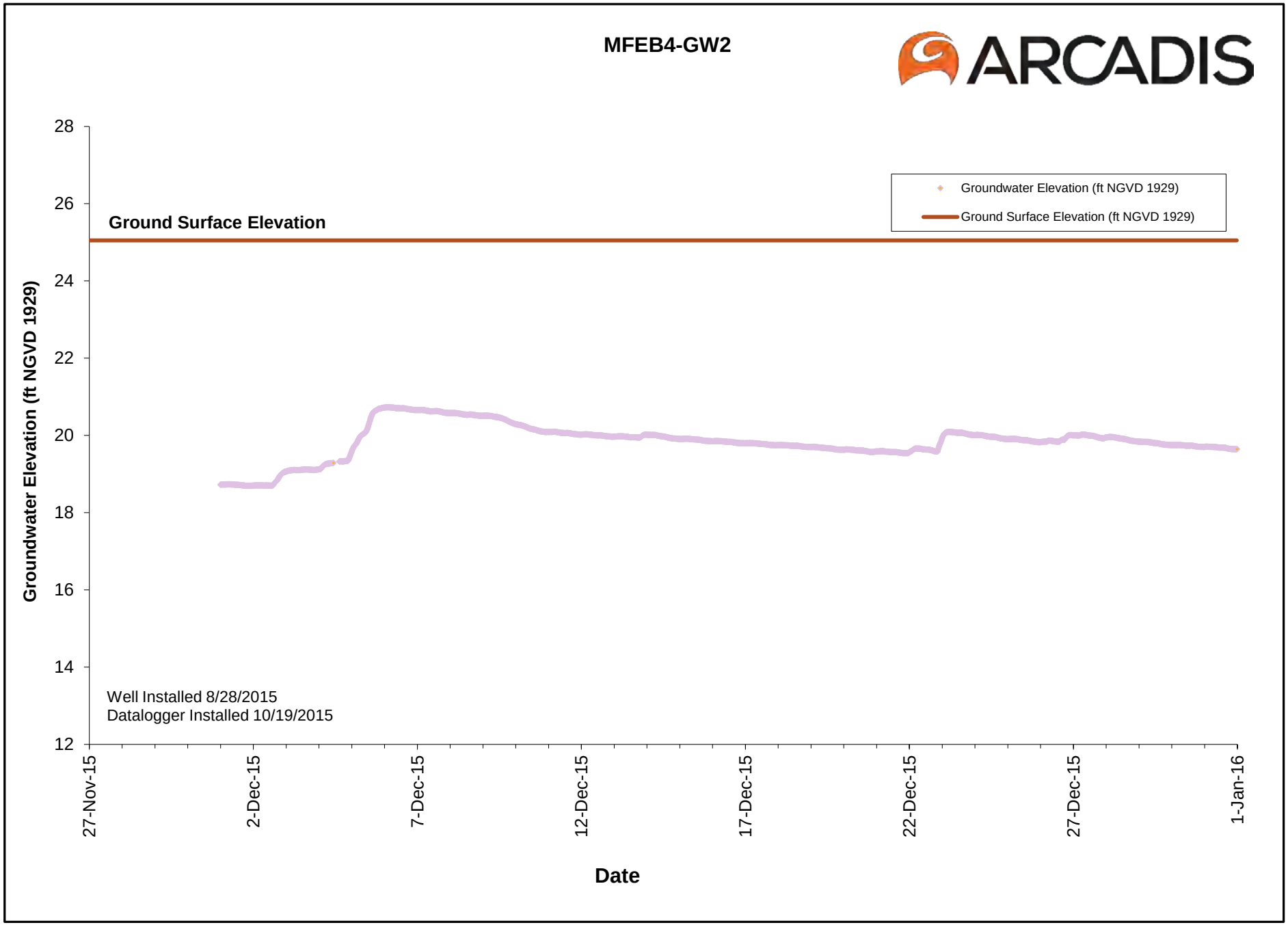


*Rainfall data is sourced from MECCA weather station.

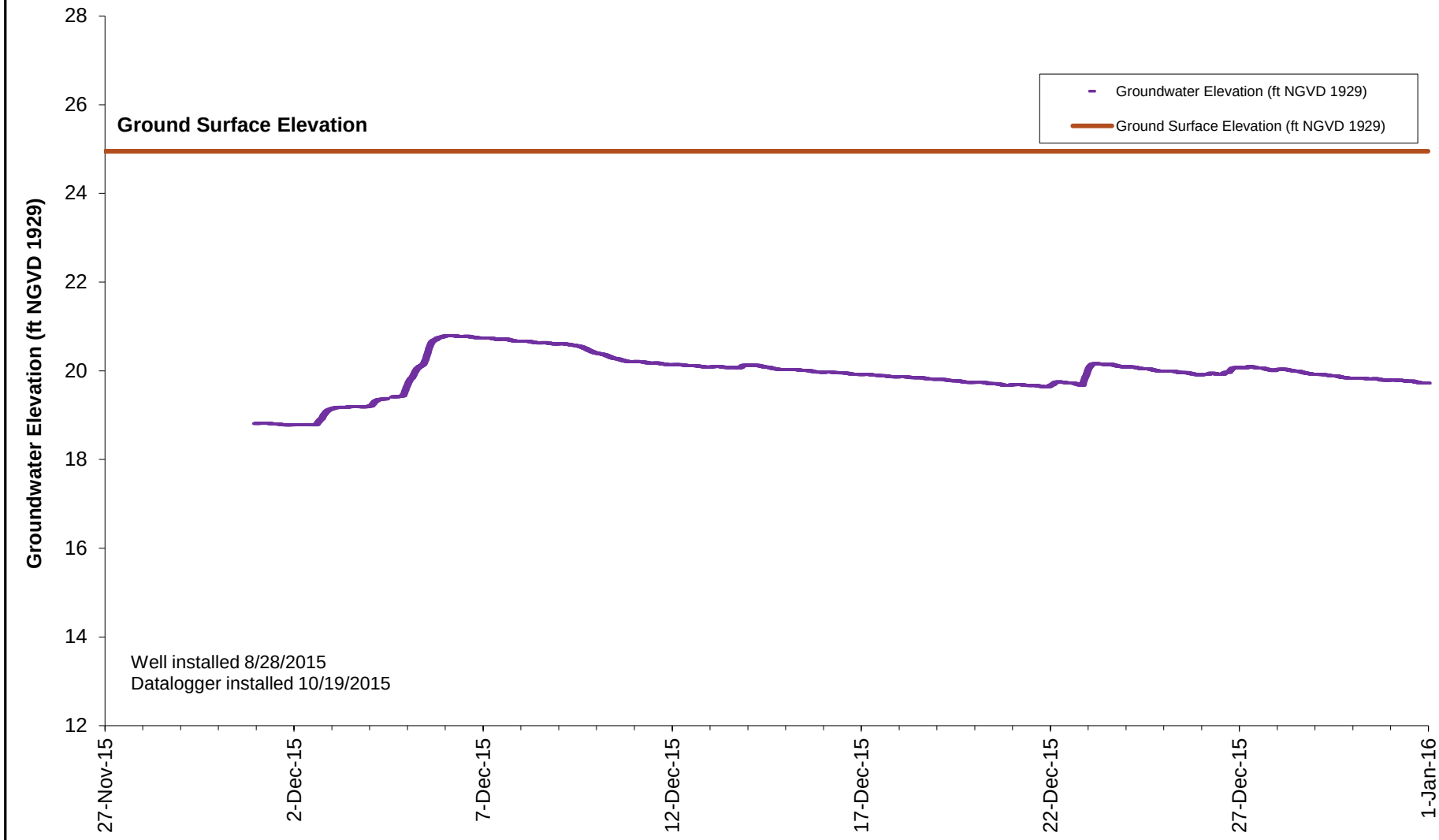
MFEB4-GW1


Groundwater Elevation (ft NGVD 1929)
Ground Surface Elevation (ft NGVD 1929)
Ground Surface Elevation
Groundwater Elevation (ft NGVD 1929)
28
26
24
22
20
18
16
14
12
Well installed 8/28/2015
Datalogger installed 10/19/2015
27-Nov-15
2-Dec-15
7-Dec-15
12-Dec-15
17-Dec-15
22-Dec-15
27-Dec-15
1-Jan-16
Date

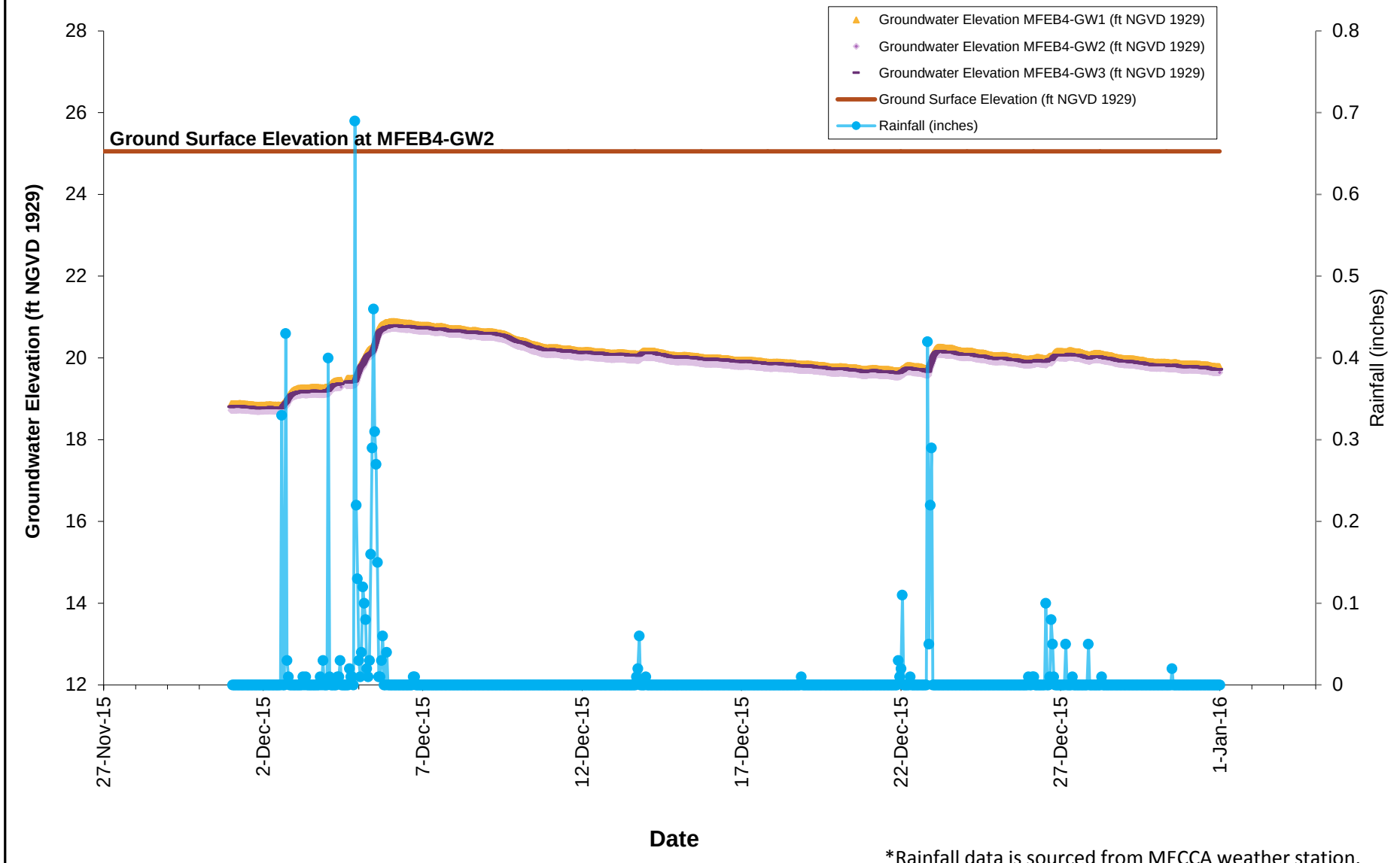
MFEB4-GW2


Groundwater Elevation (ft NGVD 1929)
Ground Surface Elevation (ft NGVD 1929)
Ground Surface Elevation
Groundwater Elevation (ft NGVD 1929)
28
26
24
22
20
18
16
14
12
Well Installed 8/28/2015
Datalogger Installed 10/19/2015
27-Nov-15
2-Dec-15
7-Dec-15
12-Dec-15
17-Dec-15
22-Dec-15
27-Dec-15
1-Jan-16
Date

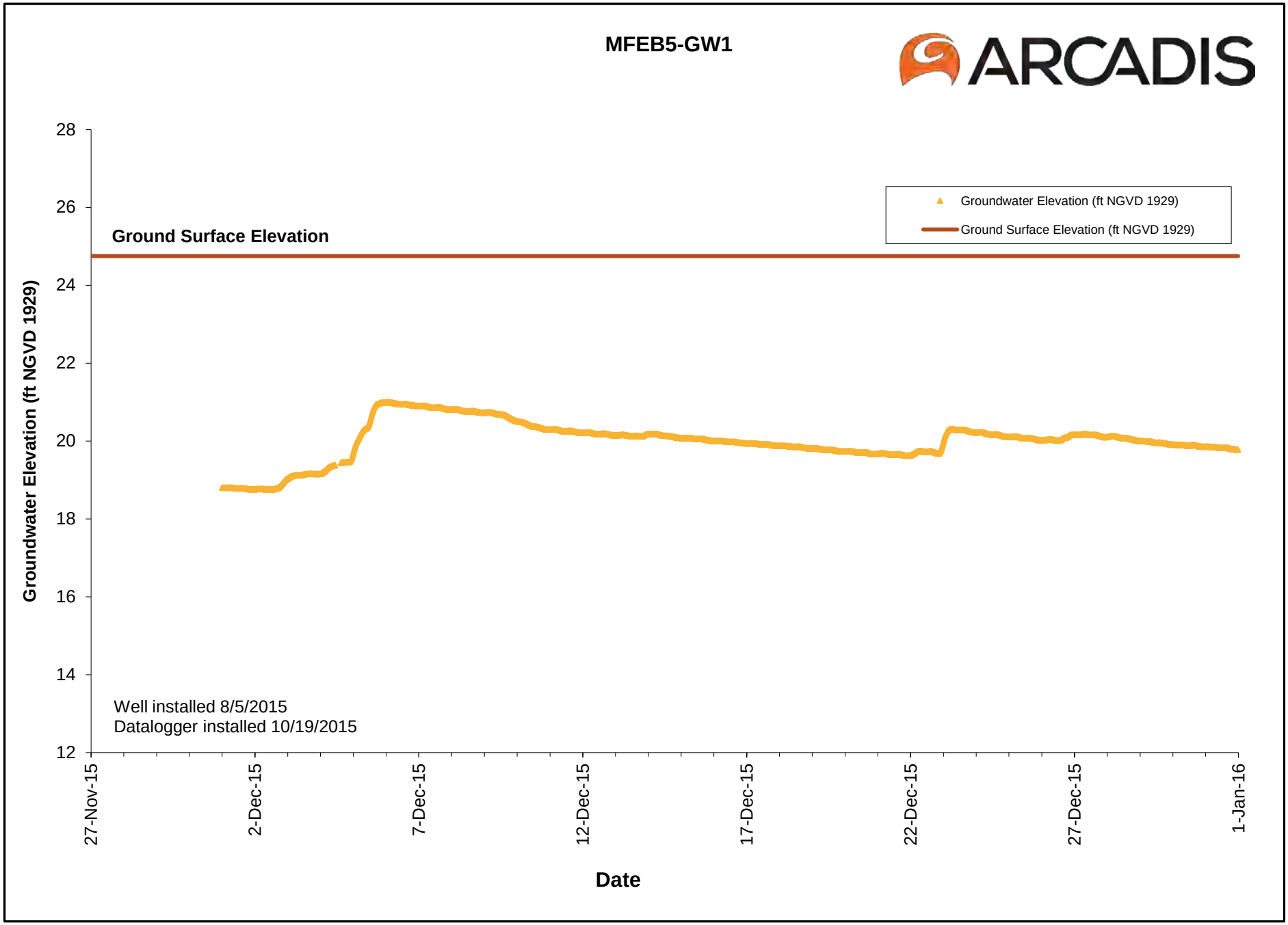
MFEB4-GW3


Groundwater Elevation (ft NGVD 1929)
Ground Surface Elevation (ft NGVD 1929)
Ground Surface Elevation
Groundwater Elevation (ft NGVD 1929)
28
26
24
22
20
18
16
14
12
Well installed 8/28/2015
Datalogger installed 10/19/2015
27-Nov-15
2-Dec-15
7-Dec-15
12-Dec-15
17-Dec-15
22-Dec-15
27-Dec-15
1-Jan-16
Date

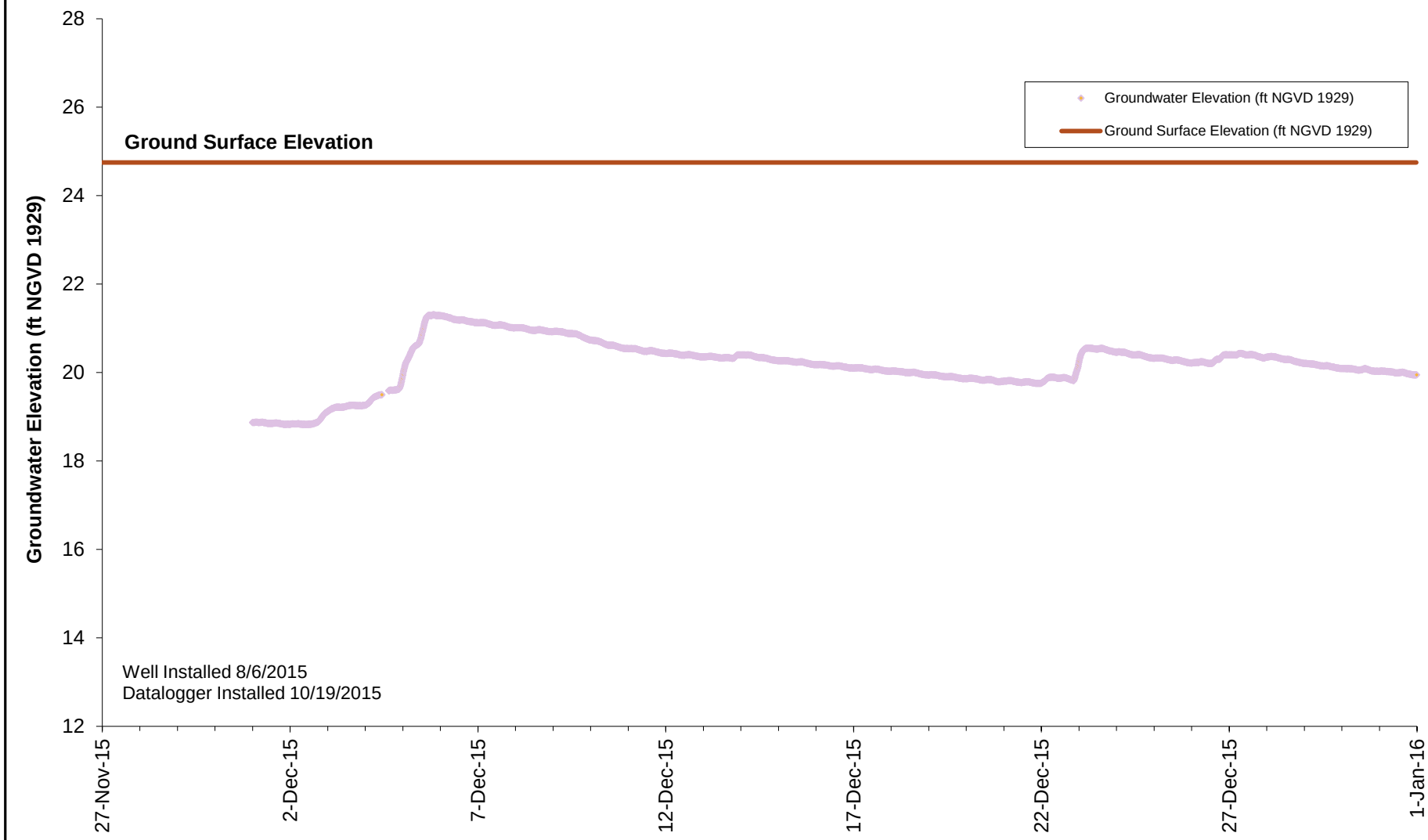
MFEB4 Cluster



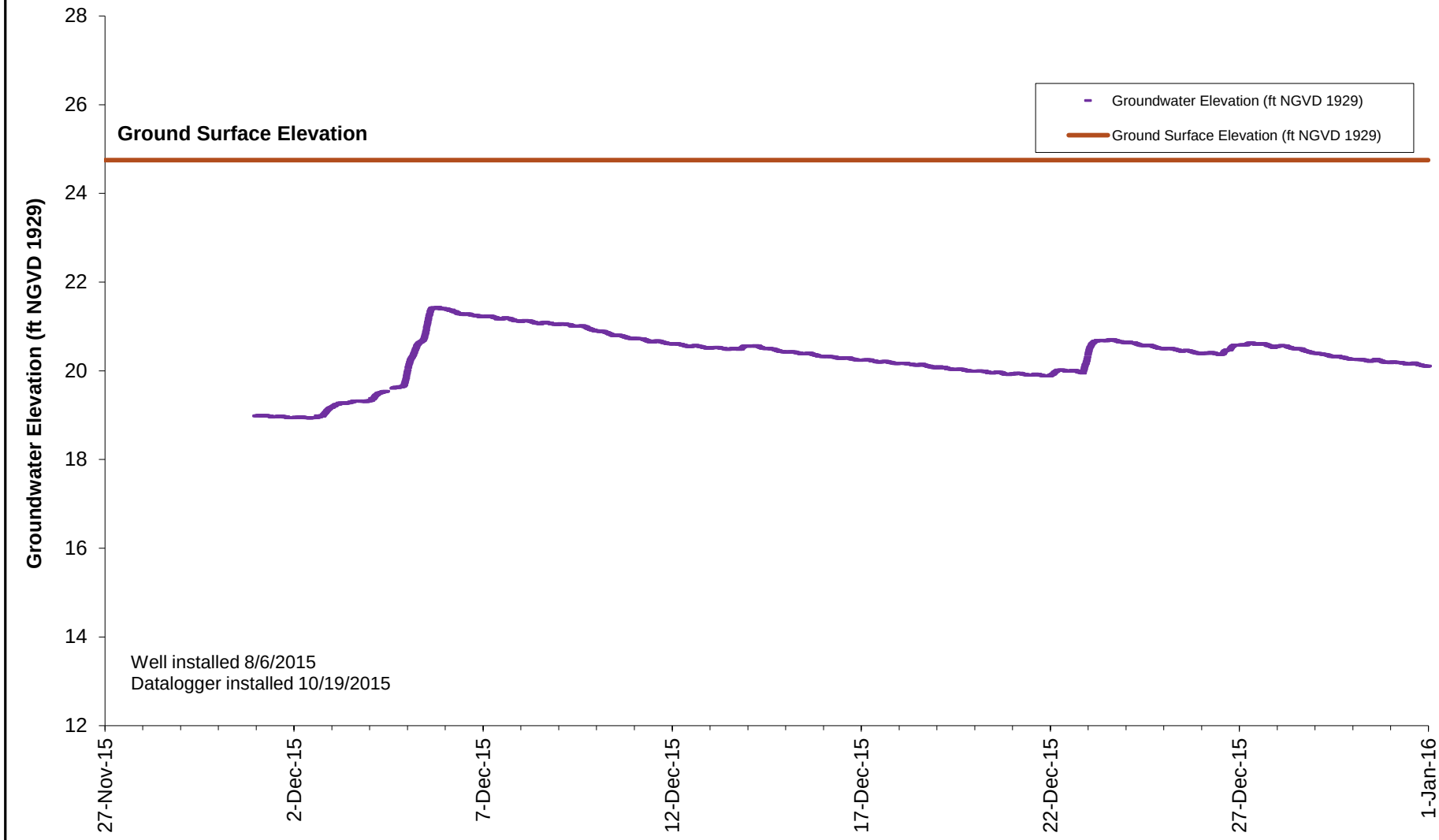
*Rainfall data is sourced from MECCA weather station.


MFEB5-GW1
ARCADIS
Groundwater Elevation (ft NGVD 1929)
Ground Surface Elevation (ft NGVD 1929)
Ground Surface Elevation
Groundwater Elevation (ft NGVD 1929)
28
26
24
22
20
18
16
14
12
Well installed 8/5/2015
Datalogger installed 10/19/2015
27-Nov-15
2-Dec-15
7-Dec-15
12-Dec-15
17-Dec-15
22-Dec-15
27-Dec-15
1-Jan-16
Date

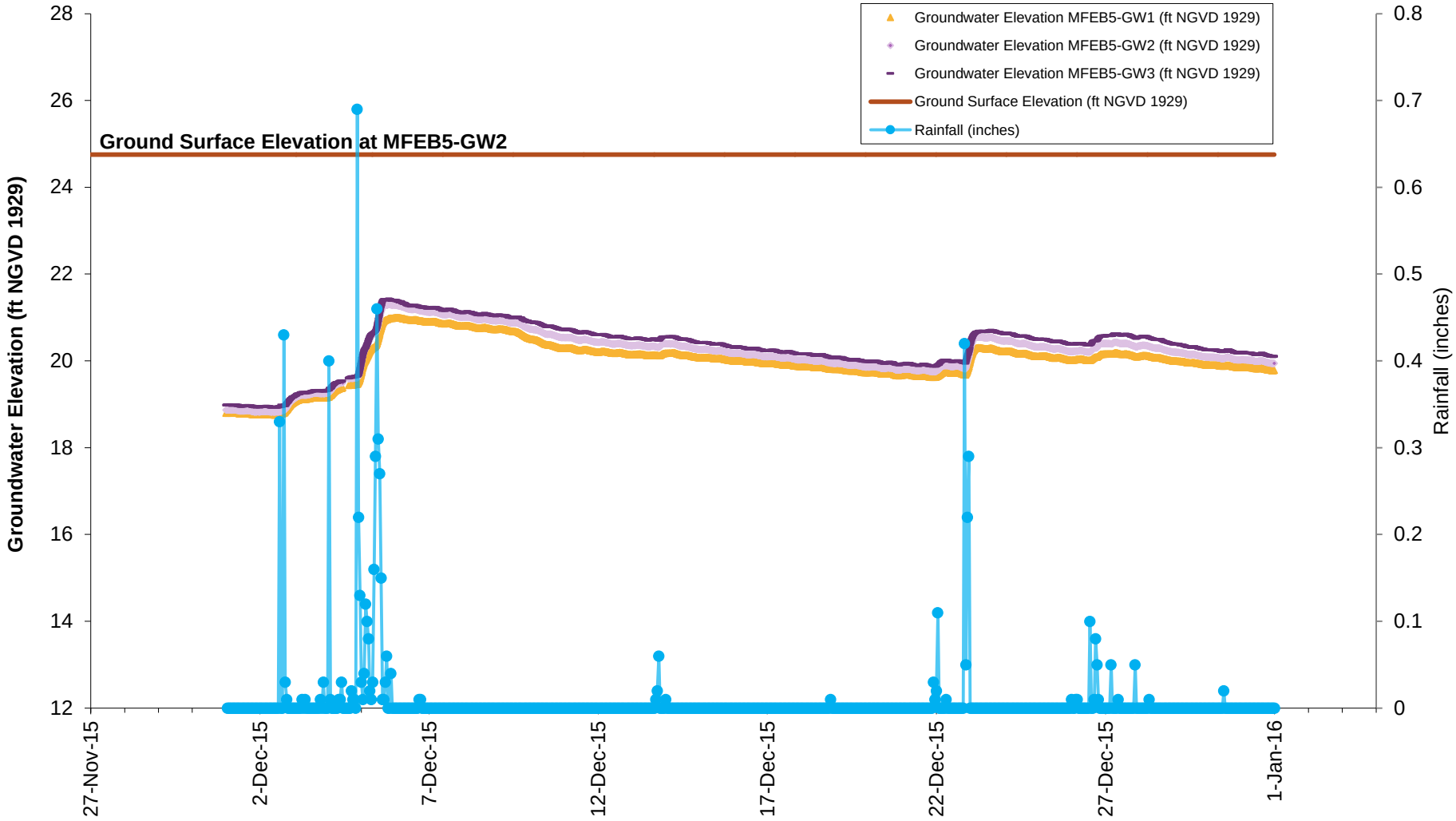
MFEB5-GW2


Groundwater Elevation (ft NGVD 1929)
Ground Surface Elevation (ft NGVD 1929)
Ground Surface Elevation
Groundwater Elevation (ft NGVD 1929)
28
26
24
22
20
18
16
14
12
Well Installed 8/6/2015
Datalogger Installed 10/19/2015
27-Nov-15
2-Dec-15
7-Dec-15
12-Dec-15
17-Dec-15
22-Dec-15
27-Dec-15
1-Jan-16
Date

MFEB5-GW3

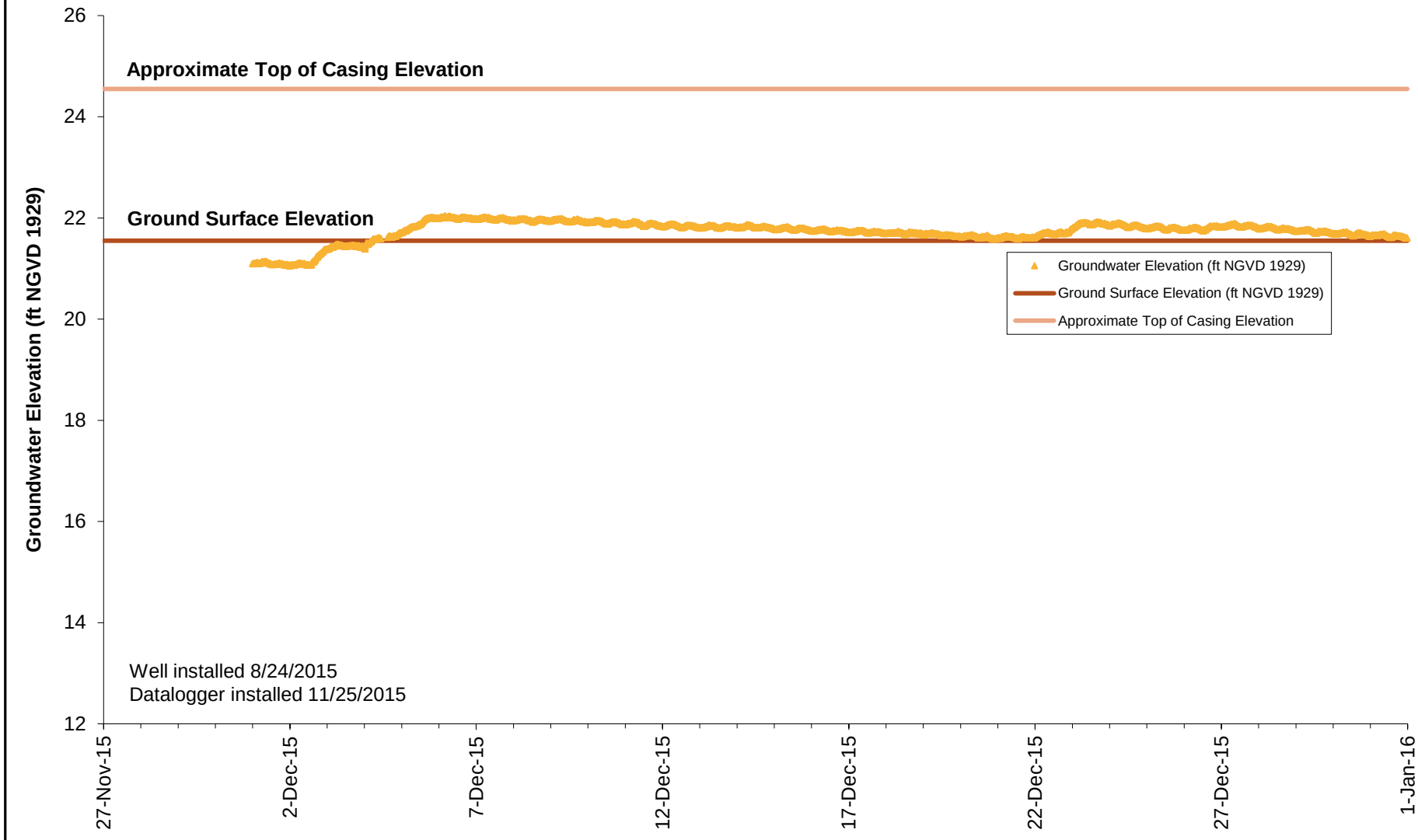

Groundwater Elevation (ft NGVD 1929)
Ground Surface Elevation (ft NGVD 1929)
Ground Surface Elevation
Groundwater Elevation (ft NGVD 1929)
28
26
24
22
20
18
16
14
12
Well installed 8/6/2015
Datalogger installed 10/19/2015
27-Nov-15
2-Dec-15
7-Dec-15
12-Dec-15
17-Dec-15
22-Dec-15
27-Dec-15
1-Jan-16
Date

MFEB5 Cluster

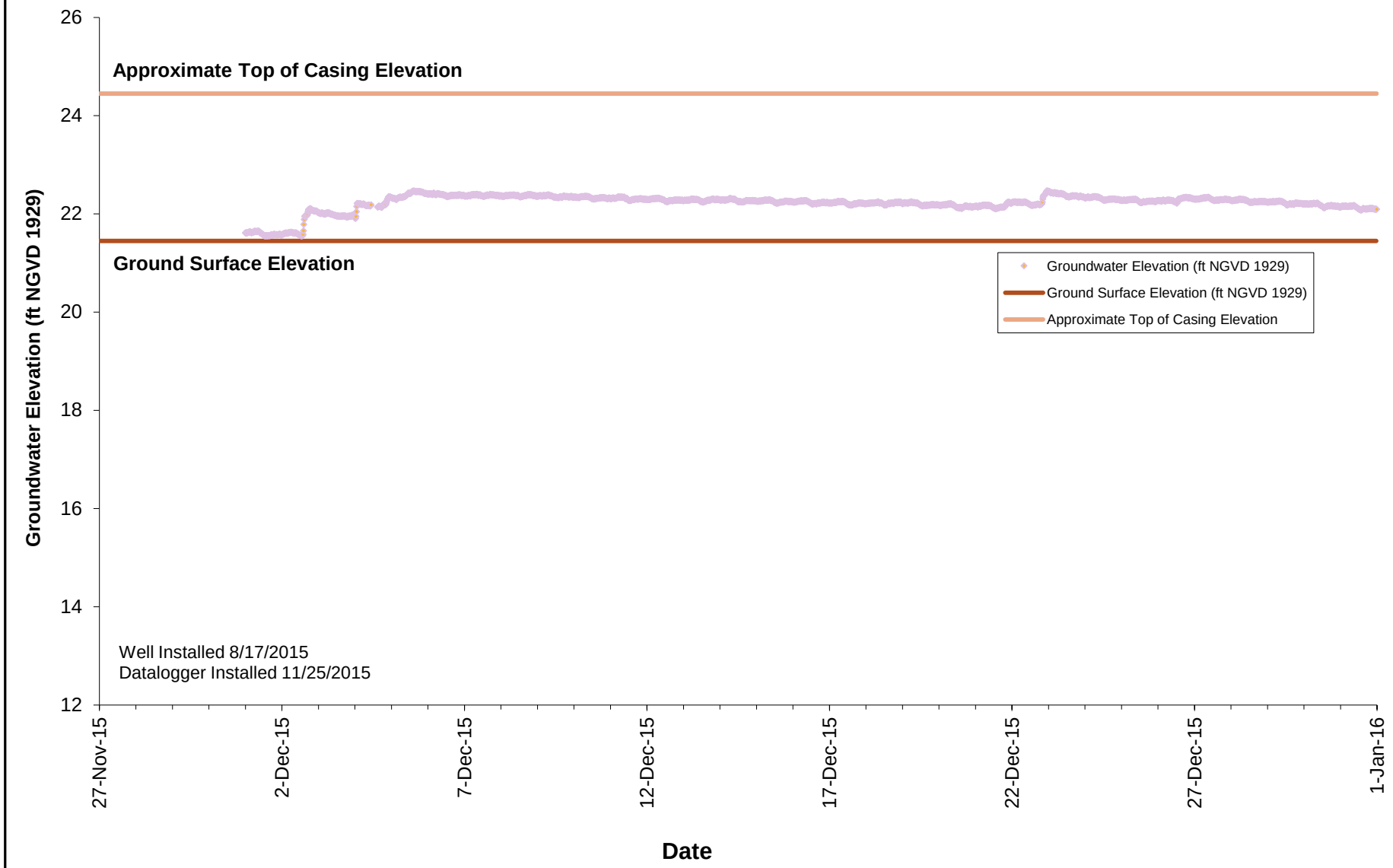


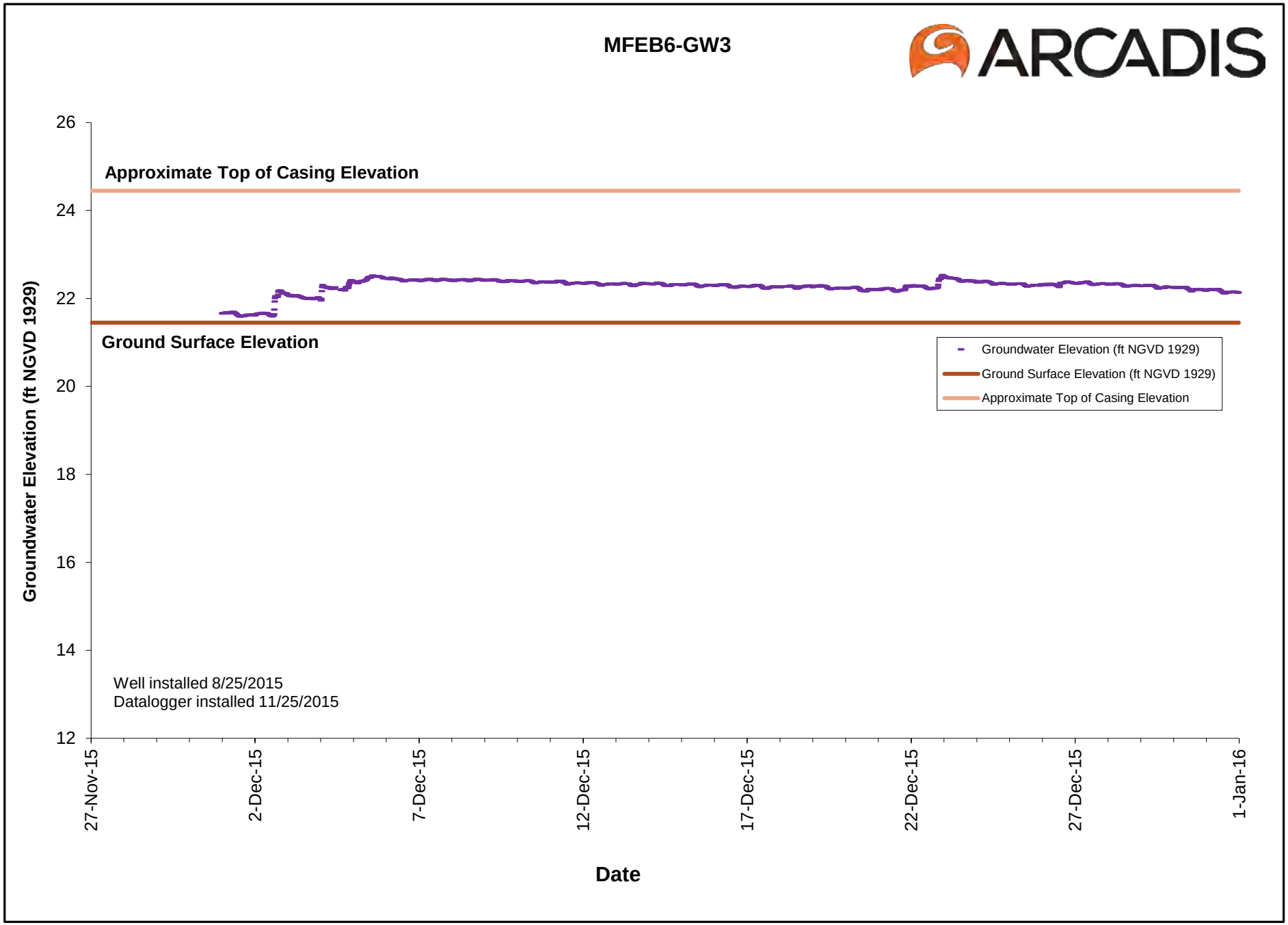
*Rainfall data is sourced from MECCA weather station.

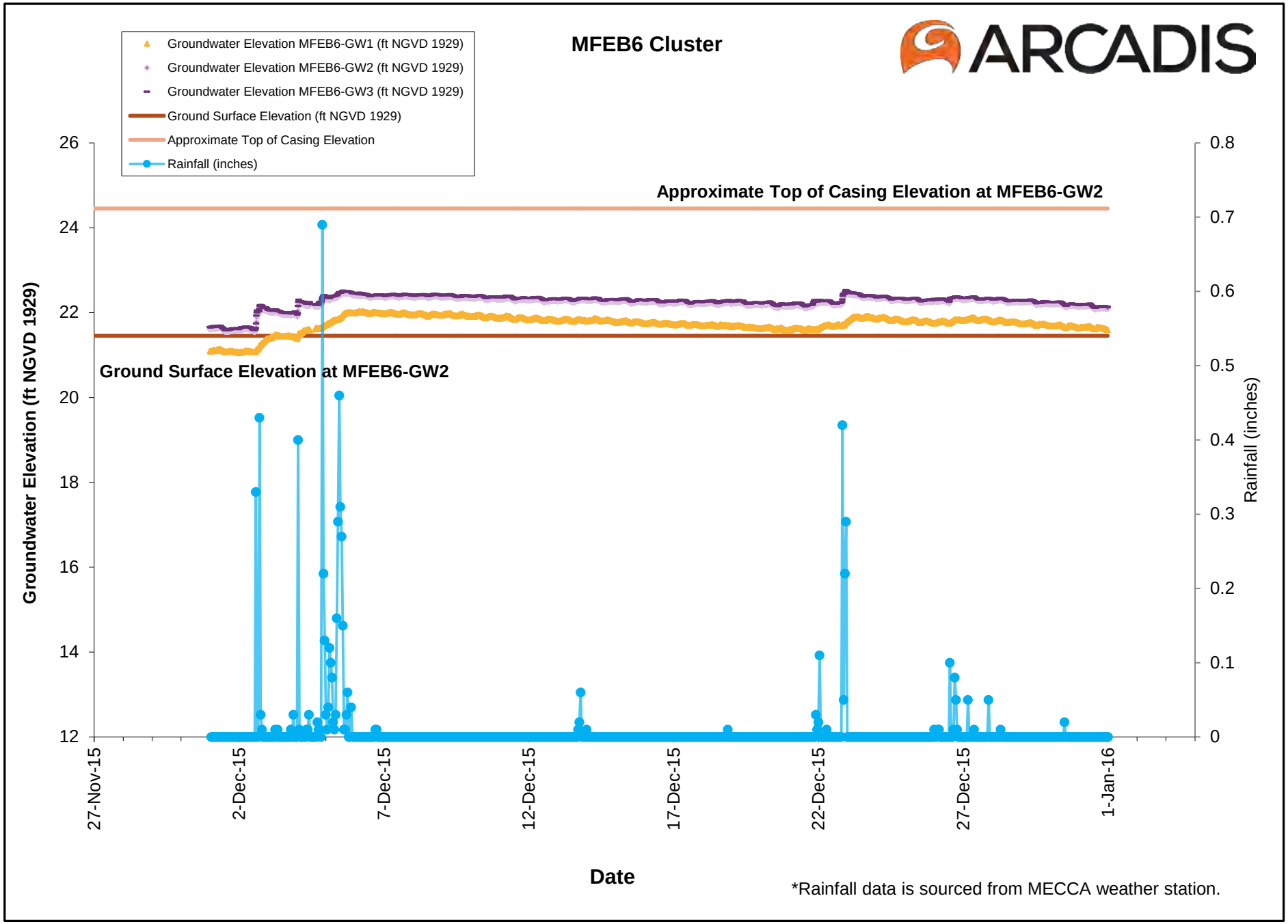
MFEB6-GW1


Approximate Top of Casing Elevation
Ground Surface Elevation
Groundwater Elevation (ft NGVD 1929)
Ground Surface Elevation (ft NGVD 1929)
Approximate Top of Casing Elevation
Well installed 8/24/2015
Datalogger installed 11/25/2015
Groundwater Elevation (ft NGVD 1929)
26
24
22
20
18
16
14
12
27-Nov-15
2-Dec-15
7-Dec-15
12-Dec-15
17-Dec-15
22-Dec-15
27-Dec-15
1-Jan-16
Date

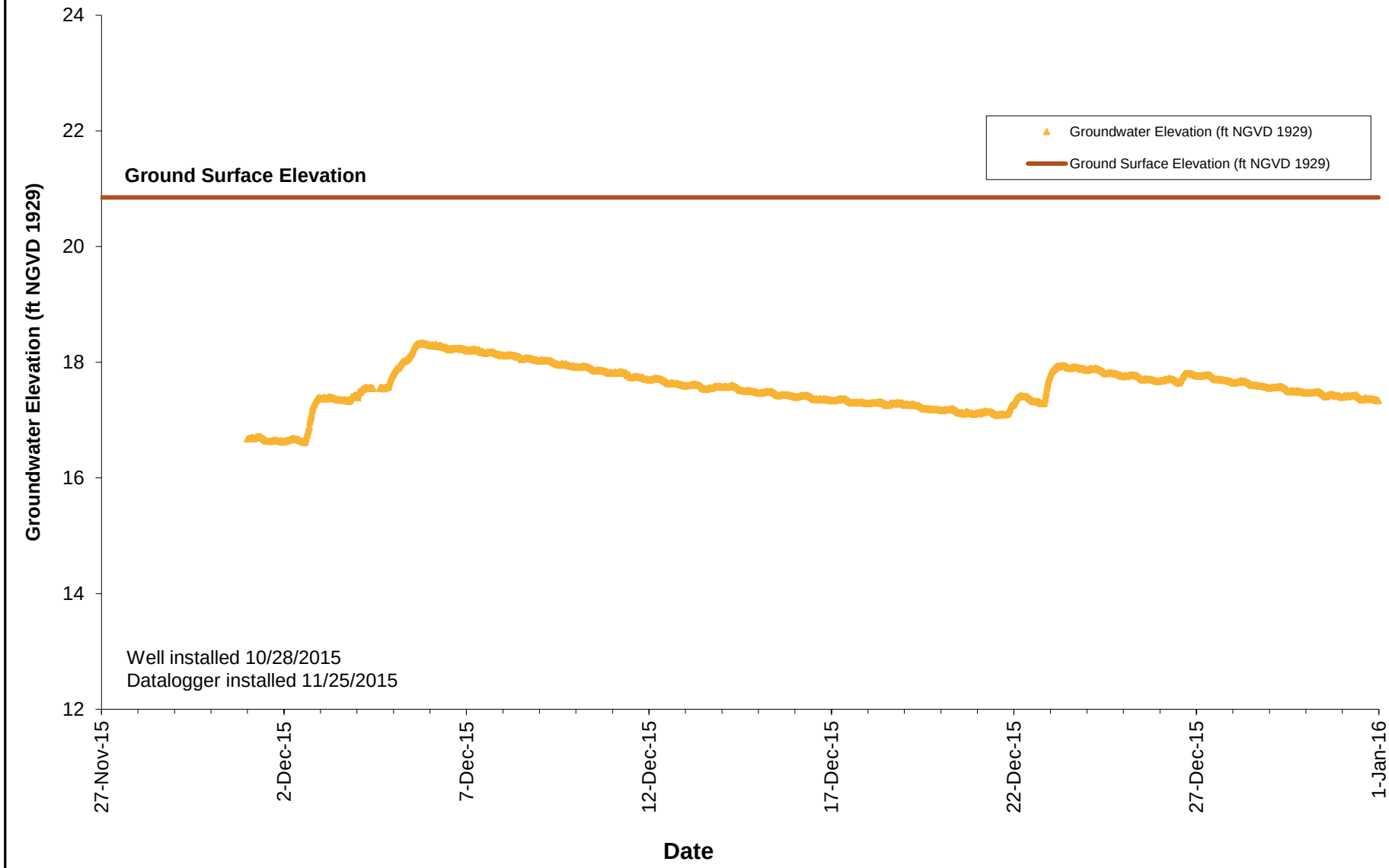
MFEB6-GW2


Groundwater Elevation (ft NGVD 1929)
26
24
22
20
18
16
14
12
Approximate Top of Casing Elevation
Ground Surface Elevation
Groundwater Elevation (ft NGVD 1929)
Ground Surface Elevation (ft NGVD 1929)
Approximate Top of Casing Elevation
Well Installed 8/17/2015
Datalogger Installed 11/25/2015
27-Nov-15
2-Dec-15
7-Dec-15
12-Dec-15
17-Dec-15
22-Dec-15
27-Dec-15
1-Jan-16
Date

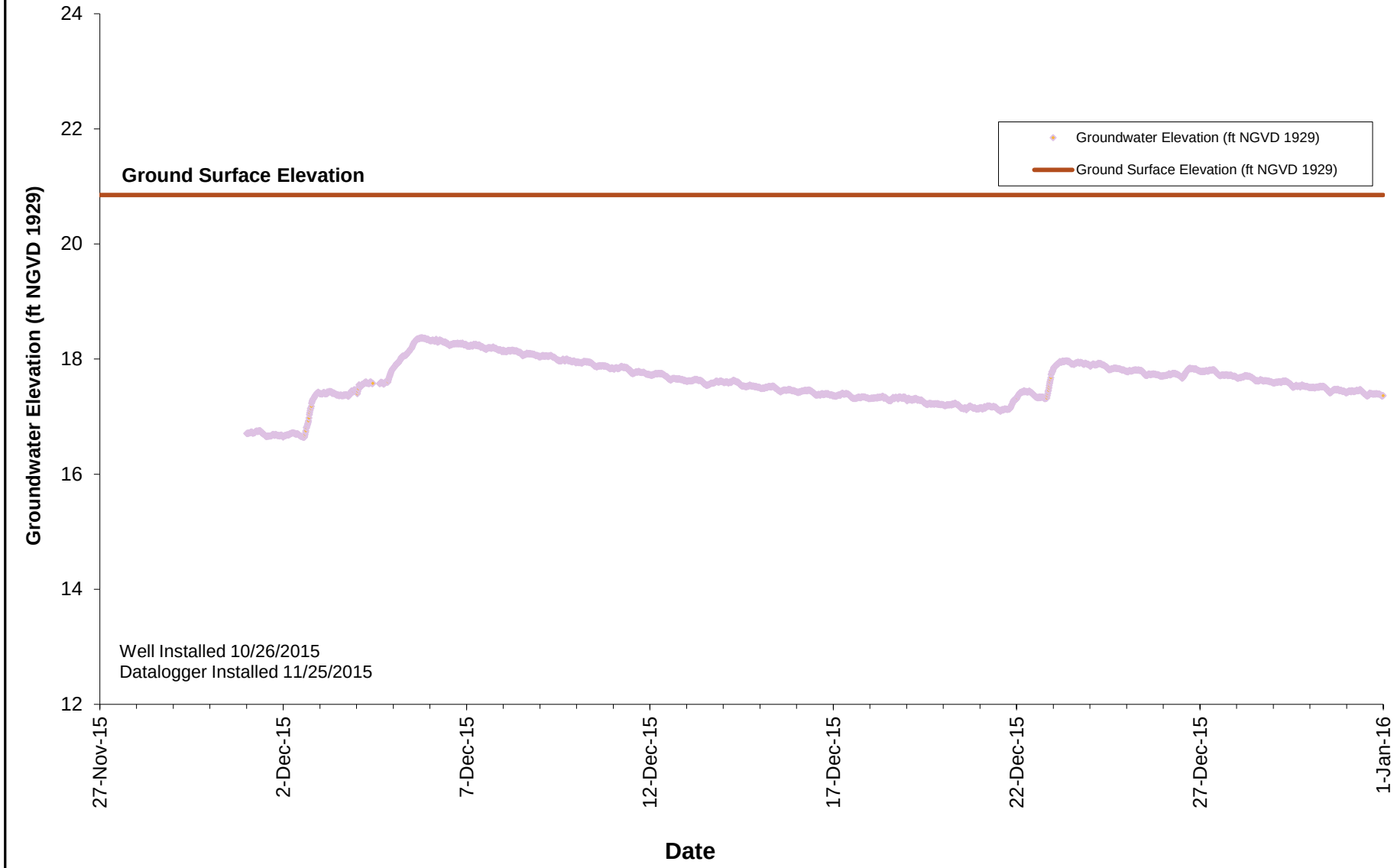

MFEB6-GW3
ARCADIS
Approximate Top of Casing Elevation
Ground Surface Elevation
Groundwater Elevation (ft NGVD 1929)
Ground Surface Elevation (ft NGVD 1929)
Approximate Top of Casing Elevation
Well installed 8/25/2015
Datalogger installed 11/25/2015
Groundwater Elevation (ft NGVD 1929)
26
24
22
20
18
16
14
12
27-Nov-15
2-Dec-15
7-Dec-15
12-Dec-15
17-Dec-15
22-Dec-15
27-Dec-15
1-Jan-16
Date


MFEB6 Cluster
ARCADIS
Groundwater Elevation MFEB6-GW1 (ft NGVD 1929)
Groundwater Elevation MFEB6-GW2 (ft NGVD 1929)
Groundwater Elevation MFEB6-GW3 (ft NGVD 1929)
Ground Surface Elevation (ft NGVD 1929)
Approximate Top of Casing Elevation
Rainfall (inches)
Approximate Top of Casing Elevation at MFEB6-GW2
Ground Surface Elevation at MFEB6-GW2
Groundwater Elevation (ft NGVD 1929)
Rainfall (inches)
26
24
22
20
18
16
14
12
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
27-Nov-15
2-Dec-15
7-Dec-15
12-Dec-15
17-Dec-15
22-Dec-15
27-Dec-15
1-Jan-16
Date
*Rainfall data is sourced from MECCA weather station.

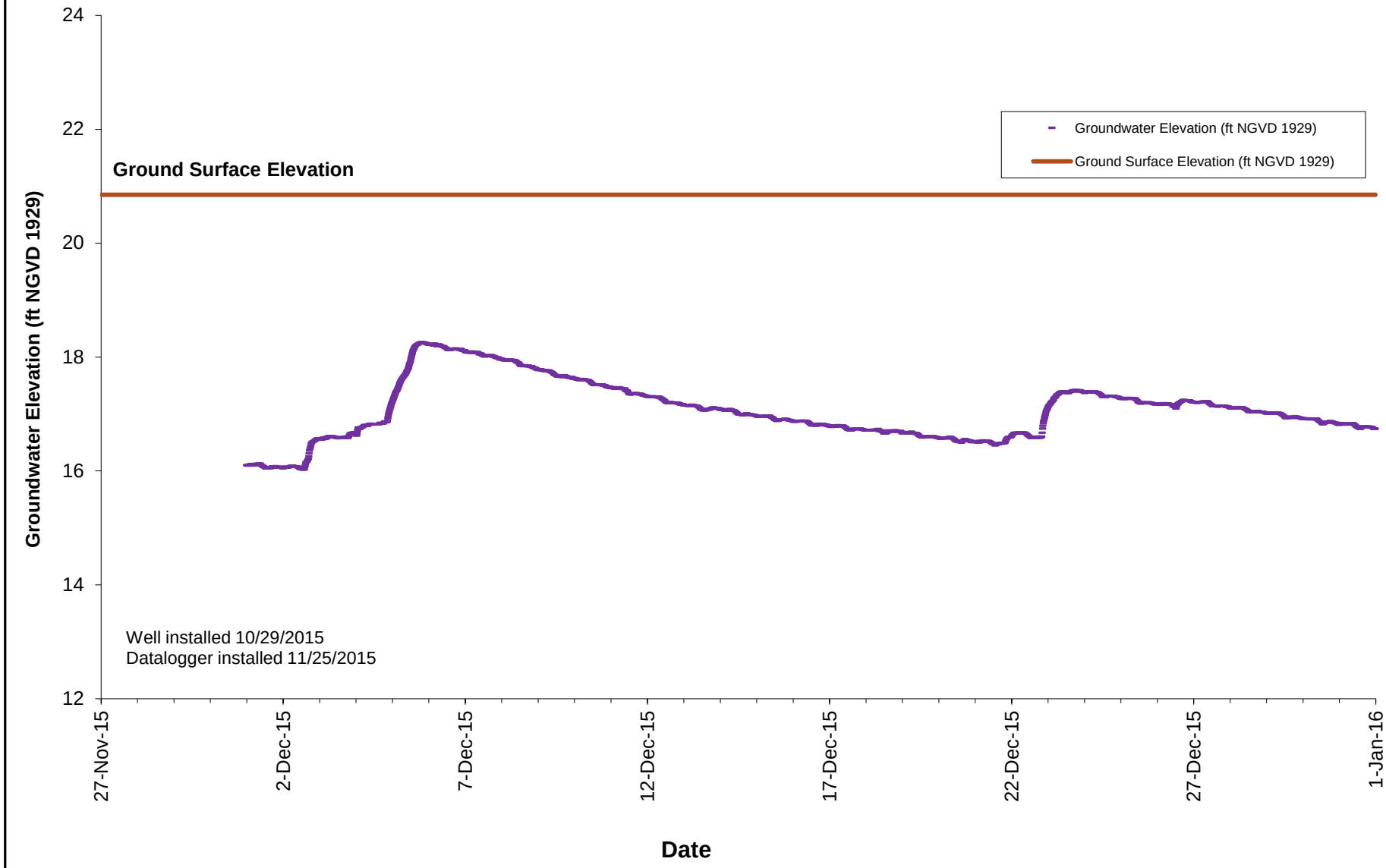
MFEB7-GW1


Groundwater Elevation (ft NGVD 1929)
Ground Surface Elevation (ft NGVD 1929)
Ground Surface Elevation
Groundwater Elevation (ft NGVD 1929)
24
22
20
18
16
14
12
Well installed 10/28/2015
Datalogger installed 11/25/2015
27-Nov-15
2-Dec-15
7-Dec-15
12-Dec-15
17-Dec-15
22-Dec-15
27-Dec-15
1-Jan-16
Date

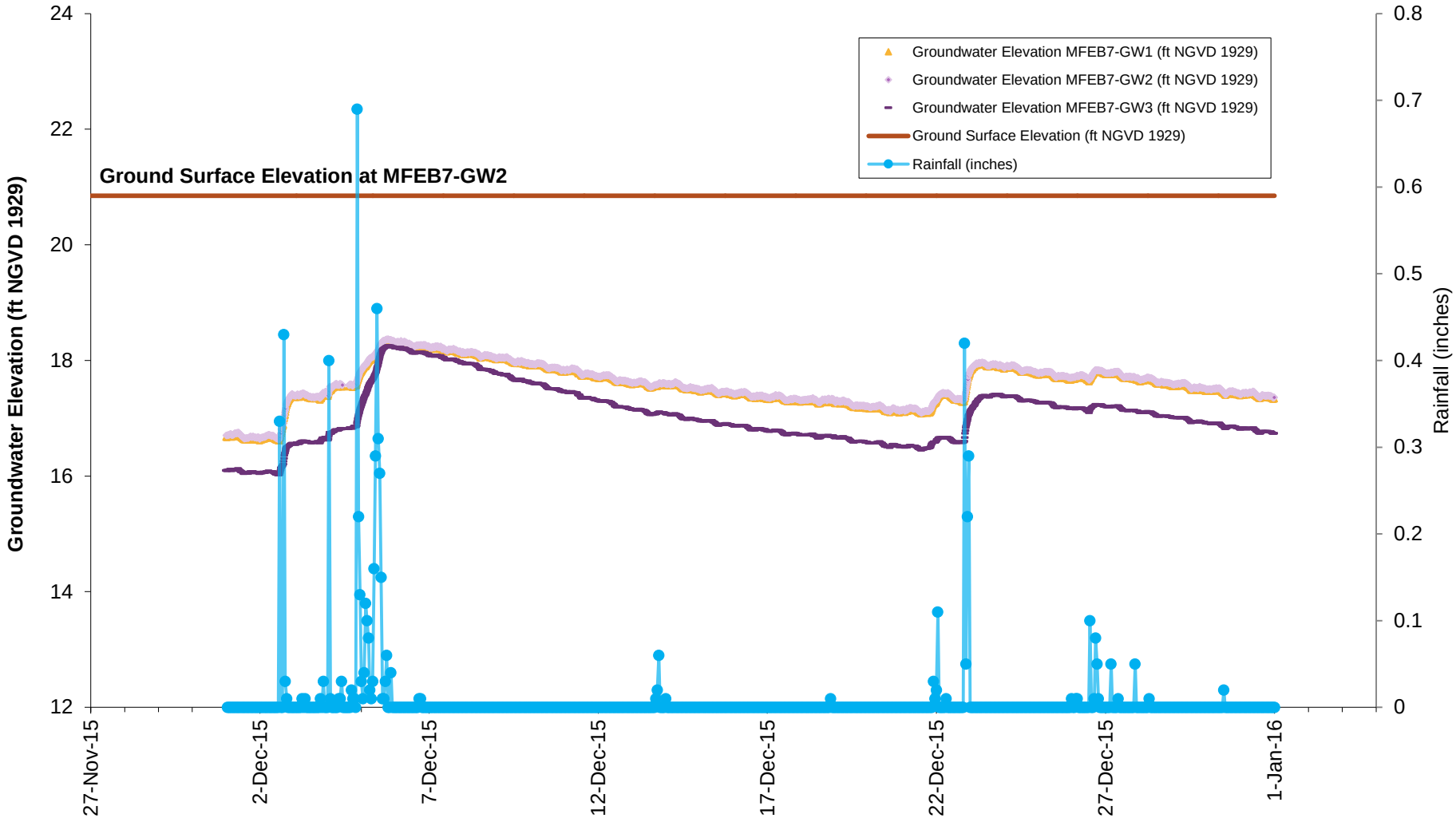
MFEB7-GW2


Groundwater Elevation (ft NGVD 1929)
Ground Surface Elevation (ft NGVD 1929)
Ground Surface Elevation
Groundwater Elevation (ft NGVD 1929)
24
22
20
18
16
14
12
Well Installed 10/26/2015
Datalogger Installed 11/25/2015
27-Nov-15
2-Dec-15
7-Dec-15
12-Dec-15
17-Dec-15
22-Dec-15
27-Dec-15
1-Jan-16
Date

MFEB7-GW3

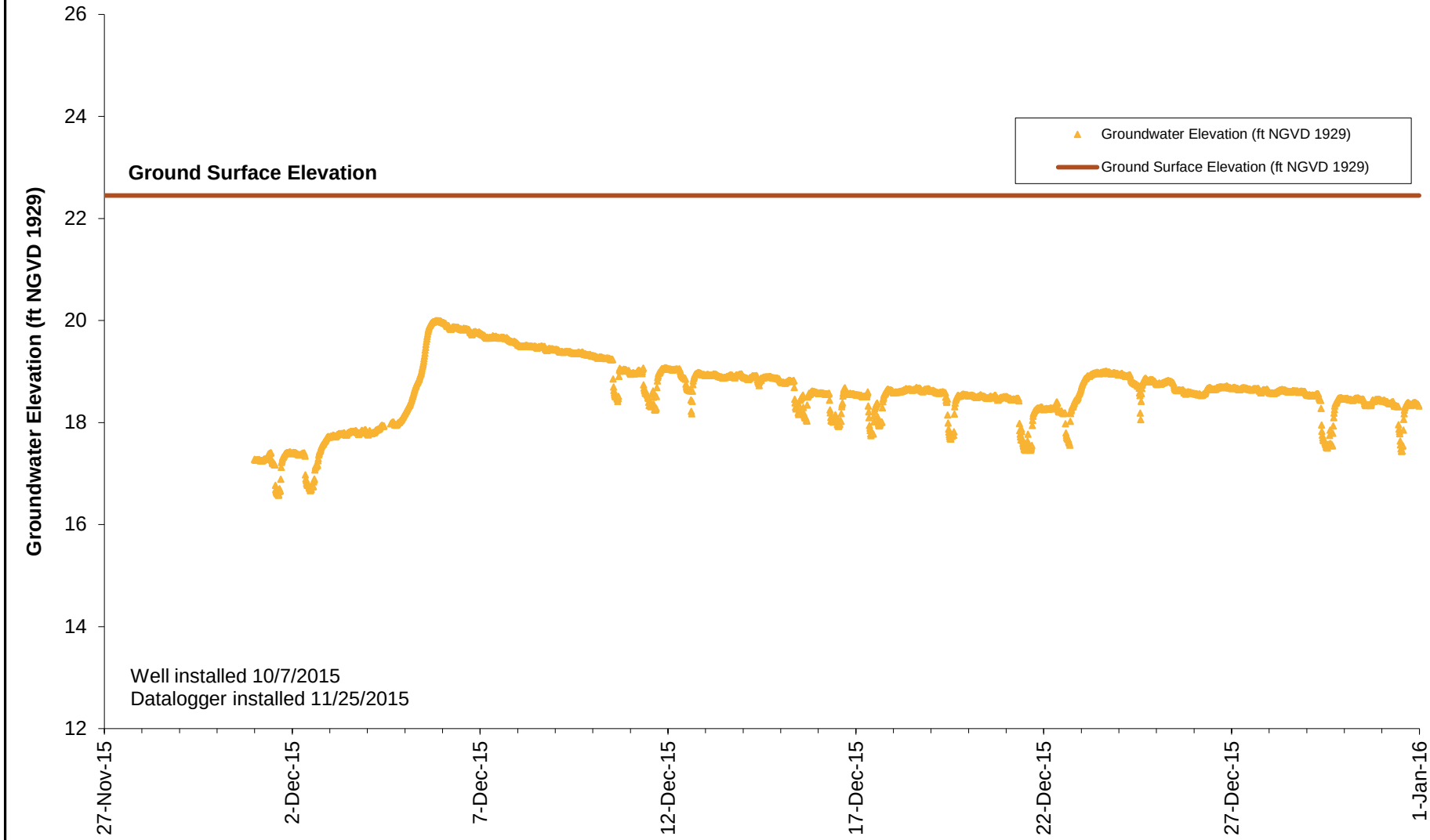

Groundwater Elevation (ft NGVD 1929)
Ground Surface Elevation (ft NGVD 1929)
Ground Surface Elevation
Well installed 10/29/2015
Datalogger installed 11/25/2015
24
22
20
18
16
14
12
27-Nov-15
2-Dec-15
7-Dec-15
12-Dec-15
17-Dec-15
22-Dec-15
27-Dec-15
1-Jan-16
Date

MFEB7 Cluster



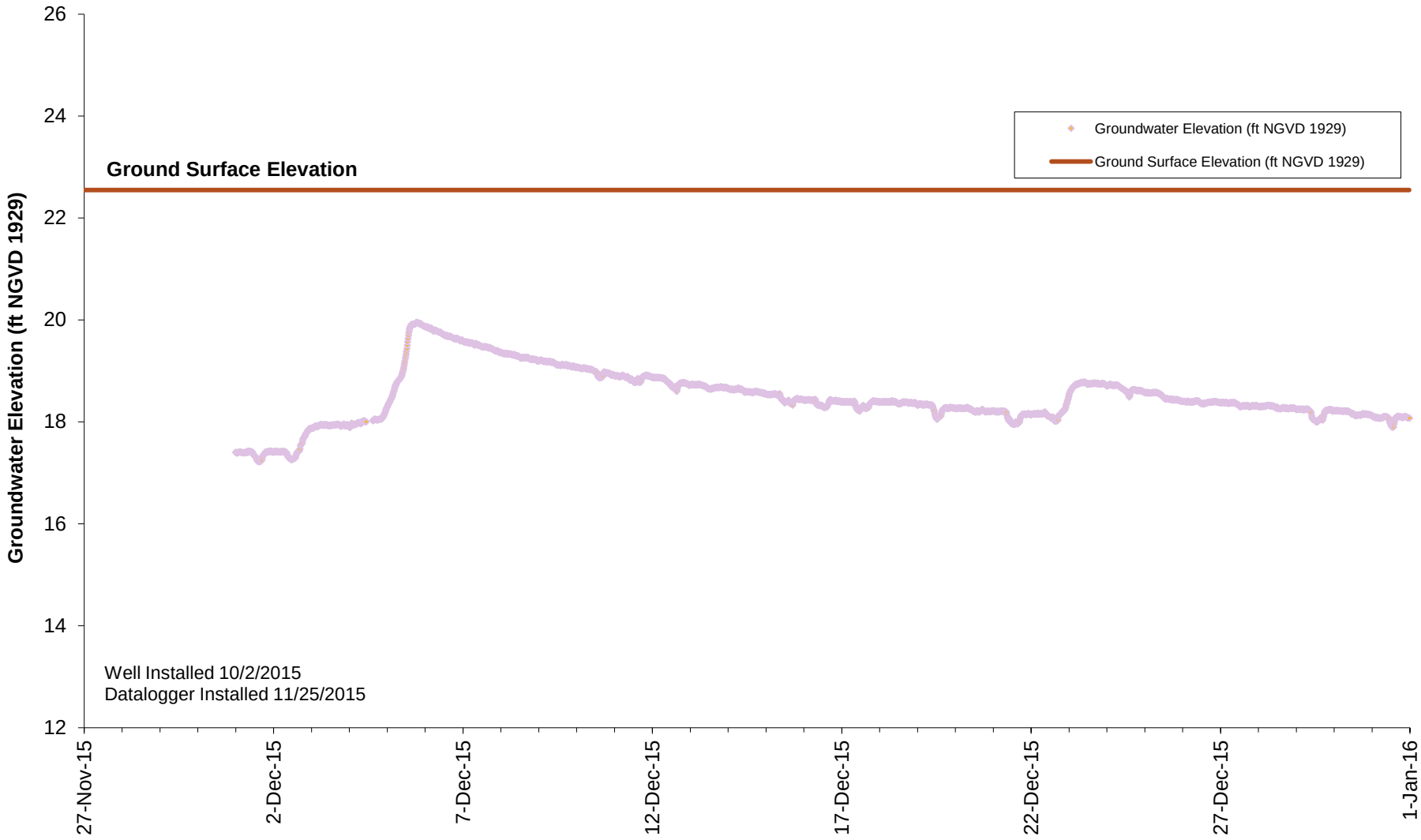
*Rainfall data is sourced from MECCA weather station.

MFEB8-GW1



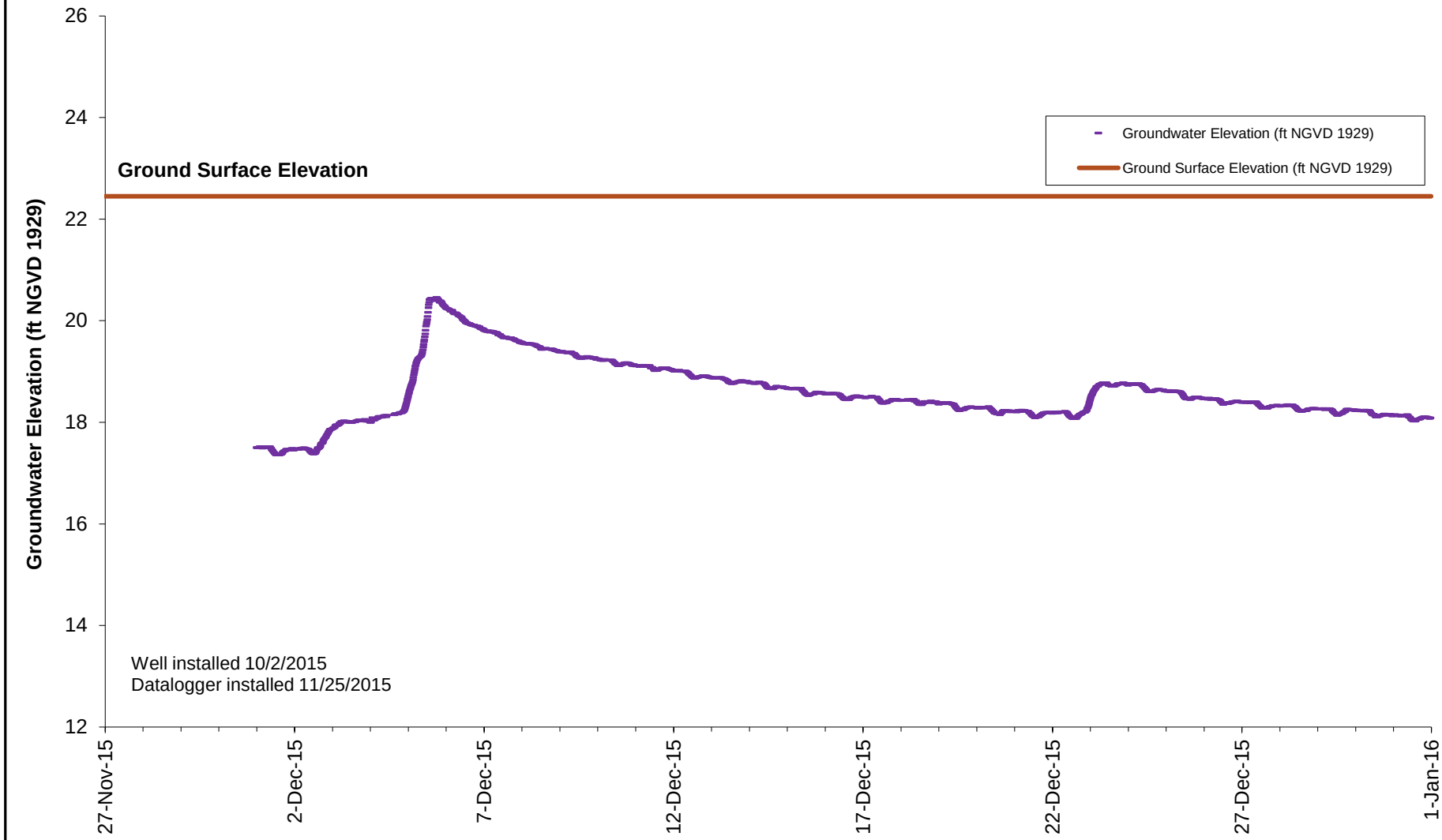
*Cyclical fluctuaions are a result of irrigation pumping from Ibis Nursery (located across the street).

MFEB8-GW2



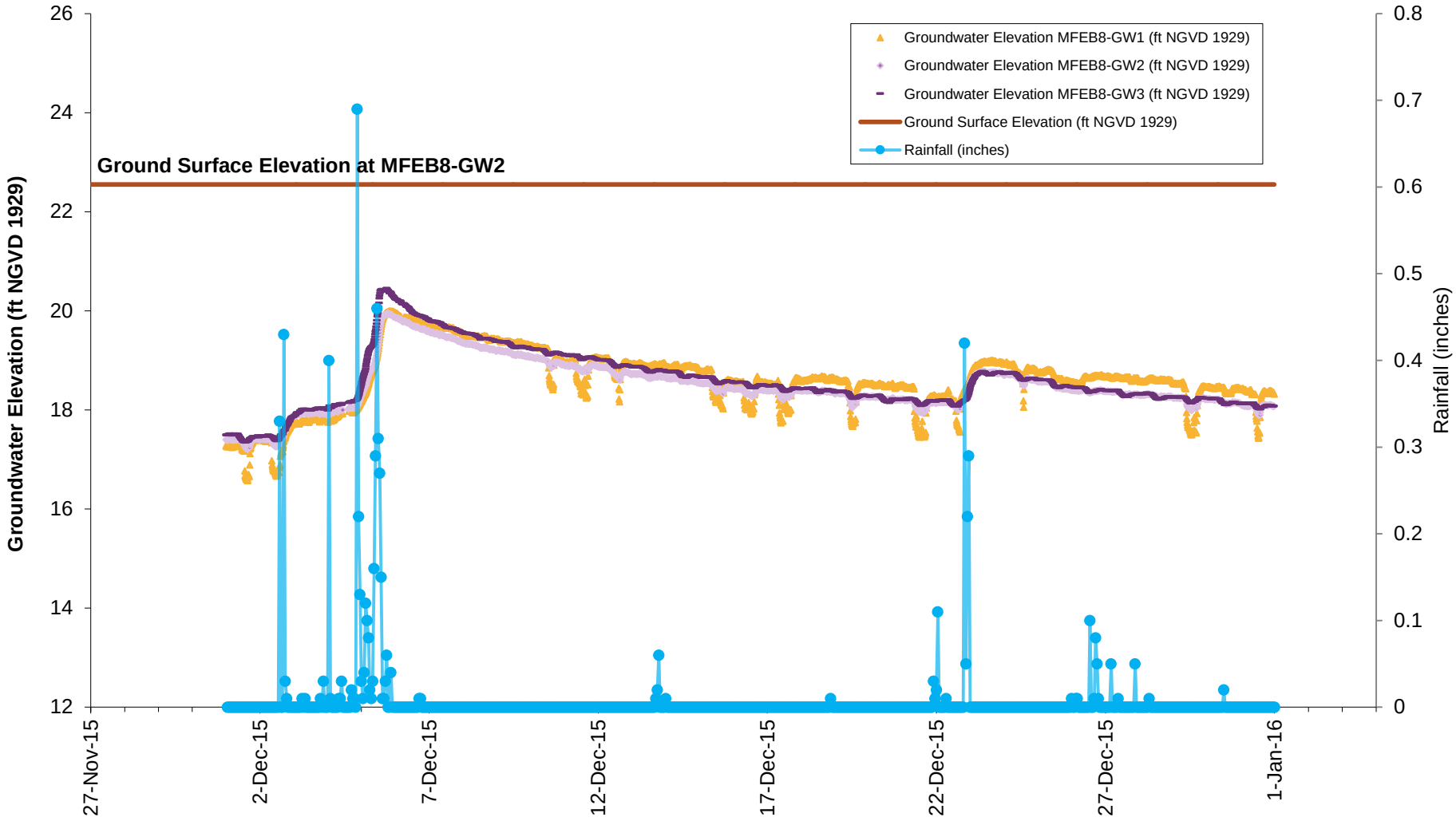
*Cyclical fluctuations are a result of irrigation pumping from Ibis Nursery (located across the street).

MFEB8-GW3



*Cyclical fluctuations shown are a result of irrigation pumping from Ibis Nursery (located across the street).

MFEB8 Cluster



*Please note reduced frequency of cyclical fluctuations during/post rain events.

*Rainfall data is sourced from MECCA weather station.

APPENDIX E

Ground Water Sampling Logs

DEP Form FD 9000-24: GROUNDWATER SAMPLING LOG

SITE NAME: Arcadis US, INC	SITE LOCATION: Former MECCA Farms/Scripps Site, Palm Beach	
WELL NO: MFEB-1 GW-1	SAMPLE ID: MFEB-1 GW-1	DATE: 10-29-15

PURGING DATA

WELL DIAMETER (inches): 2	TUBING DIAMETER (inches): 1/2	WELL SCREEN INTERVAL DEPTH: 93.1 feet to 103.1 feet	STATIC DEPTH TO WATER (feet): 13.50	PURGE PUMP TYPE OR BAILER: Peristaltic Pump

WELL VOLUME PURGE: **1 WELL VOLUME** = (TOTAL WELL DEPTH – STATIC DEPTH TO WATER) X WELL CAPACITY
(only fill out if applicable)
= (103.1 feet – 13.50 feet) X 0.16 gallons/foot = 14.33 gallons

EQUIPMENT VOLUME PURGE: **1 EQUIPMENT VOL.** = PUMP VOLUME + (TUBING CAPACITY X TUBING LENGTH) + FLOW CELL VOLUME
(only fill out if applicable)
= gallons + (gallons/foot X feet) + gallons = gallons

INITIAL PUMP OR TUBING DEPTH IN WELL (feet): 14.5	FINAL PUMP OR TUBING DEPTH IN WELL (feet): 14.5	PURGING INITIATED AT: 9:40	PURGING ENDED AT: 12:48	TOTAL VOLUME PURGED (gallons): 47.0

TIME	VOLUME PURGED (gallons)	CUMUL. VOLUME PURGED (gallons)	PURGE RATE (gpm)	DEPTH TO WATER (feet)	pH (standard units)	TEMP. (°C)	COND. (circle units) µmhos/cm or (µS/cm)	DISSOLVED OXYGEN (circle units) mg/L or % saturation	TURBIDITY (NTUs)	COLOR (describe)	ODOR (describe)
12:40	45.0	45.0	0.25	13.45	6.49	24.62	628	0.43	0.54	Clear	None
12:42	0.5	45.5	0.25	13.45	6.53	24.62	628	0.42	0.53	Clear	None
12:44	0.5	46.0	0.25	13.45	6.54	24.62	628	0.41	0.50	Clear	None
12:46	0.5	46.5	0.25	13.45	6.56	24.62	628	0.39	0.52	Clear	None
12:48	0.5	47.0	0.25	13.45	6.59	24.61	627	0.38	0.53	Clear	None

WELL CAPACITY (Gallons Per Foot): **0.75"** = 0.02; **1"** = 0.04; **1.25"** = 0.06; **2"** = 0.16; **3"** = 0.37; **4"** = 0.65; **5"** = 1.02; **6"** = 1.47; **12"** = 5.88
TUBING INSIDE DIA. CAPACITY (Gal./Ft.): **1/8"** = 0.0006; **3/16"** = 0.0014; **1/4"** = 0.0026; **5/16"** = 0.004; **3/8"** = 0.006; **1/2"** = 0.010; **5/8"** = 0.016

PURGING EQUIPMENT CODES: **B** = Bailer; **BP** = Bladder Pump; **ESP** = Electric Submersible Pump; **PP** = Peristaltic Pump; **O** = Other (Specify)

SAMPLING DATA

SAMPLED BY (PRINT) / AFFILIATION: Richard Illsley, Environmental Specialist, NEF	SAMPLER(S) SIGNATURE(S):	SAMPLING INITIATED AT: 12:49	SAMPLING ENDED AT: 12:51
PUMP OR TUBING DEPTH IN WELL (feet): 14.5	TUBING MATERIAL CODE: PE	FIELD-FILTERED: Y (N) Filtration Equipment Type:	FILTER SIZE: ____ µm
FIELD DECONTAMINATION: PUMP (Y) N TUBING Y N (replaced)		DUPLICATE: Y (N)	

SAMPLE CONTAINER SPECIFICATION				SAMPLE PRESERVATION (including wet ice)			INTENDED ANALYSIS AND/OR METHOD	SAMPLING EQUIPMENT CODE	SAMPLE PUMP FLOW RATE (mL per minute)
SAMPLE ID CODE	# CONTAINERS	MATERIAL CODE	VOLUME	PRESERVATIVE USED	TOTAL VOL ADDED IN FIELD (mL)	FINAL pH			
MFEB-1 GW-1	1	PE	125mL	HNO3	0	-	METALS	APP	1000
MFEB-1 GW-1	1	PE	125mL	NONE	0	-	NON METALS	APP	1000

REMARKS:
Stick- 2.32
GPS- 26°51'14" 80°16'20"W

MATERIAL CODES: **AG** = Amber Glass; **CG** = Clear Glass; **HDPE** = High Density Polyethylene; **LDPE** = Low Density Polyethylene; **PP** = Polypropylene; **S** = Silicone; **T** = Teflon; **O** = Other (Specify)

SAMPLING EQUIPMENT CODES: **APP** = After (Through) Peristaltic Pump; **B** = Bailer; **BP** = Bladder Pump; **ESP** = Electric Submersible Pump; **RFPP** = Reverse Flow Peristaltic Pump; **SM** = Straw Method (Tubing Gravity Drain); **O** = Other (Specify)

NOTES: **1. The above do not constitute all of the information required by Chapter 62-160, F.A.C.**

2. STABILIZATION CRITERIA FOR RANGE OF VARIATION OF LAST THREE CONSECUTIVE READINGS (SEE FS 2212, SECTION 3)

pH: ± 0.2 units **Temperature:** ± 0.2 °C **Specific Conductance:** ± 5% **Dissolved Oxygen:** all readings ≤ 20% saturation (see Table FS 2200-2); optionally, ± 0.2 mg/L or ± 10% (whichever is greater) **Turbidity:** all readings ≤ 20 NTU; optionally ± 5 NTU or ± 10% (whichever is greater)

DEP Form FD 9000-24: GROUNDWATER SAMPLING LOG

SITE NAME: Arcadis US, INC	SITE LOCATION: Former MECCA Farms/Scripps Site, Palm Beach	
WELL NO: MFEB-1 GW-2	SAMPLE ID: MFEB-1 GW-2	DATE: 10-29-15

PURGING DATA

WELL DIAMETER (inches): 2	TUBING DIAMETER (inches): 1/2	WELL SCREEN INTERVAL DEPTH: 38.48 feet to 48.48 feet	STATIC DEPTH TO WATER (feet): 14.18	PURGE PUMP TYPE OR BAILER: Peristaltic Pump

WELL VOLUME PURGE: 1 WELL VOLUME = (TOTAL WELL DEPTH − STATIC DEPTH TO WATER) X WELL CAPACITY
(only fill out if applicable)
= (48.48 feet − 14.18 feet) X 0.16 gallons/foot = 5.48 gallons

EQUIPMENT VOLUME PURGE: 1 EQUIPMENT VOL. = PUMP VOLUME + (TUBING CAPACITY X TUBING LENGTH) + FLOW CELL VOLUME
(only fill out if applicable)
= gallons + (gallons/foot X feet) + gallons = gallons

INITIAL PUMP OR TUBING DEPTH IN WELL (feet): 15.0	FINAL PUMP OR TUBING DEPTH IN WELL (feet): 15.0	PURGING INITIATED AT: 9:45	PURGING ENDED AT: 11:08	TOTAL VOLUME PURGED (gallons): 19

TIME	VOLUME PURGED (gallons)	CUMUL. VOLUME PURGED (gallons)	PURGE RATE (gpm)	DEPTH TO WATER (feet)	pH (standard units)	TEMP. (°C)	COND. (circle units) µmhos/cm or µS/cm	DISSOLVED OXYGEN (circle units) mg/L or % saturation	TURBIDITY (NTUs)	COLOR (describe)	ODOR (describe)
11:00	17.0	17.0	0.25	14.24	5.85	24.68	719	0.84	0.76	Clear	None
11:02	0.5	17.5	0.25	14.24	5.86	24.69	718	0.78	0.73	Clear	None
11:04	0.5	18.0	0.25	14.24	5.85	24.66	719	0.73	0.78	Clear	None
11:06	0.5	18.5	0.25	14.24	5.85	24.64	718	0.69	0.81	Clear	None
11:08	0.5	19.0	0.25	14.24	5.87	24.64	718	0.67	0.77	Clear	None

WELL CAPACITY (Gallons Per Foot): **0.75"** = 0.02; **1"** = 0.04; **1.25"** = 0.06; **2"** = 0.16; **3"** = 0.37; **4"** = 0.65; **5"** = 1.02; **6"** = 1.47; **12"** = 5.88
TUBING INSIDE DIA. CAPACITY (Gal./Ft.): **1/8"** = 0.0006; **3/16"** = 0.0014; **1/4"** = 0.0026; **5/16"** = 0.004; **3/8"** = 0.006; **1/2"** = 0.010; **5/8"** = 0.016

PURGING EQUIPMENT CODES: **B** = Bailer; **BP** = Bladder Pump; **ESP** = Electric Submersible Pump; **PP** = Peristaltic Pump; **O** = Other (Specify)

SAMPLING DATA

SAMPLED BY (PRINT) / AFFILIATION: Richard Illsley, Environmental Specialist, NEF	SAMPLER(S) SIGNATURE(S):	SAMPLING INITIATED AT: 11:09	SAMPLING ENDED AT: 11:11
PUMP OR TUBING DEPTH IN WELL (feet): 15.0	TUBING MATERIAL CODE: PE	FIELD-FILTERED: Y (N) Filtration Equipment Type:	FILTER SIZE: ____ µm
FIELD DECONTAMINATION: PUMP (Y) N TUBING Y N (replaced)		DUPLICATE: Y (N)	

SAMPLE CONTAINER SPECIFICATION				SAMPLE PRESERVATION (including wet ice)			INTENDED ANALYSIS AND/OR METHOD	SAMPLING EQUIPMENT CODE	SAMPLE PUMP FLOW RATE (mL per minute)
SAMPLE ID CODE	# CONTAINERS	MATERIAL CODE	VOLUME	PRESERVATIVE USED	TOTAL VOL ADDED IN FIELD (mL)	FINAL pH			
MFEB-1 GW-2	1	PE	125mL	HNO3	0	-	METALS	APP	1000
MFEB-1 GW-2	1	PE	125mL	NONE	0	-	NON METALS	APP	1000

REMARKS:
Stick- 2.40
GPS- 26°51'14" 80°16'20"W

MATERIAL CODES: **AG** = Amber Glass; **CG** = Clear Glass; **HDPE** = High Density Polyethylene; **LDPE** = Low Density Polyethylene; **PP** = Polypropylene; **S** = Silicone; **T** = Teflon; **O** = Other (Specify)

SAMPLING EQUIPMENT CODES: **APP** = After (Through) Peristaltic Pump; **B** = Bailer; **BP** = Bladder Pump; **ESP** = Electric Submersible Pump; **RFPP** = Reverse Flow Peristaltic Pump; **SM** = Straw Method (Tubing Gravity Drain); **O** = Other (Specify)

NOTES: 1. The above do not constitute all of the information required by Chapter 62-160, F.A.C.

2. STABILIZATION CRITERIA FOR RANGE OF VARIATION OF LAST THREE CONSECUTIVE READINGS (SEE FS 2212, SECTION 3)

pH: ± 0.2 units **Temperature:** ± 0.2 °C **Specific Conductance:** ± 5% **Dissolved Oxygen:** all readings ≤ 20% saturation (see Table FS 2200-2); optionally, ± 0.2 mg/L or ± 10% (whichever is greater) **Turbidity:** all readings ≤ 20 NTU; optionally ± 5 NTU or ± 10% (whichever is greater)

DEP Form FD 9000-24: GROUNDWATER SAMPLING LOG

SITE NAME: Arcadis US, INC	SITE LOCATION: Former MECCA Farms/Scripps Site, Palm Beach	
WELL NO: MFEB-1 GW-3	SAMPLE ID: MFEB-1 GW-3	DATE: 10-29-15

PURGING DATA

WELL DIAMETER (inches): 2	TUBING DIAMETER (inches): 1/2	WELL SCREEN INTERVAL DEPTH: 7.87 feet to 17.87 feet	STATIC DEPTH TO WATER (feet): 14.81	PURGE PUMP TYPE OR BAILER: Peristaltic Pump

WELL VOLUME PURGE: 1 WELL VOLUME = (TOTAL WELL DEPTH – STATIC DEPTH TO WATER) X WELL CAPACITY
(only fill out if applicable)
= (17.87 feet – 14.81 feet) X 0.16 gallons/foot = 0.49 gallons

EQUIPMENT VOLUME PURGE: 1 EQUIPMENT VOL. = PUMP VOLUME + (TUBING CAPACITY X TUBING LENGTH) + FLOW CELL VOLUME
(only fill out if applicable)
= gallons + (gallons/foot X feet) + gallons = gallons

INITIAL PUMP OR TUBING DEPTH IN WELL (feet): 15.5	FINAL PUMP OR TUBING DEPTH IN WELL (feet): 15.5	PURGING INITIATED AT: 11:14	PURGING ENDED AT: 11:34	TOTAL VOLUME PURGED (gallons): 5.0

TIME	VOLUME PURGED (gallons)	CUMUL. VOLUME PURGED (gallons)	PURGE RATE (gpm)	DEPTH TO WATER (feet)	pH (standard units)	TEMP. (°C)	COND (circle units) µmhos/cm or ~~µS/cm~~	DISSOLVED OXYGEN (circle units) mg/L or % saturation	TURBIDITY (NTUs)	COLOR (describe)	ODOR (describe)
11:00	3.0	3.0	0.25	14.86	6.44	27.07	429	0.53	1.03	Clear	None
11:02	0.5	3.5	0.25	14.86	6.44	27.06	430	0.48	0.97	Clear	None
11:04	0.5	4.0	0.25	14.86	6.45	27.05	433	0.46	0.93	Clear	None
11:06	0.5	4.5	0.25	14.86	6.44	27.06	434	0.42	0.87	Clear	None
11:08	0.5	5.0	0.25	14.86	6.45	27.06	436	0.41	0.79	Clear	None

WELL CAPACITY (Gallons Per Foot): **0.75"** = 0.02; **1"** = 0.04; **1.25"** = 0.06; **2"** = 0.16; **3"** = 0.37; **4"** = 0.65; **5"** = 1.02; **6"** = 1.47; **12"** = 5.88
TUBING INSIDE DIA. CAPACITY (Gal./Ft.): **1/8"** = 0.0006; **3/16"** = 0.0014; **1/4"** = 0.0026; **5/16"** = 0.004; **3/8"** = 0.006; **1/2"** = 0.010; **5/8"** = 0.016

PURGING EQUIPMENT CODES: **B** = Bailer; **BP** = Bladder Pump; **ESP** = Electric Submersible Pump; **PP** = Peristaltic Pump; **O** Other (Specify)

SAMPLING DATA

SAMPLED BY (PRINT) / AFFILIATION: Richard Illsley, Environmental Specialist, NEF	SAMPLER(S) SIGNATURE(S):	SAMPLING INITIATED AT: 11:35	SAMPLING ENDED AT: 11:36
PUMP OR TUBING DEPTH IN WELL (feet): 15.5	TUBING MATERIAL CODE: PE	FIELD-FILTERED: Y (N) Filtration Equipment Type:	FILTER SIZE: ____ µm
FIELD DECONTAMINATION: PUMP (Y) N TUBING Y N (replaced)		DUPLICATE: Y (N)	

SAMPLE CONTAINER SPECIFICATION				SAMPLE PRESERVATION (including wet ice)			INTENDED ANALYSIS AND/OR METHOD	SAMPLING EQUIPMENT CODE	SAMPLE PUMP FLOW RATE (mL per minute)
SAMPLE ID CODE	# CONTAINERS	MATERIAL CODE	VOLUME	PRESERVATIVE USED	TOTAL VOL ADDED IN FIELD (mL)	FINAL pH			
MFEB-1 GW-3	1	PE	125mL	HNO3	0	-	METALS	APP	1000
MFEB-1 GW-3	1	PE	125mL	NONE	0	-	NON METALS	APP	1000

REMARKS:
Stick- 2.50
GPS- 26°51'14" 80°16'20"W

MATERIAL CODES: **AG** = Amber Glass; **CG** = Clear Glass; **HDPE** = High Density Polyethylene; **LDPE** = Low Density Polyethylene; **PP** = Polypropylene; **S** = Silicone; **T** = Teflon; **O** = Other (Specify)

SAMPLING EQUIPMENT CODES: **APP** = After (Through) Peristaltic Pump; **B** = Bailer; **BP** = Bladder Pump; **ESP** = Electric Submersible Pump; **RFPP** = Reverse Flow Peristaltic Pump; **SM** = Straw Method (Tubing Gravity Drain); **O** = Other (Specify)

NOTES: 1. The above do not constitute all of the information required by Chapter 62-160, F.A.C.

2. STABILIZATION CRITERIA FOR RANGE OF VARIATION OF LAST THREE CONSECUTIVE READINGS (SEE FS 2212, SECTION 3)

pH: ± 0.2 units **Temperature:** ± 0.2 °C **Specific Conductance:** ± 5% **Dissolved Oxygen:** all readings ≤ 20% saturation (see Table FS 2200-2); optionally, ± 0.2 mg/L or ± 10% (whichever is greater) **Turbidity:** all readings ≤ 20 NTU; optionally ± 5 NTU or ± 10% (whichever is greater)

Pace Analytical Services, Inc.
3610 Park Central Blvd N
Pompano Beach, FL 33064
954-582-4300

November 10, 2015

Jan Beernink
Nutting Environmental of Florida, Inc.
1310 Neptune Drive
Boynton Beach, FL 33426

RE: Project: Arcadis US Inc
Pace Project No.: 35214400

Dear Jan Beernink:
Enclosed are the analytical results for sample(s) received by the laboratory on October 31, 2015. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

This is a revised report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Christina Raschke
christina.raschke@pacelabs.com
Project Manager

Enclosures

cc: Kristen Campos, Nutting Environmental of Flori

Pace Analytical Services, Inc.
3610 Park Central Blvd N
Pompano Beach, FL 33064
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CERTIFICATIONS

Project: Arcadis US Inc
Pace Project No.: 35214400

Ormond Beach Certification IDs
8 East Tower Circle, Ormond Beach, FL 32174
Alabama Certification #: 41320
Connecticut Certification #: PH-0216
Delaware Certification: FL NELAC Reciprocity
Florida Certification #: E83079
Georgia Certification #: 955
Guam Certification: FL NELAC Reciprocity
Hawaii Certification: FL NELAC Reciprocity
Illinois Certification #: 200068
Indiana Certification: FL NELAC Reciprocity
Kansas Certification #: E-10383
Kentucky Certification #: 90050
Louisiana Certification #: FL NELAC Reciprocity
Louisiana Environmental Certificate #: 05007
Maryland Certification: #346
Michigan Certification #: 9911
Mississippi Certification: FL NELAC Reciprocity
Missouri Certification #: 236
Montana Certification #: Cert 0074
Nebraska Certification: NE-OS-28-14
Nevada Certification: FL NELAC Reciprocity
New Hampshire Certification #: 2958
New York Certification #: 11608
North Carolina Environmental Certificate #: 667
North Carolina Certification #: 12710
North Dakota Certification #: R-216
Oklahoma Certification #: D9947
Pennsylvania Certification #: 68-00547
Puerto Rico Certification #: FL01264
South Carolina Certification: #96042001
Tennessee Certification #: TN02974
Texas Certification: FL NELAC Reciprocity
US Virgin Islands Certification: FL NELAC Reciprocity
Virginia Environmental Certification #: 460165
West Virginia Certification #: 9962C
Wisconsin Certification #: 399079670
Wyoming (EPA Region 8): FL NELAC Reciprocity

REPORT OF LABORATORY ANALYSIS

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SAMPLE SUMMARY

Project: Arcadis US Inc
Pace Project No.: 35214400

Lab ID	Sample ID	Matrix	Date Collected	Date Received
35214400004	**MFEB1-GW1**	Water	10/29/15 12:49	10/31/15 12:10
35214400005	**MFEB1-GW2**	Water	10/29/15 11:09	10/31/15 12:10
35214400006	**MFEB1-GW3**	Water	10/29/15 11:35	10/31/15 12:10

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SAMPLE ANALYTE COUNT

Project: Arcadis US Inc
Pace Project No.: 35214400

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
35214400004	**MFEB1-GW1**	EPA 6010	TAP	5	PASI-O
		SM 2320B	KAM	3	PASI-O
		EPA 300.0	CMB	2	PASI-O
35214400005	**MFEB1-GW2**	EPA 6010	TAP	5	PASI-O
		SM 2320B	KAM	3	PASI-O
		EPA 300.0	CMB	2	PASI-O
35214400006	**MFEB1-GW3**	EPA 6010	TAP	5	PASI-O
		SM 2320B	KAM	3	PASI-O
		EPA 300.0	CMB	2	PASI-O

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SUMMARY OF DETECTION

Project: Arcadis US Inc
Pace Project No.: 35214400

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
35214400004	**MFEB1-GW1**					
EPA 6010	Calcium	84600	ug/L	500	11/05/15 18:28	
EPA 6010	Iron	83.3	ug/L	40.0	11/05/15 18:28	
EPA 6010	Magnesium	15700	ug/L	500	11/05/15 18:28	
EPA 6010	Potassium	3350	ug/L	1000	11/05/15 18:28	
EPA 6010	Sodium	27700	ug/L	1000	11/05/15 18:28	
SM 2320B	Alkalinity,Bicarbonate (CaCO3)	263	mg/L	5.0	11/03/15 18:03	
SM 2320B	Alkalinity, Total as CaCO3	263	mg/L	5.0	11/03/15 18:03	
EPA 300.0	Chloride	28.6	mg/L	5.0	11/02/15 08:33	
EPA 300.0	Sulfate	2.7 I	mg/L	5.0	11/02/15 08:33	
35214400005	**MFEB1-GW2**					
EPA 6010	Calcium	110000	ug/L	500	11/05/15 18:31	
EPA 6010	Iron	726	ug/L	40.0	11/05/15 18:31	
EPA 6010	Magnesium	6070	ug/L	500	11/05/15 18:31	
EPA 6010	Potassium	4630	ug/L	1000	11/05/15 18:31	
EPA 6010	Sodium	19800	ug/L	1000	11/05/15 18:31	
SM 2320B	Alkalinity,Bicarbonate (CaCO3)	298	mg/L	5.0	11/03/15 18:11	
SM 2320B	Alkalinity, Total as CaCO3	298	mg/L	5.0	11/03/15 18:11	
EPA 300.0	Chloride	40.0	mg/L	5.0	11/02/15 08:55	
35214400006	**MFEB1-GW3**					
EPA 6010	Calcium	73400	ug/L	500	11/05/15 18:35	
EPA 6010	Iron	1310	ug/L	40.0	11/05/15 18:35	
EPA 6010	Magnesium	3110	ug/L	500	11/05/15 18:35	
EPA 6010	Potassium	4200	ug/L	1000	11/05/15 18:35	
EPA 6010	Sodium	11000	ug/L	1000	11/05/15 18:35	
SM 2320B	Alkalinity,Bicarbonate (CaCO3)	185	mg/L	5.0	11/03/15 18:17	
SM 2320B	Alkalinity, Total as CaCO3	185	mg/L	5.0	11/03/15 18:17	
EPA 300.0	Chloride	15.9	mg/L	5.0	11/02/15 09:17	

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ANALYTICAL RESULTS

Project: Arcadis US Inc
Pace Project No.: 35214400

Sample: MFEB1-GW1 **Lab ID: 35214400004** Collected: 10/29/15 12:49 Received: 10/31/15 12:10 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Calcium	**84600**	ug/L	500	250	1	11/04/15 16:00	11/05/15 18:28	7440-70-2	
Iron	**83.3**	ug/L	40.0	20.0	1	11/04/15 16:00	11/05/15 18:28	7439-89-6	
Magnesium	**15700**	ug/L	500	250	1	11/04/15 16:00	11/05/15 18:28	7439-95-4	
Potassium	**3350**	ug/L	1000	500	1	11/04/15 16:00	11/05/15 18:28	7440-09-7	
Sodium	**27700**	ug/L	1000	500	1	11/04/15 16:00	11/05/15 18:28	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity,Bicarbonate (CaCO3)	**263**	mg/L	5.0	5.0	1		11/03/15 18:03		
Alkalinity, Carbonate (CaCO3)	**5.0 U**	mg/L	5.0	5.0	1		11/03/15 18:03		
Alkalinity, Total as CaCO3	**263**	mg/L	5.0	5.0	1		11/03/15 18:03		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**28.6**	mg/L	5.0	2.5	1		11/02/15 08:33	16887-00-6	
Sulfate	**2.7 I**	mg/L	5.0	2.5	1		11/02/15 08:33	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: Arcadis US Inc
Pace Project No.: 35214400

Sample: MFEB1-GW2 **Lab ID: 35214400005** Collected: 10/29/15 11:09 Received: 10/31/15 12:10 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Calcium	**110000**	ug/L	500	250	1	11/04/15 16:00	11/05/15 18:31	7440-70-2	
Iron	**726**	ug/L	40.0	20.0	1	11/04/15 16:00	11/05/15 18:31	7439-89-6	
Magnesium	**6070**	ug/L	500	250	1	11/04/15 16:00	11/05/15 18:31	7439-95-4	
Potassium	**4630**	ug/L	1000	500	1	11/04/15 16:00	11/05/15 18:31	7440-09-7	
Sodium	**19800**	ug/L	1000	500	1	11/04/15 16:00	11/05/15 18:31	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity,Bicarbonate (CaCO3)	**298**	mg/L	5.0	5.0	1		11/03/15 18:11		
Alkalinity, Carbonate (CaCO3)	**5.0 U**	mg/L	5.0	5.0	1		11/03/15 18:11		
Alkalinity, Total as CaCO3	**298**	mg/L	5.0	5.0	1		11/03/15 18:11		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**40.0**	mg/L	5.0	2.5	1		11/02/15 08:55	16887-00-6	
Sulfate	**2.5 U**	mg/L	5.0	2.5	1		11/02/15 08:55	14808-79-8	

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ANALYTICAL RESULTS

Project: Arcadis US Inc
Pace Project No.: 35214400

Sample: MFEB1-GW3 **Lab ID: 35214400006** Collected: 10/29/15 11:35 Received: 10/31/15 12:10 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Calcium	**73400**	ug/L	500	250	1	11/04/15 16:00	11/05/15 18:35	7440-70-2	
Iron	**1310**	ug/L	40.0	20.0	1	11/04/15 16:00	11/05/15 18:35	7439-89-6	
Magnesium	**3110**	ug/L	500	250	1	11/04/15 16:00	11/05/15 18:35	7439-95-4	
Potassium	**4200**	ug/L	1000	500	1	11/04/15 16:00	11/05/15 18:35	7440-09-7	
Sodium	**11000**	ug/L	1000	500	1	11/04/15 16:00	11/05/15 18:35	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity,Bicarbonate (CaCO3)	**185**	mg/L	5.0	5.0	1		11/03/15 18:17		
Alkalinity, Carbonate (CaCO3)	**5.0 U**	mg/L	5.0	5.0	1		11/03/15 18:17		
Alkalinity, Total as CaCO3	**185**	mg/L	5.0	5.0	1		11/03/15 18:17		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**15.9**	mg/L	5.0	2.5	1		11/02/15 09:17	16887-00-6	
Sulfate	**2.5 U**	mg/L	5.0	2.5	1		11/02/15 09:17	14808-79-8	

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QUALITY CONTROL DATA

Project: Arcadis US Inc
Pace Project No.: 35214400

QC Batch: MPRP/27199 Analysis Method: EPA 6010
QC Batch Method: EPA 3010 Analysis Description: 6010 MET
Associated Lab Samples: 35214400004, 35214400005, 35214400006

METHOD BLANK: 1381991 Matrix: Water
Associated Lab Samples: 35214400004, 35214400005, 35214400006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Calcium	ug/L	250 U	500	250	11/05/15 17:44	
Iron	ug/L	20.0 U	40.0	20.0	11/05/15 17:44	
Magnesium	ug/L	250 U	500	250	11/05/15 17:44	
Potassium	ug/L	500 U	1000	500	11/05/15 17:44	
Sodium	ug/L	500 U	1000	500	11/05/15 17:44	

LABORATORY CONTROL SAMPLE: 1381992

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium	ug/L	12500	11700	93	80-120	
Iron	ug/L	2500	2270	91	80-120	
Magnesium	ug/L	12500	11500	92	80-120	
Potassium	ug/L	12500	11400	91	80-120	
Sodium	ug/L	12500	11900	95	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1381993 1381994

Parameter	Units	92269296003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium	ug/L	147000	12500	12500	163000	177000	128	240	75-125	8	20	J(M1)
Iron	ug/L	63900	2500	2500	67700	73900	154	400	75-125	9	20	J(M1)
Magnesium	ug/L	16500	12500	12500	28400	30600	95	113	75-125	7	20	
Potassium	ug/L	99200	12500	12500	114000	124000	121	196	75-125	8	20	J(M1)
Sodium	ug/L	584000	12500	12500	616000	672000	258	707	75-125	9	20	J(M1)

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QUALITY CONTROL DATA

Project: Arcadis US Inc
Pace Project No.: 35214400

QC Batch: WET/33941 Analysis Method: SM 2320B
QC Batch Method: SM 2320B Analysis Description: 2320B Alkalinity
Associated Lab Samples: 35214400004, 35214400005, 35214400006

METHOD BLANK: 1381130 Matrix: Water
Associated Lab Samples: 35214400004, 35214400005, 35214400006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Carbonate (CaCO3)	mg/L	5.0 U	5.0	5.0	11/03/15 17:21	
Alkalinity, Total as CaCO3	mg/L	5.0 U	5.0	5.0	11/03/15 17:21	
Alkalinity,Bicarbonate (CaCO3)	mg/L	5.0 U	5.0	5.0	11/03/15 17:21	

LABORATORY CONTROL SAMPLE: 1381131

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	250	239	96	90-110	

SAMPLE DUPLICATE: 1381132

Parameter	Units	35214389001 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Carbonate (CaCO3)	mg/L	<5.0	5.0 U		20	
Alkalinity, Total as CaCO3	mg/L	39.7	39.6	0	20	
Alkalinity,Bicarbonate (CaCO3)	mg/L	39.7	39.6	0	20	

SAMPLE DUPLICATE: 1381133

Parameter	Units	35214496003 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Carbonate (CaCO3)	mg/L	5.0 U	5.0 U		20	
Alkalinity, Total as CaCO3	mg/L	14.4	14.3	1	20	
Alkalinity,Bicarbonate (CaCO3)	mg/L	14.4	14.3	1	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

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QUALITY CONTROL DATA

Project: Arcadis US Inc
Pace Project No.: 35214400

QC Batch: WETA/51713 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 35214400004, 35214400005, 35214400006

METHOD BLANK: 1379293 Matrix: Water
Associated Lab Samples: 35214400004, 35214400005, 35214400006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	2.5 U	5.0	2.5	11/02/15 07:48	
Sulfate	mg/L	2.5 U	5.0	2.5	11/02/15 07:48	

LABORATORY CONTROL SAMPLE: 1379294

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	50	46.4	93	90-110	
Sulfate	mg/L	50	46.9	94	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1379295 1379296

Parameter	Units	35214098002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	46.9	50	50	98.9	97.8	104	102	90-110	1	20	
Sulfate	mg/L	26.3	50	50	76.4	75.2	100	98	90-110	2	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1379297 1379298

Parameter	Units	92273604001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	3.8	50	50	49.8	49.5	92	91	90-110	0	20	
Sulfate	mg/L	41.5	50	50	94.2	94.0	105	105	90-110	0	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

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Pace Analytical Services, Inc.
3610 Park Central Blvd N
Pompano Beach, FL 33064
954-582-4300

QUALIFIERS

Project: Arcadis US Inc
Pace Project No.: 35214400

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-O	Pace Analytical Services - Ormond Beach

ANALYTE QUALIFIERS

I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
U	Compound was analyzed for but not detected.
J(M1)	Estimated Value. Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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3610 Park Central Blvd N
Pompano Beach, FL 33064
954-582-4300

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Arcadis US Inc
Pace Project No.: 35214400

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
35214400004	**MFEB1-GW1**	EPA 3010	MPRP/27199	EPA 6010	ICP/16389
35214400005	**MFEB1-GW2**	EPA 3010	MPRP/27199	EPA 6010	ICP/16389
35214400006	**MFEB1-GW3**	EPA 3010	MPRP/27199	EPA 6010	ICP/16389
35214400004	**MFEB1-GW1**	SM 2320B	WET/33941		
35214400005	**MFEB1-GW2**	SM 2320B	WET/33941		
35214400006	**MFEB1-GW3**	SM 2320B	WET/33941		
35214400004	**MFEB1-GW1**	EPA 300.0	WETA/51713		
35214400005	**MFEB1-GW2**	EPA 300.0	WETA/51713		
35214400006	**MFEB1-GW3**	EPA 300.0	WETA/51713		

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CHAIN OF CUSTODY RECORD

WO# : 35214400

35214400

te:_____ Page 1 of 1

Company Name: Nutting Eur PO#

Address: 1310 Neptune Dr

City: Boynton Beach State: FL Zip: 33426

Attn: Jon Bermick Fax#

email: Phone:

Project Name: Arcadis US INC Proj #

Sampler Signature:

Circle One: Event: Daily Weekly Monthly
Quarterly Semi-Annual Annual N/A

LYSIS

Sample #	Sample ID	Collect Date	Collect Time	Matrix Code*	Field Filtered	Integrity OK(Y/N)	Total # of containers	Parameters: Bicarbonate	Carbonate	Sulfate	Calcium	Magnesium	Sodium	Potassium	Iron	Chloride	EXAMPLE Diss. Lead 6010
																	# of Containers Size/Type: 1 1 16ozP
1	MFEB8-GW1	10/28	12:31	GW			2										
2	MFEB8-GW2	10/28	14:24	GW			2										
3	MFEB8-GW3	10/28	14:57	GW			2										
4	MFEB1-GW1	10/29	12:49	GW			2										
5	MFEB1-GW2	10/29	11:09	GW			2										
6	MFEB1-GW3	10/29	11:35	GW			2										
7	MFB3-GW1	10/29	16:09	GW			2										
8	MFB3-GW2	10/29	14:33	GW			2										
9	MFB3-GW3	10/29	14:54	GW			2										
10																	

Container Type Codes

AV	Amber Vial	EB	Encore Sampler
CV	Clear Vial	PPV	Prepreserved vial
P	Plastic	PLC	Plastic container
AL	Amber Liter	PLJ	Plastic Jar
CL	Clear Liter	Z	Ziploc bag
AP	Amber Plastic	TB	Tedlar bag
AG	Amber Glass	WP	Wirlt pak
SJ	Soil Jar	G	Gallon Jug
Other:		TC	Terra-core

PPV: Prepreserved vial
Size(s): 2oz, 4oz, 8oz, 16oz, 32oz or 1L, other: 40ml 500ml 250ml 125 ml
Example: 4ozP = 4oz Plastic, 8ozSJ= 8oz Soil Jar

Matrix Codes

SD	Solid Waste	OL	Oil
GW	Ground Water	SL	Sludge
EFF	Effluent	SO	Soil Sediment
APW	Analyte Free H20	AQ	Aqueous
WW	Waste Water	NA	Nonaqueous
DW	Drinking Water	PE	Petroleum
SW	Surface Water	O	Other: (Please specify)
ML	Misc. Liquid		

Preservative Type Codes

A. None	E. HCL	I. Ice
B. HNO3	F. MeOH	J. MCAA
C. H2SO4	G. Na2S2O3	K. Zn Acetate
D. NaOH	H. NaHSO4	O. Other

REMARKS

2019-20

Circle TAT REQUESTED (Rush Fees Apply)
Standard: TAT = 5 Days
Today 1D 2D 3D 4D 5D ___

Short Hold: Y____ N____

Circle QA/QC Report Level: 1 2 3 4 CLP AFCEE QAPP Other____

EDD (Fees May Apply): ADaPT SEDD ERPIMS TSV CSV Other____

COC Condition: OK Incomplete

Required State Certification: FL GA SC NC NJ PA LA TX IL ___

Coolers #'s - Temp °C: 1 2 3 4 5

Item	Relinquished by	Affiliation	Date	Time	Received by	Affiliation	Date	Time
1	[illegible]	NEF	10/30	1210	[illegible]	[illegible]	10/30/19	1210
2	[illegible]	[illegible]	10/30	1600				
3	Courier Fed Ex		10/31/19	0815	[illegible]	[illegible]	11/1/19	0815
4								

Lab Use Only

Non-Conformance Found?	___	___	___
Samples INTACT upon arrival?	___	___	___
Received on Wet Ice?	___	___	___
Proper Preservatives Indicated?	___	___	___
Received within holding time?	___	___	___
Custody seals intact?	___	___	___
Volatiles rec'd without headspace?	___	___	___
Proper Containers Used?	___	___	___

C.O.C. Serial # 101217

Pace Analytical Florida Laboratory	Document Name: Sample Condition Upon Receipt Form	Document Revised: August 11, 2014
	Document No.: F-FL-C-007 rev. 06	Issuing Authority: Pace Florida Quality Office

Sample Condition Upon Receipt Form (SCUR)

Table Number: _____

Client Name: Nutting Project # 35214460

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☐ Client ☑ Commercial ☐ Pace ☐ Other _____

Tracking # N/A

Custody Seal on Cooler/Box Present: ☐ yes ☑ no Seals intact: ☐ yes ☐ no

Packing Material: ☐ Bubble Wrap ☑ Bubble Bags ☐ None ☐ Other _____

Thermometer Used T212 Type of Ice: (Wet) Blue None

Cooler Temperature °C 5.6 (Visual) 0.0 (Correction Factor) 5.6 (Actual)

Date and Initials of person examining contents: 10/3/15 SB GDO

(Temp should be above freezing to 6°C). If below 0°C, then was sample frozen? ☐ Yes ☐ No

Receipt of samples satisfactory: ☐ Yes ☐ No Rush TAT requested on COC:

If yes, then all conditions below were met:	If no, then mark box & describe issue (use comments area if necessary):
Chain of Custody Present	☐
Chain of Custody Filled Out	☐
Relinquished Signature & Sampler Name COC	☐
Samples Arrived within Hold Time	☐
Sufficient Volume	☐
Correct Containers Used	☐
Containers Intact	☐
Sample Labels match COC (sample IDs & date/time of collection)	☐ No Labels: ☐ No Time/Date on Labels: ☐
All containers needing preservation are found to be in compliance with EPA recommendation.	☐
No Headspace in VOA Vials (>6mm):	☐

Client Notification/ Resolution:

Person Contacted: _____ Date/Time: _____

Comments/ Resolution (use back for additional comments): _____

Missing samples 1-3

Sample IDs MFEB8-GW1, MFEB8-GW2, MFEB8-GW3

SO/DS

Project Manager Review: _____ Date: _____

Finished Product Information Only

F.P. Sample ID: _____

Production Code: _____

Date/Time Opened: _____

Number of Unopened Bottles Remaining: _____

Extra Sample in Shed: Yes No

Size & Qty of Bottles Received

_____ x 5 Gal
_____ x 2.5 Gal
_____ x 1 Gal
_____ x 1 Liter
_____ x 500 mL
_____ x 250 mL
_____ x Other: _____

DEP Form FD 9000-24: GROUNDWATER SAMPLING LOG

SITE NAME: Arcadis US, INC	SITE LOCATION: Former MECCA Farms/Scripps Site, Palm Beach	
WELL NO: MFEB-2 GW-1	SAMPLE ID: MFEB-2 GW-1	DATE: 11-4-15

PURGING DATA

WELL DIAMETER (inches): 2	TUBING DIAMETER (inches): 1/2	WELL SCREEN INTERVAL DEPTH: 92.0 feet to 102.03 feet	STATIC DEPTH TO WATER (feet): 5.60	PURGE PUMP TYPE OR BAILER: Peristaltic Pump

WELL VOLUME PURGE: 1 WELL VOLUME = (TOTAL WELL DEPTH − STATIC DEPTH TO WATER) X WELL CAPACITY
(only fill out if applicable)
= (102.03 feet − 5.60 feet) X 0.16 gallons/foot = 15.41 gallons

EQUIPMENT VOLUME PURGE: 1 EQUIPMENT VOL. = PUMP VOLUME + (TUBING CAPACITY X TUBING LENGTH) + FLOW CELL VOLUME
(only fill out if applicable)
= gallons + (gallons/foot X feet) + gallons = gallons

INITIAL PUMP OR TUBING DEPTH IN WELL (feet): 6.5	FINAL PUMP OR TUBING DEPTH IN WELL (feet): 6.5	PURGING INITIATED AT: 12:20	PURGING ENDED AT: 15:20	TOTAL VOLUME PURGED (gallons): 47.0

TIME	VOLUME PURGED (gallons)	CUMUL. VOLUME PURGED (gallons)	PURGE RATE (gpm)	DEPTH TO WATER (feet)	pH (standard units)	TEMP. (°C)	COND. (circle units) µmhos/cm or (µS/cm)	DISSOLVED OXYGEN (circle units) (mg/L) or % saturation	TURBIDITY (NTUs)	COLOR (describe)	ODOR (describe)
15:20	45.0	45.0	0.25	5.65	6.78	24.11	1342	0.54	0.10	Clear	None
15:22	0.5	45.5	0.25	5.65	6.78	24.09	1340	0.52	0.12	Clear	None
15:24	0.5	46.0	0.25	5.65	6.77	24.23	1340	0.49	0.10	Clear	None
15:26	0.5	46.5	0.25	5.65	6.78	24.36	1341	0.45	0.09	Clear	None
15:28	0.5	47.0	0.25	5.65	6.80	24.15	1344	0.44	0.09	Clear	None

WELL CAPACITY (Gallons Per Foot): 0.75" = 0.02; 1" = 0.047.; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88
TUBING INSIDE DIA. CAPACITY (Gal./Ft.): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016

PURGING EQUIPMENT CODES: **B** = Bailer; **BP** = Bladder Pump; **ESP** = Electric Submersible Pump; **PP** = Peristaltic Pump; **O** = Other (Specify)

SAMPLING DATA

SAMPLED BY (PRINT) / AFFILIATION: Richard Illsley, Environmental Specialist, NEF	SAMPLER(S) SIGNATURE(S):	SAMPLING INITIATED AT: 15:29	SAMPLING ENDED AT: 15:33
PUMP OR TUBING DEPTH IN WELL (feet): 6.5	TUBING MATERIAL CODE: PE	FIELD-FILTERED: Y (N) Filtration Equipment Type:	FILTER SIZE: _____ µm
FIELD DECONTAMINATION: PUMP (Y) N	TUBING Y N (replaced)	DUPLICATE: Y (N)	

SAMPLE CONTAINER SPECIFICATION				SAMPLE PRESERVATION (including wet ice)			INTENDED ANALYSIS AND/OR METHOD	SAMPLING EQUIPMENT CODE	SAMPLE PUMP FLOW RATE (mL per minute)
SAMPLE ID CODE	# CONTAINERS	MATERIAL CODE	VOLUME	PRESERVATIVE USED	TOTAL VOL ADDED IN FIELD (mL)	FINAL pH			
MFEB-2 GW-1	1	PE	125mL	HNO3	0	-	METALS	APP	1000
MFEB-2 GW-1	1	PE	125mL	NONE	0	-	NON METALS	APP	1000

REMARKS:
Stick- 2.10
GPS- 26°49'33" 80°16'52"W

MATERIAL CODES: **AG** = Amber Glass; **CG** = Clear Glass; **HDPE** = High Density Polyethylene; **LDPE** = Low Density Polyethylene; **PP** = Polypropylene; **S** = Silicone; **T** = Teflon; **O** = Other (Specify)

SAMPLING EQUIPMENT CODES: **APP** = After (Through) Peristaltic Pump; **B** = Bailer; **BP** = Bladder Pump; **ESP** = Electric Submersible Pump; **RFPP** = Reverse Flow Peristaltic Pump; **SM** = Straw Method (Tubing Gravity Drain); **O** = Other (Specify)

NOTES: 1. **The above do not constitute all of the information required by Chapter 62-160, F.A.C.**

2. STABILIZATION CRITERIA FOR RANGE OF VARIATION OF LAST THREE CONSECUTIVE READINGS (SEE FS 2212, SECTION 3)

pH: ± 0.2 units **Temperature:** ± 0.2 °C **Specific Conductance:** ± 5% **Dissolved Oxygen:** all readings ≤ 20% saturation (see Table FS 2200-2); optionally, ± 0.2 mg/L or ± 10% (whichever is greater) **Turbidity:** all readings ≤ 20 NTU; optionally ± 5 NTU or ± 10% (whichever is greater)

DEP Form FD 9000-24: GROUNDWATER SAMPLING LOG

SITE NAME: Arcadis US, INC	SITE LOCATION: Former MECCA Farms/Scripps Site, Palm Beach	
WELL NO: MFEB-2 GW-2	SAMPLE ID: MFEB-2 GW-2	DATE: 11-4-15

PURGING DATA

WELL DIAMETER (inches): 2	TUBING DIAMETER (inches): 1/2	WELL SCREEN INTERVAL DEPTH: 38.12 feet to 48.12 feet	STATIC DEPTH TO WATER (feet): 7.05	PURGE PUMP TYPE OR BAILER: Peristaltic Pump

WELL VOLUME PURGE: 1 WELL VOLUME = (TOTAL WELL DEPTH − STATIC DEPTH TO WATER) X WELL CAPACITY
(only fill out if applicable)
= (48.12 feet − 7.05 feet) X 0.16 gallons/foot = 6.51 gallons

EQUIPMENT VOLUME PURGE: 1 EQUIPMENT VOL. = PUMP VOLUME + (TUBING CAPACITY X TUBING LENGTH) + FLOW CELL VOLUME
(only fill out if applicable)
= gallons + (gallons/foot X feet) + gallons = gallons

INITIAL PUMP OR TUBING DEPTH IN WELL (feet): 6.5	FINAL PUMP OR TUBING DEPTH IN WELL (feet): 6.5	PURGING INITIATED AT: 12:25	PURGING ENDED AT: 14:07	TOTAL VOLUME PURGED (gallons): 20.0

TIME	VOLUME PURGED (gallons)	CUMUL. VOLUME PURGED (gallons)	PURGE RATE (gpm)	DEPTH TO WATER (feet)	pH (standard units)	TEMP. (°C)	COND. (circle units) µmhos/cm or (µS/cm)	DISSOLVED OXYGEN (circle units) mg/L or % saturation	TURBIDITY (NTUs)	COLOR (describe)	ODOR (describe)
13:59	18.0	18.0	0.25	7.11	6.15	23.77	752	0.53	0.57	Clear	None
14:01	0.5	18.5	0.25	7.11	6.15	23.67	752	0.52	0.59	Clear	None
14:03	0.5	19.0	0.25	7.11	6.15	23.68	751	0.51	0.55	Clear	None
14:05	0.5	19.5	0.25	7.11	6.16	23.71	750	0.50	0.56	Clear	None
14:07	0.5	20.0	0.25	7.11	6.17	23.70	750	0.50	0.55	Clear	None

WELL CAPACITY (Gallons Per Foot): 0.75" = 0.02; 1" = 0.047.; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47 12" = 5.88
TUBING INSIDE DIA. CAPACITY (Gal./Ft.): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0025; 5/16" = 0.004; 3/8" = 0.005; 1/2" = 0.010; 5/8" = 0.016

PURGING EQUIPMENT CODES: **B** = Bailer; **BP** = Bladder Pump; **ESP** = Electric Submersible Pump; **PP** = Peristaltic Pump; **O** = Other (Specify)

SAMPLING DATA

SAMPLED BY (PRINT) / AFFILIATION: Richard Ilsley, Environmental Specialist, NEF	SAMPLER(S) SIGNATURE(S):	SAMPLING INITIATED AT: 14:09	SAMPLING ENDED AT: 14:11
PUMP OR TUBING DEPTH IN WELL (feet): 6.5	TUBING MATERIAL CODE: PE	FIELD-FILTERED: Y (N) Filtration Equipment Type:	FILTER SIZE: ____ µm
FIELD DECONTAMINATION: PUMP (Y) N TUBING Y N (replaced)		DUPLICATE: Y (N)	

SAMPLE CONTAINER SPECIFICATION				SAMPLE PRESERVATION (including wet ice)			INTENDED ANALYSIS AND/OR METHOD	SAMPLING EQUIPMENT CODE	SAMPLE PUMP FLOW RATE (mL per minute)
SAMPLE ID CODE	# CONTAINERS	MATERIAL CODE	VOLUME	PRESERVATIVE USED	TOTAL VOL ADDED IN FIELD (mL)	FINAL pH			
MFEB-2 GW-2	1	PE	125mL	HNO3	0	-	METALS	APP	1000
MFEB-2 GW-2	1	PE	125mL	NONE	0	-	NON METALS	APP	1000

REMARKS:
Stick- 2.10
GPS- 26°49'33" 80°16'52"W

MATERIAL CODES: **AG** = Amber Glass; **CG** = Clear Glass; **HDPE** = High Density Polyethylene; **LDPE** = Low Density Polyethylene; **PP** = Polypropylene; **S** = Silicone; **T** = Teflon; **O** = Other (Specify)

SAMPLING EQUIPMENT CODES: **APP** = After (Through) Peristaltic Pump; **B** = Bailer; **BP** = Bladder Pump; **ESP** = Electric Submersible Pump; **RFPP** = Reverse Flow Peristaltic Pump; **SM** = Straw Method (Tubing Gravity Drain); **O** = Other (Specify)

NOTES: 1. The above do not constitute all of the information required by Chapter 62-160, F.A.C.

2. STABILIZATION CRITERIA FOR RANGE OF VARIATION OF LAST THREE CONSECUTIVE READINGS (SEE FS 2212, SECTION 3)

pH: ± 0.2 units **Temperature:** ± 0.2 °C **Specific Conductance:** ± 5% **Dissolved Oxygen:** all readings ≤ 20% saturation (see Table FS 2200-2); optionally, ± 0.2 mg/L or ± 10% (whichever is greater) **Turbidity:** all readings ≤ 20 NTU; optionally ± 5 NTU or ± 10% (whichever is greater)

DEP Form FD 9000-24: GROUNDWATER SAMPLING LOG

SITE NAME: Arcadis US, INC	SITE LOCATION: Former MECCA Farms/Scripps Site, Palm Beach	
WELL NO: MFEB-2 GW-3	SAMPLE ID: MFEB-2 GW-3	DATE: 11-4-15

PURGING DATA

WELL DIAMETER (inches): 2	TUBING DIAMETER (inches): 1/2	WELL SCREEN INTERVAL DEPTH: 7.84 feet to 17.84 feet	STATIC DEPTH TO WATER (feet): 5.63	PURGE PUMP TYPE OR BAILER: Peristaltic Pump

WELL VOLUME PURGE: 1 WELL VOLUME = (TOTAL WELL DEPTH – STATIC DEPTH TO WATER) X WELL CAPACITY
(only fill out if applicable)
= (17.84 feet – 5.63 feet) X 0.16 gallons/foot = 1.64 gallons

EQUIPMENT VOLUME PURGE: 1 EQUIPMENT VOL. = PUMP VOLUME + (TUBING CAPACITY X TUBING LENGTH) + FLOW CELL VOLUME
(only fill out if applicable)
= gallons + (gallons/foot X feet) + gallons = gallons

INITIAL PUMP OR TUBING DEPTH IN WELL (feet): 6.5	FINAL PUMP OR TUBING DEPTH IN WELL (feet): 6.5	PURGING INITIATED AT: 14:15	PURGING ENDED AT: 14:39	TOTAL VOLUME PURGED (gallons): 6.0

TIME	VOLUME PURGED (gallons)	CUMUL. VOLUME PURGED (gallons)	PURGE RATE (gpm)	DEPTH TO WATER (feet)	pH (standard units)	TEMP. (°C)	COND. (circle units) µmhos/cm or (µS/cm)	DISSOLVED OXYGEN (circle units) (mg/L) or % saturation	TURBIDITY (NTUs)	COLOR (describe)	ODOR (describe)
14:31	4.0	4.0	0.25	5.66	7.14	24.52	534	0.63	0.65	Clear	None
14:33	0.5	4.5	0.25	5.66	7.12	24.62	533	0.62	0.65	Clear	None
14:35	0.5	5.0	0.25	5.66	7.09	24.57	535	0.58	0.63	Clear	None
14:37	0.5	5.5	0.25	5.66	7.11	24.51	536	0.55	0.60	Clear	None
15:39	0.5	6.0	0.25	5.66	7.03	24.63	538	0.55	0.60	Clear	None

WELL CAPACITY (Gallons Per Foot): **0.75"** = 0.02; **1"** = 0.047.; **1.25"** = 0.06; **2"** = 0.16; **3"** = 0.37; **4"** = 0.65; **5"** = 1.02; **6"** = 1.47; **12"** = 5.88
TUBING INSIDE DIA. CAPACITY (Gal./Ft.): **1/8"** = 0.0006; **3/16"** = 0.0014; **1/4"** = 0.0026; **5/16"** = 0.004; **3/8"** = 0.006; **1/2"** = 0.010; **5/8"** = 0.016

PURGING EQUIPMENT CODES: **B** = Bailer; **BP** = Bladder Pump; **ESP** = Electric Submersible Pump; **PP** = Peristaltic Pump; **O** = Other (Specify)

SAMPLING DATA

SAMPLED BY (PRINT) / AFFILIATION: Richard Illsley, Environmental Specialist, NEF	SAMPLER(S) SIGNATURE(S):	SAMPLING INITIATED AT: 14:40	SAMPLING ENDED AT: 14:43
PUMP OR TUBING DEPTH IN WELL (feet): 6.5	TUBING MATERIAL CODE: PE	FIELD FILTERED: Y (N) Filtration Equipment Type:	FILTER SIZE: _____ µm
FIELD DECONTAMINATION: PUMP (Y) N TUBING Y N (replaced)		DUPLICATE: Y (N)	

SAMPLE CONTAINER SPECIFICATION				SAMPLE PRESERVATION (including wet ice)			INTENDED ANALYSIS AND/OR METHOD	SAMPLING EQUIPMENT CODE	SAMPLE PUMP FLOW RATE (mL per minute)
SAMPLE ID CODE	# CONTAINERS	MATERIAL CODE	VOLUME	PRESERVATIVE USED	TOTAL VOL ADDED IN FIELD (mL)	FINAL pH			
MFEB-2 GW-3	1	PE	125mL	HNO3	0	-	METALS	APP	1000
MFEB-2 GW-3	1	PE	125mL	NONE	0	-	NON METALS	APP	1000

REMARKS:
Stick- 2.10
GPS- 26°49'33" 80°16'52"W

MATERIAL CODES: **AG** = Amber Glass; **CG** = Clear Glass; **HDPE** = High Density Polyethylene; **LDPE** = Low Density Polyethylene; **PP** = Polypropylene; **S** = Silicone; **T** = Teflon; **O** = Other (Specify)

SAMPLING EQUIPMENT CODES: **APP** = After (Through) Peristaltic Pump; **B** = Bailer; **BP** = Bladder Pump; **ESP** = Electric Submersible Pump; **RFPP** = Reverse Flow Peristaltic Pump; **SM** = Straw Method (Tubing Gravity Drain); **O** = Other (Specify)

NOTES: 1. **The above do not constitute all of the information required by Chapter 62-160, F.A.C.**

2. STABILIZATION CRITERIA FOR RANGE OF VARIATION OF LAST THREE CONSECUTIVE READINGS (SEE FS 2212, SECTION 3)

pH: ± 0.2 units **Temperature:** ± 0.2 °C **Specific Conductance:** ± 5% **Dissolved Oxygen:** all readings ≤ 20% saturation (see Table FS 2200-2); optionally, ± 0.2 mg/L or ± 10% (whichever is greater) **Turbidity:** all readings ≤ 20 NTU; optionally ± 5 NTU or ± 10% (whichever is greater)

Pace Analytical Services, Inc.
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954-582-4300

November 12, 2015

Jan Beernink
Nutting Environmental of Florida, Inc.
1310 Neptune Drive
Boynton Beach, FL 33426

RE: Project: Arcadis US Inc
Pace Project No.: 35215834

Dear Jan Beernink:
Enclosed are the analytical results for sample(s) received by the laboratory on November 05, 2015. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Christina Raschke
christina.raschke@pacelabs.com
Project Manager

Enclosures

cc: Kristen Campos, Nutting Environmental of Flori

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CERTIFICATIONS

Project: Arcadis US Inc
Pace Project No.: 35215834

Ormond Beach Certification IDs
8 East Tower Circle, Ormond Beach, FL 32174
Alabama Certification #: 41320
Connecticut Certification #: PH-0216
Delaware Certification: FL NELAC Reciprocity
Florida Certification #: E83079
Georgia Certification #: 955
Guam Certification: FL NELAC Reciprocity
Hawaii Certification: FL NELAC Reciprocity
Illinois Certification #: 200068
Indiana Certification: FL NELAC Reciprocity
Kansas Certification #: E-10383
Kentucky Certification #: 90050
Louisiana Certification #: FL NELAC Reciprocity
Louisiana Environmental Certificate #: 05007
Maryland Certification: #346
Michigan Certification #: 9911
Mississippi Certification: FL NELAC Reciprocity
Missouri Certification #: 236
Montana Certification #: Cert 0074
Nebraska Certification: NE-OS-28-14
Nevada Certification: FL NELAC Reciprocity
New Hampshire Certification #: 2958
New York Certification #: 11608
North Carolina Environmental Certificate #: 667
North Carolina Certification #: 12710
North Dakota Certification #: R-216
Oklahoma Certification #: D9947
Pennsylvania Certification #: 68-00547
Puerto Rico Certification #: FL01264
South Carolina Certification: #96042001
Tennessee Certification #: TN02974
Texas Certification: FL NELAC Reciprocity
US Virgin Islands Certification: FL NELAC Reciprocity
Virginia Environmental Certification #: 460165
West Virginia Certification #: 9962C
Wisconsin Certification #: 399079670
Wyoming (EPA Region 8): FL NELAC Reciprocity

REPORT OF LABORATORY ANALYSIS

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SAMPLE SUMMARY

Project: Arcadis US Inc
Pace Project No.: 35215834

Lab ID	Sample ID	Matrix	Date Collected	Date Received
35215260007	**MFEB-2 GW-1**	Water	11/04/15 15:29	11/05/15 16:30
35215260008	**MFEB-2 GW-2**	Water	11/04/15 14:09	11/05/15 16:30
35215260009	**MFEB-2 GW-3**	Water	11/04/15 14:40	11/05/15 16:30

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SAMPLE ANALYTE COUNT

Project: Arcadis US Inc
Pace Project No.: 35215834

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
35215260007	**MFEB-2 GW-1**	EPA 6010	TAP	5	PASI-O
		SM 2320B	KAM	3	PASI-O
		EPA 300.0	CMB	2	PASI-O
35215260008	**MFEB-2 GW-2**	EPA 6010	MEW	5	PASI-O
		SM 2320B	KAM	3	PASI-O
		EPA 300.0	CMB	2	PASI-O
35215260009	**MFEB-2 GW-3**	EPA 6010	MEW	5	PASI-O
		SM 2320B	KAM	3	PASI-O
		EPA 300.0	CMB	2	PASI-O

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SUMMARY OF DETECTION

Project: Arcadis US Inc
Pace Project No.: 35215834

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
35215260007	**MFEB-2 GW-1**					
EPA 6010	Iron	75.3	ug/L	40.0	11/11/15 15:27	
EPA 6010	Magnesium	15000	ug/L	500	11/11/15 15:27	
EPA 6010	Potassium	7840	ug/L	1000	11/11/15 15:27	
EPA 6010	Sodium	137000	ug/L	1000	11/11/15 15:27	
SM 2320B	Alkalinity,Bicarbonate (CaCO3)	322	mg/L	5.0	11/09/15 14:49	
SM 2320B	Alkalinity, Total as CaCO3	322	mg/L	5.0	11/09/15 14:49	
EPA 300.0	Chloride	210	mg/L	10.0	11/06/15 21:02	
EPA 300.0	Sulfate	8.4	mg/L	5.0	11/08/15 22:32	
35215260008	**MFEB-2 GW-2**					
EPA 6010	Iron	170	ug/L	40.0	11/11/15 00:08	
EPA 6010	Magnesium	11000	ug/L	500	11/11/15 00:08	
EPA 6010	Potassium	2410	ug/L	1000	11/11/15 00:08	
EPA 6010	Sodium	15200	ug/L	1000	11/11/15 00:08	
SM 2320B	Alkalinity,Bicarbonate (CaCO3)	261	mg/L	5.0	11/09/15 14:55	
SM 2320B	Alkalinity, Total as CaCO3	261	mg/L	5.0	11/09/15 14:55	
EPA 300.0	Chloride	40.5	mg/L	5.0	11/06/15 21:21	
EPA 300.0	Sulfate	60.3	mg/L	5.0	11/06/15 21:21	
35215260009	**MFEB-2 GW-3**					
EPA 6010	Iron	410	ug/L	40.0	11/11/15 00:11	
EPA 6010	Magnesium	4350	ug/L	500	11/11/15 00:11	
EPA 6010	Potassium	6790	ug/L	1000	11/11/15 00:11	
EPA 6010	Sodium	20200	ug/L	1000	11/11/15 00:11	
SM 2320B	Alkalinity,Bicarbonate (CaCO3)	210	mg/L	5.0	11/09/15 15:13	
SM 2320B	Alkalinity, Total as CaCO3	210	mg/L	5.0	11/09/15 15:13	
EPA 300.0	Chloride	27.0	mg/L	5.0	11/06/15 21:41	
EPA 300.0	Sulfate	14.2	mg/L	5.0	11/06/15 21:41	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: Arcadis US Inc
Pace Project No.: 35215834

Sample: MFEB-2 GW-1 **Lab ID: 35215260007** Collected: 11/04/15 15:29 Received: 11/05/15 16:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Cadmium	**0.50 U**	ug/L	1.0	0.50	1	11/10/15 06:19	11/11/15 15:27	7440-43-9	
Iron	**75.3**	ug/L	40.0	20.0	1	11/10/15 06:19	11/11/15 15:27	7439-89-6	
Magnesium	**15000**	ug/L	500	250	1	11/10/15 06:19	11/11/15 15:27	7439-95-4	
Potassium	**7840**	ug/L	1000	500	1	11/10/15 06:19	11/11/15 15:27	7440-09-7	
Sodium	**137000**	ug/L	1000	500	1	11/10/15 06:19	11/11/15 15:27	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity,Bicarbonate (CaCO3)	**322**	mg/L	5.0	5.0	1		11/09/15 14:49		
Alkalinity, Carbonate (CaCO3)	**5.0 U**	mg/L	5.0	5.0	1		11/09/15 14:49		
Alkalinity, Total as CaCO3	**322**	mg/L	5.0	5.0	1		11/09/15 14:49		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**210**	mg/L	10.0	5.0	2		11/06/15 21:02	16887-00-6	
Sulfate	**8.4**	mg/L	5.0	2.5	1		11/08/15 22:32	14808-79-8	

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ANALYTICAL RESULTS

Project: Arcadis US Inc
Pace Project No.: 35215834

Sample: MFEB-2 GW-2 **Lab ID: 35215260008** Collected: 11/04/15 14:09 Received: 11/05/15 16:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Cadmium	**0.50 U**	ug/L	1.0	0.50	1	11/10/15 06:19	11/11/15 00:08	7440-43-9	
Iron	**170**	ug/L	40.0	20.0	1	11/10/15 06:19	11/11/15 00:08	7439-89-6	
Magnesium	**11000**	ug/L	500	250	1	11/10/15 06:19	11/11/15 00:08	7439-95-4	
Potassium	**2410**	ug/L	1000	500	1	11/10/15 06:19	11/11/15 00:08	7440-09-7	
Sodium	**15200**	ug/L	1000	500	1	11/10/15 06:19	11/11/15 00:08	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity,Bicarbonate (CaCO3)	**261**	mg/L	5.0	5.0	1		11/09/15 14:55		
Alkalinity, Carbonate (CaCO3)	**5.0 U**	mg/L	5.0	5.0	1		11/09/15 14:55		
Alkalinity, Total as CaCO3	**261**	mg/L	5.0	5.0	1		11/09/15 14:55		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**40.5**	mg/L	5.0	2.5	1		11/06/15 21:21	16887-00-6	
Sulfate	**60.3**	mg/L	5.0	2.5	1		11/06/15 21:21	14808-79-8	

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ANALYTICAL RESULTS

Project: Arcadis US Inc
Pace Project No.: 35215834

Sample: MFEB-2 GW-3 **Lab ID: 35215260009** Collected: 11/04/15 14:40 Received: 11/05/15 16:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Cadmium	**0.50 U**	ug/L	1.0	0.50	1	11/10/15 06:19	11/11/15 00:11	7440-43-9	
Iron	**410**	ug/L	40.0	20.0	1	11/10/15 06:19	11/11/15 00:11	7439-89-6	
Magnesium	**4350**	ug/L	500	250	1	11/10/15 06:19	11/11/15 00:11	7439-95-4	
Potassium	**6790**	ug/L	1000	500	1	11/10/15 06:19	11/11/15 00:11	7440-09-7	
Sodium	**20200**	ug/L	1000	500	1	11/10/15 06:19	11/11/15 00:11	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity,Bicarbonate (CaCO3)	**210**	mg/L	5.0	5.0	1		11/09/15 15:13		
Alkalinity, Carbonate (CaCO3)	**5.0 U**	mg/L	5.0	5.0	1		11/09/15 15:13		
Alkalinity, Total as CaCO3	**210**	mg/L	5.0	5.0	1		11/09/15 15:13		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**27.0**	mg/L	5.0	2.5	1		11/06/15 21:41	16887-00-6	
Sulfate	**14.2**	mg/L	5.0	2.5	1		11/06/15 21:41	14808-79-8	

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QUALITY CONTROL DATA

Project: Arcadis US Inc
Pace Project No.: 35215834

QC Batch: MPRP/27299 Analysis Method: EPA 6010
QC Batch Method: EPA 3010 Analysis Description: 6010 MET
Associated Lab Samples: 35215260007, 35215260008, 35215260009

METHOD BLANK: 1387437 Matrix: Water
Associated Lab Samples: 35215260007, 35215260008, 35215260009

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Cadmium	ug/L	0.50 U	1.0	0.50	11/11/15 13:03	
Iron	ug/L	20.0 U	40.0	20.0	11/11/15 13:03	
Magnesium	ug/L	250 U	500	250	11/11/15 13:03	
Potassium	ug/L	500 U	1000	500	11/11/15 13:03	
Sodium	ug/L	500 U	1000	500	11/11/15 13:03	

LABORATORY CONTROL SAMPLE: 1387438

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Cadmium	ug/L	25	26.8	107	80-120	
Iron	ug/L	2500	2670	107	80-120	
Magnesium	ug/L	12500	12900	103	80-120	
Potassium	ug/L	12500	13100	105	80-120	
Sodium	ug/L	12500	12800	103	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1387439 1387440

Parameter	Units	35214835001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Cadmium	ug/L	0.50 U	25	25	26.0	25.9	104	104	75-125	0	20	
Iron	ug/L	654	2500	2500	3340	3320	107	107	75-125	1	20	
Magnesium	ug/L	4740	12500	12500	17500	17400	102	101	75-125	1	20	
Potassium	ug/L	2990	12500	12500	16300	16200	106	105	75-125	1	20	
Sodium	ug/L	23700	12500	12500	37200	36700	108	104	75-125	1	20	

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QUALITY CONTROL DATA

Project: Arcadis US Inc
Pace Project No.: 35215834

QC Batch: WET/34045 Analysis Method: SM 2320B
QC Batch Method: SM 2320B Analysis Description: 2320B Alkalinity
Associated Lab Samples: 35215260007, 35215260008, 35215260009

METHOD BLANK: 1386777 Matrix: Water
Associated Lab Samples: 35215260007, 35215260008, 35215260009

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Carbonate (CaCO3)	mg/L	5.0 U	5.0	5.0	11/09/15 13:29	
Alkalinity, Total as CaCO3	mg/L	5.0 U	5.0	5.0	11/09/15 13:29	
Alkalinity,Bicarbonate (CaCO3)	mg/L	5.0 U	5.0	5.0	11/09/15 13:29	

LABORATORY CONTROL SAMPLE: 1386778

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	250	243	97	90-110	

SAMPLE DUPLICATE: 1386779

Parameter	Units	35215232001 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Carbonate (CaCO3)	mg/L	<5.0	5.0 U		20	
Alkalinity, Total as CaCO3	mg/L	294	298	1	20	
Alkalinity,Bicarbonate (CaCO3)	mg/L	294	298	1	20	

SAMPLE DUPLICATE: 1386780

Parameter	Units	35215594001 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Carbonate (CaCO3)	mg/L	<5.0	5.0 U		20	
Alkalinity, Total as CaCO3	mg/L	47.5	48.1	1	20	
Alkalinity,Bicarbonate (CaCO3)	mg/L	47.5	48.1	1	20	

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QUALITY CONTROL DATA

Project: Arcadis US Inc
Pace Project No.: 35215834

QC Batch: WETA/51898 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 35215260007, 35215260008, 35215260009

METHOD BLANK: 1385040 Matrix: Water
Associated Lab Samples: 35215260007, 35215260008, 35215260009

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	2.5 U	5.0	2.5	11/06/15 12:57	
Sulfate	mg/L	2.5 U	5.0	2.5	11/06/15 12:57	

LABORATORY CONTROL SAMPLE: 1385041

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	50	49.9	100	90-110	
Sulfate	mg/L	50	48.9	98	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1385042 1385043

Parameter	Units	35215232001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	64.7	50	50	114	114	98	98	90-110	0	20	
Sulfate	mg/L	<2.5	50	50	48.7	48.8	94	94	90-110	0	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1385044 1385045

Parameter	Units	35215249003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	166	50	50	216	216	99	100	90-110	0	20	L
Sulfate	mg/L	48.2	50	50	98.8	99.3	101	102	90-110	0	20	

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QUALIFIERS

Project: Arcadis US Inc
Pace Project No.: 35215834

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-O	Pace Analytical Services - Ormond Beach

ANALYTE QUALIFIERS

U	Compound was analyzed for but not detected.
L	Off-scale high. Actual value is known to be greater than value given.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Arcadis US Inc
Pace Project No.: 35215834

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
35215260007	**MFEB-2 GW-1**	EPA 3010	MPRP/27299	EPA 6010	ICP/16433
35215260008	**MFEB-2 GW-2**	EPA 3010	MPRP/27299	EPA 6010	ICP/16433
35215260009	**MFEB-2 GW-3**	EPA 3010	MPRP/27299	EPA 6010	ICP/16433
35215260007	**MFEB-2 GW-1**	SM 2320B	WET/34045		
35215260008	**MFEB-2 GW-2**	SM 2320B	WET/34045		
35215260009	**MFEB-2 GW-3**	SM 2320B	WET/34045		
35215260007	**MFEB-2 GW-1**	EPA 300.0	WETA/51898		
35215260008	**MFEB-2 GW-2**	EPA 300.0	WETA/51898		
35215260009	**MFEB-2 GW-3**	EPA 300.0	WETA/51898		

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WO# : 35215260

35215260

RECORD

Date:_____ Page 1 of ___

Company Name: Nutting Eng PO#

Address: 1310 Northmeadow Dr

City: Boynton Beach State: FL Zip: 33426

Attn: Jon Bedrnicek Fax#

email: Phone:

Project Name: Arcadis US Inc Proj #

Sampler Signature: Circle One Event: Daily Weekly Monthly Quarterly Semi-Annual Annual N/A

LAB ANALYSIS

Parameters	Bicarbonate	Carbonate	Sulfate	Calcium	Magnesium	Sodium	Potassium	Iron	Chloride	EXAMPLE Diss. Lead 6010
# of Containers Size/Type										1 16ozP

Sample #	Sample ID	Collect Date	Collect Time	Matrix Code*	Field Filtered	Integrity OK(Y/N)	Total # of containers	REMARKS
1	MFEB-7 GW-1	11/4	11:33	GW			2	
2	MFEB-7 GW-2	11/4	10:08	GW			2	
3	MFEB-7 GW-3	11/4	10:45	GW			2	
4	MFEB-6 GW-1	11/3	13:03	GW			2	
5	MFEB-6 GW-2	11/3	14:52	GW			2	
6	MFEB-6 GW-3	11/3	15:24	GW			2	
7	MFEB-2 GW-1	11/4	15:29	GW			2	
8	MFEB-2 GW-2	11/4	14:09	GW			2	
9	MFEB-2 GW-3	11/4	14:40	GW			2	
10								2L-29-20

Clean T.A.T. REQUEST (Rush Fees Apply)
Standard: Y N
Rush: Today 1D 2D 3D 4D 5D ___

Short Hold: Y___ N___

Circle QA/QC Report Level: 1 2 3 4 CLP AFCEE QAPP Other___

EDD (Fees May Apply): ADaPT SEDD ERPIMS TSV CSV Other___

COC Condition: OK Incomplete

Required State Certification: FL GA SC NC NJ PA LA TX IL ___

Coolers #'s - Temp °C: 1___ 2___ 3___ 4___ 5___

Item	Relinquished by	Affiliation	Date	Time	Received by	Affiliation	Date	Time
1	RJ Ulc		11/5/15	1200			11-5-15	1200
2			11/5/15	1630			11/6/15	1630
3								
4								

Lab Use Only	Yes	NO	N/A
Non-Conformances Found?			
Samples INTACT upon arrival?			
Received on Wet Ice?			
Proper Preservatives Indicated?			
Received within holding time?			
Custody seals Intact?			
Volatiles rec'd without headspace?			
Proper Containers Used?			

Container Type Codes

AV	Amber Vial	ES	Encore Sampler
CV	Clear Vial	PPV	Prepreserved vial
P	Plastic	PLC	Plastic container
AL	Amber Liter	PLJ	Plastic Jar
CL	Clear Liter	Z	Ziploc bag
AP	Amber Plastic	TB	Tedlar bag
AG	Amber Glass	WP	Whirl pak
SJ	Soil Jar	G	Gallon Jug
Other		TC	Terra-core

PPV Preprserved vial
Size(s): 2oz, 4oz, 8oz, 16oz, 32oz or 1L, other___
40ml 500ml 250ml 125 ml
Example: 4ozP = 4oz Plastic, 5ozSJ= 8oz Soil Jar

Matrix Codes

SD	Solid Waste	OL	Oil
GW	Ground Water	SL	Sludge
EFF	Effluent	SD	Soil Sediment
AFW	Analyte Free H20	AQ	Aqueous
WW	Waste Water	NA	Nonaqueous
DW	Drinking Water	PE	Petroleum
SW	Surface Water	O	Other___ (Please specify)
ML	Misc. Liquid		

Preservative Type Codes

A. None	E. HCL	I. Ice
B. HNO3	F. MeOH	J. MCAA
C. H2SO4	G. Na2S2O3	K. Zn Acetate
D. NaOH	H. NaHSO4	O. Other

C.O.C. Serial # 101213

Pace Analytical	Document Name Sample Condition Upon Receipt Form	Document Revised October 9, 2013
	Document No F-FL-C-007 rev. 05	Issuing Authorities Pace Florida Quality Office

Sample Condition Upon Receipt Form (SCUR)

WO# : 35215260

PM: CTR Due Date: 11/11/15
CLIENT: 36-NUTTEN

Client Name: Nutting P

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☑ Pace

Tracking # _____

Custody Seal on Cooler/Box Present: ☐ yes ☑ no Seals intact ☐ yes ☑ no

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☑ None ☐ Other _____

Thermometer Used T-104

Type of Ice: ☑ Wet ☐ Blue ☐ None

Cooler Temperature °C 2.2 (Visual) 0.3 (Correction Factor) 2.5 (Actual)

Date and Initials of person examining contents: _____

(Temp should be above freezing in 6°C) If below 0°C, was sample frozen? ☐ Yes ☑ No

Receipt of samples satisfactory: ☑ Yes ☐ No

Rush TAT requested on COC:

If yes, then all conditions below were met:	If no, then mark box & describe issue (use comments area if necessary)
Chain of Custody Present	☐
Chain of Custody Filled Out	☐
Relinquished Signature & Sampler Name COC	☐
Samples Arrived within Hold Time	☐
Sufficient Volume	☐
Correct Containers Used	☐
Containers Intact	☐
Sample Labels match COC (sample IDs & date/time of collection)	☐ No Labels ☐ No Time/Date on Labels ☐
All containers needing preservation are found to be in compliance with EPA recommendation	☐
No Headspace in VOA Vials (>6mm)	☐

Client Notification/ Resolution:

Person Contacted _____ Date/Time _____

Comments/ Resolution (use back for additional comments) _____

Project Manager Review: _____ Date: _____

Finished Product Information Only

F.P. Sample ID: _____

Production Code: _____

Date/Time Opened: _____

Number of Unopened Bottles Remaining: _____

Extra Sample in Shed: Yes No

Size & Qty of Bottles Received

_____ x 5 Gal
_____ x 2.5 Gal
_____ x 1 Gal
_____ x 1 Liter
_____ x 500 mL
_____ x 250 mL
_____ x Other: _____

DEP Form FD 9000-24: GROUNDWATER SAMPLING LOG

SITE NAME: Arcadis US, INC	SITE LOCATION: Former MECCA Farms/Scripps Site, Palm Beach	
WELL NO: MFEB-3 GW-1	SAMPLE ID: MFEB-3 GW-1	DATE: 10-29-15

PURGING DATA

WELL DIAMETER (inches): 2	TUBING DIAMETER (inches): 1/2	WELL SCREEN INTERVAL DEPTH: 93.2 feet to 103.21 feet	STATIC DEPTH TO WATER (feet): 8.25	PURGE PUMP TYPE OR BAILER: Peristaltic Pump

WELL VOLUME PURGE: 1 WELL VOLUME = (TOTAL WELL DEPTH − STATIC DEPTH TO WATER) X WELL CAPACITY
(only fill out if applicable)
= (103.21 feet − 8.25 feet) X 0.16 gallons/foot = 15.19 gallons

EQUIPMENT VOLUME PURGE: 1 EQUIPMENT VOL. = PUMP VOLUME + (TUBING CAPACITY X TUBING LENGTH) + FLOW CELL VOLUME
(only fill out if applicable)
= gallons + (gallons/foot X feet) + gallons = gallons

INITIAL PUMP OR TUBING DEPTH IN WELL (feet): 9.0	FINAL PUMP OR TUBING DEPTH IN WELL (feet): 9.0	PURGING INITIATED AT: 13:00	PURGING ENDED AT: 16:08	TOTAL VOLUME PURGED (gallons): 47

TIME	VOLUME PURGED (gallons)	CUMUL. VOLUME PURGED (gallons)	PURGE RATE (gpm)	DEPTH TO WATER (feet)	pH (standard units)	TEMP. (°C)	COND. (circle units) µmhos/cm or µS/cm	DISSOLVED OXYGEN (circle units) mg/L or % saturation	TURBIDITY (NTUs)	COLOR (describe)	ODOR (describe)
16:00	45.0	45.0	0.25	8.30	6.70	25.04	653	0.59	0.35	Clear	None
16:02	0.5	45.5	0.25	8.30	6.71	25.04	654	0.58	0.33	Clear	None
16:04	0.5	46.0	0.25	8.30	6.71	25.05	654	0.56	0.33	Clear	None
16:06	0.5	46.5	0.25	8.30	6.72	25.07	654	0.55	0.33	Clear	None
16:08	0.5	47.0	0.25	8.30	6.72	25.07	654	0.55	0.34	Clear	None

WELL CAPACITY (Gallons Per Foot): **0.75"** = 0.02; **1"** = 0.04; **1.25"** = 0.06; **2"** = 0.16; **3"** = 0.37; **4"** = 0.65; **5"** = 1.02; **6"** = 1.47; **12"** = 5.88
TUBING INSIDE DIA. CAPACITY (Gal./Ft.): **1/8"** = 0.0006; **3/16"** = 0.0014; **1/4"** = 0.0026; **5/16"** = 0.004; **3/8"** = 0.006; **1/2"** = 0.010; **5/8"** = 0.016

PURGING EQUIPMENT CODES: B = Bailer; BP = Bladder Pump; ESP = Electric Submersible Pump; PP = Peristaltic Pump; O = Other (Specify)

SAMPLING DATA

SAMPLED BY (PRINT) / AFFILIATION: Richard Illsley, Environmental Specialist, NEF	SAMPLER(S) SIGNATURE(S):	SAMPLING INITIATED AT: 16:09	SAMPLING ENDED AT: 16:11
PUMP OR TUBING DEPTH IN WELL (feet): 9.0	TUBING MATERIAL CODE: PE	FIELD-FILTERED: Y (N) Filtration Equipment Type:	FILTER SIZE: ____ µm
FIELD DECONTAMINATION: PUMP (Y) N TUBING Y N (replaced)		DUPLICATE: Y (N)	

SAMPLE CONTAINER SPECIFICATION				SAMPLE PRESERVATION (including wet ice)			INTENDED ANALYSIS AND/OR METHOD	SAMPLING EQUIPMENT CODE	SAMPLE PUMP FLOW RATE (mL per minute)
SAMPLE ID CODE	# CONTAINERS	MATERIAL CODE	VOLUME	PRESERVATIVE USED	TOTAL VOL ADDED IN FIELD (mL)	FINAL pH			
MFEB-3 GW-1	1	PE	125mL	HNO3	0	-	METALS	APP	1000
MFEB-3 GW-1	1	PE	125mL	NONE	0	-	NON METALS	APP	1000

REMARKS:
Stick- 2.50
GPS- 26°50'2" 80°17'32"W

MATERIAL CODES: **AG** = Amber Glass; **CG** = Clear Glass; **HDPE** = High Density Polyethylene; **LDPE** = Low Density Polyethylene; **PP** = Polypropylene; **S** = Silicone; **T** = Teflon; **O** = Other (Specify)

SAMPLING EQUIPMENT CODES: **APP** = After (Through) Peristaltic Pump; **B** = Bailer; **BP** = Bladder Pump; **ESP** = Electric Submersible Pump; **RFPP** = Reverse Flow Peristaltic Pump; **SM** = Straw Method (Tubing Gravity Drain); **O** = Other (Specify)

NOTES: 1. The above do not constitute all of the information required by Chapter 62-160, F.A.C.

2. STABILIZATION CRITERIA FOR RANGE OF VARIATION OF LAST THREE CONSECUTIVE READINGS (SEE FS 2212, SECTION 3)

pH: ± 0.2 units **Temperature:** ± 0.2 °C **Specific Conductance:** ± 5% **Dissolved Oxygen:** all readings ≤ 20% saturation (see Table FS 2200-2); optionally, ± 0.2 mg/L or ± 10% (whichever is greater) **Turbidity:** all readings ≤ 20 NTU; optionally ± 5 NTU or ± 10% (whichever is greater)

DEP Form FD 9000-24: GROUNDWATER SAMPLING LOG

SITE NAME: Arcadis US, INC	SITE LOCATION: Former MECCA Farms/Scripps Site, Palm Beach	
WELL NO: MFEB-3 GW-2	SAMPLE ID: MFEB-3 GW-2	DATE: 10-29-15

PURGING DATA

WELL DIAMETER (inches): 2	TUBING DIAMETER (inches): 1/2	WELL SCREEN INTERVAL DEPTH: 38.13 feet to 48.13 feet	STATIC DEPTH TO WATER (feet): 8.15	PURGE PUMP TYPE OR BAILER: Peristaltic Pump

WELL VOLUME PURGE: **1 WELL VOLUME** = (TOTAL WELL DEPTH – STATIC DEPTH TO WATER) X WELL CAPACITY
(only fill out if applicable)
= (48.13 feet – 8.15 feet) X 0.16 gallons/foot = 6.39 gallons

EQUIPMENT VOLUME PURGE: **1 EQUIPMENT VOL.** = PUMP VOLUME + (TUBING CAPACITY X TUBING LENGTH) + FLOW CELL VOLUME
(only fill out if applicable)
= gallons + (gallons/foot X feet) + gallons = gallons

INITIAL PUMP OR TUBING DEPTH IN WELL (feet): 9.0	FINAL PUMP OR TUBING DEPTH IN WELL (feet): 9.0	PURGING INITIATED AT: 13:10	PURGING ENDED AT: 14:32	TOTAL VOLUME PURGED (gallons): 19

TIME	VOLUME PURGED (gallons)	CUMUL. VOLUME PURGED (gallons)	PURGE RATE (gpm)	DEPTH TO WATER (feet)	pH (standard units)	TEMP. (°C)	COND. (circle units) µmhos/cm or µS/cm	DISSOLVED OXYGEN (circle units) mg/L or % saturation	TURBIDITY (NTUs)	COLOR (describe)	ODOR (describe)
14:25	17.0	17.0	0.25	8.19	6.28	24.98	632	0.65	0.75	Clear	None
14:27	0.5	17.5	0.25	8.19	6.29	24.96	632	0.61	0.72	Clear	None
14:28	0.5	18.0	0.25	8.19	6.30	24.96	631	0.58	0.71	Clear	None
14:30	0.5	18.5	0.25	8.19	6.32	24.98	634	0.54	0.74	Clear	None
14:32	0.5	19.0	0.25	8.19	6.32	24.98	635	0.52	0.69	Clear	None

WELL CAPACITY (Gallons Per Foot): **0.75"** = 0.02; **1"** = 0.04; **1.25"** = 0.06; **2"** = 0.16; **3"** = 0.37; **4"** = 0.65; **5"** = 1.02; **6"** = 1.47; **12"** = 5.88
TUBING INSIDE DIA. CAPACITY (Gal./Ft.): **1/8"** = 0.0006; **3/16"** = 0.0014; **1/4"** = 0.0026; **5/16"** = 0.004; **3/8"** = 0.006; **1/2"** = 0.010; **5/8"** = 0.016

PURGING EQUIPMENT CODES: **B** = Bailer; **BP** = Bladder Pump; **ESP** = Electric Submersible Pump; **PP** = Peristaltic Pump; **O** = Other (Specify)

SAMPLING DATA

SAMPLED BY (PRINT) / AFFILIATION: Richard Illsley, Environmental Specialist, NEF	SAMPLER(S) SIGNATURE(S):	SAMPLING INITIATED AT: 14:33	SAMPLING ENDED AT: 14:35
PUMP OR TUBING DEPTH IN WELL (feet): 9.0	TUBING MATERIAL CODE: PE	FIELD FILTERED: Y (N) Filtration Equipment Type:	FILTER SIZE: ____ µm
FIELD DECONTAMINATION: PUMP (Y) N TUBING Y N (replaced)		DUPLICATE: Y (N)	

SAMPLE CONTAINER SPECIFICATION				SAMPLE PRESERVATION (including wet ice)			INTENDED ANALYSIS AND/OR METHOD	SAMPLING EQUIPMENT CODE	SAMPLE PUMP FLOW RATE (mL per minute)
SAMPLE ID CODE	# CONTAINERS	MATERIAL CODE	VOLUME	PRESERVATIVE USED	TOTAL VOL ADDED IN FIELD (mL)	FINAL pH			
MFEB-3 GW-2	1	PE	125mL	HNO3	0	-	METALS	APP	1000
MFEB-3 GW-2	1	PE	125mL	NONE	0	-	NON METALS	APP	1000

REMARKS:
Stick- 2.50
GPS- 26°50'2" 80°17'32"W

MATERIAL CODES: **AG** = Amber Glass; **CG** = Clear Glass; **HDPE** = High Density Polyethylene; **LDPE** = Low Density Polyethylene; **PP** = Polypropylene; **S** = Silicone; **T** = Teflon; **O** = Other (Specify)

SAMPLING EQUIPMENT CODES: **APP** = After (Through) Peristaltic Pump; **B** = Bailer; **BP** = Bladder Pump; **ESP** = Electric Submersible Pump; **RFPP** = Reverse Flow Peristaltic Pump; **SM** = Straw Method (Tubing Gravity Drain); **O** = Other (Specify)

NOTES: **1. The above do not constitute all of the information required by Chapter 62-160, F.A.C.**

2. STABILIZATION CRITERIA FOR RANGE OF VARIATION OF LAST THREE CONSECUTIVE READINGS (SEE FS 2212, SECTION 3)

pH: ± 0.2 units **Temperature:** ± 0.2 °C **Specific Conductance:** ± 5% **Dissolved Oxygen:** all readings ≤ 20% saturation (see Table FS 2200-2); optionally, ± 0.2 mg/L or ± 10% (whichever is greater) **Turbidity:** all readings ≤ 20 NTU; optionally ± 5 NTU or ± 10% (whichever is greater)

DEP Form FD 9000-24: GROUNDWATER SAMPLING LOG

SITE NAME: Arcadis US, INC	SITE LOCATION: Former MECCA Farms/Scripps Site, Palm Beach	
WELL NO: MFEB-3 GW-3	SAMPLE ID: MFEB-3 GW-3	DATE: 10-29-15

PURGING DATA

WELL DIAMETER (inches): 2	TUBING DIAMETER (inches): 1/2	WELL SCREEN INTERVAL DEPTH: 8.10 feet to 18.10 feet	STATIC DEPTH TO WATER (feet): 7.84	PURGE PUMP TYPE OR BAILER: Peristaltic Pump

WELL VOLUME PURGE: 1 WELL VOLUME = (TOTAL WELL DEPTH − STATIC DEPTH TO WATER) X WELL CAPACITY
(only fill out if applicable)
= (18.10 feet − 7.84 feet) X 0.16 gallons/foot = 1.60 gallons

EQUIPMENT VOLUME PURGE: 1 EQUIPMENT VOL. = PUMP VOLUME + (TUBING CAPACITY X TUBING LENGTH) + FLOW CELL VOLUME
(only fill out if applicable)
= gallons + (gallons/foot X feet) + gallons = gallons

INITIAL PUMP OR TUBING DEPTH IN WELL (feet): 8.5	FINAL PUMP OR TUBING DEPTH IN WELL (feet): 8.5	PURGING INITIATED AT: 14:36	PURGING ENDED AT: 14:58	TOTAL VOLUME PURGED (gallons): 5.0

TIME	VOLUME PURGED (gallons)	CUMUL. VOLUME PURGED (gallons)	PURGE RATE (gpm)	DEPTH TO WATER (feet)	pH (standard units)	TEMP. (°C)	COND (circle units) µmhos/cm or µS/cm	DISSOLVED OXYGEN (circle units) mg/L or % saturation	TURBIDITY (NTUs)	COLOR (describe)	ODOR (describe)
14:50	3.0	3.0	0.25	7.93	6.26	25.86	892	0.49	1.15	Clear	None
14:52	0.5	3.5	0.25	7.93	6.25	25.87	891	0.45	1.08	Clear	None
14:54	0.5	4.0	0.25	7.93	6.25	25.87	891	0.41	0.98	Clear	None
14:56	0.5	4.5	0.25	7.93	6.25	25.85	891	0.38	0.95	Clear	None
14:58	0.5	5.0	0.25	7.93	6.26	25.86	889	0.35	0.94	Clear	None

WELL CAPACITY (Gallons Per Foot): **0.75"** = 0.02; **1"** = 0.047.; **1.25"** = 0.06; **2"** = 0.16; **3"** = 0.37; **4"** = 0.65; **5"** = 1.02; **6"** = 1.47; **12"** = 5.88
TUBING INSIDE DIA. CAPACITY (Gal./Ft.): **1/8"** = 0.0006; **3/16"** = 0.0014; **1/4"** = 0.0026; **5/16"** = 0.004; **3/8"** = 0.006; **1/2"** = 0.010; **5/8"** = 0.016

PURGING EQUIPMENT CODES: **B** = Bailer; **BP** = Bladder Pump; **ESP** = Electric Submersible Pump; **PP** = Peristaltic Pump; **O** = Other (Specify)

SAMPLING DATA

SAMPLED BY (PRINT) / AFFILIATION: Richard Illsley, Environmental Specialist, NEF	SAMPLER(S) SIGNATURE(S):	SAMPLING INITIATED AT: 14:59	SAMPLING ENDED AT: 15:01
PUMP OR TUBING DEPTH IN WELL (feet): 9.0	TUBING MATERIAL CODE: PE	FIELD-FILTERED: Y (N) Filtration Equipment Type:	FILTER SIZE: ____ µm
FIELD DECONTAMINATION: PUMP (Y) N TUBING Y N (replaced)		DUPLICATE: Y (N)	

SAMPLE CONTAINER SPECIFICATION				SAMPLE PRESERVATION (including wet ice)			INTENDED ANALYSIS AND/OR METHOD	SAMPLING EQUIPMENT CODE	SAMPLE PUMP FLOW RATE (mL per minute)
SAMPLE ID CODE	# CONTAINERS	MATERIAL CODE	VOLUME	PRESERVATIVE USED	TOTAL VOL ADDED IN FIELD (mL)	FINAL pH			
MFEB-3 GW-3	1	PE	125mL	HNO3	0	-	METALS	APP	1000
MFEB-3 GW-3	1	PE	125mL	NONE	0	-	NON METALS	APP	1000

REMARKS:
Stick- 2.00
GPS- 26°50'2" 80°17'32"W

MATERIAL CODES: **AG** = Amber Glass; **CG** = Clear Glass; **HDPE** = High Density Polyethylene; **LDPE** = Low Density Polyethylene; **PP** = Polypropylene; **S** = Silicone; **T** = Teflon; **O** = Other (Specify)

SAMPLING EQUIPMENT CODES: **APP** = After (Through) Peristaltic Pump; **B** = Bailer; **BP** = Bladder Pump; **ESP** = Electric Submersible Pump; **RFPP** = Reverse Flow Peristaltic Pump; **SM** = Straw Method (Tubing Gravity Drain); **O** = Other (Specify)

NOTES: 1. The above do not constitute all of the information required by Chapter 62-160, F.A.C.

2. STABILIZATION CRITERIA FOR RANGE OF VARIATION OF LAST THREE CONSECUTIVE READINGS (SEE FS 2212, SECTION 3)

pH: ± 0.2 units **Temperature:** ± 0.2 °C **Specific Conductance:** ± 5% **Dissolved Oxygen:** all readings ≤ 20% saturation (see Table FS 2200-2); optionally, ± 0.2 mg/L or ± 10% (whichever is greater) **Turbidity:** all readings ≤ 20 NTU; optionally ± 5 NTU or ± 10% (whichever is greater)

Pace Analytical Services, Inc.
3610 Park Central Blvd N
Pompano Beach, FL 33064
954-582-4300

November 10, 2015

Jan Beernink
Nutting Environmental of Florida, Inc.
1310 Neptune Drive
Boynton Beach, FL 33426

RE: Project: Arcadis US Inc
Pace Project No.: 35215819

Dear Jan Beernink:
Enclosed are the analytical results for sample(s) received by the laboratory on October 31, 2015. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Christina Raschke
christina.raschke@pacelabs.com
Project Manager

Enclosures

cc: Kristen Campos, Nutting Environmental of Flori

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Pace Analytical Services, Inc.
3610 Park Central Blvd N
Pompano Beach, FL 33064
954-582-4300

CERTIFICATIONS

Project: Arcadis US Inc
Pace Project No.: 35215819

Ormond Beach Certification IDs
8 East Tower Circle, Ormond Beach, FL 32174
Alabama Certification #: 41320
Connecticut Certification #: PH-0216
Delaware Certification: FL NELAC Reciprocity
Florida Certification #: E83079
Georgia Certification #: 955
Guam Certification: FL NELAC Reciprocity
Hawaii Certification: FL NELAC Reciprocity
Illinois Certification #: 200068
Indiana Certification: FL NELAC Reciprocity
Kansas Certification #: E-10383
Kentucky Certification #: 90050
Louisiana Certification #: FL NELAC Reciprocity
Louisiana Environmental Certificate #: 05007
Maryland Certification: #346
Michigan Certification #: 9911
Mississippi Certification: FL NELAC Reciprocity
Missouri Certification #: 236
Montana Certification #: Cert 0074
Nebraska Certification: NE-OS-28-14
Nevada Certification: FL NELAC Reciprocity
New Hampshire Certification #: 2958
New York Certification #: 11608
North Carolina Environmental Certificate #: 667
North Carolina Certification #: 12710
North Dakota Certification #: R-216
Oklahoma Certification #: D9947
Pennsylvania Certification #: 68-00547
Puerto Rico Certification #: FL01264
South Carolina Certification: #96042001
Tennessee Certification #: TN02974
Texas Certification: FL NELAC Reciprocity
US Virgin Islands Certification: FL NELAC Reciprocity
Virginia Environmental Certification #: 460165
West Virginia Certification #: 9962C
Wisconsin Certification #: 399079670
Wyoming (EPA Region 8): FL NELAC Reciprocity

REPORT OF LABORATORY ANALYSIS

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Pace Analytical Services, Inc.
3610 Park Central Blvd N
Pompano Beach, FL 33064
954-582-4300

SAMPLE SUMMARY

Project: Arcadis US Inc
Pace Project No.: 35215819

Lab ID	Sample ID	Matrix	Date Collected	Date Received
35214400007	**MFEB3-GW1**	Water	10/29/15 16:09	10/31/15 12:10
35214400008	**MFEB3-GW2**	Water	10/29/15 14:33	10/31/15 12:10
35214400009	**MFEB3-GW3**	Water	10/29/15 14:54	10/31/15 12:10

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Pompano Beach, FL 33064
954-582-4300

SAMPLE ANALYTE COUNT

Project: Arcadis US Inc
Pace Project No.: 35215819

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
35214400007	**MFEB3-GW1**	EPA 6010	TAP	5	PASI-O
		SM 2320B	KAM	3	PASI-O
		EPA 300.0	CMB	2	PASI-O
35214400008	**MFEB3-GW2**	EPA 6010	TAP	5	PASI-O
		SM 2320B	KAM	3	PASI-O
		EPA 300.0	CMB	2	PASI-O
35214400009	**MFEB3-GW3**	EPA 6010	TAP	5	PASI-O
		SM 2320B	KAM	3	PASI-O
		EPA 300.0	CMB	2	PASI-O

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Pace Analytical Services, Inc.
3610 Park Central Blvd N
Pompano Beach, FL 33064
954-582-4300

SUMMARY OF DETECTION

Project: Arcadis US Inc
Pace Project No.: 35215819

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
35214400007	**MFEB3-GW1**					
EPA 6010	Calcium	83000	ug/L	500	11/05/15 18:38	
EPA 6010	Iron	90.3	ug/L	40.0	11/05/15 18:38	
EPA 6010	Magnesium	10700	ug/L	500	11/05/15 18:38	
EPA 6010	Potassium	3260	ug/L	1000	11/05/15 18:38	
EPA 6010	Sodium	32100	ug/L	1000	11/05/15 18:38	
SM 2320B	Alkalinity,Bicarbonate (CaCO3)	284	mg/L	5.0	11/03/15 18:24	
SM 2320B	Alkalinity, Total as CaCO3	284	mg/L	5.0	11/03/15 18:24	
EPA 300.0	Chloride	29.4	mg/L	5.0	11/02/15 09:39	
35214400008	**MFEB3-GW2**					
EPA 6010	Calcium	105000	ug/L	500	11/05/15 18:41	
EPA 6010	Iron	170	ug/L	40.0	11/05/15 18:41	
EPA 6010	Magnesium	5660	ug/L	500	11/05/15 18:41	
EPA 6010	Potassium	611	ug/L	1000	11/05/15 18:41	I
EPA 6010	Sodium	11800	ug/L	1000	11/05/15 18:41	
SM 2320B	Alkalinity,Bicarbonate (CaCO3)	295	mg/L	5.0	11/03/15 18:31	
SM 2320B	Alkalinity, Total as CaCO3	295	mg/L	5.0	11/03/15 18:31	
EPA 300.0	Chloride	14.6	mg/L	5.0	11/02/15 10:01	
35214400009	**MFEB3-GW3**					
EPA 6010	Calcium	163000	ug/L	500	11/05/15 18:44	
EPA 6010	Iron	2410	ug/L	40.0	11/05/15 18:44	
EPA 6010	Magnesium	3860	ug/L	500	11/05/15 18:44	
EPA 6010	Potassium	1760	ug/L	1000	11/05/15 18:44	
EPA 6010	Sodium	7960	ug/L	1000	11/05/15 18:44	
SM 2320B	Alkalinity,Bicarbonate (CaCO3)	447	mg/L	5.0	11/03/15 18:53	
SM 2320B	Alkalinity, Total as CaCO3	447	mg/L	5.0	11/03/15 18:53	
EPA 300.0	Chloride	10.3	mg/L	5.0	11/02/15 10:23	

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Pompano Beach, FL 33064
954-582-4300

ANALYTICAL RESULTS

Project: Arcadis US Inc
Pace Project No.: 35215819

Sample: MFEB3-GW1 **Lab ID: 35214400007** Collected: 10/29/15 16:09 Received: 10/31/15 12:10 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Calcium	**83000**	ug/L	500	250	1	11/04/15 16:00	11/05/15 18:38	7440-70-2	
Iron	**90.3**	ug/L	40.0	20.0	1	11/04/15 16:00	11/05/15 18:38	7439-89-6	
Magnesium	**10700**	ug/L	500	250	1	11/04/15 16:00	11/05/15 18:38	7439-95-4	
Potassium	**3260**	ug/L	1000	500	1	11/04/15 16:00	11/05/15 18:38	7440-09-7	
Sodium	**32100**	ug/L	1000	500	1	11/04/15 16:00	11/05/15 18:38	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity,Bicarbonate (CaCO3)	**284**	mg/L	5.0	5.0	1		11/03/15 18:24		
Alkalinity, Carbonate (CaCO3)	**5.0 U**	mg/L	5.0	5.0	1		11/03/15 18:24		
Alkalinity, Total as CaCO3	**284**	mg/L	5.0	5.0	1		11/03/15 18:24		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**29.4**	mg/L	5.0	2.5	1		11/02/15 09:39	16887-00-6	
Sulfate	**2.5 U**	mg/L	5.0	2.5	1		11/02/15 09:39	14808-79-8	

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ANALYTICAL RESULTS

Project: Arcadis US Inc
Pace Project No.: 35215819

Sample: MFEB3-GW2 **Lab ID: 35214400008** Collected: 10/29/15 14:33 Received: 10/31/15 12:10 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Calcium	**105000**	ug/L	500	250	1	11/04/15 16:00	11/05/15 18:41	7440-70-2	
Iron	**170**	ug/L	40.0	20.0	1	11/04/15 16:00	11/05/15 18:41	7439-89-6	
Magnesium	**5660**	ug/L	500	250	1	11/04/15 16:00	11/05/15 18:41	7439-95-4	
Potassium	**611 I**	ug/L	1000	500	1	11/04/15 16:00	11/05/15 18:41	7440-09-7	
Sodium	**11800**	ug/L	1000	500	1	11/04/15 16:00	11/05/15 18:41	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity,Bicarbonate (CaCO3)	**295**	mg/L	5.0	5.0	1		11/03/15 18:31		
Alkalinity, Carbonate (CaCO3)	**5.0 U**	mg/L	5.0	5.0	1		11/03/15 18:31		
Alkalinity, Total as CaCO3	**295**	mg/L	5.0	5.0	1		11/03/15 18:31		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**14.6**	mg/L	5.0	2.5	1		11/02/15 10:01	16887-00-6	
Sulfate	**2.5 U**	mg/L	5.0	2.5	1		11/02/15 10:01	14808-79-8	

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ANALYTICAL RESULTS

Project: Arcadis US Inc
Pace Project No.: 35215819

Sample: MFEB3-GW3 **Lab ID: 35214400009** Collected: 10/29/15 14:54 Received: 10/31/15 12:10 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Calcium	**163000**	ug/L	500	250	1	11/04/15 16:00	11/05/15 18:44	7440-70-2	
Iron	**2410**	ug/L	40.0	20.0	1	11/04/15 16:00	11/05/15 18:44	7439-89-6	
Magnesium	**3860**	ug/L	500	250	1	11/04/15 16:00	11/05/15 18:44	7439-95-4	
Potassium	**1760**	ug/L	1000	500	1	11/04/15 16:00	11/05/15 18:44	7440-09-7	
Sodium	**7960**	ug/L	1000	500	1	11/04/15 16:00	11/05/15 18:44	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity,Bicarbonate (CaCO3)	**447**	mg/L	5.0	5.0	1		11/03/15 18:53		
Alkalinity, Carbonate (CaCO3)	**5.0 U**	mg/L	5.0	5.0	1		11/03/15 18:53		
Alkalinity, Total as CaCO3	**447**	mg/L	5.0	5.0	1		11/03/15 18:53		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**10.3**	mg/L	5.0	2.5	1		11/02/15 10:23	16887-00-6	
Sulfate	**2.5 U**	mg/L	5.0	2.5	1		11/02/15 10:23	14808-79-8	

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QUALITY CONTROL DATA

Project: Arcadis US Inc
Pace Project No.: 35215819

QC Batch: MPRP/27199 Analysis Method: EPA 6010
QC Batch Method: EPA 3010 Analysis Description: 6010 MET
Associated Lab Samples: 35214400007, 35214400008, 35214400009

METHOD BLANK: 1381991 Matrix: Water
Associated Lab Samples: 35214400007, 35214400008, 35214400009

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Calcium	ug/L	250 U	500	250	11/05/15 17:44	
Iron	ug/L	20.0 U	40.0	20.0	11/05/15 17:44	
Magnesium	ug/L	250 U	500	250	11/05/15 17:44	
Potassium	ug/L	500 U	1000	500	11/05/15 17:44	
Sodium	ug/L	500 U	1000	500	11/05/15 17:44	

LABORATORY CONTROL SAMPLE: 1381992

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium	ug/L	12500	11700	93	80-120	
Iron	ug/L	2500	2270	91	80-120	
Magnesium	ug/L	12500	11500	92	80-120	
Potassium	ug/L	12500	11400	91	80-120	
Sodium	ug/L	12500	11900	95	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1381993 1381994

Parameter	Units	92269296003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium	ug/L	147000	12500	12500	163000	177000	128	240	75-125	8	20	J(M1)
Iron	ug/L	63900	2500	2500	67700	73900	154	400	75-125	9	20	J(M1)
Magnesium	ug/L	16500	12500	12500	28400	30600	95	113	75-125	7	20	
Potassium	ug/L	99200	12500	12500	114000	124000	121	196	75-125	8	20	J(M1)
Sodium	ug/L	584000	12500	12500	616000	672000	258	707	75-125	9	20	J(M1)

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QUALITY CONTROL DATA

Project: Arcadis US Inc
Pace Project No.: 35215819

QC Batch: WET/33941 Analysis Method: SM 2320B
QC Batch Method: SM 2320B Analysis Description: 2320B Alkalinity
Associated Lab Samples: 35214400007, 35214400008, 35214400009

METHOD BLANK: 1381130 Matrix: Water
Associated Lab Samples: 35214400007, 35214400008, 35214400009

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Carbonate (CaCO3)	mg/L	5.0 U	5.0	5.0	11/03/15 17:21	
Alkalinity, Total as CaCO3	mg/L	5.0 U	5.0	5.0	11/03/15 17:21	
Alkalinity,Bicarbonate (CaCO3)	mg/L	5.0 U	5.0	5.0	11/03/15 17:21	

LABORATORY CONTROL SAMPLE: 1381131

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	250	239	96	90-110	

SAMPLE DUPLICATE: 1381132

Parameter	Units	35214389001 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Carbonate (CaCO3)	mg/L	<5.0	5.0 U		20	
Alkalinity, Total as CaCO3	mg/L	39.7	39.6	0	20	
Alkalinity,Bicarbonate (CaCO3)	mg/L	39.7	39.6	0	20	

SAMPLE DUPLICATE: 1381133

Parameter	Units	35214496003 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Carbonate (CaCO3)	mg/L	5.0 U	5.0 U		20	
Alkalinity, Total as CaCO3	mg/L	14.4	14.3	1	20	
Alkalinity,Bicarbonate (CaCO3)	mg/L	14.4	14.3	1	20	

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QUALITY CONTROL DATA

Project: Arcadis US Inc
Pace Project No.: 35215819

QC Batch: WETA/51713 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 35214400007, 35214400008, 35214400009

METHOD BLANK: 1379293 Matrix: Water
Associated Lab Samples: 35214400007, 35214400008, 35214400009

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	2.5 U	5.0	2.5	11/02/15 07:48	
Sulfate	mg/L	2.5 U	5.0	2.5	11/02/15 07:48	

LABORATORY CONTROL SAMPLE: 1379294

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	50	46.4	93	90-110	
Sulfate	mg/L	50	46.9	94	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1379295 1379296

Parameter	Units	35214098002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	46.9	50	50	98.9	97.8	104	102	90-110	1	20	
Sulfate	mg/L	26.3	50	50	76.4	75.2	100	98	90-110	2	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1379297 1379298

Parameter	Units	92273604001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	3.8	50	50	49.8	49.5	92	91	90-110	0	20	
Sulfate	mg/L	41.5	50	50	94.2	94.0	105	105	90-110	0	20	

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QUALIFIERS

Project: Arcadis US Inc
Pace Project No.: 35215819

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-O	Pace Analytical Services - Ormond Beach

ANALYTE QUALIFIERS

I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
U	Compound was analyzed for but not detected.
J(M1)	Estimated Value. Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Arcadis US Inc
Pace Project No.: 35215819

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
35214400007	**MFEB3-GW1**	EPA 3010	MPRP/27199	EPA 6010	ICP/16389
35214400008	**MFEB3-GW2**	EPA 3010	MPRP/27199	EPA 6010	ICP/16389
35214400009	**MFEB3-GW3**	EPA 3010	MPRP/27199	EPA 6010	ICP/16389
35214400007	**MFEB3-GW1**	SM 2320B	WET/33941		
35214400008	**MFEB3-GW2**	SM 2320B	WET/33941		
35214400009	**MFEB3-GW3**	SM 2320B	WET/33941		
35214400007	**MFEB3-GW1**	EPA 300.0	WETA/51713		
35214400008	**MFEB3-GW2**	EPA 300.0	WETA/51713		
35214400009	**MFEB3-GW3**	EPA 300.0	WETA/51713		

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CHAIN OF CUSTODY RECORD

WO# : 35214400

35214400

te:_____ Page 1 of 1

Company Name: Nutting Eur PO#

Address: 1310 Neptune Dr

City: Boynton Beach State: FL Zip: 33426

Attn: Jon Bermick Fax#

email: Phone:

Project Name: Arcadis US INC Proj #

Sampler Signature:

Circle One: Event: Daily Weekly Monthly
Quarterly Semi-Annual Annual N/A

LYSIS

Sample #	Sample ID	Collect Date	Collect Time	Matrix Code*	Field Filtered	Integrity OK(Y/N)	Total # of containers	Parameters: Bicarbonate	Carbonate	Sulfate	Calcium	Magnesium	Sodium	Potassium	Iron	Chloride	EXAMPLE Diss. Lead 6010
																	# of Containers Size/Type: 1 1 16ozP
1	MFEB8-GW1	10/28	12:31	GW			2										
2	MFEB8-GW2	10/28	14:24	GW			2										
3	MFEB8-GW3	10/28	14:57	GW			2										
4	MFEB1-GW1	10/29	12:49	GW			2										
5	MFEB1-GW2	10/29	11:09	GW			2										
6	MFEB1-GW3	10/29	11:35	GW			2										
7	MFB3-GW1	10/29	16:09	GW			2										
8	MFB3-GW2	10/29	14:33	GW			2										
9	MFB3-GW3	10/29	14:54	GW			2										
10																	

Container Type Codes

AV	Amber Vial	EB	Encore Sampler
CV	Clear Vial	PPV	Prepreserved vial
P	Plastic	PLC	Plastic container
AL	Amber Liter	PLJ	Plastic Jar
CL	Clear Liter	Z	Ziploc bag
AP	Amber Plastic	TB	Tedlar bag
AG	Amber Glass	WP	Wirlt pak
SJ	Soil Jar	G	Gallon Jug
Other:		TC	Terra-core

PPV: Prepreserved vial
Size(s): 2oz, 4oz, 8oz, 16oz, 32oz or 1L, other: 40ml 500ml 250ml 125 ml
Example: 4ozP = 4oz Plastic, 8ozSJ= 8oz Soil Jar

Matrix Codes

SD	Solid Waste	OL	Oil
GW	Ground Water	SL	Sludge
EFF	Effluent	SO	Soil Sediment
APW	Analyte Free H20	AQ	Aqueous
WW	Waste Water	NA	Nonaqueous
DW	Drinking Water	PE	Petroleum
SW	Surface Water	O	Other: (Please specify)
ML	Misc. Liquid		

Preservative Type Codes

A. None	E. HCL	I. Ice
B. HNO3	F. MeOH	J. MCAA
C. H2SO4	G. Na2S2O3	K. Zn Acetate
D. NaOH	H. NaHSO4	O. Other

REMARKS

2019-20

Circle TAT REQUESTED (Rush Fees Apply)
Standard: TAT = 5 Days
Today 1D 2D 3D 4D 5D ___

Short Hold: Y____ N____

Circle QA/QC Report Level: 1 2 3 4 CLP AFCEE QAPP Other____

EDD (Fees May Apply): ADaPT SEDD ERPIMS TSV CSV Other____

COC Condition: OK Incomplete

Required State Certification: FL GA SC NC NJ PA LA TX IL ___

Coolers #'s - Temp °C: 1 2 3 4 5

Item	Relinquished by	Affiliation	Date	Time	Received by	Affiliation	Date	Time
1	[illegible]	NEF	10/30	1210	[illegible]	[illegible]	10/30/19	1210
2	[illegible]	[illegible]	10/30	1600				
3	Courier Fed Ex		10/31/19	0815	[illegible]	[illegible]	11/1/19	0815
4								

Lab Use Only

Non-Conformance Found?	___	___	___
Samples INTACT upon arrival?	___	___	___
Received on Wet Ice?	___	___	___
Proper Preservatives Indicated?	___	___	___
Received within holding time?	___	___	___
Custody seals intact?	___	___	___
Volatiles rec'd without headspace?	___	___	___
Proper Containers Used?	___	___	___

C.O.C. Serial # 101217

Pace Analytical Florida Laboratory	Document Name: Sample Condition Upon Receipt Form	Document Revised: August 11, 2014
	Document No.: F-FL-C-007 rev. 06	Issuing Authority: Pace Florida Quality Office

Sample Condition Upon Receipt Form (SCUR)

Table Number: _____

Client Name: Nutting Project # 35214460

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☐ Client ☑ Commercial ☐ Pace ☐ Other _____

Tracking # N/A

Custody Seal on Cooler/Box Present: ☐ yes ☑ no Seals intact: ☐ yes ☐ no

Packing Material: ☐ Bubble Wrap ☑ Bubble Bags ☐ None ☐ Other _____

Thermometer Used T212 Type of Ice: (Wet) Blue None

Cooler Temperature °C 5.6 (Visual) 0.0 (Correction Factor) 5.6 (Actual)

Date and Initials of person examining contents: 10/3/15 SB GDO

(Temp should be above freezing to 6°C). If below 0°C, then was sample frozen? ☐ Yes ☐ No

Receipt of samples satisfactory: ☐ Yes ☐ No Rush TAT requested on COC:

If yes, then all conditions below were met:	If no, then mark box & describe issue (use comments area if necessary):
Chain of Custody Present	☐
Chain of Custody Filled Out	☐
Relinquished Signature & Sampler Name COC	☐
Samples Arrived within Hold Time	☐
Sufficient Volume	☐
Correct Containers Used	☐
Containers Intact	☐
Sample Labels match COC (sample IDs & date/time of collection)	☐ No Labels: ☐ No Time/Date on Labels: ☐
All containers needing preservation are found to be in compliance with EPA recommendation.	☐
No Headspace in VOA Vials (>6mm):	☐

Client Notification/ Resolution:

Person Contacted: _____ Date/Time: _____

Comments/ Resolution (use back for additional comments): _____

Missing samples 1-3

Sample IDs MFEB8-GW1, MFEB8-GW2, MFEB8-GW3

SO/DS

Project Manager Review: _____ Date: _____

Finished Product Information Only

F.P. Sample ID: _____

Production Code: _____

Date/Time Opened: _____

Number of Unopened Bottles Remaining: _____

Extra Sample in Shed: Yes No

Size & Qty of Bottles Received

_____ x 5 Gal
_____ x 2.5 Gal
_____ x 1 Gal
_____ x 1 Liter
_____ x 500 mL
_____ x 250 mL
_____ x Other: _____

DEP Form FD 9000-24: GROUNDWATER SAMPLING LOG

SITE NAME: Arcadis US, INC	SITE LOCATION: Former MECCA Farms/Scripps Site, Palm Beach	
WELL NO: MFEB-4 GW-1	SAMPLE ID: MFEB-4 GW-1	DATE: 11-2-15

PURGING DATA

WELL DIAMETER (inches): 2	TUBING DIAMETER (inches): 1/2	WELL SCREEN INTERVAL DEPTH: 92.6 feet to 102.6 feet	STATIC DEPTH TO WATER (feet): 8.72	PURGE PUMP TYPE OR BAILER: Peristaltic Pump

WELL VOLUME PURGE: **1 WELL VOLUME** = (TOTAL WELL DEPTH − STATIC DEPTH TO WATER) X WELL CAPACITY
(only fill out if applicable)
= (102.6 feet − 8.72 feet) X 0.16 gallons/foot = 15.02 gallons

EQUIPMENT VOLUME PURGE: **1 EQUIPMENT VOL.** = PUMP VOLUME + (TUBING CAPACITY X TUBING LENGTH) + FLOW CELL VOLUME
(only fill out if applicable)
= gallons + (gallons/foot X feet) + gallons = gallons

INITIAL PUMP OR TUBING DEPTH IN WELL (feet): 9.5	FINAL PUMP OR TUBING DEPTH IN WELL (feet): 9.5	PURGING INITIATED AT: 9:30	PURGING ENDED AT: 12:40	TOTAL VOLUME PURGED (gallons): 47.5

TIME	VOLUME PURGED (gallons)	CUMUL. VOLUME PURGED (gallons)	PURGE RATE (gpm)	DEPTH TO WATER (feet)	pH (standard units)	TEMP. (°C)	COND. (circle units) µmhos/cm or µS/cm	DISSOLVED OXYGEN (circle units) mg/l or % saturation	TURBIDITY (NTUs)	COLOR (describe)	ODOR (describe)
12:32	45.5	45.5	0.25	8.79	6.46	25.24	1023	0.49	0.23	Clear	None
12:34	0.5	46.0	0.25	8.79	6.47	25.25	1022	0.48	0.25	Clear	None
12:36	0.5	46.5	0.25	8.79	6.47	25.27	1023	0.47	0.24	Clear	None
12:38	0.5	47.0	0.25	8.79	6.48	25.28	1023	0.46	0.22	Clear	None
12:40	0.5	47.5	0.25	8.79	6.50	25.29	1023	0.46	0.21	Clear	None

WELL CAPACITY (Gallons Per Foot): **0.75"** = 0.02; **1"** = 0.047.; **1.25"** = 0.06; **2"** = 0.16; **3"** = 0.37; **4"** = 0.65; **5"** = 1.02; **6"** = 1.47; **12"** = 5.88
TUBING INSIDE DIA. CAPACITY (Gal./Ft.): **1/8"** = 0.0006; **3/16"** = 0.0014; **1/4"** = 0.0026; **5/16"** = 0.004; **3/8"** = 0.006; **1/2"** = 0.010; **5/8"** = 0.016

PURGING EQUIPMENT CODES: **B** = Bailer; **BP** = Bladder Pump; **ESP** = Electric Submersible Pump; **PP** = Peristaltic Pump; **O** = Other (Specify)

SAMPLING DATA

SAMPLED BY (PRINT) / AFFILIATION: Richard Illsley, Environmental Specialist, NEF	SAMPLER(S) SIGNATURE(S):	SAMPLING INITIATED AT: 12:41	SAMPLING ENDED AT: 12:43
PUMP OR TUBING DEPTH IN WELL (feet): 9.5	TUBING MATERIAL CODE: PE	FIELD-FILTERED: Y (N) Filtration Equipment Type:	FILTER SIZE: ____ µm
FIELD DECONTAMINATION: PUMP (Y) N TUBING Y N (replaced)		DUPLICATE: Y (N)	

SAMPLE CONTAINER SPECIFICATION				SAMPLE PRESERVATION (including wet ice)			INTENDED ANALYSIS AND/OR METHOD	SAMPLING EQUIPMENT CODE	SAMPLE PUMP FLOW RATE (mL per minute)
SAMPLE ID CODE	# CONTAINERS	MATERIAL CODE	VOLUME	PRESERVATIVE USED	TOTAL VOL ADDED IN FIELD (mL)	FINAL pH			
MFEB-4 GW-1	1	PE	125mL	HNO3	0	-	METALS	APP	1000
MFEB-4 GW-1	1	PE	125mL	NONE	0	-	NON METALS	APP	1000

REMARKS:
Stick- 2.15
GPS- 26°50'9" 80°16'51"W

MATERIAL CODES: **AG** = Amber Glass; **CG** = Clear Glass; **HDPE** = High Density Polyethylene; **LDPE** = Low Density Polyethylene; **PP** = Polypropylene; **S** = Silicone; **T** = Teflon; **O** = Other (Specify)

SAMPLING EQUIPMENT CODES: **APP** = After (Through) Peristaltic Pump; **B** = Bailer; **BP** = Bladder Pump; **ESP** = Electric Submersible Pump; **RFPP** = Reverse Flow Peristaltic Pump; **SM** = Straw Method (Tubing Gravity Drain); **O** = Other (Specify)

NOTES: 1. **The above do not constitute all of the information required by Chapter 62-160, F.A.C.**

2. STABILIZATION CRITERIA FOR RANGE OF VARIATION OF LAST THREE CONSECUTIVE READINGS (SEE FS 2212, SECTION 3)

pH: ± 0.2 units **Temperature:** ± 0.2 °C **Specific Conductance:** ± 5% **Dissolved Oxygen:** all readings ≤ 20% saturation (see Table FS 2200-2); optionally, ± 0.2 mg/L or ± 10% (whichever is greater) **Turbidity:** all readings ≤ 20 NTU; optionally ± 5 NTU or ± 10% (whichever is greater)

DEP Form FD 9000-24: GROUNDWATER SAMPLING LOG

SITE NAME: Arcadis US, INC	SITE LOCATION: Former MECCA Farms/Scripps Site, Palm Beach	
WELL NO: MFEB-4 GW-2	SAMPLE ID: MFEB-4 GW-2	DATE: 11-2-15

PURGING DATA

WELL DIAMETER (inches): 2	TUBING DIAMETER (inches): 1/2	WELL SCREEN INTERVAL DEPTH: 38.29 feet to 48.29 feet	STATIC DEPTH TO WATER (feet): 8.62	PURGE PUMP TYPE OR BAILER: Peristaltic Pump

WELL VOLUME PURGE: 1 WELL VOLUME = (TOTAL WELL DEPTH − STATIC DEPTH TO WATER) X WELL CAPACITY
(only fill out if applicable)
= (48.29 feet − 8.62 feet) X 0.16 gallons/foot = 6.24 gallons

EQUIPMENT VOLUME PURGE: 1 EQUIPMENT VOL. = PUMP VOLUME + (TUBING CAPACITY X TUBING LENGTH) + FLOW CELL VOLUME
(only fill out if applicable)
= gallons + (gallons/foot X feet) + gallons = gallons

INITIAL PUMP OR TUBING DEPTH IN WELL (feet): 9.5	FINAL PUMP OR TUBING DEPTH IN WELL (feet): 9.5	PURGING INITIATED AT: 12:55	PURGING ENDED AT: 14:33	TOTAL VOLUME PURGED (gallons) 19.0

TIME	VOLUME PURGED (gallons)	CUMUL. VOLUME PURGED (gallons)	PURGE RATE (gpm)	DEPTH TO WATER (feet)	pH (standard units)	TEMP. (°C)	COND. (circle units) µmhos/cm or µS/cm	DISSOLVED OXYGEN (circle units) mg/L or % saturation	TURBIDITY (NTUs)	COLOR (describe)	ODOR (describe)
14:25	17.0	17.0	0.25	8.71	6.55	25.53	728	0.79	0.52	Clear	None
14:27	0.5	17.5	0.25	8.71	6.58	25.51	727	0.73	0.51	Clear	None
14:29	0.5	18.0	0.25	8.71	6.62	25.55	728	0.67	0.52	Clear	None
14:31	0.5	18.5	0.25	8.71	6.67	25.50	725	0.65	0.53	Clear	None
14:33	0.5	19.0	0.25	8.71	6.65	25.52	725	0.65	0.52	Clear	None

WELL CAPACITY (Gallons Per Foot): **0.75"** = 0.02; **1"** = 0.047; **1.25"** = 0.06; **2"** = 0.16; **3"** = 0.37; **4"** = 0.65; **5"** = 1.02; **6"** = 1.47; **12"** = 5.88
TUBING INSIDE DIA. CAPACITY (Gal./Ft.): **1/8"** = 0.0006; **3/16"** = 0.0014; **1/4"** = 0.0026; **5/16"** = 0.004; **3/8"** = 0.006; **1/2"** = 0.010; **5/8"** = 0.016

PURGING EQUIPMENT CODES: **B** = Bailer; **BP** = Bladder Pump; **ESP** = Electric Submersible Pump; **PP** = Peristaltic Pump; **O** = Other (Specify)

SAMPLING DATA

SAMPLED BY (PRINT) / AFFILIATION: Richard Illsley, Environmental Specialist, NEF	SAMPLER(S) SIGNATURE(S):	SAMPLING INITIATED AT: 14:34	SAMPLING ENDED AT: 14:36
PUMP OR TUBING DEPTH IN WELL (feet): 9.5	TUBING MATERIAL CODE: PE	FIELD-FILTERED: Y (N) Filtration Equipment Type:	FILTER SIZE: ____ µm
FIELD DECONTAMINATION: PUMP (Y) N TUBING Y N (replaced)		DUPLICATE: Y (N)	

SAMPLE CONTAINER SPECIFICATION				SAMPLE PRESERVATION (including wet ice)			INTENDED ANALYSIS AND/OR METHOD	SAMPLING EQUIPMENT CODE	SAMPLE PUMP FLOW RATE (mL per minute)
SAMPLE ID CODE	# CONTAINERS	MATERIAL CODE	VOLUME	PRESERVATIVE USED	TOTAL VOL ADDED IN FIELD (mL)	FINAL pH			
MFEB-4 GW-2	1	PE	125mL	HNO3	0	-	METALS	APP	1000
MFEB-4 GW-2	1	PE	125mL	NONE	0	-	NON METALS	APP	1000

REMARKS:
Stick- 2.10
GPS- 26°50'9" 80°16'51"W

MATERIAL CODES: **AG** = Amber Glass; **CG** = Clear Glass; **HDPE** = High Density Polyethylene; **LDPE** = Low Density Polyethylene; **PP** = Polypropylene; **S** = Silicone; **T** = Teflon; **O** = Other (Specify)

SAMPLING EQUIPMENT CODES: **APP** = After (Through) Peristaltic Pump; **B** = Bailer; **BP** = Bladder Pump; **ESP** = Electric Submersible Pump; **RFPP** = Reverse Flow Peristaltic Pump; **SM** = Straw Method (Tubing Gravity Drain); **O** = Other (Specify)

NOTES: 1. The above do not constitute all of the information required by Chapter 62-160, F.A.C.

2. STABILIZATION CRITERIA FOR RANGE OF VARIATION OF LAST THREE CONSECUTIVE READINGS (SEE FS 2212, SECTION 3)

pH: ± 0.2 units **Temperature:** ± 0.2 °C **Specific Conductance:** ± 5% **Dissolved Oxygen:** all readings ≤ 20% saturation (see Table FS 2200-2); optionally, ± 0.2 mg/L or ± 10% (whichever is greater) **Turbidity:** all readings ≤ 20 NTU; optionally ± 5 NTU or ± 10% (whichever is greater)

DEP Form FD 9000-24: GROUNDWATER SAMPLING LOG

SITE NAME: Arcadis US, INC	SITE LOCATION: Former MECCA Farms/Scripps Site, Palm Beach	
WELL NO: MFEB-4 GW-3	SAMPLE ID: MFEB-4 GW-3	DATE: 11-2-15

PURGING DATA

WELL DIAMETER (inches): 2	TUBING DIAMETER (inches): 1/2	WELL SCREEN INTERVAL DEPTH: 8.10 feet to 18.10 feet	STATIC DEPTH TO WATER (feet): 8.67	PURGE PUMP TYPE OR BAILER: Peristaltic Pump

WELL VOLUME PURGE: 1 WELL VOLUME = (TOTAL WELL DEPTH − STATIC DEPTH TO WATER) X WELL CAPACITY
(only fill out if applicable)
= (18.10 feet − 8.67 feet) X 0.16 gallons/foot = 1.51 gallons

EQUIPMENT VOLUME PURGE: 1 EQUIPMENT VOL. = PUMP VOLUME + (TUBING CAPACITY X TUBING LENGTH) + FLOW CELL VOLUME
(only fill out if applicable)
= gallons + (gallons/foot X feet) + gallons = gallons

INITIAL PUMP OR TUBING DEPTH IN WELL (feet): 9.5	FINAL PUMP OR TUBING DEPTH IN WELL (feet): 9.5	PURGING INITIATED AT: 14:50	PURGING ENDED AT: 15:10	TOTAL VOLUME PURGED (gallons): 5.0

TIME	VOLUME PURGED (gallons)	CUMUL. VOLUME PURGED (gallons)	PURGE RATE (gpm)	DEPTH TO WATER (feet)	pH (standard units)	TEMP. (°C)	COND. (circle units) µmhos/cm or µS/cm	DISSOLVED OXYGEN (circle units) mg/L or % saturation	TURBIDITY (NTUs)	COLOR (describe)	ODOR (describe)
15:02	3.0	3.0	0.25	8.72	6.81	27.10	624	0.84	1.15	Clear	None
15:04	0.5	3.5	0.25	8.72	6.80	27.11	624	0.82	1.13	Clear	None
15:06	0.5	4.0	0.25	8.72	6.80	27.13	624	0.79	1.08	Clear	None
15:08	0.5	4.5	0.25	8.72	6.79	27.10	624	0.77	1.03	Clear	None
15:10	0.5	5.0	0.25	8.72	6.79	27.11	624	0.75	1.05	Clear	None

WELL CAPACITY (Gallons Per Foot): **0.75"** = 0.02; **1"** = 0.047.; **1.25"** = 0.06; **2"** = 0.16; **3"** = 0.37; **4"** = 0.65; **5"** = 1.02; **6"** = 1.47; **12"** = 5.88
TUBING INSIDE DIA. CAPACITY (Gal./Ft.): **1/8"** = 0.0006; **3/16"** = 0.0014; **1/4"** = 0.0026; **5/16"** = 0.004; **3/8"** = 0.006; **1/2"** = 0.010; **5/8"** = 0.016

PURGING EQUIPMENT CODES: **B** = Bailer; **BP** = Bladder Pump; **ESP** = Electric Submersible Pump; **PP** = Peristaltic Pump; **O** = Other (Specify)

SAMPLING DATA

SAMPLED BY (PRINT) / AFFILIATION: Richard Illsley, Environmental Specialist, NEF	SAMPLER(S) SIGNATURE(S):	SAMPLING INITIATED AT: 15:11	SAMPLING ENDED AT: 15:13
PUMP OR TUBING DEPTH IN WELL (feet): 9.5	TUBING MATERIAL CODE: PE	FIELD-FILTERED: Y (N) Filtration Equipment Type:	FILTER SIZE: ____ µm
FIELD DECONTAMINATION: PUMP (Y) N TUBING Y N (replaced)		DUPLICATE: Y (N)	

SAMPLE CONTAINER SPECIFICATION				SAMPLE PRESERVATION (including wet ice)					
SAMPLE ID CODE	# CONTAINERS	MATERIAL CODE	VOLUME	PRESERVATIVE USED	TOTAL VOL ADDED IN FIELD (mL)	FINAL pH	INTENDED ANALYSIS AND/OR METHOD	SAMPLING EQUIPMENT CODE	SAMPLE PUMP FLOW RATE (mL per minute)
MFEB-4 GW-3	1	PE	125mL	HNO3	0	-	METALS	APP	1000
MFEB-4 GW-3	1	PE	125mL	NONE	0	-	NON METALS	APP	1000

REMARKS:
Stick- 2.35
GPS- 26°50'9" 80°16'51"W

MATERIAL CODES: **AG** = Amber Glass; **CG** = Clear Glass; **HDPE** = High Density Polyethylene; **LDPE** = Low Density Polyethylene; **PP** = Polypropylene; **S** = Silicone; **T** = Teflon; **O** = Other (Specify)

SAMPLING EQUIPMENT CODES: **APP** = After (Through) Peristaltic Pump; **B** = Bailer; **BP** = Bladder Pump; **ESP** = Electric Submersible Pump; **RFPP** = Reverse Flow Peristaltic Pump; **SM** = Straw Method (Tubing Gravity Drain); **O** = Other (Specify)

NOTES: 1. The above do not constitute all of the information required by Chapter 62-160, F.A.C.

2. STABILIZATION CRITERIA FOR RANGE OF VARIATION OF LAST THREE CONSECUTIVE READINGS (SEE FS 2212, SECTION 3)

pH: ± 0.2 units **Temperature:** ± 0.2 °C **Specific Conductance:** ± 5% **Dissolved Oxygen:** all readings ≤ 20% saturation (see Table FS 2200-2); optionally, ± 0.2 mg/L or ± 10% (whichever is greater) **Turbidity:** all readings ≤ 20 NTU; optionally ± 5 NTU or ± 10% (whichever is greater)

Pace Analytical Services, Inc.
3610 Park Central Blvd N
Pompano Beach, FL 33064
954-582-4300

November 10, 2015

Jan Beernink
Nutting Environmental of Florida, Inc.
1310 Neptune Drive
Boynton Beach, FL 33426

RE: Project: Arcadis Inc
Pace Project No.: 35215827

Dear Jan Beernink:
Enclosed are the analytical results for sample(s) received by the laboratory on November 03, 2015. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Christina Raschke
christina.raschke@pacelabs.com
Project Manager

Enclosures

cc: Kristen Campos, Nutting Environmental of Flori

REPORT OF LABORATORY ANALYSIS

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CERTIFICATIONS

Project: Arcadis Inc
Pace Project No.: 35215827

Ormond Beach Certification IDs
8 East Tower Circle, Ormond Beach, FL 32174
Alabama Certification #: 41320
Connecticut Certification #: PH-0216
Delaware Certification: FL NELAC Reciprocity
Florida Certification #: E83079
Georgia Certification #: 955
Guam Certification: FL NELAC Reciprocity
Hawaii Certification: FL NELAC Reciprocity
Illinois Certification #: 200068
Indiana Certification: FL NELAC Reciprocity
Kansas Certification #: E-10383
Kentucky Certification #: 90050
Louisiana Certification #: FL NELAC Reciprocity
Louisiana Environmental Certificate #: 05007
Maryland Certification: #346
Michigan Certification #: 9911
Mississippi Certification: FL NELAC Reciprocity
Missouri Certification #: 236
Montana Certification #: Cert 0074
Nebraska Certification: NE-OS-28-14
Nevada Certification: FL NELAC Reciprocity
New Hampshire Certification #: 2958
New York Certification #: 11608
North Carolina Environmental Certificate #: 667
North Carolina Certification #: 12710
North Dakota Certification #: R-216
Oklahoma Certification #: D9947
Pennsylvania Certification #: 68-00547
Puerto Rico Certification #: FL01264
South Carolina Certification: #96042001
Tennessee Certification #: TN02974
Texas Certification: FL NELAC Reciprocity
US Virgin Islands Certification: FL NELAC Reciprocity
Virginia Environmental Certification #: 460165
West Virginia Certification #: 9962C
Wisconsin Certification #: 399079670
Wyoming (EPA Region 8): FL NELAC Reciprocity

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SAMPLE SUMMARY

Project: Arcadis Inc
Pace Project No.: 35215827

Lab ID	Sample ID	Matrix	Date Collected	Date Received
35214771004	**MFEB-4 GW-1**	Water	11/02/15 12:41	11/03/15 15:50
35214771005	**MFEB-4 GW-2**	Water	11/02/15 14:34	11/03/15 15:50
35214771006	**MFEB-4 GW-3**	Water	11/02/15 15:11	11/03/15 15:50

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SAMPLE ANALYTE COUNT

Project: Arcadis Inc
Pace Project No.: 35215827

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
35214771004	**MFEB-4 GW-1**	EPA 6010	TAP	5	PASI-O
		SM 2320B	KAM	3	PASI-O
		EPA 300.0	KEK	2	PASI-O
35214771005	**MFEB-4 GW-2**	EPA 6010	TAP	5	PASI-O
		SM 2320B	KAM	3	PASI-O
		EPA 300.0	KEK	2	PASI-O
35214771006	**MFEB-4 GW-3**	EPA 6010	TAP	5	PASI-O
		SM 2320B	KAM	3	PASI-O
		EPA 300.0	KEK	2	PASI-O

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SUMMARY OF DETECTION

Project: Arcadis Inc
Pace Project No.: 35215827

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
35214771004	**MFEB-4 GW-1**					
EPA 6010	Calcium	128000	ug/L	500	11/09/15 16:48	
EPA 6010	Iron	137	ug/L	40.0	11/09/15 16:48	
EPA 6010	Magnesium	12600	ug/L	500	11/09/15 16:48	
EPA 6010	Potassium	3700	ug/L	1000	11/09/15 16:48	
EPA 6010	Sodium	63900	ug/L	1000	11/09/15 16:48	
SM 2320B	Alkalinity,Bicarbonate (CaCO3)	329	mg/L	5.0	11/05/15 13:19	
SM 2320B	Alkalinity, Total as CaCO3	329	mg/L	5.0	11/05/15 13:19	
EPA 300.0	Chloride	107	mg/L	10.0	11/05/15 21:04	
EPA 300.0	Sulfate	8.3	mg/L	5.0	11/04/15 16:45	
35214771005	**MFEB-4 GW-2**					
EPA 6010	Calcium	110000	ug/L	500	11/09/15 16:51	
EPA 6010	Iron	50.2	ug/L	40.0	11/09/15 16:51	
EPA 6010	Magnesium	6720	ug/L	500	11/09/15 16:51	
EPA 6010	Potassium	3230	ug/L	1000	11/09/15 16:51	
EPA 6010	Sodium	24900	ug/L	1000	11/09/15 16:51	
SM 2320B	Alkalinity,Bicarbonate (CaCO3)	265	mg/L	5.0	11/05/15 13:26	
SM 2320B	Alkalinity, Total as CaCO3	265	mg/L	5.0	11/05/15 13:26	
EPA 300.0	Chloride	37.0	mg/L	5.0	11/04/15 17:07	
EPA 300.0	Sulfate	42.0	mg/L	5.0	11/04/15 17:07	
35214771006	**MFEB-4 GW-3**					
EPA 6010	Calcium	104000	ug/L	500	11/09/15 16:55	
EPA 6010	Iron	1570	ug/L	40.0	11/09/15 16:55	
EPA 6010	Magnesium	6220	ug/L	500	11/09/15 16:55	
EPA 6010	Potassium	10700	ug/L	1000	11/09/15 16:55	
EPA 6010	Sodium	7680	ug/L	1000	11/09/15 16:55	
SM 2320B	Alkalinity,Bicarbonate (CaCO3)	302	mg/L	5.0	11/05/15 15:21	
SM 2320B	Alkalinity, Total as CaCO3	302	mg/L	5.0	11/05/15 15:21	
EPA 300.0	Chloride	8.0	mg/L	5.0	11/04/15 17:29	
EPA 300.0	Sulfate	9.5	mg/L	5.0	11/04/15 17:29	

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Pompano Beach, FL 33064
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ANALYTICAL RESULTS

Project: Arcadis Inc
Pace Project No.: 35215827

Sample: MFEB-4 GW-1 **Lab ID: 35214771004** Collected: 11/02/15 12:41 Received: 11/03/15 15:50 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Calcium	**128000**	ug/L	500	250	1	11/06/15 12:20	11/09/15 16:48	7440-70-2	
Iron	**137**	ug/L	40.0	20.0	1	11/06/15 12:20	11/09/15 16:48	7439-89-6	
Magnesium	**12600**	ug/L	500	250	1	11/06/15 12:20	11/09/15 16:48	7439-95-4	
Potassium	**3700**	ug/L	1000	500	1	11/06/15 12:20	11/09/15 16:48	7440-09-7	
Sodium	**63900**	ug/L	1000	500	1	11/06/15 12:20	11/09/15 16:48	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity,Bicarbonate (CaCO3)	**329**	mg/L	5.0	5.0	1		11/05/15 13:19		
Alkalinity, Carbonate (CaCO3)	**5.0 U**	mg/L	5.0	5.0	1		11/05/15 13:19		
Alkalinity, Total as CaCO3	**329**	mg/L	5.0	5.0	1		11/05/15 13:19		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**107**	mg/L	10.0	5.0	2		11/05/15 21:04	16887-00-6	
Sulfate	**8.3**	mg/L	5.0	2.5	1		11/04/15 16:45	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: Arcadis Inc
Pace Project No.: 35215827

Sample: MFEB-4 GW-2 **Lab ID: 35214771005** Collected: 11/02/15 14:34 Received: 11/03/15 15:50 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Calcium	**110000**	ug/L	500	250	1	11/06/15 12:20	11/09/15 16:51	7440-70-2	
Iron	**50.2**	ug/L	40.0	20.0	1	11/06/15 12:20	11/09/15 16:51	7439-89-6	
Magnesium	**6720**	ug/L	500	250	1	11/06/15 12:20	11/09/15 16:51	7439-95-4	
Potassium	**3230**	ug/L	1000	500	1	11/06/15 12:20	11/09/15 16:51	7440-09-7	
Sodium	**24900**	ug/L	1000	500	1	11/06/15 12:20	11/09/15 16:51	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity,Bicarbonate (CaCO3)	**265**	mg/L	5.0	5.0	1		11/05/15 13:26		
Alkalinity, Carbonate (CaCO3)	**5.0 U**	mg/L	5.0	5.0	1		11/05/15 13:26		
Alkalinity, Total as CaCO3	**265**	mg/L	5.0	5.0	1		11/05/15 13:26		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**37.0**	mg/L	5.0	2.5	1		11/04/15 17:07	16887-00-6	
Sulfate	**42.0**	mg/L	5.0	2.5	1		11/04/15 17:07	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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Pompano Beach, FL 33064
954-582-4300

ANALYTICAL RESULTS

Project: Arcadis Inc
Pace Project No.: 35215827

Sample: MFEB-4 GW-3 **Lab ID: 35214771006** Collected: 11/02/15 15:11 Received: 11/03/15 15:50 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Calcium	**104000**	ug/L	500	250	1	11/06/15 12:20	11/09/15 16:55	7440-70-2	
Iron	**1570**	ug/L	40.0	20.0	1	11/06/15 12:20	11/09/15 16:55	7439-89-6	
Magnesium	**6220**	ug/L	500	250	1	11/06/15 12:20	11/09/15 16:55	7439-95-4	
Potassium	**10700**	ug/L	1000	500	1	11/06/15 12:20	11/09/15 16:55	7440-09-7	
Sodium	**7680**	ug/L	1000	500	1	11/06/15 12:20	11/09/15 16:55	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity,Bicarbonate (CaCO3)	**302**	mg/L	5.0	5.0	1		11/05/15 15:21		
Alkalinity, Carbonate (CaCO3)	**5.0 U**	mg/L	5.0	5.0	1		11/05/15 15:21		
Alkalinity, Total as CaCO3	**302**	mg/L	5.0	5.0	1		11/05/15 15:21		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**8.0**	mg/L	5.0	2.5	1		11/04/15 17:29	16887-00-6	
Sulfate	**9.5**	mg/L	5.0	2.5	1		11/04/15 17:29	14808-79-8	

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QUALITY CONTROL DATA

Project: Arcadis Inc
Pace Project No.: 35215827

QC Batch: MPRP/27244 Analysis Method: EPA 6010
QC Batch Method: EPA 3010 Analysis Description: 6010 MET
Associated Lab Samples: 35214771004, 35214771005, 35214771006

METHOD BLANK: 1384740 Matrix: Water
Associated Lab Samples: 35214771004, 35214771005, 35214771006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Calcium	ug/L	250 U	500	250	11/09/15 11:11	
Iron	ug/L	20.0 U	40.0	20.0	11/09/15 11:11	
Magnesium	ug/L	250 U	500	250	11/09/15 11:11	
Potassium	ug/L	500 U	1000	500	11/09/15 11:11	
Sodium	ug/L	500 U	1000	500	11/09/15 11:11	

LABORATORY CONTROL SAMPLE: 1384741

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium	ug/L	12500	12800	103	80-120	
Iron	ug/L	2500	2560	102	80-120	
Magnesium	ug/L	12500	12600	101	80-120	
Potassium	ug/L	12500	12700	102	80-120	
Sodium	ug/L	12500	12900	103	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1384742 1384743

Parameter	Units	35214771001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium	ug/L	101000	12500	12500	112000	111000	90	81	75-125	1	20	
Iron	ug/L	197	2500	2500	2720	2670	101	99	75-125	2	20	
Magnesium	ug/L	15100	12500	12500	27500	27000	100	96	75-125	2	20	
Potassium	ug/L	3010	12500	12500	15800	15600	103	101	75-125	1	20	
Sodium	ug/L	79700	12500	12500	91900	91200	98	92	75-125	1	20	

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QUALITY CONTROL DATA

Project: Arcadis Inc
Pace Project No.: 35215827

QC Batch: WET/33984 Analysis Method: SM 2320B
QC Batch Method: SM 2320B Analysis Description: 2320B Alkalinity
Associated Lab Samples: 35214771004, 35214771005

METHOD BLANK: 1383433 Matrix: Water
Associated Lab Samples: 35214771004, 35214771005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Carbonate (CaCO3)	mg/L	5.0 U	5.0	5.0	11/05/15 12:24	
Alkalinity, Total as CaCO3	mg/L	5.0 U	5.0	5.0	11/05/15 12:24	
Alkalinity,Bicarbonate (CaCO3)	mg/L	5.0 U	5.0	5.0	11/05/15 12:24	

LABORATORY CONTROL SAMPLE: 1383434

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	250	243	97	90-110	

SAMPLE DUPLICATE: 1383435

Parameter	Units	35214389002 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Carbonate (CaCO3)	mg/L	<5.0	5.0 U		20	
Alkalinity, Total as CaCO3	mg/L	123	122	1	20	
Alkalinity,Bicarbonate (CaCO3)	mg/L	123	122	1	20	

SAMPLE DUPLICATE: 1383436

Parameter	Units	35214980003 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Carbonate (CaCO3)	mg/L	<5.0	5.0 U		20	
Alkalinity, Total as CaCO3	mg/L	105	102	2	20	
Alkalinity,Bicarbonate (CaCO3)	mg/L	105	102	2	20	

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QUALITY CONTROL DATA

Project: Arcadis Inc
Pace Project No.: 35215827

QC Batch: WET/33989 Analysis Method: SM 2320B
QC Batch Method: SM 2320B Analysis Description: 2320B Alkalinity
Associated Lab Samples: 35214771006

METHOD BLANK: 1383576 Matrix: Water
Associated Lab Samples: 35214771006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Carbonate (CaCO3)	mg/L	5.0 U	5.0	5.0	11/05/15 15:06	
Alkalinity, Total as CaCO3	mg/L	5.0 U	5.0	5.0	11/05/15 15:06	
Alkalinity,Bicarbonate (CaCO3)	mg/L	5.0 U	5.0	5.0	11/05/15 15:06	

LABORATORY CONTROL SAMPLE: 1383577

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	250	238	95	90-110	

SAMPLE DUPLICATE: 1383578

Parameter	Units	35214771006 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Carbonate (CaCO3)	mg/L	5.0 U	5.0 U		20	
Alkalinity, Total as CaCO3	mg/L	302	295	2	20	
Alkalinity,Bicarbonate (CaCO3)	mg/L	302	295	2	20	

SAMPLE DUPLICATE: 1383579

Parameter	Units	35215041002 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Carbonate (CaCO3)	mg/L	5.0 U	5.0 U		20	
Alkalinity, Total as CaCO3	mg/L	151	153	1	20	
Alkalinity,Bicarbonate (CaCO3)	mg/L	151	153	1	20	

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QUALITY CONTROL DATA

Project: Arcadis Inc
Pace Project No.: 35215827

QC Batch: WETA/51785 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 35214771004, 35214771005, 35214771006

METHOD BLANK: 1381758 Matrix: Water
Associated Lab Samples: 35214771004, 35214771005, 35214771006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	2.5 U	5.0	2.5	11/04/15 07:31	
Sulfate	mg/L	2.5 U	5.0	2.5	11/04/15 07:31	

LABORATORY CONTROL SAMPLE: 1381759

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	50	48.2	96	90-110	
Sulfate	mg/L	50	47.9	96	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1381760 1381761

Parameter	Units	35214576001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	43.2	50	50	95.8	95.9	105	105	90-110	0	20	
Sulfate	mg/L	9.9	50	50	57.5	57.6	95	95	90-110	0	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1381762 1381763

Parameter	Units	35214665002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	61.4	50	50	113	112	104	102	90-110	1	20	L
Sulfate	mg/L	69.1	50	50	124	123	109	108	90-110	1	20	L

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QUALIFIERS

Project: Arcadis Inc
Pace Project No.: 35215827

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-O	Pace Analytical Services - Ormond Beach

ANALYTE QUALIFIERS

U	Compound was analyzed for but not detected.
L	Off-scale high. Actual value is known to be greater than value given.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Arcadis Inc
Pace Project No.: 35215827

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
35214771004	**MFEB-4 GW-1**	EPA 3010	MPRP/27244	EPA 6010	ICP/16413
35214771005	**MFEB-4 GW-2**	EPA 3010	MPRP/27244	EPA 6010	ICP/16413
35214771006	**MFEB-4 GW-3**	EPA 3010	MPRP/27244	EPA 6010	ICP/16413
35214771004	**MFEB-4 GW-1**	SM 2320B	WET/33984		
35214771005	**MFEB-4 GW-2**	SM 2320B	WET/33984		
35214771006	**MFEB-4 GW-3**	SM 2320B	WET/33989		
35214771004	**MFEB-4 GW-1**	EPA 300.0	WETA/51785		
35214771005	**MFEB-4 GW-2**	EPA 300.0	WETA/51785		
35214771006	**MFEB-4 GW-3**	EPA 300.0	WETA/51785		

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WO# : 35214771

35214771

OF CUSTODY RECORD

_____ Quote:_____ Page 1 of ___

Container Type Codes			
AV Amber Vial		ES Encore Sampler	
CV Clear Vial		PPV Prepreserved vial	
P Plastic		PL C Plastic container	
AL Amber Liter		PL J Plastic Jar	
CL Clear Liter		Z Ziploc bag	
AP Amber Plastic		TB Tedlar bag	
AG Amber Glass		WP White pail	
SJ Soil Jar		G Gallon Jug	
Other_____		TC Terracore	

PPV Preprepserved vial
Size(s): 2oz, 4oz, 8oz, 16oz, 32oz or 1L, other_____
40ml 500ml 250ml 125 ml
Example: 4ozP = 4oz Plastic, 8ozSJ= 8oz Soil Jar

Matrix Codes			
SD Solid Waste		OL Oil	
GW Ground Water		SL Sludge	
EFF Effluent		SO Soil Sediment	
AFW Analyte Free H20		AQ Aqueous	
WW Waste Water		NA Nonaqueous	
DW Drinking Water		PE Petroleum	
SW Surface Water		O Other_____ (Please specify)	
ML Misc. Liquid			

Preservative Type Codes		
A. None	E. HCL	I. Ice
B. HNO_3	F. MeOH	J. MCAA
C. H_2SO_4	G. $Na_2S_2O_3$	K. Zn Acetate
D. NaOH	H. $NaHSO_4$	O. Other

Company Name: Nutting Eng PO#

Address: 810 Neptune Dr

City: Boynton Beach State: FL Zip: 33426

Attn: Jon Bielnick Fax#

email: Phone:

Project Name: Acadia Inc Proj #

Sampler Signature:

Circle One Event: Daily Weekly Monthly Quarterly Semi-Annual Annual N/A

LAB ANALYSIS

Sample #	Sample ID	Collect Date	Collect Time	Matrix Code*	Field Filtered	Integrity (Y/N)	Total # of containers	Parameters	Bicarbonate	Carbonate	Sulfate	Calcium	Magnesium	Sodium	Potassium	Iron	Chloride	EXAMPLE Diss. Lead 6010
									# of Containers Size/Type									1 16ozP
1	MFEB-4 MW-1	10/27	12:31	GW			2											
2	MFEB-4 MW-2	10/28	11:24	GW			2											
3	MFEB-4 MW-3	10/28	14:57	GW			2											
4	MFEB-4 MW-1	11/2	12:41	GW			2											
5	MFEB-4 MW-2	11/2	14:34	GW			2											
6	MFEB-4 MW-3	11/2	16:11	GW			2											
7																		
8																		
9																		
10																		

REMARKS

2629-20

Circle T.A.T. REQUEST (Rush Fees Applied)
Standard: Y N
ASAP: Today 1D 2D 3D 4D 5D

Short Hold: Y___ N___

Circle QA/QC Report Level: 1 2 3 4 CLP APCEE QAPP Other_____

EDD (Fees May Apply): ADaPT SEDD ERPIMS TSV CSV Other_____

COC Condition: OK Incomplete

Required State Certification: FL GA SC NC NJ PA LA TX IL ___

Coolers #'s - Temp °C: 1 4.3 2___ 3___ 4___ 5___

Item	Relinquished by	Affiliation	Date	Time	Received by	Affiliation	Date	Time
1	[signature]	NEF	11/3/15	~~9:30~~	[signature]	[signature]	11-3-15	1200
2				12:00	[signature]	[signature]	11/3/15	1550
3	[signature]	[signature]	11/3/15	1550				
4								

Lab Use Only	YES	NO	N/A
Non-Conformance Found?			
Samples INTACT upon arrival?			
Received on Wet Ice?			
Proper Preservatives Indicated?			
Received within holding time?			
Custody seals intact?			
Volatiles rec'd without headspace?			
Proper Containers Used?			

Pace Analytical	Document Name Sample Condition Upon Receipt Form	Document Revised October 9, 2013
	Document No. F-FL-C-007 rev. 05	Issuing Authorities Pace Florida Quality Office

Sample Condition Upon Receipt Form (SCUR)

WO# : 35214771

Client Name: Nutting EV Pr

PM: CTR **Due Date: 11/09/15**

CLIENT: 36-NUTTEN

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace

Tracking # _____

Custody Seal on Cooler/Box Present: ☐ yes ☒ no Seals intact ☐ yes ☒ no

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☒ None ☐ Other _____

Thermometer Used T160 Type of Ice: ☒ Wet Blue None

Cooler Temperature °C 4.3 (Visual) +0.2 (Correction Factor) 4.5 (Actual)

Date and Initials of person examining contents: SLA 11/03/15

(Temp should be above freezing to 6°C) If below 0°C, was sample frozen? ☒ Yes ☐ No

Receipt of samples satisfactory: ☐ Yes ☐ No

Rush TAT requested on COC:

If yes, then all conditions below were met	If no, then mark box & describe issue (use comments area if necessary)
Chain of Custody Present	☐
Chain of Custody Filled Out	☐
Relinquished Signature & Sampler Name COC	☐
Samples Arrived within Hold Time	☐
Sufficient Volume	☐
Correct Containers Used	☐
Containers Intact	☐
Sample Labels match COC (sample IDs & date/time of collection)	☐ No Labels ☐ No Time/Date on Labels ☐
All containers needing preservation are found to be in compliance with EPA recommendation	☐
No Headspace in VOA Vials (>6mm)	☐

Client Notification/ Resolution:

Person Contacted _____ Date/Time _____

Comments/ Resolution (use back for additional comments) _____

Project Manager Review: _____ Date: _____

Finished Product Information Only

F.P. Sample ID: _____

Production Code: _____

Date/Time Opened: _____

Number of Unopened Bottles Remaining: _____

Extra Sample in Shed: Yes No

Size & Qty of Bottles Received

_____ x 5 Gal
_____ x 2.5 Gal
_____ x 1 Gal
_____ x 1 Liter
_____ x 500 mL
_____ x 250 mL
_____ x Other: _____

DEP Form FD 9000-24: GROUNDWATER SAMPLING LOG

SITE NAME: Arcadis US, INC	SITE LOCATION: Former MECCA Farms/Scripps Site, Palm Beach	
WELL NO: MFEB-5 GW-1	SAMPLE ID: MFEB-5 GW-1	DATE: 10-30-15

PURGING DATA

WELL DIAMETER (inches): 2	TUBING DIAMETER (inches): 1/2	WELL SCREEN INTERVAL DEPTH: 92.3 feet to 102.3 feet	STATIC DEPTH TO WATER (feet): 7.85	PURGE PUMP TYPE OR BAILER: Peristaltic Pump

WELL VOLUME PURGE: 1 WELL VOLUME = (TOTAL WELL DEPTH − STATIC DEPTH TO WATER) X WELL CAPACITY
(only fill out if applicable)
= (102.3 feet − 7.85 feet) X 0.16 gallons/foot = 15.11 gallons

EQUIPMENT VOLUME PURGE: 1 EQUIPMENT VOL. = PUMP VOLUME + (TUBING CAPACITY X TUBING LENGTH) + FLOW CELL VOLUME
(only fill out if applicable)
= gallons + (gallons/foot X feet) + gallons = gallons

INITIAL PUMP OR TUBING DEPTH IN WELL (feet): 8.5	FINAL PUMP OR TUBING DEPTH IN WELL (feet): 8.5	PURGING INITIATED AT: 9:15	PURGING ENDED AT: 12:23	TOTAL VOLUME PURGED (gallons): 47.0

TIME	VOLUME PURGED (gallons)	CUMUL. VOLUME PURGED (gallons)	PURGE RATE (gpm)	DEPTH TO WATER (feet)	pH (standard units)	TEMP. (°C)	COND (circle units) µmhos/cm or µS/cm	DISSOLVED OXYGEN (circle units) mg/L or % saturation	TURBIDITY (NTUs)	COLOR (describe)	ODOR (describe)
12:15	45.0	45.0	0.25	7.91	6.86	24.70	851	0.61	0.43	Clear	None
12:17	0.5	45.5	0.25	7.91	6.87	24.72	850	0.57	0.45	Clear	None
12:19	0.5	46.0	0.25	7.91	6.86	24.67	850	0.55	0.40	Clear	None
12:21	0.5	46.5	0.25	7.91	6.86	24.70	850	0.53	0.39	Clear	None
12:23	0.5	47.0	0.25	7.91	6.87	24.73	850	0.52	0.40	Clear	None

WELL CAPACITY (Gallons Per Foot): **0.75"** = 0.02; **1"** = 0.047.; **1.25"** = 0.06; **2"** = 0.16; **3"** = 0.37; **4"** = 0.65; **5"** = 1.02; **6"** = 1.47; **12"** = 5.88
TUBING INSIDE DIA. CAPACITY (Gal./Ft.): **1/8"** = 0.0006; **3/16"** = 0.0014; **1/4"** = 0.0026; **5/16"** = 0.004; **3/8"** = 0.006; **1/2"** = 0.010; **5/8"** = 0.016

PURGING EQUIPMENT CODES: **B** = Bailer; **BP** = Bladder Pump; **ESP** = Electric Submersible Pump; **PP** = Peristaltic Pump; **O** = Other (Specify)

SAMPLING DATA

SAMPLED BY (PRINT) / AFFILIATION: Richard Illsley, Environmental Specialist, NEF	SAMPLER(S) SIGNATURE(S):	SAMPLING INITIATED AT: 12:24	SAMPLING ENDED AT: 12:26

PUMP OR TUBING DEPTH IN WELL (feet): 8.5	TUBING MATERIAL CODE: PE	FIELD-FILTERED: Y (N) Filtration Equipment Type:	FILTER SIZE: ____ µm

FIELD DECONTAMINATION: PUMP (Y) N TUBING Y N (replaced) DUPLICATE: Y (N)

SAMPLE CONTAINER SPECIFICATION				SAMPLE PRESERVATION (including wet ice)			INTENDED ANALYSIS AND/OR METHOD	SAMPLING EQUIPMENT CODE	SAMPLE PUMP FLOW RATE (mL per minute)
SAMPLE ID CODE	# CONTAINERS	MATERIAL CODE	VOLUME	PRESERVATIVE USED	TOTAL VOL ADDED IN FIELD (mL)	FINAL pH			
MFEB-5 GW-1	1	PE	125mL	HNO3	0	-	METALS	APP	1000
MFEB-5 GW-1	1	PE	125mL	NONE	0	-	NON METALS	APP	1000

REMARKS:
Stick- 2.80
GPS- 26°49'46" 80°16'10"W

MATERIAL CODES: **AG** = Amber Glass; **CG** = Clear Glass; **HDPE** = High Density Polyethylene; **LDPE** = Low Density Polyethylene; **PP** = Polypropylene; **S** = Silicone; **T** = Teflon; **O** = Other (Specify)

SAMPLING EQUIPMENT CODES: **APP** = After (Through) Peristaltic Pump; **B** = Bailer; **BP** = Bladder Pump; **ESP** = Electric Submersible Pump; **RFPP** = Reverse Flow Peristaltic Pump; **SM** = Straw Method (Tubing Gravity Drain); **Q** = Other (Specify)

NOTES: 1. The above do not constitute all of the information required by Chapter 62-160, F.A.C.

2. STABILIZATION CRITERIA FOR RANGE OF VARIATION OF LAST THREE CONSECUTIVE READINGS (SEE FS 2212, SECTION 3)

pH: ± 0.2 units **Temperature:** ± 0.2 °C **Specific Conductance:** ± 5% **Dissolved Oxygen:** all readings ≤ 20% saturation (see Table FS 2200-2); optionally, ± 0.2 mg/L or ± 10% (whichever is greater) **Turbidity:** all readings ≤ 20 NTU; optionally ± 5 NTU or ± 10% (whichever is greater)

DEP Form FD 9000-24: GROUNDWATER SAMPLING LOG

SITE NAME: Arcadis US, INC	SITE LOCATION: Former MECCA Farms/Scripps Site, Palm Beach	
WELL NO: MFEB-5 GW-2	SAMPLE ID: MFEB-5 GW-2	DATE: 10-30-15

PURGING DATA

WELL DIAMETER (inches): 2	TUBING DIAMETER (inches): 1/2	WELL SCREEN INTERVAL DEPTH: 38.45 feet to 48.45 feet	STATIC DEPTH TO WATER (feet): 7.62	PURGE PUMP TYPE OR BAILER: Peristaltic Pump

WELL VOLUME PURGE: 1 WELL VOLUME = (TOTAL WELL DEPTH − STATIC DEPTH TO WATER) X WELL CAPACITY
(only fill out if applicable)
= (48.45 feet − 7.62 feet) X 0.16 gallons/foot = 6.50 gallons

EQUIPMENT VOLUME PURGE: 1 EQUIPMENT VOL. = PUMP VOLUME + (TUBING CAPACITY X TUBING LENGTH) + FLOW CELL VOLUME
(only fill out if applicable)
= gallons + (gallons/foot X feet) + gallons = gallons

INITIAL PUMP OR TUBING DEPTH IN WELL (feet): 8.5	FINAL PUMP OR TUBING DEPTH IN WELL (feet): 8.5	PURGING INITIATED AT: 12:30	PURGING ENDED AT: 14:08	TOTAL VOLUME PURGED (gallons): 19.0

TIME	VOLUME PURGED (gallons)	CUMUL. VOLUME PURGED (gallons)	PURGE RATE (gpm)	DEPTH TO WATER (feet)	pH (standard units)	TEMP. (°C)	COND. (circle units) µmhos/cm or µS/cm	DISSOLVED OXYGEN (circle units) mg/L or % saturation	TURBIDITY (NTUs)	COLOR (describe)	ODOR (describe)
14:00	17.0	17.0	0.25	7.69	7.39	24.89	579	0.45	0.51	Clear	None
14:02	0.5	17.5	0.25	7.69	7.39	24.92	578	0.44	0.48	Clear	None
14:04	0.5	18.0	0.25	7.69	7.39	24.92	579	0.43	0.50	Clear	None
14:06	0.5	18.5	0.25	7.69	7.39	24.97	579	0.42	0.43	Clear	None
14:08	0.5	19.0	0.25	7.69	7.39	24.99	578	0.41	0.37	Clear	None

WELL CAPACITY (Gallons Per Foot): 0.75" = 0.02; 1" = 0.047.; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88
TUBING INSIDE DIA. CAPACITY (Gal./Ft.): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016

PURGING EQUIPMENT CODES: B = Bailer; BP = Bladder Pump; ESP = Electric Submersible Pump; PP = Peristaltic Pump; O = Other (Specify)

SAMPLING DATA

SAMPLED BY (PRINT) / AFFILIATION: Richard Ilisley, Environmental Specialist, NEF	SAMPLER(S) SIGNATURE(S):	SAMPLING INITIATED AT: 14:09	SAMPLING ENDED AT: 14:11
PUMP OR TUBING DEPTH IN WELL (feet): 8.5	TUBING MATERIAL CODE: PE	FIELD FILTERED: Y (N) Filtration Equipment Type:	FILTER SIZE: ____ µm
FIELD DECONTAMINATION: PUMP (Y) N TUBING Y N (replaced)		DUPLICATE: Y (N)	

SAMPLE CONTAINER SPECIFICATION				SAMPLE PRESERVATION (including wet ice)					
SAMPLE ID CODE	# CONTAINERS	MATERIAL CODE	VOLUME	PRESERVATIVE USED	TOTAL VOL ADDED IN FIELD (mL)	FINAL pH	INTENDED ANALYSIS AND/OR METHOD	SAMPLING EQUIPMENT CODE	SAMPLE PUMP FLOW RATE (mL per minute)
MFEB-5 GW-2	1	PE	125mL	HNO3	0	-	METALS	APP	1000
MFEB-5 GW-2	1	PE	125mL	NONE	0	-	NON METALS	APP	1000

REMARKS:
Stick- 2.60
GPS- 26°49'46" 80°16'10"W

MATERIAL CODES: AG = Amber Glass; CG = Clear Glass; HDPE = High Density Polyethylene; LDPE = Low Density Polyethylene; PP = Polypropylene; S = Silicone; T = Teflon; O = Other (Specify)

SAMPLING EQUIPMENT CODES: APP = After (Through) Peristaltic Pump; B = Bailer; BP = Bladder Pump; ESP = Electric Submersible Pump; RFPP = Reverse Flow Peristaltic Pump; SM = Straw Method (Tubing Gravity Drain); O = Other (Specify)

NOTES: 1. **The above do not constitute all of the information required by Chapter 62-160, F.A.C.**

2. STABILIZATION CRITERIA FOR RANGE OF VARIATION OF LAST THREE CONSECUTIVE READINGS (SEE FS 2212, SECTION 3)

pH: ± 0.2 units **Temperature:** ± 0.2 °C **Specific Conductance:** ± 5% **Dissolved Oxygen:** all readings ≤ 20% saturation (see Table FS 2200-2); optionally, ± 0.2 mg/L or ± 10% (whichever is greater) **Turbidity:** all readings ≤ 20 NTU; optionally ± 5 NTU or ± 10% (whichever is greater)

DEP Form FD 9000-24: GROUNDWATER SAMPLING LOG

SITE NAME: Arcadis US, INC	SITE LOCATION: Former MECCA Farms/Scripps Site, Palm Beach	
WELL NO: MFEB-5 GW-3	SAMPLE ID: MFEB-5 GW-3	DATE: 10-30-15

PURGING DATA

WELL DIAMETER (inches): 2	TUBING DIAMETER (inches): 1/2	WELL SCREEN INTERVAL DEPTH: 8.0 feet to 18.0 feet	STATIC DEPTH TO WATER (feet): 7.71	PURGE PUMP TYPE OR BAILER: Peristaltic Pump

WELL VOLUME PURGE: 1 WELL VOLUME = (TOTAL WELL DEPTH − STATIC DEPTH TO WATER) X WELL CAPACITY
(only fill out if applicable)
= (18.0 feet − 7.71 feet) X 0.16 gallons/foot = 1.64 gallons

EQUIPMENT VOLUME PURGE: 1 EQUIPMENT VOL. = PUMP VOLUME + (TUBING CAPACITY X TUBING LENGTH) + FLOW CELL VOLUME
(only fill out if applicable)
= gallons + (gallons/foot X feet) + gallons = gallons

INITIAL PUMP OR TUBING DEPTH IN WELL (feet): 8.5	FINAL PUMP OR TUBING DEPTH IN WELL (feet): 8.5	PURGING INITIATED AT: 14:15	PURGING ENDED AT: 14:35	TOTAL VOLUME PURGED (gallons): 5.0

TIME	VOLUME PURGED (gallons)	CUMUL. VOLUME PURGED (gallons)	PURGE RATE (gpm)	DEPTH TO WATER (feet)	pH (standard units)	TEMP. (°C)	COND. (circle units) µmhos/cm or µS/cm	DISSOLVED OXYGEN (circle units) mg/L or % saturation	TURBIDITY (NTUs)	COLOR (describe)	ODOR (describe)
14:27	3.0	3.0	0.25	7.74	7.85	26.66	732	0.68	1.05	Clear	None
14:29	0.5	3.5	0.25	7.74	7.85	26.55	732	0.68	0.99	Clear	None
14:31	0.5	4.0	0.25	7.74	7.86	26.50	732	0.68	0.95	Clear	None
14:33	0.5	4.5	0.25	7.74	7.86	26.52	733	0.68	0.93	Clear	None
14:35	0.5	5.0	0.25	7.74	7.86	26.50	733	0.68	0.90	Clear	None

WELL CAPACITY (Gallons Per Foot): **0.75"** = 0.02; **1"** = 0.047.; **1.25"** = 0.06; **2"** = 0.16; **3"** = 0.37; **4"** = 0.65; **5"** = 1.02; **6"** = 1.47; **12"** = 5.88
TUBING INSIDE DIA. CAPACITY (Gal./Ft.): **1/8"** = 0.0006; **3/16"** = 0.0014; **1/4"** = 0.0026; **5/16"** = 0.004; **3/8"** = 0.006; **1/2"** = 0.010; **5/8"** = 0.016

PURGING EQUIPMENT CODES: **B** = Bailer; **BP** = Bladder Pump; **ESP** = Electric Submersible Pump; **PP** = Peristaltic Pump; **O** = Other (Specify)

SAMPLING DATA

SAMPLED BY (PRINT) / AFFILIATION: Richard Illsley, Environmental Specialist, NEF	SAMPLER(S) SIGNATURE(S):	SAMPLING INITIATED AT: 14:36	SAMPLING ENDED AT: 14:39
PUMP OR TUBING DEPTH IN WELL (feet): 8.5	TUBING MATERIAL CODE: PE	FIELD-FILTERED: Y (N) Filtration Equipment Type:	FILTER SIZE: _____ µm
FIELD DECONTAMINATION: PUMP (Y) N TUBING Y N (replaced)		DUPLICATE: Y (N)	

SAMPLE CONTAINER SPECIFICATION				SAMPLE PRESERVATION (including wet ice)			INTENDED ANALYSIS AND/OR METHOD	SAMPLING EQUIPMENT CODE	SAMPLE PUMP FLOW RATE (mL per minute)
SAMPLE ID CODE	# CONTAINERS	MATERIAL CODE	VOLUME	PRESERVATIVE USED	TOTAL VOL ADDED IN FIELD (mL)	FINAL pH			
MFEB-5 GW-3	1	PE	125mL	HNO3	0	-	METALS	APP	1000
MFEB-5 GW-3	1	PE	125mL	NONE	0	-	NON METALS	APP	1000

REMARKS:
Stick- 2.91
GPS- 26°49'46" 80°16'10"W

MATERIAL CODES: **AG** = Amber Glass; **CG** = Clear Glass; **HDPE** = High Density Polyethylene; **LDPE** = Low Density Polyethylene; **PP** = Polypropylene; **S** = Silicone; **T** = Teflon; **O** = Other (Specify)

SAMPLING EQUIPMENT CODES: **APP** = After (Through) Peristaltic Pump; **B** = Bailer; **BP** = Bladder Pump; **ESP** = Electric Submersible Pump; **RFPP** = Reverse Flow Peristaltic Pump; **SM** = Straw Method (Tubing Gravity Drain); **O** = Other (Specify)

NOTES: 1. The above do not constitute all of the information required by Chapter 62-160, F.A.C.

2. STABILIZATION CRITERIA FOR RANGE OF VARIATION OF LAST THREE CONSECUTIVE READINGS (SEE FS 2212, SECTION 3)

pH: ± 0.2 units **Temperature:** ± 0.2 °C **Specific Conductance:** ± 5% **Dissolved Oxygen:** all readings ≤ 20% saturation (see Table FS 2200-2); optionally, ± 0.2 mg/L or ± 10% (whichever is greater) **Turbidity:** all readings ≤ 20 NTU; optionally ± 5 NTU or ± 10% (whichever is greater)

Pace Analytical Services, Inc.
3610 Park Central Blvd N
Pompano Beach, FL 33064
954-582-4300

November 10, 2015

Jan Beernink
Nutting Environmental of Florida, Inc.
1310 Neptune Drive
Boynton Beach, FL 33426

RE: Project: Arcadis US Inc
Pace Project No.: 35214547

Dear Jan Beernink:
Enclosed are the analytical results for sample(s) received by the laboratory on November 02, 2015. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

This is a revised report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Christina Raschke
christina.raschke@pacelabs.com
Project Manager

Enclosures

cc: Kristen Campos, Nutting Environmental of Flori

Pace Analytical Services, Inc.
3610 Park Central Blvd N
Pompano Beach, FL 33064
954-582-4300

CERTIFICATIONS

Project: Arcadis US Inc
Pace Project No.: 35214547

Ormond Beach Certification IDs
8 East Tower Circle, Ormond Beach, FL 32174
Alabama Certification #: 41320
Connecticut Certification #: PH-0216
Delaware Certification: FL NELAC Reciprocity
Florida Certification #: E83079
Georgia Certification #: 955
Guam Certification: FL NELAC Reciprocity
Hawaii Certification: FL NELAC Reciprocity
Illinois Certification #: 200068
Indiana Certification: FL NELAC Reciprocity
Kansas Certification #: E-10383
Kentucky Certification #: 90050
Louisiana Certification #: FL NELAC Reciprocity
Louisiana Environmental Certificate #: 05007
Maryland Certification: #346
Michigan Certification #: 9911
Mississippi Certification: FL NELAC Reciprocity
Missouri Certification #: 236
Montana Certification #: Cert 0074
Nebraska Certification: NE-OS-28-14
Nevada Certification: FL NELAC Reciprocity
New Hampshire Certification #: 2958
New York Certification #: 11608
North Carolina Environmental Certificate #: 667
North Carolina Certification #: 12710
North Dakota Certification #: R-216
Oklahoma Certification #: D9947
Pennsylvania Certification #: 68-00547
Puerto Rico Certification #: FL01264
South Carolina Certification: #96042001
Tennessee Certification #: TN02974
Texas Certification: FL NELAC Reciprocity
US Virgin Islands Certification: FL NELAC Reciprocity
Virginia Environmental Certification #: 460165
West Virginia Certification #: 9962C
Wisconsin Certification #: 399079670
Wyoming (EPA Region 8): FL NELAC Reciprocity

REPORT OF LABORATORY ANALYSIS

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Pompano Beach, FL 33064
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SAMPLE SUMMARY

Project: Arcadis US Inc
Pace Project No.: 35214547

Lab ID	Sample ID	Matrix	Date Collected	Date Received
35214547001	**MFEB-5 GW-1**	Water	10/30/15 12:24	11/02/15 10:30
35214547002	**MFEB-5 GW-2**	Water	10/30/15 14:09	11/02/15 10:30
35214547003	**MFEB-5 GW-3**	Water	10/30/15 14:36	11/02/15 10:30

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SAMPLE ANALYTE COUNT

Project: Arcadis US Inc
Pace Project No.: 35214547

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
35214547001	**MFEB-5 GW-1**	EPA 6010	TAP	5	PASI-O
		SM 2320B	KAM	3	PASI-O
		EPA 300.0	CMB	2	PASI-O
35214547002	**MFEB-5 GW-2**	EPA 6010	TAP	5	PASI-O
		SM 2320B	KAM	3	PASI-O
		EPA 300.0	CMB	2	PASI-O
35214547003	**MFEB-5 GW-3**	EPA 6010	TAP	5	PASI-O
		SM 2320B	KAM	3	PASI-O
		EPA 300.0	CMB, KEK	2	PASI-O

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SUMMARY OF DETECTION

Project: Arcadis US Inc
Pace Project No.: 35214547

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
35214547001	**MFEB-5 GW-1**					
EPA 6010	Calcium	107000	ug/L	500	11/05/15 18:47	
EPA 6010	Iron	213	ug/L	40.0	11/05/15 18:47	
EPA 6010	Magnesium	11500	ug/L	500	11/05/15 18:47	
EPA 6010	Potassium	2990	ug/L	1000	11/05/15 18:47	
EPA 6010	Sodium	58300	ug/L	1000	11/05/15 18:47	
SM 2320B	Alkalinity,Bicarbonate (CaCO3)	314	mg/L	5.0	11/05/15 12:48	
SM 2320B	Alkalinity, Total as CaCO3	314	mg/L	5.0	11/05/15 12:48	
EPA 300.0	Chloride	71.6	mg/L	5.0	11/03/15 10:28	
EPA 300.0	Sulfate	6.1	mg/L	5.0	11/03/15 10:28	
35214547002	**MFEB-5 GW-2**					
EPA 6010	Calcium	46800	ug/L	500	11/05/15 18:51	
EPA 6010	Magnesium	5220	ug/L	500	11/05/15 18:51	
EPA 6010	Potassium	2000	ug/L	1000	11/05/15 18:51	
EPA 6010	Sodium	52200	ug/L	1000	11/05/15 18:51	
SM 2320B	Alkalinity,Bicarbonate (CaCO3)	116	mg/L	5.0	11/05/15 12:53	
SM 2320B	Alkalinity, Total as CaCO3	116	mg/L	5.0	11/05/15 12:53	
EPA 300.0	Chloride	90.6	mg/L	5.0	11/03/15 10:50	
EPA 300.0	Sulfate	15.5	mg/L	5.0	11/03/15 10:50	
35214547003	**MFEB-5 GW-3**					
EPA 6010	Calcium	121000	ug/L	500	11/05/15 18:54	
EPA 6010	Iron	88.4	ug/L	40.0	11/05/15 18:54	
EPA 6010	Magnesium	3890	ug/L	500	11/05/15 18:54	
EPA 6010	Potassium	7040	ug/L	1000	11/05/15 18:54	
EPA 6010	Sodium	30700	ug/L	1000	11/05/15 18:54	
SM 2320B	Alkalinity,Bicarbonate (CaCO3)	243	mg/L	5.0	11/03/15 19:23	
SM 2320B	Alkalinity, Total as CaCO3	243	mg/L	5.0	11/03/15 19:23	
EPA 300.0	Chloride	29.8	mg/L	5.0	11/03/15 11:12	
EPA 300.0	Sulfate	108	mg/L	10.0	11/04/15 20:26	

REPORT OF LABORATORY ANALYSIS

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Pace Analytical Services, Inc.
3610 Park Central Blvd N
Pompano Beach, FL 33064
954-582-4300

ANALYTICAL RESULTS

Project: Arcadis US Inc
Pace Project No.: 35214547

Sample: MFEB-5 GW-1 **Lab ID: 35214547001** Collected: 10/30/15 12:24 Received: 11/02/15 10:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Calcium	**107000**	ug/L	500	250	1	11/04/15 16:00	11/05/15 18:47	7440-70-2	
Iron	**213**	ug/L	40.0	20.0	1	11/04/15 16:00	11/05/15 18:47	7439-89-6	
Magnesium	**11500**	ug/L	500	250	1	11/04/15 16:00	11/05/15 18:47	7439-95-4	
Potassium	**2990**	ug/L	1000	500	1	11/04/15 16:00	11/05/15 18:47	7440-09-7	
Sodium	**58300**	ug/L	1000	500	1	11/04/15 16:00	11/05/15 18:47	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity,Bicarbonate (CaCO3)	**314**	mg/L	5.0	5.0	1		11/05/15 12:48		
Alkalinity, Carbonate (CaCO3)	**5.0 U**	mg/L	5.0	5.0	1		11/05/15 12:48		
Alkalinity, Total as CaCO3	**314**	mg/L	5.0	5.0	1		11/05/15 12:48		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**71.6**	mg/L	5.0	2.5	1		11/03/15 10:28	16887-00-6	
Sulfate	**6.1**	mg/L	5.0	2.5	1		11/03/15 10:28	14808-79-8	

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ANALYTICAL RESULTS

Project: Arcadis US Inc
Pace Project No.: 35214547

Sample: MFEB-5 GW-2 **Lab ID: 35214547002** Collected: 10/30/15 14:09 Received: 11/02/15 10:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Calcium	**46800**	ug/L	500	250	1	11/04/15 16:00	11/05/15 18:51	7440-70-2	
Iron	**20.0 U**	ug/L	40.0	20.0	1	11/04/15 16:00	11/05/15 18:51	7439-89-6	
Magnesium	**5220**	ug/L	500	250	1	11/04/15 16:00	11/05/15 18:51	7439-95-4	
Potassium	**2000**	ug/L	1000	500	1	11/04/15 16:00	11/05/15 18:51	7440-09-7	
Sodium	**52200**	ug/L	1000	500	1	11/04/15 16:00	11/05/15 18:51	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity,Bicarbonate (CaCO3)	**116**	mg/L	5.0	5.0	1		11/05/15 12:53		
Alkalinity, Carbonate (CaCO3)	**5.0 U**	mg/L	5.0	5.0	1		11/05/15 12:53		
Alkalinity, Total as CaCO3	**116**	mg/L	5.0	5.0	1		11/05/15 12:53		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**90.6**	mg/L	5.0	2.5	1		11/03/15 10:50	16887-00-6	
Sulfate	**15.5**	mg/L	5.0	2.5	1		11/03/15 10:50	14808-79-8	

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ANALYTICAL RESULTS

Project: Arcadis US Inc
Pace Project No.: 35214547

Sample: MFEB-5 GW-3 **Lab ID: 35214547003** Collected: 10/30/15 14:36 Received: 11/02/15 10:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Calcium	**121000**	ug/L	500	250	1	11/04/15 16:00	11/05/15 18:54	7440-70-2	
Iron	**88.4**	ug/L	40.0	20.0	1	11/04/15 16:00	11/05/15 18:54	7439-89-6	
Magnesium	**3890**	ug/L	500	250	1	11/04/15 16:00	11/05/15 18:54	7439-95-4	
Potassium	**7040**	ug/L	1000	500	1	11/04/15 16:00	11/05/15 18:54	7440-09-7	
Sodium	**30700**	ug/L	1000	500	1	11/04/15 16:00	11/05/15 18:54	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity,Bicarbonate (CaCO3)	**243**	mg/L	5.0	5.0	1		11/03/15 19:23		
Alkalinity, Carbonate (CaCO3)	**5.0 U**	mg/L	5.0	5.0	1		11/03/15 19:23		
Alkalinity, Total as CaCO3	**243**	mg/L	5.0	5.0	1		11/03/15 19:23		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**29.8**	mg/L	5.0	2.5	1		11/03/15 11:12	16887-00-6	
Sulfate	**108**	mg/L	10.0	5.0	2		11/04/15 20:26	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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Pompano Beach, FL 33064
954-582-4300

QUALITY CONTROL DATA

Project: Arcadis US Inc
Pace Project No.: 35214547

QC Batch: MPRP/27199 Analysis Method: EPA 6010
QC Batch Method: EPA 3010 Analysis Description: 6010 MET
Associated Lab Samples: 35214547001, 35214547002, 35214547003

METHOD BLANK: 1381991 Matrix: Water
Associated Lab Samples: 35214547001, 35214547002, 35214547003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Calcium	ug/L	250 U	500	250	11/05/15 17:44	
Iron	ug/L	20.0 U	40.0	20.0	11/05/15 17:44	
Magnesium	ug/L	250 U	500	250	11/05/15 17:44	
Potassium	ug/L	500 U	1000	500	11/05/15 17:44	
Sodium	ug/L	500 U	1000	500	11/05/15 17:44	

LABORATORY CONTROL SAMPLE: 1381992

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium	ug/L	12500	11700	93	80-120	
Iron	ug/L	2500	2270	91	80-120	
Magnesium	ug/L	12500	11500	92	80-120	
Potassium	ug/L	12500	11400	91	80-120	
Sodium	ug/L	12500	11900	95	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1381993 1381994

Parameter	Units	92269296003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium	ug/L	147000	12500	12500	163000	177000	128	240	75-125	8	20	J(M1)
Iron	ug/L	63900	2500	2500	67700	73900	154	400	75-125	9	20	J(M1)
Magnesium	ug/L	16500	12500	12500	28400	30600	95	113	75-125	7	20	
Potassium	ug/L	99200	12500	12500	114000	124000	121	196	75-125	8	20	J(M1)
Sodium	ug/L	584000	12500	12500	616000	672000	258	707	75-125	9	20	J(M1)

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REPORT OF LABORATORY ANALYSIS

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3610 Park Central Blvd N
Pompano Beach, FL 33064
954-582-4300

QUALITY CONTROL DATA

Project: Arcadis US Inc
Pace Project No.: 35214547

QC Batch: WET/33941 Analysis Method: SM 2320B
QC Batch Method: SM 2320B Analysis Description: 2320B Alkalinity
Associated Lab Samples: 35214547003

METHOD BLANK: 1381130 Matrix: Water
Associated Lab Samples: 35214547003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Carbonate (CaCO3)	mg/L	5.0 U	5.0	5.0	11/03/15 17:21	
Alkalinity, Total as CaCO3	mg/L	5.0 U	5.0	5.0	11/03/15 17:21	
Alkalinity,Bicarbonate (CaCO3)	mg/L	5.0 U	5.0	5.0	11/03/15 17:21	

LABORATORY CONTROL SAMPLE: 1381131

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	250	239	96	90-110	

SAMPLE DUPLICATE: 1381132

Parameter	Units	35214389001 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Carbonate (CaCO3)	mg/L	<5.0	5.0 U		20	
Alkalinity, Total as CaCO3	mg/L	39.7	39.6	0	20	
Alkalinity,Bicarbonate (CaCO3)	mg/L	39.7	39.6	0	20	

SAMPLE DUPLICATE: 1381133

Parameter	Units	35214496003 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Carbonate (CaCO3)	mg/L	5.0 U	5.0 U		20	
Alkalinity, Total as CaCO3	mg/L	14.4	14.3	1	20	
Alkalinity,Bicarbonate (CaCO3)	mg/L	14.4	14.3	1	20	

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QUALITY CONTROL DATA

Project: Arcadis US Inc
Pace Project No.: 35214547

QC Batch: WET/33984 Analysis Method: SM 2320B
QC Batch Method: SM 2320B Analysis Description: 2320B Alkalinity
Associated Lab Samples: 35214547001, 35214547002

METHOD BLANK: 1383433 Matrix: Water
Associated Lab Samples: 35214547001, 35214547002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Carbonate (CaCO3)	mg/L	5.0 U	5.0	5.0	11/05/15 12:24	
Alkalinity, Total as CaCO3	mg/L	5.0 U	5.0	5.0	11/05/15 12:24	
Alkalinity,Bicarbonate (CaCO3)	mg/L	5.0 U	5.0	5.0	11/05/15 12:24	

LABORATORY CONTROL SAMPLE: 1383434

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	250	243	97	90-110	

SAMPLE DUPLICATE: 1383435

Parameter	Units	35214389002 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Carbonate (CaCO3)	mg/L	<5.0	5.0 U		20	
Alkalinity, Total as CaCO3	mg/L	123	122	1	20	
Alkalinity,Bicarbonate (CaCO3)	mg/L	123	122	1	20	

SAMPLE DUPLICATE: 1383436

Parameter	Units	35214980003 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Carbonate (CaCO3)	mg/L	<5.0	5.0 U		20	
Alkalinity, Total as CaCO3	mg/L	105	102	2	20	
Alkalinity,Bicarbonate (CaCO3)	mg/L	105	102	2	20	

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QUALITY CONTROL DATA

Project: Arcadis US Inc
Pace Project No.: 35214547

QC Batch: WETA/51745 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 35214547001, 35214547002, 35214547003

METHOD BLANK: 1380341 Matrix: Water
Associated Lab Samples: 35214547001, 35214547002, 35214547003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	2.5 U	5.0	2.5	11/03/15 07:52	
Sulfate	mg/L	2.5 U	5.0	2.5	11/03/15 07:52	

LABORATORY CONTROL SAMPLE: 1380342

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	50	48.0	96	90-110	
Sulfate	mg/L	50	47.7	95	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1380343 1380344

Parameter	Units	35214520001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	33.9	50	50	85.5	86.0	103	104	90-110	1	20	
Sulfate	mg/L	18.1	50	50	66.9	67.4	98	99	90-110	1	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1380345 1380346

Parameter	Units	92273816006 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	5.1	50	50	52.5	53.0	95	96	90-110	1	20	
Sulfate	mg/L	7.9	50	50	55.1	55.6	95	95	90-110	1	20	

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Pompano Beach, FL 33064
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QUALIFIERS

Project: Arcadis US Inc
Pace Project No.: 35214547

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-O	Pace Analytical Services - Ormond Beach

ANALYTE QUALIFIERS

U	Compound was analyzed for but not detected.
J(M1)	Estimated Value. Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Arcadis US Inc
Pace Project No.: 35214547

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
35214547001	**MFEB-5 GW-1**	EPA 3010	MPRP/27199	EPA 6010	ICP/16389
35214547002	**MFEB-5 GW-2**	EPA 3010	MPRP/27199	EPA 6010	ICP/16389
35214547003	**MFEB-5 GW-3**	EPA 3010	MPRP/27199	EPA 6010	ICP/16389
35214547001	**MFEB-5 GW-1**	SM 2320B	WET/33984		
35214547002	**MFEB-5 GW-2**	SM 2320B	WET/33984		
35214547003	**MFEB-5 GW-3**	SM 2320B	WET/33941		
35214547001	**MFEB-5 GW-1**	EPA 300.0	WETA/51745		
35214547002	**MFEB-5 GW-2**	EPA 300.0	WETA/51745		
35214547003	**MFEB-5 GW-3**	EPA 300.0	WETA/51745		

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WO# : 35214547

35214547

:D

Page 1 of 1

Container Type Codes

AV	Amber Vial	ES	Encore Sampler
CV	Clear Vial	PPV	Prepreserved vial
P	Plastic	PL C	Plastic container
AL	Amber Liter	PL J	Plastic Jar
CL	Clear Liter	Z	Ziploc bag
AP	Amber Plastic	TB	Tertier bag
AG	Amber Glass	WP	Whirl pak
SJ	Soil Jar	G	Gallon Jug
Other		TC	Terra-core

PPV = Preservative vial
Size(s): 2oz, 4oz, 8oz, 16oz, 32oz or 1L, other
40ml 500ml 250ml 125 ml
Example: 4ozP = 4oz Plastic, 8ozSJ= 8oz Soil Jar

Matrix Codes

SO	Solid Waste	OL	Oil
GW	Ground Water	SL	Sludge
EFF	Effluent	SO	Soil Sediment
AFW	Analyte Free H20	AQ	Aqueous
WW	Waste Water	NA	Nonaqueous
DW	Drinking Water	PE	Petroleum
SW	Surface Water	O	Other
ML	Misc. Liquid		(Please specify)

Preservative Type Codes

A. None	E. HCL	I. Ice
B. HNO_3	F. MeOH	J. MCAA
C. H_2SO_4	G. $Na_2S_2O_3$	K. Zn Acetate
D. NaOH	H. $NaHSO_4$	O. Other

Company Name: Mutiny ENR PO#

Address: 1310 N Ocean Dr

City: Boynton Beach State: FL Zip: 33426

Attn: Jon Bierock Fax#

email: Phone:

Project Name: Arcadis US Inc Proj #

Sampler Signature:

Circle One Event: Daily Weekly Monthly Quartely Semi-Annual Annual N/A

LAB ANALYSIS

Sample #	Sample ID	Collect Date	Collect Time	Matrix Code*	Field Filtered	Integrity OK(Y/N)	Total # of containers	Parameters: Bicarbonate	Carbonate	Sulfate	Calcium	Magnesium	Sodium	Potassium	Iron	Chloride	EXAMPLE Diss. Lead 6010
								# of Containers Size/Type									1 16ozP
1	MFEB-5 MW-1	10/30	12:24	GW			2										
2	MFEB-5 MW-2	10/30	14:09	GW			2										
3	MFEB-5 MW-3	10/30	14:36	GW			2										
4																	
5																	
6																	
7																	
8																	
9																	
10																	

REMARKS

26291-20

Circle TAT REQUEST (Surcharges Apply): Standard | RUSH

Y N | Today 1D 2D 3D 4D 5D

Short Hold: Y N

Circle QA/QC Report Level: 1 2 3 4 CLP AFCEE QAPP Other

EDD (Fees May Apply): ADaPT SEDD ERPIMS TSV CSV Other

COC Condition: OK Incomplete

Required State Certification: FL GA SC NC NJ PA LA TX IL

Coolers #'s - Temp °C: 1 2.6 3 4 5

Item	Relinquished by	Affiliation	Date	Time	Received by	Affiliation	Date	Time
1	Tony Ruiz	NET	11/2/15	10:30	CTR	Pace	11/2/15	1030
2								
3								
4								

Lab Use Only	Yes	No	NA
Non-Conformance Found?			
Samples INTACT upon arrival?			
Received on Wet Ice?			
Proper Preservatives Indicated?			
Received within holding time?			
Custody seals Intact?			
Volatiles rec'd without headspace?			
Proper Containers Used?			

Pace Analytical	Document Name Sample Condition Upon Receipt Form	Document Revised October 9, 2013
	Document No. F-FL-C-007 rev. 05	Issuing Authorities Pace Florida Quality Office

Sample Condition Upon Receipt Form (SCUR)

WO#: 35214547

PM: CTR Due Date: 11/06/15

CLIENT: 36-NUTTEN

Client Name: Nutting Prc

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☑ Pace

Tracking # _____

Custody Seal on Cooler/Box Present: ☐ yes ☑ no Seals intact ☐ yes ☐ no

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☑ None ☐ Other _____

Thermometer Used T-109 Type of Ice: Wet Blue None

Cooler Temperature °C 4.3 (Visual) 0.3 (Correction Factor) 4.6 (Actual)

Date and Initials of person examining contents: _____

(Temp should be above freezing to 6°C) If below 0°C, then was sample frozen?

☐ Yes ☑ No

Receipt of samples satisfactory: ☑ Yes ☐ No

Rush TAT requested on COC:

If yes, then all conditions below were met:	If no, then mark box & describe issue (use comments area if necessary)
Chain of Custody Present	☐
Chain of Custody Filled Out	☐
Relinquished Signature & Sampler Name COC	☐
Samples Arrived within Hold Time	☐
Sufficient Volume	☐
Correct Containers Used	☐
Containers Intact	☐
Sample Labels match COC (sample IDs & date/time of collection)	☐ No Labels ☐ No Time/Date on Labels ☐
All containers needing preservation are found to be in compliance with EPA recommendation	☐
No Headspace in VOA Vials (>6mm)	☐

Client Notification/ Resolution:

Person Contacted _____ Date/Time _____

Comments/ Resolution (use back for additional comments) _____

Project Manager Review: _____ Date: _____

Finished Product Information Only

F.P. Sample ID: _____

Production Code: _____

Date/Time Opened: _____

Number of Unopened Bottles Remaining: _____

Extra Sample in Shed: Yes No

Size & Qty of Bottles Received

_____ x 5 Gal

_____ x 2.5 Gal

_____ x 1 Gal

_____ x 1 Liter

_____ x 500 mL

_____ x 250 mL

_____ x Other: _____

DEP Form FD 9000-24: GROUNDWATER SAMPLING LOG

SITE NAME: Arcadis US, INC	SITE LOCATION: Former MECCA Farms/Scripps Site, Palm Beach	
WELL NO: MFEB-6 GW-1	SAMPLE ID: MFEB-6 GW-1	DATE: 11-3-15

PURGING DATA

WELL DIAMETER (inches): 2	TUBING DIAMETER (inches): 1/2	WELL SCREEN INTERVAL DEPTH: 92.80 feet to 102.8 feet	STATIC DEPTH TO WATER (feet): 3.92	PURGE PUMP TYPE OR BAILER: Peristaltic Pump

WELL VOLUME PURGE: 1 WELL VOLUME = (TOTAL WELL DEPTH – STATIC DEPTH TO WATER) X WELL CAPACITY
(only fill out if applicable)
= (102.80 feet – 3.92 feet) X 0.16 gallons/foot = 15.82 gallons

EQUIPMENT VOLUME PURGE: 1 EQUIPMENT VOL. = PUMP VOLUME + (TUBING CAPACITY X TUBING LENGTH) + FLOW CELL VOLUME
(only fill out if applicable)
= gallons + (gallons/foot X feet) + gallons = gallons

INITIAL PUMP OR TUBING DEPTH IN WELL (feet): 4.5	FINAL PUMP OR TUBING DEPTH IN WELL (feet): 4.5	PURGING INITIATED AT: 9:50	PURGING ENDED AT: 13:02	TOTAL VOLUME PURGED (gallons): 48

TIME	VOLUME PURGED (gallons)	CUMUL. VOLUME PURGED (gallons)	PURGE RATE (gpm)	DEPTH TO WATER (feet)	pH (standard units)	TEMP. (°C)	COND. (circle units) µmhos/cm or mS/cm	DISSOLVED OXYGEN (circle units) mg/L or % saturation	TURBIDITY (NTUs)	COLOR (describe)	ODOR (describe)
12:54	46.0	46.0	0.25	3.95	6.57	24.70	1248	0.68	0.22	Clear	None
12:56	0.5	46.5	0.25	3.95	6.57	24.69	1248	0.67	0.18	Clear	None
12:58	0.5	47.0	0.25	3.95	6.58	24.73	1249	0.65	0.15	Clear	None
13:00	0.5	47.5	0.25	3.95	6.60	24.70	1248	0.64	0.10	Clear	None
13:02	0.5	48.0	0.25	3.95	6.60	24.67	1250	0.63	0.10	Clear	None

WELL CAPACITY (Gallons Per Foot): **0.75"** = 0.02; **1"** = 0.047.; **1.25"** = 0.06; **2"** = 0.16; **3"** = 0.37; **4"** = 0.65; **5"** = 1.02; **6"** = 1.47; **12"** = 5.88
TUBING INSIDE DIA. CAPACITY (Gal./Ft.): **1/8"** = 0.0006; **3/16"** = 0.0014; **1/4"** = 0.0026; **5/16"** = 0.004; **3/8"** = 0.006; **1/2"** = 0.010; **5/8"** = 0.016

PURGING EQUIPMENT CODES: **B** = Bailer; **BP** = Bladder Pump; **ESP** = Electric Submersible Pump; **PP** = Peristaltic Pump; **O** = Other (Specify)

SAMPLING DATA

SAMPLED BY (PRINT) / AFFILIATION: Richard Ilsley, Environmental Specialist, NEF	SAMPLER(S) SIGNATURE(S):	SAMPLING INITIATED AT: 13:03	SAMPLING ENDED AT: 13:05
PUMP OR TUBING DEPTH IN WELL (feet): 4.5	TUBING MATERIAL CODE: PE	FIELD-FILTERED: Y (N) Filtration Equipment Type:	FILTER SIZE: ____ µm
FIELD DECONTAMINATION: PUMP (Y) N TUBING Y N (replaced)		DUPLICATE: Y (N)	

SAMPLE CONTAINER SPECIFICATION				SAMPLE PRESERVATION (including wet ice)			INTENDED ANALYSIS AND/OR METHOD	SAMPLING EQUIPMENT CODE	SAMPLE PUMP FLOW RATE (mL per minute)
SAMPLE ID CODE	# CONTAINERS	MATERIAL CODE	VOLUME	PRESERVATIVE USED	TOTAL VOL ADDED IN FIELD (mL)	FINAL pH			
MFEB-6 GW-1	1	PE	125mL	HNO3	0	-	METALS	APP	1000
MFEB-6 GW-1	1	PE	125mL	NONE	0	-	NON METALS	APP	1000

REMARKS:
Stick- 2.35
GPS- 26°52'7" 80°16'50"W

MATERIAL CODES: **AG** = Amber Glass; **CG** = Clear Glass; **HDPE** = High Density Polyethylene; **LDPE** = Low Density Polyethylene; **PP** = Polypropylene; **S** = Silicone; **T** = Teflon; **O** = Other (Specify)

SAMPLING EQUIPMENT CODES: **APP** = After (Through) Peristaltic Pump; **B** = Bailer; **BP** = Bladder Pump; **ESP** = Electric Submersible Pump; **RFPP** = Reverse Flow Peristaltic Pump; **SM** = Straw Method (Tubing Gravity Drain); **O** = Other (Specify)

NOTES: 1. **The above do not constitute all of the information required by Chapter 62-160, F.A.C.**

2. STABILIZATION CRITERIA FOR RANGE OF VARIATION OF LAST THREE CONSECUTIVE READINGS (SEE FS 2212, SECTION 3)

pH: ± 0.2 units **Temperature:** ± 0.2 °C **Specific Conductance:** ± 5% **Dissolved Oxygen:** all readings ≤ 20% saturation (see Table FS 2200-2); optionally, ± 0.2 mg/L or ± 10% (whichever is greater) **Turbidity:** all readings ≤ 20 NTU; optionally ± 5 NTU or ± 10% (whichever is greater)

DEP Form FD 9000-24: GROUNDWATER SAMPLING LOG

SITE NAME: Arcadis US, INC	SITE LOCATION: Former MECCA Farms/Scripps Site, Palm Beach	
WELL NO: MFEB-6 GW-2	SAMPLE ID: MFEB-6 GW-2	DATE: 11-3-15

PURGING DATA

WELL DIAMETER (inches): 2	TUBING DIAMETER (inches): 1/2	WELL SCREEN INTERVAL DEPTH: 38.20 feet to 48.20 feet	STATIC DEPTH TO WATER (feet). 3.29	PURGE PUMP TYPE OR BAILER: Peristaltic Pump

WELL VOLUME PURGE: 1 WELL VOLUME = (TOTAL WELL DEPTH − STATIC DEPTH TO WATER) X WELL CAPACITY
(only fill out if applicable)
= (48.20 feet − 3.29 feet) X 0.16 gallons/foot = 7.01 gallons

EQUIPMENT VOLUME PURGE: 1 EQUIPMENT VOL. = PUMP VOLUME + (TUBING CAPACITY X TUBING LENGTH) + FLOW CELL VOLUME
(only fill out if applicable)
= gallons + (gallons/foot X feet) + gallons = gallons

INITIAL PUMP OR TUBING DEPTH IN WELL (feet): 4.5	FINAL PUMP OR TUBING DEPTH IN WELL (feet): 4.5	PURGING INITIATED AT: 13:10	PURGING ENDED AT: 14:52	TOTAL VOLUME PURGED (gallons): 18.0

TIME	VOLUME PURGED (gallons)	CUMUL. VOLUME PURGED (gallons)	PURGE RATE (gpm)	DEPTH TO WATER (feet)	pH (standard units)	TEMP. (°C)	COND. (circle units) µmhos/cm or (µS/cm)	DISSOLVED OXYGEN (circle units) mg/L or % saturation	TURBIDITY (NTUs)	COLOR (describe)	ODOR (describe)
14:40	18.0	18.0	0.25	33.3	6.62	24.86	740	0.32	0.49	Clear	None
14:42	0.5	18.5	0.25	33.3	6.65	24.84	740	0.32	0.46	Clear	None
14:44	0.5	19.0	0.25	33.3	6.67	24.84	740	0.32	0.45	Clear	None
14:46	0.5	19.5	0.25	33.3	6.66	24.85	740	0.31	0.45	Clear	None
14:48	0.5	20.0	0.25	33.3	6.66	24.82	739	0.30	0.43	Clear	None

WELL CAPACITY (Gallons Per Foot): **0.75"** = 0.02; **1"** = 0.047.; **1.25"** = 0.06; **2"** = 0.16; **3"** = 0.37; **4"** = 0.65; **5"** = 1.02; **6"** = 1.47; **12"** = 5.88
TUBING INSIDE DIA. CAPACITY (Gal./Ft.): **1/8"** = 0.0006; **3/16"** = 0.0014; **1/4"** = 0.0026; **5/16"** = 0.004, **3/8"** = 0.006, **1/2"** = 0.010; **5/8"** = 0.016

PURGING EQUIPMENT CODES: **B** = Bailer; **BP** = Bladder Pump; **ESP** = Electric Submersible Pump; **PP** = Peristaltic Pump; **O** = Other (Specify)

SAMPLING DATA

SAMPLED BY (PRINT) / AFFILIATION: Richard Illsley, Environmental Specialist, NEF	SAMPLER(S) SIGNATURE(S):	SAMPLING INITIATED AT: 14:52	SAMPLING ENDED AT: 14:54
PUMP OR TUBING DEPTH IN WELL (feet): 4.5	TUBING MATERIAL CODE: PE	FIELD-FILTERED: Y (N) Filtration Equipment Type:	FILTER SIZE: _____ µm
FIELD DECONTAMINATION: PUMP (Y) N TUBING Y N (replaced)		DUPLICATE: Y (N)	

SAMPLE CONTAINER SPECIFICATION				SAMPLE PRESERVATION (including wet ice)			INTENDED ANALYSIS AND/OR METHOD	SAMPLING EQUIPMENT CODE	SAMPLE PUMP FLOW RATE (mL per minute)
SAMPLE ID CODE	# CONTAINERS	MATERIAL CODE	VOLUME	PRESERVATIVE USED	TOTAL VOL ADDED IN FIELD (mL)	FINAL pH			
MFEB-6 GW-2	1	PE	125mL	HNO3	0	-	METALS	APP	1000
MFEB-6 GW-2	1	PE	125mL	NONE	0	-	NON METALS	APP	1000

REMARKS:
Stick- 2.31
GPS- 26°52'7" 80°16'50"W

MATERIAL CODES: **AG** = Amber Glass; **CG** = Clear Glass; **HDPE** = High Density Polyethylene; **LDPE** = Low Density Polyethylene, **PP** = Polypropylene; **S** = Silicone, **T** = Teflon; **O** = Other (Specify)

SAMPLING EQUIPMENT CODES: **APP** = After (Through) Peristaltic Pump; **B** = Bailer; **BP** = Bladder Pump; **ESP** = Electric Submersible Pump; **RFPP** = Reverse Flow Peristaltic Pump; **SM** = Straw Method (Tubing Gravity Drain); **O** = Other (Specify)

NOTES: 1. The above do not constitute all of the information required by Chapter 62-160, F.A.C.

2. STABILIZATION CRITERIA FOR RANGE OF VARIATION OF LAST THREE CONSECUTIVE READINGS (SEE FS 2212, SECTION 3)

pH: ± 0.2 units **Temperature:** ± 0.2 °C **Specific Conductance:** ± 5% **Dissolved Oxygen:** all readings ≤ 20% saturation (see Table FS 2200-2); optionally, ± 0.2 mg/L or ± 10% (whichever is greater) **Turbidity:** all readings ≤ 20 NTU; optionally ± 5 NTU or ± 10% (whichever is greater)

DEP Form FD 9000-24: GROUNDWATER SAMPLING LOG

SITE NAME: Arcadis US, INC	SITE LOCATION: Former MECCA Farms/Scripps Site, Palm Beach	
WELL NO: MFEB-6 GW-3	SAMPLE ID: MFEB-6 GW-3	DATE: 11-3-15

PURGING DATA

WELL DIAMETER (inches): 2	TUBING DIAMETER (inches): 1/2	WELL SCREEN INTERVAL DEPTH: 8.49 feet to 18.49 feet	STATIC DEPTH TO WATER (feet): 3.44	PURGE PUMP TYPE OR BAILER: Penstaltic Pump

WELL VOLUME PURGE: 1 WELL VOLUME = (TOTAL WELL DEPTH – STATIC DEPTH TO WATER) X WELL CAPACITY
(only fill out if applicable)
= (18.49 feet – 3.44 feet) X 0.16 gallons/foot = 2.01 gallons

EQUIPMENT VOLUME PURGE: 1 EQUIPMENT VOL. = PUMP VOLUME + (TUBING CAPACITY X TUBING LENGTH) + FLOW CELL VOLUME
(only fill out if applicable)
= gallons + (gallons/foot X feet) + gallons = gallons

INITIAL PUMP OR TUBING DEPTH IN WELL (feet): 4.5	FINAL PUMP OR TUBING DEPTH IN WELL (feet): 4.5	PURGING INITIATED AT: 15:00	PURGING ENDED AT: 15:24	TOTAL VOLUME PURGED (gallons): 6.0

TIME	VOLUME PURGED (gallons)	CUMUL. VOLUME PURGED (gallons)	PURGE RATE (gpm)	DEPTH TO WATER (feet)	pH (standard units)	TEMP. (°C)	COND. (circle units µmhos/cm or µS/cm)	DISSOLVED OXYGEN (circle units mg/L or % saturation)	TURBIDITY (NTUs)	COLOR (describe)	ODOR (describe)
15:16	4.0	4.0	0.25	3.46	7.13	26.11	536	0.58	0.60	Clear	None
15:18	0.5	4.5	0.25	3.46	7.11	26.10	536	0.56	0.63	Clear	None
15:20	0.5	5.0	[illegible]	[illegible]16	7.13	26.11	537	0.55	0.65	Clear	None
15:22	0.5	5.5	[illegible]	[illegible]06	7.12	26.11	537	0.55	0.64	Clear	None
15:24	0.5	6.0	0.25	3.46	7.11	26.12	536	0.54	0.63	Clear	None

WELL CAPACITY (Gallons Per Foot): **0.75"** = 0.02; **1"** = 0.047; **1.25"** = 0.06; **2"** = 0.16; **3"** = 0.37; **4"** = 0.65; **5"** = 1.02; **6"** = 1.47; **12"** = 5.88
TUBING INSIDE DIA. CAPACITY (Gal./Ft.): **1/8"** = 0.0006; **3/16"** = 0.0014; **1/4"** = 0.0026; [illegible]06; **1/2"** = 0.010; **5/8"** = 0.016

PURGING EQUIPMENT CODES: **B** = Bailer; **BP** = Bladder Pump; **ESP** = Electric Submersible Pump; **PP** = Penstaltic Pump; **O** = Other (Specify)

SAMPLING DATA

SAMPLED BY (PRINT) / AFFILIATION: Richard Illsley, Environmental Specialist, NEF	SAMPLER(S) SIGNATURE(S):	SAMPLING INITIATED AT: 15:24	SAMPLING ENDED AT: 15:26
PUMP OR TUBING DEPTH IN WELL (feet): 4.5	TUBING MATERIAL CODE: PE	FIELD-FILTERED: Y (N) Filtration Equipment Type:	FILTER SIZE: ____ µm
FIELD DECONTAMINATION: PUMP (Y) N TUBING Y N (replaced)		DUPLICATE: Y (N)	

SAMPLE CONTAINER SPECIFICATION				SAMPLE PRESERVATION (including wet ice)			INTENDED ANALYSIS AND/OR METHOD	SAMPLING EQUIPMENT CODE	SAMPLE PUMP FLOW RATE (mL per minute)
SAMPLE ID CODE	# CONTAINERS	MATERIAL CODE	VOLUME	PRESERVATIVE USED	TOTAL VOL ADDED IN FIELD (mL)	FINAL pH			
MFEB-6 GW-3	1	PE	125mL	HNO3	0	-	METALS	APP	1000
MFEB-6 GW-3	1	PE	125mL	NONE	0	-	NON METALS	APP	1000

REMARKS:
Stick- 2.41
GPS- 26°52'7" 80°16'50"W

MATERIAL CODES: **AG** = Amber Glass; **CG** = Clear Glass; **HDPE** = High Density Polyethylene; **LDPE** = Low Density Polyethylene; **PP** = Polypropylene; **S** = Silicone; **T** = Teflon; **O** = Other (Specify)

SAMPLING EQUIPMENT CODES: **APP** = After (Through) Peristaltic Pump; **B** = Bailer; **BP** = Bladder Pump; **ESP** = Electric Submersible Pump; **RFPP** = Reverse Flow Peristaltic Pump; **SM** = Straw Method (Tubing Gravity Drain); **O** = Other (Specify)

NOTES: 1. The above do not constitute all of the information required by Chapter 62-160, F.A.C.

2. STABILIZATION CRITERIA FOR RANGE OF VARIATION OF LAST THREE CONSECUTIVE READINGS (SEE FS 2212, SECTION 3)

pH: ± 0.2 units **Temperature:** ± 0.2 °C **Specific Conductance:** ± 5% **Dissolved Oxygen:** all readings ≤ 20% saturation (see Table FS 2200-2); optionally, ± 0.2 mg/L or ± 10% (whichever is greater) **Turbidity:** all readings ≤ 20 NTU; optionally ± 5 NTU or ± 10% (whichever is greater)

Pace Analytical Services, Inc.
3610 Park Central Blvd N
Pompano Beach, FL 33064
954-582-4300

November 12, 2015

Jan Beernink
Nutting Environmental of Florida, Inc.
1310 Neptune Drive
Boynton Beach, FL 33426

RE: Project: Arcadis US Inc
Pace Project No.: 35215833

Dear Jan Beernink:
Enclosed are the analytical results for sample(s) received by the laboratory on November 05, 2015. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Christina Raschke
christina.raschke@pacelabs.com
Project Manager

Enclosures

cc: Kristen Campos, Nutting Environmental of Flori

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CERTIFICATIONS

Project: Arcadis US Inc
Pace Project No.: 35215833

Ormond Beach Certification IDs
8 East Tower Circle, Ormond Beach, FL 32174
Alabama Certification #: 41320
Connecticut Certification #: PH-0216
Delaware Certification: FL NELAC Reciprocity
Florida Certification #: E83079
Georgia Certification #: 955
Guam Certification: FL NELAC Reciprocity
Hawaii Certification: FL NELAC Reciprocity
Illinois Certification #: 200068
Indiana Certification: FL NELAC Reciprocity
Kansas Certification #: E-10383
Kentucky Certification #: 90050
Louisiana Certification #: FL NELAC Reciprocity
Louisiana Environmental Certificate #: 05007
Maryland Certification: #346
Michigan Certification #: 9911
Mississippi Certification: FL NELAC Reciprocity
Missouri Certification #: 236
Montana Certification #: Cert 0074
Nebraska Certification: NE-OS-28-14
Nevada Certification: FL NELAC Reciprocity
New Hampshire Certification #: 2958
New York Certification #: 11608
North Carolina Environmental Certificate #: 667
North Carolina Certification #: 12710
North Dakota Certification #: R-216
Oklahoma Certification #: D9947
Pennsylvania Certification #: 68-00547
Puerto Rico Certification #: FL01264
South Carolina Certification: #96042001
Tennessee Certification #: TN02974
Texas Certification: FL NELAC Reciprocity
US Virgin Islands Certification: FL NELAC Reciprocity
Virginia Environmental Certification #: 460165
West Virginia Certification #: 9962C
Wisconsin Certification #: 399079670
Wyoming (EPA Region 8): FL NELAC Reciprocity

REPORT OF LABORATORY ANALYSIS

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SAMPLE SUMMARY

Project: Arcadis US Inc
Pace Project No.: 35215833

Lab ID	Sample ID	Matrix	Date Collected	Date Received
35215260004	**MFEB-6 GW-1**	Water	11/04/15 13:03	11/05/15 16:30
35215260005	**MFEB-6 GW-2**	Water	11/04/15 14:52	11/05/15 16:30
35215260006	**MFEB-6 GW-3**	Water	11/04/15 15:24	11/05/15 16:30

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SAMPLE ANALYTE COUNT

Project: Arcadis US Inc
Pace Project No.: 35215833

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
35215260004	**MFEB-6 GW-1**	EPA 6010	TAP	5	PASI-O
		SM 2320B	KAM	3	PASI-O
		EPA 300.0	CMB	2	PASI-O
35215260005	**MFEB-6 GW-2**	EPA 6010	TAP	5	PASI-O
		SM 2320B	KAM	3	PASI-O
		EPA 300.0	CMB	2	PASI-O
35215260006	**MFEB-6 GW-3**	EPA 6010	TAP	5	PASI-O
		SM 2320B	KAM	3	PASI-O
		EPA 300.0	CMB	2	PASI-O

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SUMMARY OF DETECTION

Project: Arcadis US Inc
Pace Project No.: 35215833

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
35215260004	**MFEB-6 GW-1**					
EPA 6010	Iron	544	ug/L	40.0	11/11/15 14:30	
EPA 6010	Magnesium	16800	ug/L	500	11/11/15 14:30	
EPA 6010	Potassium	5250	ug/L	1000	11/11/15 14:30	
EPA 6010	Sodium	103000	ug/L	1000	11/11/15 14:30	
SM 2320B	Alkalinity,Bicarbonate (CaCO3)	373	mg/L	5.0	11/09/15 14:28	
SM 2320B	Alkalinity, Total as CaCO3	373	mg/L	5.0	11/09/15 14:28	
EPA 300.0	Chloride	161	mg/L	10.0	11/06/15 20:04	
EPA 300.0	Sulfate	4.1 I	mg/L	5.0	11/08/15 22:10	
35215260005	**MFEB-6 GW-2**					
EPA 6010	Iron	674	ug/L	40.0	11/11/15 15:03	
EPA 6010	Magnesium	4720	ug/L	500	11/11/15 15:03	
EPA 6010	Potassium	988 I	ug/L	1000	11/11/15 15:03	
EPA 6010	Sodium	51300	ug/L	1000	11/11/15 15:03	
SM 2320B	Alkalinity,Bicarbonate (CaCO3)	281	mg/L	5.0	11/09/15 14:35	
SM 2320B	Alkalinity, Total as CaCO3	281	mg/L	5.0	11/09/15 14:35	
EPA 300.0	Chloride	47.5	mg/L	5.0	11/06/15 20:23	
EPA 300.0	Sulfate	16.4	mg/L	5.0	11/06/15 20:23	
35215260006	**MFEB-6 GW-3**					
EPA 6010	Iron	251	ug/L	40.0	11/11/15 14:38	
EPA 6010	Magnesium	2640	ug/L	500	11/11/15 14:38	
EPA 6010	Potassium	1120	ug/L	1000	11/11/15 14:38	
EPA 6010	Sodium	25400	ug/L	1000	11/11/15 14:38	
SM 2320B	Alkalinity,Bicarbonate (CaCO3)	220	mg/L	5.0	11/09/15 14:41	
SM 2320B	Alkalinity, Total as CaCO3	220	mg/L	5.0	11/09/15 14:41	
EPA 300.0	Chloride	25.2	mg/L	5.0	11/06/15 20:43	
EPA 300.0	Sulfate	10.7	mg/L	5.0	11/06/15 20:43	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: Arcadis US Inc
Pace Project No.: 35215833

Sample: MFEB-6 GW-1 **Lab ID: 35215260004** Collected: 11/04/15 13:03 Received: 11/05/15 16:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Cadmium	**0.50 U**	ug/L	1.0	0.50	1	11/10/15 06:19	11/11/15 14:30	7440-43-9	
Iron	**544**	ug/L	40.0	20.0	1	11/10/15 06:19	11/11/15 14:30	7439-89-6	
Magnesium	**16800**	ug/L	500	250	1	11/10/15 06:19	11/11/15 14:30	7439-95-4	
Potassium	**5250**	ug/L	1000	500	1	11/10/15 06:19	11/11/15 14:30	7440-09-7	
Sodium	**103000**	ug/L	1000	500	1	11/10/15 06:19	11/11/15 14:30	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity,Bicarbonate (CaCO3)	**373**	mg/L	5.0	5.0	1		11/09/15 14:28		
Alkalinity, Carbonate (CaCO3)	**5.0 U**	mg/L	5.0	5.0	1		11/09/15 14:28		
Alkalinity, Total as CaCO3	**373**	mg/L	5.0	5.0	1		11/09/15 14:28		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**161**	mg/L	10.0	5.0	2		11/06/15 20:04	16887-00-6	
Sulfate	**4.1 I**	mg/L	5.0	2.5	1		11/08/15 22:10	14808-79-8	

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ANALYTICAL RESULTS

Project: Arcadis US Inc
Pace Project No.: 35215833

Sample: MFEB-6 GW-2 **Lab ID: 35215260005** Collected: 11/04/15 14:52 Received: 11/05/15 16:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Cadmium	**0.50 U**	ug/L	1.0	0.50	1	11/10/15 06:19	11/11/15 15:03	7440-43-9	
Iron	**674**	ug/L	40.0	20.0	1	11/10/15 06:19	11/11/15 15:03	7439-89-6	
Magnesium	**4720**	ug/L	500	250	1	11/10/15 06:19	11/11/15 15:03	7439-95-4	
Potassium	**988 I**	ug/L	1000	500	1	11/10/15 06:19	11/11/15 15:03	7440-09-7	
Sodium	**51300**	ug/L	1000	500	1	11/10/15 06:19	11/11/15 15:03	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity,Bicarbonate (CaCO3)	**281**	mg/L	5.0	5.0	1		11/09/15 14:35		
Alkalinity, Carbonate (CaCO3)	**5.0 U**	mg/L	5.0	5.0	1		11/09/15 14:35		
Alkalinity, Total as CaCO3	**281**	mg/L	5.0	5.0	1		11/09/15 14:35		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**47.5**	mg/L	5.0	2.5	1		11/06/15 20:23	16887-00-6	
Sulfate	**16.4**	mg/L	5.0	2.5	1		11/06/15 20:23	14808-79-8	

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ANALYTICAL RESULTS

Project: Arcadis US Inc
Pace Project No.: 35215833

Sample: MFEB-6 GW-3 **Lab ID: 35215260006** Collected: 11/04/15 15:24 Received: 11/05/15 16:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Cadmium	**0.50 U**	ug/L	1.0	0.50	1	11/10/15 06:19	11/11/15 14:38	7440-43-9	
Iron	**251**	ug/L	40.0	20.0	1	11/10/15 06:19	11/11/15 14:38	7439-89-6	
Magnesium	**2640**	ug/L	500	250	1	11/10/15 06:19	11/11/15 14:38	7439-95-4	
Potassium	**1120**	ug/L	1000	500	1	11/10/15 06:19	11/11/15 14:38	7440-09-7	
Sodium	**25400**	ug/L	1000	500	1	11/10/15 06:19	11/11/15 14:38	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity,Bicarbonate (CaCO3)	**220**	mg/L	5.0	5.0	1		11/09/15 14:41		
Alkalinity, Carbonate (CaCO3)	**5.0 U**	mg/L	5.0	5.0	1		11/09/15 14:41		
Alkalinity, Total as CaCO3	**220**	mg/L	5.0	5.0	1		11/09/15 14:41		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**25.2**	mg/L	5.0	2.5	1		11/06/15 20:43	16887-00-6	
Sulfate	**10.7**	mg/L	5.0	2.5	1		11/06/15 20:43	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: Arcadis US Inc
Pace Project No.: 35215833

QC Batch: MPRP/27299 Analysis Method: EPA 6010
QC Batch Method: EPA 3010 Analysis Description: 6010 MET
Associated Lab Samples: 35215260004, 35215260005, 35215260006

METHOD BLANK: 1387437 Matrix: Water
Associated Lab Samples: 35215260004, 35215260005, 35215260006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Cadmium	ug/L	0.50 U	1.0	0.50	11/11/15 13:03	
Iron	ug/L	20.0 U	40.0	20.0	11/11/15 13:03	
Magnesium	ug/L	250 U	500	250	11/11/15 13:03	
Potassium	ug/L	500 U	1000	500	11/11/15 13:03	
Sodium	ug/L	500 U	1000	500	11/11/15 13:03	

LABORATORY CONTROL SAMPLE: 1387438

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Cadmium	ug/L	25	26.8	107	80-120	
Iron	ug/L	2500	2670	107	80-120	
Magnesium	ug/L	12500	12900	103	80-120	
Potassium	ug/L	12500	13100	105	80-120	
Sodium	ug/L	12500	12800	103	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1387439 1387440

Parameter	Units	35214835001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Cadmium	ug/L	0.50 U	25	25	26.0	25.9	104	104	75-125	0	20	
Iron	ug/L	654	2500	2500	3340	3320	107	107	75-125	1	20	
Magnesium	ug/L	4740	12500	12500	17500	17400	102	101	75-125	1	20	
Potassium	ug/L	2990	12500	12500	16300	16200	106	105	75-125	1	20	
Sodium	ug/L	23700	12500	12500	37200	36700	108	104	75-125	1	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: Arcadis US Inc
Pace Project No.: 35215833

QC Batch: WET/34045 Analysis Method: SM 2320B
QC Batch Method: SM 2320B Analysis Description: 2320B Alkalinity
Associated Lab Samples: 35215260004, 35215260005, 35215260006

METHOD BLANK: 1386777 Matrix: Water
Associated Lab Samples: 35215260004, 35215260005, 35215260006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Carbonate (CaCO3)	mg/L	5.0 U	5.0	5.0	11/09/15 13:29	
Alkalinity, Total as CaCO3	mg/L	5.0 U	5.0	5.0	11/09/15 13:29	
Alkalinity,Bicarbonate (CaCO3)	mg/L	5.0 U	5.0	5.0	11/09/15 13:29	

LABORATORY CONTROL SAMPLE: 1386778

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	250	243	97	90-110	

SAMPLE DUPLICATE: 1386779

Parameter	Units	35215232001 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Carbonate (CaCO3)	mg/L	<5.0	5.0 U		20	
Alkalinity, Total as CaCO3	mg/L	294	298	1	20	
Alkalinity,Bicarbonate (CaCO3)	mg/L	294	298	1	20	

SAMPLE DUPLICATE: 1386780

Parameter	Units	35215594001 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Carbonate (CaCO3)	mg/L	<5.0	5.0 U		20	
Alkalinity, Total as CaCO3	mg/L	47.5	48.1	1	20	
Alkalinity,Bicarbonate (CaCO3)	mg/L	47.5	48.1	1	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

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Pace Analytical Services, Inc.
3610 Park Central Blvd N
Pompano Beach, FL 33064
954-582-4300

QUALITY CONTROL DATA

Project: Arcadis US Inc
Pace Project No.: 35215833

QC Batch: WETA/51898 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 35215260004, 35215260005, 35215260006

METHOD BLANK: 1385040 Matrix: Water
Associated Lab Samples: 35215260004, 35215260005, 35215260006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	2.5 U	5.0	2.5	11/06/15 12:57	
Sulfate	mg/L	2.5 U	5.0	2.5	11/06/15 12:57	

LABORATORY CONTROL SAMPLE: 1385041

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	50	49.9	100	90-110	
Sulfate	mg/L	50	48.9	98	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1385042 1385043

Parameter	Units	35215232001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	64.7	50	50	114	114	98	98	90-110	0	20	
Sulfate	mg/L	<2.5	50	50	48.7	48.8	94	94	90-110	0	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1385044 1385045

Parameter	Units	35215249003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	166	50	50	216	216	99	100	90-110	0	20	L
Sulfate	mg/L	48.2	50	50	98.8	99.3	101	102	90-110	0	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

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3610 Park Central Blvd N
Pompano Beach, FL 33064
954-582-4300

QUALIFIERS

Project: Arcadis US Inc
Pace Project No.: 35215833

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-O	Pace Analytical Services - Ormond Beach

ANALYTE QUALIFIERS

I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
U	Compound was analyzed for but not detected.
L	Off-scale high. Actual value is known to be greater than value given.

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Pace Analytical Services, Inc.
3610 Park Central Blvd N
Pompano Beach, FL 33064
954-582-4300

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Arcadis US Inc
Pace Project No.: 35215833

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
35215260004	**MFEB-6 GW-1**	EPA 3010	MPRP/27299	EPA 6010	ICP/16433
35215260005	**MFEB-6 GW-2**	EPA 3010	MPRP/27299	EPA 6010	ICP/16433
35215260006	**MFEB-6 GW-3**	EPA 3010	MPRP/27299	EPA 6010	ICP/16433
35215260004	**MFEB-6 GW-1**	SM 2320B	WET/34045		
35215260005	**MFEB-6 GW-2**	SM 2320B	WET/34045		
35215260006	**MFEB-6 GW-3**	SM 2320B	WET/34045		
35215260004	**MFEB-6 GW-1**	EPA 300.0	WETA/51898		
35215260005	**MFEB-6 GW-2**	EPA 300.0	WETA/51898		
35215260006	**MFEB-6 GW-3**	EPA 300.0	WETA/51898		

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Pace Analytical
www.pacelabs.com

WO# : 35215260

35215260

RECORD

Date:_____ Page 1 of ___

Company Name: Nutting Eng PO#

Address: 1310 Northmeadow Dr

City: Boynton Beach State: FL Zip: 33426

Attn: Jon Bedrnicek Fax#

email: Phone:

Project Name: Arcadis US Inc Proj #

Sampler Signature: Circle One Event: Daily Weekly Monthly Quarterly Semi-Annual Annual N/A

LAB ANALYSIS

Parameters	Bicarbonate	Carbonate	Sulfate	Calcium	Magnesium	Sodium	Potassium	Iron	Chloride	EXAMPLE Diss. Lead 6010
# of Containers Size/Type										1 16ozP

Sample #	Sample ID	Collect Date	Collect Time	Matrix Code*	Field Filtered	Integrity OK(Y/N)	Total # of containers	REMARKS
1	MFEB-7 GW-1	11/4	11:33	GW			2	
2	MFEB-7 GW-2	11/4	10:08	GW			2	
3	MFEB-7 GW-3	11/4	10:45	GW			2	
4	MFEB-6 GW-1	11/3	13:03	GW			2	
5	MFEB-6 GW-2	11/3	14:52	GW			2	
6	MFEB-6 GW-3	11/3	15:24	GW			2	
7	MFEB-2 GW-1	11/4	15:29	GW			2	
8	MFEB-2 GW-2	11/4	14:09	GW			2	
9	MFEB-2 GW-3	11/4	14:40	GW			2	
10								2L-29-20

Clean T.A.T. REQUEST (Rush Fees Apply)
Standard: Y N
Rush: Today 1D 2D 3D 4D 5D ___

Short Hold: Y___ N___

Circle QA/QC Report Level: 1 2 3 4 CLP AFCEE QAPP Other___

EDD (Fees May Apply): ADaPT SEDD ERPIMS TSV CSV Other___

COC Condition: OK Incomplete

Required State Certification: FL GA SC NC NJ PA LA TX IL ___

Coolers #'s - Temp °C: 1___ 2___ 3___ 4___ 5___

Item	Relinquished by	Affiliation	Date	Time	Received by	Affiliation	Date	Time
1	RJ Ulc		11/5/15	1200			11-5-15	1200
2			11/5/15	1630			11/6/15	1630
3								
4								

Lab Use Only	Yes	NO	N/A
Non-Conformances Found?			
Samples INTACT upon arrival?			
Received on Wet Ice?			
Proper Preservatives Indicated?			
Received within holding time?			
Custody seals Intact?			
Volatiles rec'd without headspace?			
Proper Containers Used?			

Container Type Codes

AV	Amber Vial	ES	Encore Sampler
CV	Clear Vial	PPV	Prepreserved vial
P	Plastic	PLC	Plastic container
AL	Amber Liter	PLJ	Plastic Jar
CL	Clear Liter	Z	Ziploc bag
AP	Amber Plastic	TB	Tedlar bag
AG	Amber Glass	WP	Whirl pak
SJ	Soil Jar	G	Gallon Jug
Other		TC	Terra-core

PPV Preprserved vial
Size(s): 2oz, 4oz, 8oz, 16oz, 32oz or 1L, other___
40ml 500ml 250ml 125 ml
Example: 4ozP = 4oz Plastic, 5ozSJ= 8oz Soil Jar

Matrix Codes

SD	Solid Waste	OL	Oil
GW	Ground Water	SL	Sludge
EFF	Effluent	SD	Soil Sediment
AFW	Analyte Free H20	AQ	Aqueous
WW	Waste Water	NA	Nonaqueous
DW	Drinking Water	PE	Petroleum
SW	Surface Water	O	Other___ (Please specify)
ML	Misc. Liquid		

Preservative Type Codes

A. None	E. HCL	I. Ice
B. HNO3	F. MeOH	J. MCAA
C. H2SO4	G. Na2S2O3	K. Zn Acetate
D. NaOH	H. NaHSO4	O. Other

C.O.C. Serial # 101213

Pace Analytical	Document Name Sample Condition Upon Receipt Form	Document Revised October 9, 2013
	Document No F-FL-C-007 rev. 05	Issuing Authorities Pace Florida Quality Office

Sample Condition Upon Receipt Form (SCUR)

WO# : 35215260

PM: CTR Due Date: 11/11/15
CLIENT: 36-NUTTEN

Client Name: Nutting P

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☑ Pace

Tracking # _____

Custody Seal on Cooler/Box Present: ☐ yes ☑ no Seals intact ☐ yes ☑ no

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☑ None ☐ Other _____

Thermometer Used T-104

Type of Ice: ☑ Wet ☐ Blue ☐ None

Cooler Temperature °C 2.2 (Visual) 0.3 (Correction Factor) 2.5 (Actual)

Date and Initials of person examining contents: _____

(Temp should be above freezing in 6°C) If below 0°C, was sample frozen? ☐ Yes ☑ No

Receipt of samples satisfactory: ☑ Yes ☐ No

Rush TAT requested on COC:

If yes, then all conditions below were met:	If no, then mark box & describe issue (use comments area if necessary)
Chain of Custody Present	☐
Chain of Custody Filled Out	☐
Relinquished Signature & Sampler Name COC	☐
Samples Arrived within Hold Time	☐
Sufficient Volume	☐
Correct Containers Used	☐
Containers Intact	☐
Sample Labels match COC (sample IDs & date/time of collection)	☐ No Labels ☐ No Time/Date on Labels ☐
All containers needing preservation are found to be in compliance with EPA recommendation	☐
No Headspace in VOA Vials (>6mm)	☐

Client Notification/ Resolution:

Person Contacted _____ Date/Time _____

Comments/ Resolution (use back for additional comments) _____

Project Manager Review: _____ Date: _____

Finished Product Information Only

F.P. Sample ID: _____

Production Code: _____

Date/Time Opened: _____

Number of Unopened Bottles Remaining: _____

Extra Sample in Shed: Yes No

Size & Qty of Bottles Received

_____ x 5 Gal
_____ x 2.5 Gal
_____ x 1 Gal
_____ x 1 Liter
_____ x 500 mL
_____ x 250 mL
_____ x Other: _____

DEP Form FD 9000-24: GROUNDWATER SAMPLING LOG

SITE NAME: Arcadis US, INC	SITE LOCATION: Former MECCA Farms/Scripps Site, Palm Beach	
WELL NO: MFEB-7 GW-1	SAMPLE ID: MFEB-7 GW-1	DATE: 11-4-15

PURGING DATA

WELL DIAMETER (inches): 2	TUBING DIAMETER (inches): 1/2	WELL SCREEN INTERVAL DEPTH: 92.4 feet to 102.42 feet	STATIC DEPTH TO WATER (feet): 5.50	PURGE PUMP TYPE OR BAILER: Peristaltic Pump

WELL VOLUME PURGE: 1 WELL VOLUME = (TOTAL WELL DEPTH – STATIC DEPTH TO WATER) X WELL CAPACITY
(only fill out if applicable)
= (102.42 feet – 5.50 feet) X 0.16 gallons/foot = 15.01 gallons

EQUIPMENT VOLUME PURGE: 1 EQUIPMENT VOL. = PUMP VOLUME + (TUBING CAPACITY X TUBING LENGTH) + FLOW CELL VOLUME
(only fill out if applicable)
= gallons + (gallons/foot X feet) + gallons = gallons

INITIAL PUMP OR TUBING DEPTH IN WELL (feet): 6.5	FINAL PUMP OR TUBING DEPTH IN WELL (feet): 6.5	PURGING INITIATED AT: 8:20	PURGING ENDED AT: 11:32	TOTAL VOLUME PURGED (gallons): 48.0

TIME	VOLUME PURGED (gallons)	CUMUL. VOLUME PURGED (gallons)	PURGE RATE (gpm)	DEPTH TO WATER (feet)	pH (standard units)	TEMP. (°C)	COND (circle units) µmhos/cm or (µS/cm)	DISSOLVED OXYGEN (circle units) (mg/L) or % saturation	TURBIDITY (NTUs)	COLOR (describe)	ODOR (describe)
11:24	46.0	46.0	0.25	5.59	7.01	24.93	1148	0.73	0.15	Clear	None
11:26	0.5	46.5	0.25	5.59	7.01	24.95	1149	0.67	0.17	Clear	None
11:28	0.5	47.0	0.25	5.59	7.03	24.96	1148	0.65	0.18	Clear	None
11:30	0.5	47.5	0.25	5.59	7.04	24.91	1149	0.63	0.16	Clear	None
11:32	0.5	48.0	0.25	5.59	7.03	24.90	1149	0.61	0.15	Clear	None

WELL CAPACITY (Gallons Per Foot): **0.75"** = 0.02; **1"** = 0.047; **1.25"** = 0.06; **2"** = 0.16; **3"** = 0.37; **4"** = 0.65; **5"** = 1.02; **6"** = 1.47; **12"** = 5.88
TUBING INNER DIA. CAPACITY (Gal./Ft.): **1/8"** = 0.0006; **3/16"** = 0.0014; **1/4"** = 0.0026; **5/16"** = 0.004; **3/8"** = 0.006; **1/2"** = 0.010; **5/8"** = 0.016
PURGING EQUIPMENT CODES: **B** = Bailer; **BP** = Bladder Pump; **ESP** = Electric Submersible Pump; **PP** = Peristaltic Pump; **O** = Other (Specify)

SAMPLING DATA

SAMPLED BY (PRINT) / AFFILIATION: Richard Illsley, Environmental Specialist, NEF	SAMPLER(S) SIGNATURE(S):	SAMPLING INITIATED AT: 11:33	SAMPLING ENDED AT: 11:25
PUMP OR TUBING DEPTH IN WELL (feet): 6.5	TUBING MATERIAL CODE: PE	FIELD-FILTERED: Y (N) Filtration Equipment Type:	FILTER SIZE: ____ µm
FIELD DECONTAMINATION: PUMP (Y) N TUBING Y N (replaced)		DUPLICATE: Y (N)	

SAMPLE CONTAINER SPECIFICATION				SAMPLE PRESERVATION (including wet ice)			INTENDED ANALYSIS AND/OR METHOD	SAMPLING EQUIPMENT CODE	SAMPLE PUMP FLOW RATE (mL per minute)
SAMPLE ID CODE	# CONTAINERS	MATERIAL CODE	VOLUME	PRESERVATIVE USED	TOTAL VOL ADDED IN FIELD (mL)	FINAL pH			
MFEB-7 GW-1	1	PE	125mL	HNO3	0	-	METALS	APP	1000
MFEB-7 GW-1	1	PE	125mL	NONE	0	-	NON METALS	APP	1000

REMARKS:
Stick- 2.21
GPS- 26°50'29" 80°14'37"W

MATERIAL CODES: **AG** = Amber Glass; **CG** = Clear Glass; **HDPE** = High Density Polyethylene; **LDPE** = Low Density Polyethylene; **PP** = Polypropylene; **S** = Silicone; **T** = Teflon; **O** = Other (Specify)

SAMPLING EQUIPMENT CODES: **APP** = After (Through) Peristaltic Pump; **B** = Bailer; **BP** = Bladder Pump; **ESP** = Electric Submersible Pump; **RFPP** = Reverse Flow Peristaltic Pump; **SM** = Straw Method (Tubing Gravity Drain); **O** = Other (Specify)

NOTES: 1. **The above do not constitute all of the information required by Chapter 62-160, F.A.C.**

2. STABILIZATION CRITERIA FOR RANGE OF VARIATION OF LAST THREE CONSECUTIVE READINGS (SEE FS 2212, SECTION 3)

pH: ± 0.2 units **Temperature:** ± 0.2 °C **Specific Conductance:** ± 5% **Dissolved Oxygen:** all readings ≤ 20% saturation (see Table FS 2200-2); optionally, ± 0.2 mg/L or ± 10% (whichever is greater) **Turbidity:** all readings ≤ 20 NTU; optionally ± 5 NTU or ± 10% (whichever is greater)

DEP Form FD 9000-24: GROUNDWATER SAMPLING LOG

SITE NAME: Arcadis US, INC		SITE LOCATION: Former MECCA Farms/Scripps Site, Palm Beach
WELL NO: MFEB-7 GW-2	SAMPLE ID: MFEB-7 GW-2	DATE: 11-4-15

PURGING DATA

WELL DIAMETER (inches): 2	TUBING DIAMETER (inches): 1/2	WELL SCREEN INTERVAL DEPTH: 38.39 feet to 48.39 feet	STATIC DEPTH TO WATER (feet): 5.51	PURGE PUMP TYPE OR BAILER: Peristaltic Pump

WELL VOLUME PURGE: 1 WELL VOLUME = (TOTAL WELL DEPTH − STATIC DEPTH TO WATER) X WELL CAPACITY
(only fill out if applicable)
= (48.39 feet − 5.51 feet) X 0.16 gallons/foot = 6.51 gallons

EQUIPMENT VOLUME PURGE: 1 EQUIPMENT VOL. = PUMP VOLUME + (TUBING CAPACITY X TUBING LENGTH) + FLOW CELL VOLUME
(only fill out if applicable)
= gallons + (gallons/foot X feet) + gallons = gallons

INITIAL PUMP OR TUBING DEPTH IN WELL (feet): 6.5	FINAL PUMP OR TUBING DEPTH IN WELL (feet): 6.5	PURGING INITIATED AT: 8:25	PURGING ENDED AT: 10:07	TOTAL VOLUME PURGED (gallons): 20.0

TIME	VOLUME PURGED (gallons)	CUMUL. VOLUME PURGED (gallons)	PURGE RATE (gpm)	DEPTH TO WATER (feet)	pH (standard units)	TEMP. (°C)	COND. (circle units) µmhos/cm or µS/cm	DISSOLVED OXYGEN (circle units) mg/L or % saturation	TURBIDITY (NTUs)	COLOR (describe)	ODOR (describe)
9:59	18.0	18.0	0.25	5.59	6.82	24.88	551	0.40	0.43	Clear	None
10:01	0.5	18.5	0.25	5.59	6.82	24.90	551	0.39	0.37	Clear	None
10:03	0.5	19.0	0.25	5.59	6.83	24.86	551	0.37	0.38	Clear	None
10:05	0.5	19.5	0.25	5.59	6.79	24.93	551	0.36	0.42	Clear	None
10:07	0.5	20.0	0.25	5.59	6.80	24.90	551	0.36	0.40	Clear	None

WELL CAPACITY (Gallons Per Foot): **0.75"** = 0.02; **1"** = 0.047.; **1.25"** = 0.06; **2"** = 0.16; **3"** = 0.37; **4"** = 0.65; **5"** = 1.02; **6"** = 1.47; **12"** = 5.88
TUBING INSIDE DIA. CAPACITY (Gal./Ft.): **1/8"** = 0.0006; **3/16"** = 0.0014; **1/4"** = 0.0026; **5/16"** = 0.004; **3/8"** = 0.006; **1/2"** = 0.010; **5/8"** = 0.016

PURGING EQUIPMENT CODES: **B** = Bailer; **BP** = Bladder Pump; **ESP** = Electric Submersible Pump; **PP** = Peristaltic Pump; **O** = Other (Specify)

SAMPLING DATA

SAMPLED BY (PRINT) / AFFILIATION: Richard Illsley, Environmental Specialist, NEF	SAMPLER(S) SIGNATURE(S):	SAMPLING INITIATED AT: 10:08	SAMPLING ENDED AT: 10:10
PUMP OR TUBING DEPTH IN WELL (feet): 6.5	TUBING MATERIAL CODE: PE	FIELD-FILTERED: Y (N) Filtration Equipment Type:	FILTER SIZE: ____ µm
FIELD DECONTAMINATION: PUMP (Y) N TUBING Y N (replaced)		DUPLICATE: Y (N)	

SAMPLE CONTAINER SPECIFICATION				SAMPLE PRESERVATION (including wet ice)			INTENDED ANALYSIS AND/OR METHOD	SAMPLING EQUIPMENT CODE	SAMPLE PUMP FLOW RATE (mL per minute)
SAMPLE ID CODE	# CONTAINERS	MATERIAL CODE	VOLUME	PRESERVATIVE USED	TOTAL VOL ADDED IN FIELD (mL)	FINAL pH			
MFEB-7 GW-2	1	PE	125mL	HNO3	0	-	METALS	APP	1000
MFEB-7 GW-2	1	PE	125mL	NONE	0	-	NON METALS	APP	1000

REMARKS:
Stick- 2.21
GPS- 26°50'29" 80°14'37"W

MATERIAL CODES: **AG** = Amber Glass; **CG** = Clear Glass; **HDPE** = High Density Polyethylene; **LDPE** = Low Density Polyethylene; **PP** = Polypropylene; **S** = Silicone; **T** = Teflon; **O** = Other (Specify)

SAMPLING EQUIPMENT CODES: **APP** = After (Through) Peristaltic Pump; **B** = Bailer; **BP** = Bladder Pump; **ESP** = Electric Submersible Pump; **RFPP** = Reverse Flow Peristaltic Pump; **SM** = Straw Method (Tubing Gravity Drain); **O** = Other (Specify)

NOTES: 1. **The above do not constitute all of the information required by Chapter 62-160, F.A.C.**

2. STABILIZATION CRITERIA FOR RANGE OF VARIATION OF LAST THREE CONSECUTIVE READINGS (SEE FS 2212, SECTION 3)

pH: ± 0.2 units **Temperature:** ± 0.2 °C **Specific Conductance:** ± 5% **Dissolved Oxygen:** all readings ≤ 20% saturation (see Table FS 2200-2); optionally, ± 0.2 mg/L or ± 10% (whichever is greater) **Turbidity:** all readings ≤ 20 NTU; optionally ± 5 NTU or ± 10% (whichever is greater)

DEP Form FD 9000-24: GROUNDWATER SAMPLING LOG

SITE NAME: Arcadis US, INC	SITE LOCATION: Former MECCA Farms/Scripps Site, Palm Beach	
WELL NO: MFEB-7 GW-3	SAMPLE ID: MFEB-7 GW-3	DATE: 11-4-15

PURGING DATA

WELL DIAMETER (inches): 2	TUBING DIAMETER (inches): 1/2	WELL SCREEN INTERVAL DEPTH: 8.09 feet to 18.09 feet	STATIC DEPTH TO WATER (feet): 5.85	PURGE PUMP TYPE OR BAILER: Peristaltic Pump

WELL VOLUME PURGE: 1 WELL VOLUME = (TOTAL WELL DEPTH − STATIC DEPTH TO WATER) X WELL CAPACITY
(only fill out if applicable)
= (18.09 feet − 5.85 feet) X 0.16 gallons/foot = 1.74 gallons

EQUIPMENT VOLUME PURGE: 1 EQUIPMENT VOL. = PUMP VOLUME + (TUBING CAPACITY X TUBING LENGTH) + FLOW CELL VOLUME
(only fill out if applicable)
= gallons + (gallons/foot X feet) + gallons = gallons

INITIAL PUMP OR TUBING DEPTH IN WELL (feet): 6.5	FINAL PUMP OR TUBING DEPTH IN WELL (feet): 6.5	PURGING INITIATED AT: 10:20	PURGING ENDED AT: 10:44	TOTAL VOLUME PURGED (gallons): 4.0

TIME	VOLUME PURGED (gallons)	CUMUL. VOLUME PURGED (gallons)	PURGE RATE (gpm)	DEPTH TO WATER (feet)	pH (standard units)	TEMP. (°C)	COND (circle units) µmhos/cm or µS/cm	DISSOLVED OXYGEN (circle units) (mg/L) or % saturation	TURBIDITY (NTUs)	COLOR (describe)	ODOR (describe)
10:36	4.0	4.0	0.25	5.91	6.83	26.79	617	0.63	0.76	Clear	None
10:38	0.5	4.5	0.25	5.91	6.81	26.81	618	0.60	0.76	Clear	None
10:40	0.5	5.0	0.25	5.91	6.83	26.80	619	0.59	0.77	Clear	None
10:42	0.5	5.5	0.25	5.91	6.81	26.80	620	0.58	0.76	Clear	None
10:44	0.5	6.0	0.25	5.91	6.82	26.80	621	0.59	0.75	Clear	None

WELL CAPACITY (Gallons Per Foot): **0.75"** = 0.02; **1"** = 0.047.; **1.25"** = 0.06; **2"** = 0.16; **3"** = 0.37; **4"** = 0.65; **5"** = 1.02; **6"** = 1.47; **12"** = 5.88
TUBING INSIDE DIA. CAPACITY (Gal./Ft.): **1/8"** = 0.0006; **3/16"** = 0.0014; **1/4"** = 0.0026; **5/16"** = 0.004; **3/8"** = 0.006; **1/2"** = 0.010; **5/8"** = 0.016

PURGING EQUIPMENT CODES: **B** = Bailer; **BP** = Bladder Pump; **ESP** = Electric Submersible Pump; **PP** = Peristaltic Pump; **O** = Other (Specify)

SAMPLING DATA

SAMPLED BY (PRINT) / AFFILIATION: Richard Illsley, Environmental Specialist, NEF	SAMPLER(S) SIGNATURE(S):	SAMPLING INITIATED AT: 10:45	SAMPLING ENDED AT: 10:47
PUMP OR TUBING DEPTH IN WELL (feet): 6.5	TUBING MATERIAL CODE: PE	FIELD-FILTERED: Y (N) Filtration Equipment Type:	FILTER SIZE: ____ µm
FIELD DECONTAMINATION: PUMP (Y) N	TUBING Y N (replaced)	DUPLICATE: Y (N)	

SAMPLE CONTAINER SPECIFICATION				SAMPLE PRESERVATION (including wet ice)			INTENDED ANALYSIS AND/OR METHOD	SAMPLING EQUIPMENT CODE	SAMPLE PUMP FLOW RATE (mL per minute)
SAMPLE ID CODE	# CONTAINERS	MATERIAL CODE	VOLUME	PRESERVATIVE USED	TOTAL VOL ADDED IN FIELD (mL)	FINAL pH			
MFEB-7 GW-3	1	PE	125mL	HNO3	0	-	METALS	APP	1000
MFEB-7 GW-3	1	PE	125mL	NONE	0	-	NON METALS	APP	1000

REMARKS:
Stick- 2.10
GPS- 26°50'29" 80°14'37"W

MATERIAL CODES: **AG** = Amber Glass; **CG** = Clear Glass; **HDPE** = High Density Polyethylene; **LDPE** = Low Density Polyethylene; **PP** = Polypropylene; **S** = Silicone; **T** = Teflon; **O** = Other (Specify)

SAMPLING EQUIPMENT CODES: **APP** = After (Through) Peristaltic Pump; **B** = Bailer; **BP** = Bladder Pump; **ESP** = Electric Submersible Pump; **RFPP** = Reverse Flow Peristaltic Pump; **SM** = Straw Method (Tubing Gravity Drain); **O** = Other (Specify)

NOTES: 1. **The above do not constitute all of the information required by Chapter 62-160, F.A.C.**

2. STABILIZATION CRITERIA FOR RANGE OF VARIATION OF LAST THREE CONSECUTIVE READINGS (SEE FS 2212, SECTION 3)

pH: ± 0.2 units **Temperature:** ± 0.2 °C **Specific Conductance:** ± 5% **Dissolved Oxygen:** all readings ≤ 20% saturation (see Table FS 2200-2); optionally, ± 0.2 mg/L or ± 10% (whichever is greater) **Turbidity:** all readings ≤ 20 NTU; optionally ± 5 NTU or ± 10% (whichever is greater)

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November 11, 2015

Jan Beernink
Nutting Environmental of Florida, Inc.
1310 Neptune Drive
Boynton Beach, FL 33426

RE: Project: Arcadis US Inc
Pace Project No.: 35215260

Dear Jan Beernink:
Enclosed are the analytical results for sample(s) received by the laboratory on November 05, 2015. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Christina Raschke
christina.raschke@pacelabs.com
Project Manager

Enclosures

cc: Kristen Campos, Nutting Environmental of Flori

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CERTIFICATIONS

Project: Arcadis US Inc
Pace Project No.: 35215260

Ormond Beach Certification IDs
8 East Tower Circle, Ormond Beach, FL 32174
Alabama Certification #: 41320
Connecticut Certification #: PH-0216
Delaware Certification: FL NELAC Reciprocity
Florida Certification #: E83079
Georgia Certification #: 955
Guam Certification: FL NELAC Reciprocity
Hawaii Certification: FL NELAC Reciprocity
Illinois Certification #: 200068
Indiana Certification: FL NELAC Reciprocity
Kansas Certification #: E-10383
Kentucky Certification #: 90050
Louisiana Certification #: FL NELAC Reciprocity
Louisiana Environmental Certificate #: 05007
Maryland Certification: #346
Michigan Certification #: 9911
Mississippi Certification: FL NELAC Reciprocity
Missouri Certification #: 236
Montana Certification #: Cert 0074
Nebraska Certification: NE-OS-28-14
Nevada Certification: FL NELAC Reciprocity
New Hampshire Certification #: 2958
New York Certification #: 11608
North Carolina Environmental Certificate #: 667
North Carolina Certification #: 12710
North Dakota Certification #: R-216
Oklahoma Certification #: D9947
Pennsylvania Certification #: 68-00547
Puerto Rico Certification #: FL01264
South Carolina Certification: #96042001
Tennessee Certification #: TN02974
Texas Certification: FL NELAC Reciprocity
US Virgin Islands Certification: FL NELAC Reciprocity
Virginia Environmental Certification #: 460165
West Virginia Certification #: 9962C
Wisconsin Certification #: 399079670
Wyoming (EPA Region 8): FL NELAC Reciprocity

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SAMPLE SUMMARY

Project: Arcadis US Inc
Pace Project No.: 35215260

Lab ID	Sample ID	Matrix	Date Collected	Date Received
35215260001	**MFEB-7 GW-1**	Water	11/04/15 11:33	11/05/15 16:30
35215260002	**MFEB-7 GW-2**	Water	11/04/15 10:08	11/05/15 16:30
35215260003	**MFEB-7 GW-3**	Water	11/04/15 10:45	11/05/15 16:30

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SAMPLE ANALYTE COUNT

Project: Arcadis US Inc
Pace Project No.: 35215260

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
35215260001	**MFEB-7 GW-1**	EPA 6010	MEW	5	PASI-O
		SM 2320B	KAM	3	PASI-O
		EPA 300.0	CMB	2	PASI-O
35215260002	**MFEB-7 GW-2**	EPA 6010	MEW	5	PASI-O
		SM 2320B	KAM	3	PASI-O
		EPA 300.0	CMB	2	PASI-O
35215260003	**MFEB-7 GW-3**	EPA 6010	MEW	5	PASI-O
		SM 2320B	KAM	3	PASI-O
		EPA 300.0	CMB	2	PASI-O

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SUMMARY OF DETECTION

Project: Arcadis US Inc
Pace Project No.: 35215260

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
35215260001	**MFEB-7 GW-1**					
EPA 6010	Iron	93.5	ug/L	40.0	11/11/15 14:05	
EPA 6010	Magnesium	13000	ug/L	500	11/11/15 14:05	
EPA 6010	Potassium	8170	ug/L	1000	11/11/15 14:05	
EPA 6010	Sodium	129000	ug/L	1000	11/11/15 14:05	
SM 2320B	Alkalinity,Bicarbonate (CaCO3)	242	mg/L	5.0	11/09/15 14:07	
SM 2320B	Alkalinity, Total as CaCO3	242	mg/L	5.0	11/09/15 14:07	
EPA 300.0	Chloride	191	mg/L	10.0	11/06/15 19:05	
EPA 300.0	Sulfate	30.5	mg/L	10.0	11/06/15 19:05	
35215260002	**MFEB-7 GW-2**					
EPA 6010	Iron	158	ug/L	40.0	11/11/15 14:09	
EPA 6010	Magnesium	4750	ug/L	500	11/11/15 14:09	
EPA 6010	Potassium	1740	ug/L	1000	11/11/15 14:09	
EPA 6010	Sodium	34800	ug/L	1000	11/11/15 14:09	
SM 2320B	Alkalinity,Bicarbonate (CaCO3)	209	mg/L	5.0	11/09/15 14:13	
SM 2320B	Alkalinity, Total as CaCO3	209	mg/L	5.0	11/09/15 14:13	
EPA 300.0	Chloride	37.2	mg/L	5.0	11/06/15 19:25	
EPA 300.0	Sulfate	8.0	mg/L	5.0	11/06/15 19:25	
35215260003	**MFEB-7 GW-3**					
EPA 6010	Iron	77.7	ug/L	40.0	11/11/15 14:13	
EPA 6010	Magnesium	3820	ug/L	500	11/11/15 14:13	
EPA 6010	Potassium	3090	ug/L	1000	11/11/15 14:13	
EPA 6010	Sodium	31800	ug/L	1000	11/11/15 14:13	
SM 2320B	Alkalinity,Bicarbonate (CaCO3)	270	mg/L	5.0	11/09/15 14:19	
SM 2320B	Alkalinity, Total as CaCO3	270	mg/L	5.0	11/09/15 14:19	
EPA 300.0	Chloride	27.3	mg/L	5.0	11/06/15 19:44	
EPA 300.0	Sulfate	5.2	mg/L	5.0	11/06/15 19:44	

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ANALYTICAL RESULTS

Project: Arcadis US Inc
Pace Project No.: 35215260

Sample: MFEB-7 GW-1 **Lab ID: 35215260001** Collected: 11/04/15 11:33 Received: 11/05/15 16:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Cadmium	**0.50 U**	ug/L	1.0	0.50	1	11/10/15 06:19	11/11/15 14:05	7440-43-9	
Iron	**93.5**	ug/L	40.0	20.0	1	11/10/15 06:19	11/11/15 14:05	7439-89-6	
Magnesium	**13000**	ug/L	500	250	1	11/10/15 06:19	11/11/15 14:05	7439-95-4	
Potassium	**8170**	ug/L	1000	500	1	11/10/15 06:19	11/11/15 14:05	7440-09-7	
Sodium	**129000**	ug/L	1000	500	1	11/10/15 06:19	11/11/15 14:05	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity,Bicarbonate (CaCO3)	**242**	mg/L	5.0	5.0	1		11/09/15 14:07		
Alkalinity, Carbonate (CaCO3)	**5.0 U**	mg/L	5.0	5.0	1		11/09/15 14:07		
Alkalinity, Total as CaCO3	**242**	mg/L	5.0	5.0	1		11/09/15 14:07		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**191**	mg/L	10.0	5.0	2		11/06/15 19:05	16887-00-6	
Sulfate	**30.5**	mg/L	10.0	5.0	2		11/06/15 19:05	14808-79-8	

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ANALYTICAL RESULTS

Project: Arcadis US Inc
Pace Project No.: 35215260

Sample: MFEB-7 GW-2 **Lab ID: 35215260002** Collected: 11/04/15 10:08 Received: 11/05/15 16:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Cadmium	**0.50 U**	ug/L	1.0	0.50	1	11/10/15 06:19	11/11/15 14:09	7440-43-9	
Iron	**158**	ug/L	40.0	20.0	1	11/10/15 06:19	11/11/15 14:09	7439-89-6	
Magnesium	**4750**	ug/L	500	250	1	11/10/15 06:19	11/11/15 14:09	7439-95-4	
Potassium	**1740**	ug/L	1000	500	1	11/10/15 06:19	11/11/15 14:09	7440-09-7	
Sodium	**34800**	ug/L	1000	500	1	11/10/15 06:19	11/11/15 14:09	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity,Bicarbonate (CaCO3)	**209**	mg/L	5.0	5.0	1		11/09/15 14:13		
Alkalinity, Carbonate (CaCO3)	**5.0 U**	mg/L	5.0	5.0	1		11/09/15 14:13		
Alkalinity, Total as CaCO3	**209**	mg/L	5.0	5.0	1		11/09/15 14:13		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**37.2**	mg/L	5.0	2.5	1		11/06/15 19:25	16887-00-6	
Sulfate	**8.0**	mg/L	5.0	2.5	1		11/06/15 19:25	14808-79-8	

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ANALYTICAL RESULTS

Project: Arcadis US Inc
Pace Project No.: 35215260

Sample: MFEB-7 GW-3 **Lab ID: 35215260003** Collected: 11/04/15 10:45 Received: 11/05/15 16:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Cadmium	**0.50 U**	ug/L	1.0	0.50	1	11/10/15 06:19	11/11/15 14:13	7440-43-9	
Iron	**77.7**	ug/L	40.0	20.0	1	11/10/15 06:19	11/11/15 14:13	7439-89-6	
Magnesium	**3820**	ug/L	500	250	1	11/10/15 06:19	11/11/15 14:13	7439-95-4	
Potassium	**3090**	ug/L	1000	500	1	11/10/15 06:19	11/11/15 14:13	7440-09-7	
Sodium	**31800**	ug/L	1000	500	1	11/10/15 06:19	11/11/15 14:13	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity,Bicarbonate (CaCO3)	**270**	mg/L	5.0	5.0	1		11/09/15 14:19		
Alkalinity, Carbonate (CaCO3)	**5.0 U**	mg/L	5.0	5.0	1		11/09/15 14:19		
Alkalinity, Total as CaCO3	**270**	mg/L	5.0	5.0	1		11/09/15 14:19		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**27.3**	mg/L	5.0	2.5	1		11/06/15 19:44	16887-00-6	
Sulfate	**5.2**	mg/L	5.0	2.5	1		11/06/15 19:44	14808-79-8	

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QUALITY CONTROL DATA

Project: Arcadis US Inc
Pace Project No.: 35215260

QC Batch: MPRP/27299 Analysis Method: EPA 6010
QC Batch Method: EPA 3010 Analysis Description: 6010 MET
Associated Lab Samples: 35215260001, 35215260002, 35215260003

METHOD BLANK: 1387437 Matrix: Water
Associated Lab Samples: 35215260001, 35215260002, 35215260003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Cadmium	ug/L	0.50 U	1.0	0.50	11/11/15 13:03	
Iron	ug/L	20.0 U	40.0	20.0	11/11/15 13:03	
Magnesium	ug/L	250 U	500	250	11/11/15 13:03	
Potassium	ug/L	500 U	1000	500	11/11/15 13:03	
Sodium	ug/L	500 U	1000	500	11/11/15 13:03	

LABORATORY CONTROL SAMPLE: 1387438

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Cadmium	ug/L	25	26.8	107	80-120	
Iron	ug/L	2500	2670	107	80-120	
Magnesium	ug/L	12500	12900	103	80-120	
Potassium	ug/L	12500	13100	105	80-120	
Sodium	ug/L	12500	12800	103	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1387439 1387440

Parameter	Units	35214835001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Cadmium	ug/L	0.50 U	25	25	26.0	25.9	104	104	75-125	0	20	
Iron	ug/L	654	2500	2500	3340	3320	107	107	75-125	1	20	
Magnesium	ug/L	4740	12500	12500	17500	17400	102	101	75-125	1	20	
Potassium	ug/L	2990	12500	12500	16300	16200	106	105	75-125	1	20	
Sodium	ug/L	23700	12500	12500	37200	36700	108	104	75-125	1	20	

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QUALITY CONTROL DATA

Project: Arcadis US Inc
Pace Project No.: 35215260

QC Batch: WET/34045 Analysis Method: SM 2320B
QC Batch Method: SM 2320B Analysis Description: 2320B Alkalinity
Associated Lab Samples: 35215260001, 35215260002, 35215260003

METHOD BLANK: 1386777 Matrix: Water
Associated Lab Samples: 35215260001, 35215260002, 35215260003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Carbonate (CaCO3)	mg/L	5.0 U	5.0	5.0	11/09/15 13:29	
Alkalinity, Total as CaCO3	mg/L	5.0 U	5.0	5.0	11/09/15 13:29	
Alkalinity,Bicarbonate (CaCO3)	mg/L	5.0 U	5.0	5.0	11/09/15 13:29	

LABORATORY CONTROL SAMPLE: 1386778

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	250	243	97	90-110	

SAMPLE DUPLICATE: 1386779

Parameter	Units	35215232001 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Carbonate (CaCO3)	mg/L	<5.0	5.0 U		20	
Alkalinity, Total as CaCO3	mg/L	294	298	1	20	
Alkalinity,Bicarbonate (CaCO3)	mg/L	294	298	1	20	

SAMPLE DUPLICATE: 1386780

Parameter	Units	35215594001 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Carbonate (CaCO3)	mg/L	<5.0	5.0 U		20	
Alkalinity, Total as CaCO3	mg/L	47.5	48.1	1	20	
Alkalinity,Bicarbonate (CaCO3)	mg/L	47.5	48.1	1	20	

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QUALITY CONTROL DATA

Project: Arcadis US Inc
Pace Project No.: 35215260

QC Batch: WETA/51898 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 35215260001, 35215260002, 35215260003

METHOD BLANK: 1385040 Matrix: Water
Associated Lab Samples: 35215260001, 35215260002, 35215260003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	2.5 U	5.0	2.5	11/06/15 12:57	
Sulfate	mg/L	2.5 U	5.0	2.5	11/06/15 12:57	

LABORATORY CONTROL SAMPLE: 1385041

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	50	49.9	100	90-110	
Sulfate	mg/L	50	48.9	98	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1385042 1385043

Parameter	Units	35215232001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	64.7	50	50	114	114	98	98	90-110	0	20	
Sulfate	mg/L	<2.5	50	50	48.7	48.8	94	94	90-110	0	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1385044 1385045

Parameter	Units	35215249003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	166	50	50	216	216	99	100	90-110	0	20	L
Sulfate	mg/L	48.2	50	50	98.8	99.3	101	102	90-110	0	20	

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QUALIFIERS

Project: Arcadis US Inc
Pace Project No.: 35215260

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-O	Pace Analytical Services - Ormond Beach

ANALYTE QUALIFIERS

U	Compound was analyzed for but not detected.
L	Off-scale high. Actual value is known to be greater than value given.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Arcadis US Inc
Pace Project No.: 35215260

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
35215260001	**MFEB-7 GW-1**	EPA 3010	MPRP/27299	EPA 6010	ICP/16433
35215260002	**MFEB-7 GW-2**	EPA 3010	MPRP/27299	EPA 6010	ICP/16433
35215260003	**MFEB-7 GW-3**	EPA 3010	MPRP/27299	EPA 6010	ICP/16433
35215260001	**MFEB-7 GW-1**	SM 2320B	WET/34045		
35215260002	**MFEB-7 GW-2**	SM 2320B	WET/34045		
35215260003	**MFEB-7 GW-3**	SM 2320B	WET/34045		
35215260001	**MFEB-7 GW-1**	EPA 300.0	WETA/51898		
35215260002	**MFEB-7 GW-2**	EPA 300.0	WETA/51898		
35215260003	**MFEB-7 GW-3**	EPA 300.0	WETA/51898		

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Pace Analytical
www.pacelabs.com

WO# : 35215260

35215260

RECORD

Date:_____ Page 1 of ___

Company Name: Nutting Eng PO#

Address: 1310 Northmeadow Dr

City: Boynton Beach State: FL Zip: 33426

Attn: Jon Bedrnicek Fax#

email: Phone:

Project Name: Arcadis US Inc Proj #

Sampler Signature: Circle One Event: Daily Weekly Monthly Quarterly Semi-Annual Annual N/A

LAB ANALYSIS

Parameters	Bicarbonate	Carbonate	Sulfate	Calcium	Magnesium	Sodium	Potassium	Iron	Chloride	EXAMPLE Diss. Lead 6010
# of Containers Size/Type										1 16ozP

Sample #	Sample ID	Collect Date	Collect Time	Matrix Code*	Field Filtered	Integrity OK(Y/N)	Total # of containers	REMARKS
1	MFEB-7 GW-1	11/4	11:33	GW			2	
2	MFEB-7 GW-2	11/4	10:08	GW			2	
3	MFEB-7 GW-3	11/4	10:45	GW			2	
4	MFEB-6 GW-1	11/3	13:03	GW			2	
5	MFEB-6 GW-2	11/3	14:52	GW			2	
6	MFEB-6 GW-3	11/3	15:24	GW			2	
7	MFEB-2 GW-1	11/4	15:29	GW			2	
8	MFEB-2 GW-2	11/4	14:09	GW			2	
9	MFEB-2 GW-3	11/4	14:40	GW			2	
10								2L-29-20

Clean T.A.T. REQUEST (Rush Fees Apply)
Standard: Y N
Rush: Today 1D 2D 3D 4D 5D ___

Short Hold: Y___ N___

Circle QA/QC Report Level: 1 2 3 4 CLP AFCEE QAPP Other___

EDD (Fees May Apply): ADaPT SEDD ERPIMS TSV CSV Other___

COC Condition: OK Incomplete

Required State Certification: FL GA SC NC NJ PA LA TX IL ___

Coolers #'s - Temp °C: 1___ 2___ 3___ 4___ 5___

Item	Relinquished by	Affiliation	Date	Time	Received by	Affiliation	Date	Time
1	RJ Ulc		11/5/15	1200			11-5-15	1200
2			11/5/15	1630			11/6/15	1630
3								
4								

Lab Use Only	Yes	NO	N/A
Non-Conformances Found?			
Samples INTACT upon arrival?			
Received on Wet Ice?			
Proper Preservatives Indicated?			
Received within holding time?			
Custody seals Intact?			
Volatiles rec'd without headspace?			
Proper Containers Used?			

Container Type Codes

AV	Amber Vial	ES	Encore Sampler
CV	Clear Vial	PPV	Prepreserved vial
P	Plastic	PLC	Plastic container
AL	Amber Liter	PLJ	Plastic Jar
CL	Clear Liter	Z	Ziploc bag
AP	Amber Plastic	TB	Tedlar bag
AG	Amber Glass	WP	Whirl pak
SJ	Soil Jar	G	Gallon Jug
Other		TC	Terra-core

PPV Preprserved vial
Size(s): 2oz, 4oz, 8oz, 16oz, 32oz or 1L, other___
40ml 500ml 250ml 125 ml
Example: 4ozP = 4oz Plastic, 5ozSJ= 8oz Soil Jar

Matrix Codes

SD	Solid Waste	OL	Oil
GW	Ground Water	SL	Sludge
EFF	Effluent	SD	Soil Sediment
AFW	Analyte Free H20	AQ	Aqueous
WW	Waste Water	NA	Nonaqueous
DW	Drinking Water	PE	Petroleum
SW	Surface Water	O	Other___ (Please specify)
ML	Misc. Liquid		

Preservative Type Codes

A. None	E. HCL	I. Ice
B. HNO3	F. MeOH	J. MCAA
C. H2SO4	G. Na2S2O3	K. Zn Acetate
D. NaOH	H. NaHSO4	O. Other

C.O.C. Serial # 101213

Pace Analytical	Document Name Sample Condition Upon Receipt Form	Document Revised October 9, 2013
	Document No F-FL-C-007 rev. 05	Issuing Authorities Pace Florida Quality Office

Sample Condition Upon Receipt Form (SCUR)

WO# : 35215260

PM: CTR Due Date: 11/11/15
CLIENT: 36-NUTTEN

Client Name: Nutting P

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☑ Pace

Tracking # _____

Custody Seal on Cooler/Box Present: ☐ yes ☑ no Seals intact ☐ yes ☑ no

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☑ None ☐ Other _____

Thermometer Used T-104

Type of Ice: ☑ Wet ☐ Blue ☐ None

Cooler Temperature °C 2.2 (Visual) 0.3 (Correction Factor) 2.5 (Actual)

Date and Initials of person examining contents: _____

(Temp should be above freezing in 6°C) If below 0°C, was sample frozen? ☐ Yes ☑ No

Receipt of samples satisfactory: ☑ Yes ☐ No

Rush TAT requested on COC:

If yes, then all conditions below were met:	If no, then mark box & describe issue (use comments area if necessary)
Chain of Custody Present	☐
Chain of Custody Filled Out	☐
Relinquished Signature & Sampler Name COC	☐
Samples Arrived within Hold Time	☐
Sufficient Volume	☐
Correct Containers Used	☐
Containers Intact	☐
Sample Labels match COC (sample IDs & date/time of collection)	☐ No Labels ☐ No Time/Date on Labels ☐
All containers needing preservation are found to be in compliance with EPA recommendation	☐
No Headspace in VOA Vials (>6mm)	☐

Client Notification/ Resolution:

Person Contacted _____ Date/Time _____

Comments/ Resolution (use back for additional comments) _____

Project Manager Review: _____ Date: _____

Finished Product Information Only

F.P. Sample ID: _____

Production Code: _____

Date/Time Opened: _____

Number of Unopened Bottles Remaining: _____

Extra Sample in Shed: Yes No

Size & Qty of Bottles Received

_____ x 5 Gal
_____ x 2.5 Gal
_____ x 1 Gal
_____ x 1 Liter
_____ x 500 mL
_____ x 250 mL
_____ x Other: _____

DEP Form FD 9000-24: GROUNDWATER SAMPLING LOG

SITE NAME: Arcadis US, INC	SITE LOCATION: Former MECCA Farms/Scripps Site, Palm Beach	
WELL NO: MFEB-8 GW-1	SAMPLE ID: MFEB-8 GW-1	DATE: 10-28-15

PURGING DATA

WELL DIAMETER (inches): 2	TUBING DIAMETER (inches): 1/2	WELL SCREEN INTERVAL DEPTH: 90.3 feet to 103.2 feet	STATIC DEPTH TO WATER (feet): 8.61	PURGE PUMP TYPE OR BAILER: Peristaltic Pump

WELL VOLUME PURGE: **1 WELL VOLUME** = (TOTAL WELL DEPTH − STATIC DEPTH TO WATER) X WELL CAPACITY
(only fill out if applicable)
= (103.2 feet − 8.61 feet) X 0.16 gallons/foot = 15.13gallons

EQUIPMENT VOLUME PURGE: **1 EQUIPMENT VOL.** = PUMP VOLUME + (TUBING CAPACITY X TUBING LENGTH) + FLOW CELL VOLUME
(only fill out if applicable)
= gallons + (gallons/foot X feet) + gallons = gallons

INITIAL PUMP OR TUBING DEPTH IN WELL (feet): 9.5	FINAL PUMP OR TUBING DEPTH IN WELL (feet): 9.5	PURGING INITIATED AT: 9:20	PURGING ENDED AT: 12:30	TOTAL VOLUME PURGED (gallons): 47.5

TIME	VOLUME PURGED (gallons)	CUMUL. VOLUME PURGED (gallons)	PURGE RATE (gpm)	DEPTH TO WATER (feet)	pH (standard units)	TEMP. (°C)	COND. (circle units) µmhos/cm or µS/cm	DISSOLVED OXYGEN (circle units) mg/L or % saturation	TURBIDITY (NTUs)	COLOR (describe)	ODOR (describe)
12:22	45.5	45.5	0.25	6.92	6.92	24.98	971	0.53	0.83	Clear	None
12:24	0.5	46.0	0.25	6.92	6.91	25.02	971	0.53	0.80	Clear	None
12:26	0.5	46.5	0.25	6.92	6.92	25.02	972	0.52	0.74	Clear	None
12:28	0.5	47.0	0.25	6.92	6.92	25.03	971	0.52	0.69	Clear	None
12:39	0.5	47.5	0.25	6.92	6.92	25.03	972	0.51	0.64	Clear	None

WELL CAPACITY (Gallons Per Foot): **0.75"** = 0.02; **1"** = 0.04; **1.25"** = 0.06; **2"** = 0.16; **3"** = 0.37; **4"** = 0.65; **5"** = 1.02; **6"** = 1.47; **12"** = 5.88
TUBING INSIDE DIA. CAPACITY (Gal./Ft.): **1/8"** = 0.0006; **3/16"** = 0.0014; **1/4"** = 0.0026; **5/16"** = [illegible]; **3/8"** = 0.006; **1/2"** = 0.010; **5/8"** = 0.016

PURGING EQUIPMENT CODES: **B** = Bailer; **BP** = Bladder Pump; **ESP** = Electric Submersible Pump; **PP** = Peristaltic Pump; **O** = Other (Specify)

SAMPLING DATA

SAMPLED BY (PRINT) / AFFILIATION: Richard Illsley, Environmental Specialist, NEF	SAMPLER(S) SIGNATURE(S):	SAMPLING INITIATED AT: 12:31	SAMPLING ENDED AT: 12:32
PUMP OR TUBING DEPTH IN WELL (feet): 9.5	TUBING MATERIAL CODE: PE	FIELD FILTERED: Y (N) Filtration Equipment Type:	FILTER SIZE: ____ µm
FIELD DECONTAMINATION: PUMP (Y) N TUBING Y N (replaced)		DUPLICATE: Y (N)	

SAMPLE CONTAINER SPECIFICATION				SAMPLE PRESERVATION (including wet ice)					
SAMPLE ID CODE	# CONTAINERS	MATERIAL CODE	VOLUME	PRESERVATIVE USED	TOTAL VOL ADDED IN FIELD (mL)	FINAL pH	INTENDED ANALYSIS AND/OR METHOD	SAMPLING EQUIPMENT CODE	SAMPLE PUMP FLOW RATE (mL per minute)
MFEB-8 GW-1	1	PE	125mL	HNO3	0	-	METALS	APP	1000
MFEB-8 GW-1	1	PE	125mL	NONE	0	-	NON METALS	APP	1000

REMARKS:
Stick-2.67
GPS- 26°48'42" 80°16'55"W

MATERIAL CODES: **AG** = Amber Glass; **CG** = Clear Glass; **HDPE** = High Density Polyethylene; **LDPE** = Low Density Polyethylene; **PP** = Polypropylene; **S** = Silicone; T = Teflon; **O** = Other (Specify)

SAMPLING EQUIPMENT CODES: **APP** = After (Through) Peristaltic Pump; **B** = Bailer; **BP** = Bladder Pump; **ESP** = Electric Submersible Pump; **RFPP** = Reverse Flow Peristaltic Pump; **SM** = Straw Method (Tubing Gravity Drain); **O** = Other (Specify)

NOTES: 1. **The above do not constitute all of the information required by Chapter 62-160, F.A.C.**

2. STABILIZATION CRITERIA FOR RANGE OF VARIATION OF LAST THREE CONSECUTIVE READINGS (SEE FS 2212, SECTION 3)

pH: ± 0.2 units **Temperature:** ± 0.2 °C **Specific Conductance:** ± 5% **Dissolved Oxygen:** all readings ≤ 20% saturation (see Table FS 2200-2); optionally, ± 0.2 mg/L or ± 10% (whichever is greater) **Turbidity:** all readings ≤ 20 NTU; optionally ± 5 NTU or ± 10% (whichever is greater)

DEP Form FD 9000-24: GROUNDWATER SAMPLING LOG

SITE NAME: Arcadis US, INC	SITE LOCATION: Former MECCA Farms/Scripps Site, Palm Beach	
WELL NO: MFEB-8 GW-2	SAMPLE ID: MFEB-8 GW-2	DATE: 10-28-15

PURGING DATA

WELL DIAMETER (inches): 2	TUBING DIAMETER (inches): 1/2	WELL SCREEN INTERVAL DEPTH: 38.71 feet to 48.71 feet	STATIC DEPTH TO WATER (feet): 7.45	PURGE PUMP TYPE OR BAILER: Peristaltic Pump

WELL VOLUME PURGE: 1 WELL VOLUME = (TOTAL WELL DEPTH – STATIC DEPTH TO WATER) X WELL CAPACITY
(only fill out if applicable)
= (48.71 feet – 7.45 feet) X 0.16 gallons/foot = 6.06gallons

EQUIPMENT VOLUME PURGE: 1 EQUIPMENT VOL. = PUMP VOLUME + (TUBING CAPACITY X TUBING LENGTH) + FLOW CELL VOLUME
(only fill out if applicable)
= gallons + (gallons/foot X feet) + gallons = gallons

INITIAL PUMP OR TUBING DEPTH IN WELL (feet): 8.5	FINAL PUMP OR TUBING DEPTH IN WELL (feet): 8.5	PURGING INITIATED AT: 12:45	PURGING ENDED AT: 14:23	TOTAL VOLUME PURGED (gallons): 24.5

TIME	VOLUME PURGED (gallons)	CUMUL. VOLUME PURGED (gallons)	PURGE RATE (gpm)	DEPTH TO WATER (feet)	pH (standard units)	TEMP. (°C)	COND. (circle units: µmhos/cm or µS/cm)	DISSOLVED OXYGEN (circle units: ~~mg/L~~ or % saturation)	TURBIDITY (NTUs)	COLOR (describe)	ODOR (describe)
14:15	22.5	22.5	0.25	7.47	7.18	24.93	551	0.64	1.03	Clear	None
14:17	0.5	23.0	0.25	7.47	7.18	24.91	552	0.61	0.95	Clear	None
14:19	0.5	23.5	0.25	7.47	7.18	24.90	552	0.57	0.93	Clear	None
14:21	0.5	24.0	0.25	7.47	7.18	24.90	552	0.56	0.91	Clear	None
14:23	0.5	24.5	0.25	7.47	7.19	24.90	552	0.54	0.87	Clear	None

WELL CAPACITY (Gallons Per Foot): **0.75"** = 0.02; **1"** = 0.04; **1.25"** = 0.06; **2"** = 0.16; **3"** = 0.37; **4"** = 0.65; **5"** = 1.02; **6"** = 1.47; **12"** = 5.88
TUBING INSIDE DIA. CAPACITY (Gal./Ft.): **1/8"** = 0.0006; **3/16"** = 0.0014; **1/4"** = 0.0026; **5/16"** = 0.004; **3/8"** = 0.006; **1/2"** = 0.010; **5/8"** = 0.016

PURGING EQUIPMENT CODES: **B** = Bailer; **BP** = Bladder Pump; **ESP** = Electric Submersible Pump; **PP** = Peristaltic Pump; **O** = Other (Specify)

SAMPLING DATA

SAMPLED BY (PRINT) / AFFILIATION: Richard Illsley, Environmental Specialist, NEF	SAMPLER(S) SIGNATURE(S):	SAMPLING INITIATED AT: 14:24	SAMPLING ENDED AT: 14:25
PUMP OR TUBING DEPTH IN WELL (feet): 8.5	TUBING MATERIAL CODE: PE	FIELD-FILTERED: Y (N) Filtration Equipment Type:	FILTER SIZE: ____ µm
FIELD DECONTAMINATION: PUMP (Y) N	TUBING Y N (replaced)	DUPLICATE: Y (N)	

SAMPLE CONTAINER SPECIFICATION				SAMPLE PRESERVATION (including wet ice)			INTENDED ANALYSIS AND/OR METHOD	SAMPLING EQUIPMENT CODE	SAMPLE PUMP FLOW RATE (mL per minute)
SAMPLE ID CODE	# CONTAINERS	MATERIAL CODE	VOLUME	PRESERVATIVE USED	TOTAL VOL ADDED IN FIELD (mL)	FINAL pH			
MFEB-8 GW-2	1	PE	125mL	HNO3	0	-	METALS	APP	1000
MFEB-8 GW-2	1	PE	125mL	NONE	0	-	NON METALS	APP	1000

REMARKS:
Stick- 3.39
GPS- 26°48'42" 80°16'55"W

MATERIAL CODES: **AG** = Amber Glass; **CG** = Clear Glass; **HDPE** = High Density Polyethylene; **LDPE** = Low Density Polyethylene; **PP** = Polypropylene; **S** = Silicone; **T** = Teflon; **O** = Other (Specify)

SAMPLING EQUIPMENT CODES: **APP** = After (Through) Peristaltic Pump; **B** = Bailer; **BP** = Bladder Pump; **ESP** = Electric Submersible Pump; **RFPP** = Reverse Flow Peristaltic Pump; **SM** = Straw Method (Tubing Gravity Drain); **O** = Other (Specify)

NOTES: 1. **The above do not constitute all of the information required by Chapter 62-160, F.A.C.**

2. STABILIZATION CRITERIA FOR RANGE OF VARIATION OF LAST THREE CONSECUTIVE READINGS (SEE FS 2212, SECTION 3)

pH: ± 0.2 units **Temperature:** ± 0.2 °C **Specific Conductance:** ± 5% **Dissolved Oxygen:** all readings ≤ 20% saturation (see Table FS 2200-2); optionally, ± 0.2 mg/L or ± 10% (whichever is greater) **Turbidity:** all readings ≤ 20 NTU; optionally ± 5 NTU or ± 10% (whichever is greater)

DEP Form FD 9000-24: GROUNDWATER SAMPLING LOG

SITE NAME: Arcadis US, INC	SITE LOCATION: Former MECCA Farms/Scripps Site, Palm Beach	
WELL NO: MFEB-8 GW-3	SAMPLE ID: MFEB-8 GW-3	DATE: 10-28-15

PURGING DATA

WELL DIAMETER (inches): 2	TUBING DIAMETER (inches): 1/2	WELL SCREEN INTERVAL DEPTH: 8.16 feet to 18.16 feet	STATIC DEPTH TO WATER (feet): 7.21	PURGE PUMP TYPE OR BAILER: Peristaltic Pump

WELL VOLUME PURGE: 1 WELL VOLUME = (TOTAL WELL DEPTH − STATIC DEPTH TO WATER) X WELL CAPACITY
(only fill out if applicable)
= (18.16 feet − 7.21 feet) X 0.16 gallons/foot = 1.75 gallons

EQUIPMENT VOLUME PURGE: 1 EQUIPMENT VOL. = PUMP VOLUME + (TUBING CAPACITY X TUBING LENGTH) + FLOW CELL VOLUME
(only fill out if applicable)
= gallons + (gallons/foot X feet) + gallons = gallons

INITIAL PUMP OR TUBING DEPTH IN WELL (feet): 8.0	FINAL PUMP OR TUBING DEPTH IN WELL (feet): 8.0	PURGING INITIATED AT: 14:32	PURGING ENDED AT: 14:56	TOTAL VOLUME PURGED (gallons): 6.0

TIME	VOLUME PURGED (gallons)	CUMUL. VOLUME PURGED (gallons)	PURGE RATE (gpm)	DEPTH TO WATER (feet)	pH (standard units)	TEMP. (°C)	COND. (circle units: µmhos/cm or µS/cm)	DISSOLVED OXYGEN (circle units: mg/l or % saturation)	TURBIDITY (NTUs)	COLOR (describe)	ODOR (describe)
14:48	4.0	4.0	0.25	7.24	7.22	25.56	551	0.97	1.26	Clear	None
14:50	0.5	4.5	0.25	7.24	7.18	25.55	552	0.95	1.17	Clear	None
14:52	0.5	5.0	0.25	7.24	7.14	25.55	553	0.93	1.10	Clear	None
14:54	0.5	5.5	0.25	7.24	7.09	25.55	554	0.89	0.97	Clear	None
14:56	0.5	6.0	0.25	7.24	7.07	25.55	555	0.88	0.93	Clear	None

WELL CAPACITY (Gallons Per Foot): **0.75"** = 0.02; **1"** = 0.04; **1.25"** = 0.06; **2"** = 0.16; **3"** = 0.37; **4"** = 0.65; **5"** = 1.02; **6"** = 1.47; **12"** = 5.88
TUBING INSIDE DIA. CAPACITY (Gal./Ft.): **1/8"** = 0.0006; **3/16"** = 0.0014; **1/4"** = 0.0026; **5/16"** = 0.004; **3/8"** = 0.006; **1/2"** = 0.010; **5/8"** = 0.016

PURGING EQUIPMENT CODES: **B** = Bailer; **BP** = Bladder Pump; **ESP** = Electric Submersible Pump, **PP** = Peristaltic Pump; **O** = Other (Specify)

SAMPLING DATA

SAMPLED BY (PRINT) / AFFILIATION: Richard Illsley, Environmental Specialist, NEF	SAMPLER(S) SIGNATURE(S):	SAMPLING INITIATED AT: 14:57	SAMPLING ENDED AT: 14:59
PUMP OR TUBING DEPTH IN WELL (feet): 8.0	TUBING MATERIAL CODE: PE	FIELD-FILTERED: Y (N) Filtration Equipment Type:	FILTER SIZE: ____ µm
FIELD DECONTAMINATION: PUMP (Y) N TUBING Y N (replaced)		DUPLICATE: Y (N)	

SAMPLE CONTAINER SPECIFICATION				SAMPLE PRESERVATION (including wet ice)			INTENDED ANALYSIS AND/OR METHOD	SAMPLING EQUIPMENT CODE	SAMPLE PUMP FLOW RATE (mL per minute)
SAMPLE ID CODE	# CONTAINERS	MATERIAL CODE	VOLUME	PRESERVATIVE USED	TOTAL VOL ADDED IN FIELD (mL)	FINAL pH			
MFEB-8 GW-3	1	PE	125mL	HNO3	0	-	METALS	APP	1000
MFEB-8 GW-3	1	PE	125mL	NONE	0	-	NON METALS	APP	1000

REMARKS:
Stick- 2.32
GPS- 26°48'42" 80°16'55"W

MATERIAL CODES: **AG** = Amber Glass; **CG** = Clear Glass; **HDPE** = High Density Polyethylene; **LDPE** = Low Density Polyethylene; **PP** = Polypropylene; **S** = Silicone; T = Teflon; **O** = Other (Specify)

SAMPLING EQUIPMENT CODES: **APP** = After (Through) Peristaltic Pump; **B** = Bailer; **BP** = Bladder Pump; **ESP** = Electric Submersible Pump; **RFPP** = Reverse Flow Peristaltic Pump; **SM** = Straw Method (Tubing Gravity Drain); **O** = Other (Specify)

NOTES: 1. The above do not constitute all of the information required by Chapter 62-160, F.A.C.

2. STABILIZATION CRITERIA FOR RANGE OF VARIATION OF LAST THREE CONSECUTIVE READINGS (SEE FS 2212, SECTION 3)

pH: ± 0.2 units **Temperature:** ± 0.2 °C **Specific Conductance:** ± 5% **Dissolved Oxygen:** all readings ≤ 20% saturation (see Table FS 2200-2); optionally, ± 0.2 mg/L or ± 10% (whichever is greater) **Turbidity:** all readings ≤ 20 NTU; optionally ± 5 NTU or ± 10% (whichever is greater)

Pace Analytical Services, Inc.
3610 Park Central Blvd N
Pompano Beach, FL 33064
954-582-4300

November 10, 2015

Jan Beernink
Nutting Environmental of Florida, Inc.
1310 Neptune Drive
Boynton Beach, FL 33426

RE: Project: Arcadis Inc
Pace Project No.: 35214771

Dear Jan Beernink:
Enclosed are the analytical results for sample(s) received by the laboratory on November 03, 2015. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

This is a revised report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Christina Raschke
christina.raschke@pacelabs.com
Project Manager

Enclosures

cc: Kristen Campos, Nutting Environmental of Flori

REPORT OF LABORATORY ANALYSIS

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without the written consent of Pace Analytical Services, Inc..

Pace Analytical Services, Inc.
3610 Park Central Blvd N
Pompano Beach, FL 33064
954-582-4300

CERTIFICATIONS

Project: Arcadis Inc
Pace Project No.: 35214771

Ormond Beach Certification IDs
8 East Tower Circle, Ormond Beach, FL 32174
Alabama Certification #: 41320
Connecticut Certification #: PH-0216
Delaware Certification: FL NELAC Reciprocity
Florida Certification #: E83079
Georgia Certification #: 955
Guam Certification: FL NELAC Reciprocity
Hawaii Certification: FL NELAC Reciprocity
Illinois Certification #: 200068
Indiana Certification: FL NELAC Reciprocity
Kansas Certification #: E-10383
Kentucky Certification #: 90050
Louisiana Certification #: FL NELAC Reciprocity
Louisiana Environmental Certificate #: 05007
Maryland Certification: #346
Michigan Certification #: 9911
Mississippi Certification: FL NELAC Reciprocity
Missouri Certification #: 236
Montana Certification #: Cert 0074
Nebraska Certification: NE-OS-28-14
Nevada Certification: FL NELAC Reciprocity
New Hampshire Certification #: 2958
New York Certification #: 11608
North Carolina Environmental Certificate #: 667
North Carolina Certification #: 12710
North Dakota Certification #: R-216
Oklahoma Certification #: D9947
Pennsylvania Certification #: 68-00547
Puerto Rico Certification #: FL01264
South Carolina Certification: #96042001
Tennessee Certification #: TN02974
Texas Certification: FL NELAC Reciprocity
US Virgin Islands Certification: FL NELAC Reciprocity
Virginia Environmental Certification #: 460165
West Virginia Certification #: 9962C
Wisconsin Certification #: 399079670
Wyoming (EPA Region 8): FL NELAC Reciprocity

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Pace Analytical Services, Inc.
3610 Park Central Blvd N
Pompano Beach, FL 33064
954-582-4300

SAMPLE SUMMARY

Project: Arcadis Inc
Pace Project No.: 35214771

Lab ID	Sample ID	Matrix	Date Collected	Date Received
35214771001	**MFEB-8 GW-1**	Water	10/28/15 12:31	11/03/15 15:50
35214771002	**MFEB-8 GW-2**	Water	10/28/15 14:24	11/03/15 15:50
35214771003	**MFEB-8 GW-3**	Water	10/28/15 14:57	11/03/15 15:50

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Pace Analytical Services, Inc.
3610 Park Central Blvd N
Pompano Beach, FL 33064
954-582-4300

SAMPLE ANALYTE COUNT

Project: Arcadis Inc
Pace Project No.: 35214771

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
35214771001	**MFEB-8 GW-1**	EPA 6010	CKJ	5	PASI-O
		SM 2320B	KAM	3	PASI-O
		EPA 300.0	KEK	2	PASI-O
35214771002	**MFEB-8 GW-2**	EPA 6010	TAP	5	PASI-O
		SM 2320B	KAM	3	PASI-O
		EPA 300.0	KEK	2	PASI-O
35214771003	**MFEB-8 GW-3**	EPA 6010	TAP	5	PASI-O
		SM 2320B	KAM	3	PASI-O
		EPA 300.0	KEK	2	PASI-O

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SUMMARY OF DETECTION

Project: Arcadis Inc
Pace Project No.: 35214771

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
35214771001	**MFEB-8 GW-1**					
EPA 6010	Calcium	101000	ug/L	500	11/09/15 10:51	
EPA 6010	Iron	197	ug/L	40.0	11/09/15 10:51	
EPA 6010	Magnesium	15100	ug/L	500	11/09/15 10:51	
EPA 6010	Potassium	3010	ug/L	1000	11/09/15 10:51	
EPA 6010	Sodium	79700	ug/L	1000	11/09/15 10:51	
SM 2320B	Alkalinity,Bicarbonate (CaCO3)	277	mg/L	5.0	11/05/15 13:00	
SM 2320B	Alkalinity, Total as CaCO3	277	mg/L	5.0	11/05/15 13:00	
EPA 300.0	Chloride	115	mg/L	25.0	11/05/15 20:42	
EPA 300.0	Sulfate	13.7	mg/L	5.0	11/04/15 15:38	
35214771002	**MFEB-8 GW-2**					
EPA 6010	Calcium	70100	ug/L	500	11/09/15 16:41	
EPA 6010	Magnesium	4700	ug/L	500	11/09/15 16:41	
EPA 6010	Potassium	1320	ug/L	1000	11/09/15 16:41	
EPA 6010	Sodium	33000	ug/L	1000	11/09/15 16:41	
SM 2320B	Alkalinity,Bicarbonate (CaCO3)	170	mg/L	5.0	11/05/15 13:06	
SM 2320B	Alkalinity, Total as CaCO3	170	mg/L	5.0	11/05/15 13:06	
EPA 300.0	Chloride	48.5	mg/L	5.0	11/04/15 16:00	
EPA 300.0	Sulfate	16.5	mg/L	5.0	11/04/15 16:00	
35214771003	**MFEB-8 GW-3**					
EPA 6010	Calcium	62400	ug/L	500	11/09/15 16:44	
EPA 6010	Magnesium	5560	ug/L	500	11/09/15 16:44	
EPA 6010	Potassium	2770	ug/L	1000	11/09/15 16:44	
EPA 6010	Sodium	40700	ug/L	1000	11/09/15 16:44	
SM 2320B	Alkalinity,Bicarbonate (CaCO3)	164	mg/L	5.0	11/05/15 13:12	
SM 2320B	Alkalinity, Total as CaCO3	164	mg/L	5.0	11/05/15 13:12	
EPA 300.0	Chloride	57.8	mg/L	5.0	11/04/15 16:22	
EPA 300.0	Sulfate	17.5	mg/L	5.0	11/04/15 16:22	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: Arcadis Inc
Pace Project No.: 35214771

Sample: MFEB-8 GW-1 **Lab ID: 35214771001** Collected: 10/28/15 12:31 Received: 11/03/15 15:50 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Calcium	**101000**	ug/L	500	250	1	11/06/15 12:20	11/09/15 10:51	7440-70-2	
Iron	**197**	ug/L	40.0	20.0	1	11/06/15 12:20	11/09/15 10:51	7439-89-6	
Magnesium	**15100**	ug/L	500	250	1	11/06/15 12:20	11/09/15 10:51	7439-95-4	
Potassium	**3010**	ug/L	1000	500	1	11/06/15 12:20	11/09/15 10:51	7440-09-7	
Sodium	**79700**	ug/L	1000	500	1	11/06/15 12:20	11/09/15 10:51	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity,Bicarbonate (CaCO3)	**277**	mg/L	5.0	5.0	1		11/05/15 13:00		
Alkalinity, Carbonate (CaCO3)	**5.0 U**	mg/L	5.0	5.0	1		11/05/15 13:00		
Alkalinity, Total as CaCO3	**277**	mg/L	5.0	5.0	1		11/05/15 13:00		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**115**	mg/L	25.0	12.5	5		11/05/15 20:42	16887-00-6	
Sulfate	**13.7**	mg/L	5.0	2.5	1		11/04/15 15:38	14808-79-8	

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ANALYTICAL RESULTS

Project: Arcadis Inc
Pace Project No.: 35214771

Sample: MFEB-8 GW-2 **Lab ID: 35214771002** Collected: 10/28/15 14:24 Received: 11/03/15 15:50 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Calcium	**70100**	ug/L	500	250	1	11/06/15 12:20	11/09/15 16:41	7440-70-2	
Iron	**20.0 U**	ug/L	40.0	20.0	1	11/06/15 12:20	11/09/15 16:41	7439-89-6	
Magnesium	**4700**	ug/L	500	250	1	11/06/15 12:20	11/09/15 16:41	7439-95-4	
Potassium	**1320**	ug/L	1000	500	1	11/06/15 12:20	11/09/15 16:41	7440-09-7	
Sodium	**33000**	ug/L	1000	500	1	11/06/15 12:20	11/09/15 16:41	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity,Bicarbonate (CaCO3)	**170**	mg/L	5.0	5.0	1		11/05/15 13:06		
Alkalinity, Carbonate (CaCO3)	**5.0 U**	mg/L	5.0	5.0	1		11/05/15 13:06		
Alkalinity, Total as CaCO3	**170**	mg/L	5.0	5.0	1		11/05/15 13:06		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**48.5**	mg/L	5.0	2.5	1		11/04/15 16:00	16887-00-6	
Sulfate	**16.5**	mg/L	5.0	2.5	1		11/04/15 16:00	14808-79-8	

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ANALYTICAL RESULTS

Project: Arcadis Inc
Pace Project No.: 35214771

Sample: MFEB-8 GW-3 **Lab ID: 35214771003** Collected: 10/28/15 14:57 Received: 11/03/15 15:50 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Calcium	**62400**	ug/L	500	250	1	11/06/15 12:20	11/09/15 16:44	7440-70-2	
Iron	**20.0 U**	ug/L	40.0	20.0	1	11/06/15 12:20	11/09/15 16:44	7439-89-6	
Magnesium	**5560**	ug/L	500	250	1	11/06/15 12:20	11/09/15 16:44	7439-95-4	
Potassium	**2770**	ug/L	1000	500	1	11/06/15 12:20	11/09/15 16:44	7440-09-7	
Sodium	**40700**	ug/L	1000	500	1	11/06/15 12:20	11/09/15 16:44	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity,Bicarbonate (CaCO3)	**164**	mg/L	5.0	5.0	1		11/05/15 13:12		
Alkalinity, Carbonate (CaCO3)	**5.0 U**	mg/L	5.0	5.0	1		11/05/15 13:12		
Alkalinity, Total as CaCO3	**164**	mg/L	5.0	5.0	1		11/05/15 13:12		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**57.8**	mg/L	5.0	2.5	1		11/04/15 16:22	16887-00-6	
Sulfate	**17.5**	mg/L	5.0	2.5	1		11/04/15 16:22	14808-79-8	

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QUALITY CONTROL DATA

Project: Arcadis Inc
Pace Project No.: 35214771

QC Batch: MPRP/27244 Analysis Method: EPA 6010
QC Batch Method: EPA 3010 Analysis Description: 6010 MET
Associated Lab Samples: 35214771001, 35214771002, 35214771003

METHOD BLANK: 1384740 Matrix: Water
Associated Lab Samples: 35214771001, 35214771002, 35214771003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Calcium	ug/L	250 U	500	250	11/09/15 11:11	
Iron	ug/L	20.0 U	40.0	20.0	11/09/15 11:11	
Magnesium	ug/L	250 U	500	250	11/09/15 11:11	
Potassium	ug/L	500 U	1000	500	11/09/15 11:11	
Sodium	ug/L	500 U	1000	500	11/09/15 11:11	

LABORATORY CONTROL SAMPLE: 1384741

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium	ug/L	12500	12800	103	80-120	
Iron	ug/L	2500	2560	102	80-120	
Magnesium	ug/L	12500	12600	101	80-120	
Potassium	ug/L	12500	12700	102	80-120	
Sodium	ug/L	12500	12900	103	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1384742 1384743

Parameter	Units	35214771001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium	ug/L	101000	12500	12500	112000	111000	90	81	75-125	1	20	
Iron	ug/L	197	2500	2500	2720	2670	101	99	75-125	2	20	
Magnesium	ug/L	15100	12500	12500	27500	27000	100	96	75-125	2	20	
Potassium	ug/L	3010	12500	12500	15800	15600	103	101	75-125	1	20	
Sodium	ug/L	79700	12500	12500	91900	91200	98	92	75-125	1	20	

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QUALITY CONTROL DATA

Project: Arcadis Inc
Pace Project No.: 35214771

QC Batch: WET/33984 Analysis Method: SM 2320B
QC Batch Method: SM 2320B Analysis Description: 2320B Alkalinity
Associated Lab Samples: 35214771001, 35214771002, 35214771003

METHOD BLANK: 1383433 Matrix: Water
Associated Lab Samples: 35214771001, 35214771002, 35214771003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Carbonate (CaCO3)	mg/L	5.0 U	5.0	5.0	11/05/15 12:24	
Alkalinity, Total as CaCO3	mg/L	5.0 U	5.0	5.0	11/05/15 12:24	
Alkalinity,Bicarbonate (CaCO3)	mg/L	5.0 U	5.0	5.0	11/05/15 12:24	

LABORATORY CONTROL SAMPLE: 1383434

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	250	243	97	90-110	

SAMPLE DUPLICATE: 1383435

Parameter	Units	35214389002 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Carbonate (CaCO3)	mg/L	<5.0	5.0 U		20	
Alkalinity, Total as CaCO3	mg/L	123	122	1	20	
Alkalinity,Bicarbonate (CaCO3)	mg/L	123	122	1	20	

SAMPLE DUPLICATE: 1383436

Parameter	Units	35214980003 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Carbonate (CaCO3)	mg/L	<5.0	5.0 U		20	
Alkalinity, Total as CaCO3	mg/L	105	102	2	20	
Alkalinity,Bicarbonate (CaCO3)	mg/L	105	102	2	20	

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QUALITY CONTROL DATA

Project: Arcadis Inc
Pace Project No.: 35214771

QC Batch: WETA/51785 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 35214771001, 35214771002, 35214771003

METHOD BLANK: 1381758 Matrix: Water
Associated Lab Samples: 35214771001, 35214771002, 35214771003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	2.5 U	5.0	2.5	11/04/15 07:31	
Sulfate	mg/L	2.5 U	5.0	2.5	11/04/15 07:31	

LABORATORY CONTROL SAMPLE: 1381759

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	50	48.2	96	90-110	
Sulfate	mg/L	50	47.9	96	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1381760 1381761

Parameter	Units	35214576001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	43.2	50	50	95.8	95.9	105	105	90-110	0	20	
Sulfate	mg/L	9.9	50	50	57.5	57.6	95	95	90-110	0	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1381762 1381763

Parameter	Units	35214665002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	61.4	50	50	113	112	104	102	90-110	1	20	L
Sulfate	mg/L	69.1	50	50	124	123	109	108	90-110	1	20	L

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QUALIFIERS

Project: Arcadis Inc
Pace Project No.: 35214771

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-O	Pace Analytical Services - Ormond Beach

ANALYTE QUALIFIERS

U	Compound was analyzed for but not detected.
L	Off-scale high. Actual value is known to be greater than value given.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Arcadis Inc
Pace Project No.: 35214771

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
35214771001	**MFEB-8 GW-1**	EPA 3010	MPRP/27244	EPA 6010	ICP/16413
35214771002	**MFEB-8 GW-2**	EPA 3010	MPRP/27244	EPA 6010	ICP/16413
35214771003	**MFEB-8 GW-3**	EPA 3010	MPRP/27244	EPA 6010	ICP/16413
35214771001	**MFEB-8 GW-1**	SM 2320B	WET/33984		
35214771002	**MFEB-8 GW-2**	SM 2320B	WET/33984		
35214771003	**MFEB-8 GW-3**	SM 2320B	WET/33984		
35214771001	**MFEB-8 GW-1**	EPA 300.0	WETA/51785		
35214771002	**MFEB-8 GW-2**	EPA 300.0	WETA/51785		
35214771003	**MFEB-8 GW-3**	EPA 300.0	WETA/51785		

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WO# : 35214771

35214771

OF CUSTODY RECORD

_____ Quote:_____ Page 1 of ___

Container Type Codes			
AV Amber Vial		ES Encore Sampler	
CV Clear Vial		PPV Prepreserved vial	
P Plastic		PL C Plastic container	
AL Amber Liter		PL J Plastic Jar	
CL Clear Liter		Z Ziploc bag	
AP Amber Plastic		TB Tedlar bag	
AG Amber Glass		WP White pail	
SJ Soil Jar		G Gallon Jug	
Other_____		TC Terracore	

PPV Preprepared vial
Size(s): 2oz, 4oz, 8oz, 16oz, 32oz or 1L, other_____
40ml 500ml 250ml 125 ml
Example: 4ozP = 4oz Plastic, 8ozSJ= 8oz Soil Jar

Company Name: Nutting Eng PO#

Address: 810 Neptune Dr

City: Boynton Beach State: FL Zip: 33426

Attn: Jon Bielnick Fax#

email: Phone:

Project Name: Arcadis Inc Proj #

Sampler Signature:

Circle One Event: Daily Weekly Monthly Quarterly Semi-Annual Annual N/A

LAB ANALYSIS

Sample #	Sample ID	Collect Date	Collect Time	Matrix Code*	Field Filtered	Integrity On(Y/N)	Total # of containers	Parameters	Bicarbonate	Carbonate	Sulfate	Calcium	Magnesium	Sodium	Potassium	Iron	Chloride	EXAMPLE Diss. Lead 6010
									# of Containers Size/Type									1 16ozP
1	MFEB-8 MW-1	10/28	12:31	GW			2											
2	MFEB-8 MW-2	10/28	14:24	GW			2											
3	MFEB-8 MW-3	10/28	14:57	GW			2											
4	MFEB-4 MW-1	11/2	12:41	GW			2											
5	MFEB-4 MW-2	11/2	14:34	GW			2											
6	MFEB-4 MW-3	11/2	15:11	GW			2											
7																		
8																		
9																		
10																		

Matrix Codes

SD Solid Waste		OL Oil	
GW Ground Water		SL Sludge	
EFF Effluent		SO Soil Sediment	
AFW Analyte Free H20		AQ Aqueous	
WW Waste Water		NA Nonaqueous	
DW Drinking Water		PE Petroleum	
SW Surface Water		O Other_____ (Please specify)	
ML Misc. Liquid			

Preservative Type Codes

A. None	E. HCL	I. Ice
B. HNO_3	F. MeOH	J. MCAA
C. H_2SO_4	G. $Na_2S_2O_3$	K. Zn Acetate
D. NaOH	H. $NaHSO_4$	O. Other

REMARKS

2629-20

Circle T.A.T. REQUEST (Rush Fees Applied)
Standard: Y N
RUSH: Today 1D 2D 3D 4D 5D ___

Short Hold: Y___ N___

Circle QA/QC Report Level: 1 2 3 4 CLP APCEE QAPP Other_____

EDD (Fees May Apply): ADaPT SEDD ERPIMS TSV CSV Other_____

COC Condition: OK Incomplete

Required State Certification: FL GA SC NC NJ PA LA TX IL ___

Coolers #'s - Temp °C: 1 4.3 2___ 3___ 4___ 5___

Item	Relinquished by	Affiliation	Date	Time	Received by	Affiliation	Date	Time
1	Emily Rudzi	NEF	11/3/15	~~5:30~~				
2				12:00				
3			11/3/15	1550			11.3.15	1200
4							11/3/15	1550

Lab Use Only	YES	NO	N/A
Non-Conformance Found?			
Samples INTACT upon arrival?			
Received on Wet Ice?			
Proper Preservatives Indicated?			
Received within holding time?			
Custody seals intact?			
Volatiles rec'd without headspace?			
Proper Containers Used?			

Pace Analytical	Document Name Sample Condition Upon Receipt Form	Document Revised October 9, 2013
	Document No. F-FL-C-007 rev. 05	Issuing Authorities Pace Florida Quality Office

Sample Condition Upon Receipt Form (SCUR)

WO# : 35214771

Client Name: Nutting EV Pr

PM: CTR **Due Date: 11/09/15**

CLIENT: 36-NUTTEN

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace

Tracking # _____

Custody Seal on Cooler/Box Present: ☐ yes ☒ no Seals intact ☐ yes ☒ no

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☒ None ☐ Other _____

Thermometer Used T160 Type of Ice: ☒ Wet Blue None

Cooler Temperature °C 4.3 (Visual) +0.2 (Correction Factor) 4.5 (Actual)

Date and Initials of person examining contents: SLA 11/03/15

(Temp should be above freezing to 6°C) Below 0°C, Was sample frozen? ☒ Yes ☐ No

Receipt of samples satisfactory: ☐ Yes ☐ No

Rush TAT requested on COC:

If yes, then all conditions below were met	If no, then mark box & describe issue (use comments area if necessary)
Chain of Custody Present	☐
Chain of Custody Filled Out	☐
Relinquished Signature & Sampler Name COC	☐
Samples Arrived within Hold Time	☐
Sufficient Volume	☐
Correct Containers Used	☐
Containers Intact	☐
Sample Labels match COC (sample IDs & date/time of collection)	☐ No Labels ☐ No Time/Date on Labels ☐
All containers needing preservation are found to be in compliance with EPA recommendation	☐
No Headspace in VOA Vials (>6mm)	☐

Client Notification/ Resolution:

Person Contacted _____ Date/Time _____

Comments/ Resolution (use back for additional comments) _____

Project Manager Review: _____ Date: _____

Finished Product Information Only

F.P. Sample ID: _____

Production Code: _____

Date/Time Opened: _____

Number of Unopened Bottles Remaining: _____

Extra Sample in Shed: Yes No

Size & Qty of Bottles Received

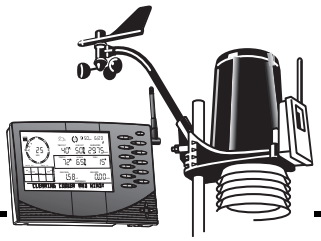
_____ x 5 Gal
_____ x 2.5 Gal
_____ x 1 Gal
_____ x 1 Liter
_____ x 500 mL
_____ x 250 mL
_____ x Other: _____

APPENDIX F

Rainfall Monitoring Equipment

Wireless Vantage Pro2™ & Vantage Pro2™ Plus Stations

(Including Fan-Aspirated Models)



6152 6162
6153 6163

WIRELESS VANTAGE PRO2™

Vantage Pro2™ (6152, 6153) and Vantage Pro2™ Plus (6162, 6163) Wireless Weather Stations include two components: the Integrated Sensor Suite (ISS) which houses and manages the external sensor array, and the console which provides the user interface, data display, and calculations. The ISS and Vantage Pro2 console communicate via an FCC-certified, license-free, spread-spectrum frequency-hopping (FHSS) transmitter and receiver. User-selectable transmitter ID codes allow up to eight stations to coexist in the same geographic area. The frequency hopping spread spectrum technology provides greater communication strength over longer distances and areas of weaker reception. The Wireless Vantage Pro2 Plus weather station includes two additional sensors that are optional on the Vantage Pro2: the UV sensor and the solar radiation sensor.

The console may be powered by batteries or by the included AC-power adapter. The wireless ISS is solar powered with a battery backup. Use WeatherLink® for Vantage Pro2 and Vantage Vue® to let your weather station interface with a computer, to log weather data, and to upload weather information to the internet.

The 6152 and 6162 rely on passive shielding to reduce solar-radiation induced temperature errors in the outside temperature sensor readings. The Fan-aspirated 6153 and 6163 combine passive shielding with a solar-powered fan that draws outside air in over the temperature and humidity sensors, providing a much more accurate temperature reading than that available using passive shielding alone.

Integrated Sensor Suite (ISS)

Operating Temperature	-40° to +150°F (-40° to +65°C)
Non-operating Temperature	-40° to +158°F (-40° to +70°C)
Current Draw (ISS SIM only)	0.14 mA (average), 30 mA (peak) at 4 to 6 VDC
Solar Power Panel	0.5 Watts (ISS SIM), plus 0.75 Watts (Fan-Aspirated)
Battery (ISS SIM /Fan-Aspirated)	CR-123 3-Volt Lithium cell / 2 - 1.2 Volt NiCad C-cells
Battery Life (3-Volt Lithium cell)	8 months without sunlight - greater than 2 years depending on solar charging
Battery Life (NiCad C-cells, Fan-Aspirated)	1 year
Fan Aspiration Rate (Fan-Aspirated only)	
Intake Flow Rate, full sun	190 feet/min. (0.9 m/s)
Intake Flow Rate, battery only	80 feet/min. (0.4 m/s)
Sensor Chamber Flow Rate, full sun	500 feet/min. (2.5 m/s)
Sensor Chamber Flow Rate, battery only	280 feet/min. (1.4 m/s)
Connectors, Sensor	Modular RJ-11
Cable Type	4-conductor, 26 AWG
Cable Length, Anemometer	40’ (12 m) (included) 240’ (73 m) (maximum recommended)

Note: Maximum displayable wind decreases as the length of cable increases. At 140’ (42 m) of cable, the maximum wind speed displayed is 135 mph (60 m/s); at 240’ (73 m), the maximum wind speed displayed is 100 mph (34 m/s).

Wind Speed Sensor	Solid state magnetic sensor
Wind Direction Sensor	Wind vane with potentiometer
Rain Collector Type	Tipping bucket, 0.01" per tip (0.2 mm with metric rain adapter), 33.2 in^2 (214 cm^2) collection area
Temperature Sensor Type	PN Junction Silicon Diode
Relative Humidity Sensor Type	Film capacitor element
Housing Material	UV-resistant ABS, ASA plastic

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ISS Dimensions:

Product #	(Length x Width x Height)	Package Weight
6152	11.00" x 9.38" x 14.00" (279 mm x 238 mm x 355 mm)	5.7 lbs. (2.6 kg)
6162		6.1 lbs. (2.6 kg)
6153	11.00" x 9.38" x 21.00" (279 mm x 238 mm x 533 mm)	8.6 lbs. (3.9 kg)
6163		9 lbs. (4.1 kg)

Console

Console Operating Temperature . . . . . +32° to +140°F (0° to +60°C)
Non-Operating (Storage) Temperature . . . . . +14° to +158°F (-10° to +70°C)
Current Draw . . . . . 0.9 mA average, 30 mA peak, (add 120 mA for display lamps, add 0.125 mA for each optional wireless transmitter received by the console) at 4 - 6 VDC
AC Power Adapter . . . . . 5 VDC, 300 mA, regulated
Batteries . . . . . 3 C-cells
Battery Life . . . . . up to 9 months
Connectors . . . . . Modular RJ-11
Housing Material . . . . . UV-resistant ABS plastic
Console Display Type . . . . . LCD Transflective
Display Backlight . . . . . LEDs
Console Dimensions
- Console with antenna down (L x H x D) . . . . . 10.625" x 6.125" x 1.625" (270 mm x 156 mm x 41 mm)
- Console with antenna extended up (L x H x D) . . . . . 10.625" x 9.625" x 1.625" (270 mm x 245 mm x 41 mm)
- Display (L x H) . . . . . 5.94" x 3.375" (151 mm x 86 mm)

Weight (with batteries) . . . . . 1.88 lbs. (.85 kg)

Data Displayed on Console

Data display categories are listed with General first, then in alphabetical order.

General

Historical Data . . . . . Includes the past 24 values listed unless otherwise noted; all can be cleared and all totals reset
Daily Data . . . . . Includes the earliest time of occurrence of highs and lows; period begins/ends at 12:00 am
Monthly Data . . . . . Period begins/ends at 12:00 am on the first of the month
Yearly Data . . . . . Period begins/ends at 12:00 am on the first of January unless otherwise noted
Current Display Data . . . . . Current display data describes the current reading for each weather variable. In most cases, the variable lists the most recently updated reading or calculation. Some current variable displays can be adjusted so there is an offset for the reading
Current Graph Data . . . . . Current graph data appears in the right-most column in the console graph and represents the latest value within the last period on the graph; totals can be set or reset. Display intervals vary. Examples include: Instant, 15-min., and Hourly Reading; Daily, Monthly, High and Low
Graph Time Interval . . . . . 1 min., 10 min., 15 min., 1 hour, 1 day, 1 month, 1 year (user-selectable, availability depends upon variable selected)
Graph Time Span . . . . . 24 Intervals + Current Interval (see Graph Intervals to determine time span)
Graph Variable Span (Vertical Scale) . . . . . Automatic (varies depending upon data range); Maximum and Minimum value in range appear in ticker
Alarm Indication . . . . . Alarms sound for only 2 minutes (time alarm is always 1 minute) if operating on battery power. Alarm message is displayed in ticker as long as threshold is met or exceeded. Alarms can be silenced (but not cleared) by pressing the DONE key.
Transmission Interval . . . . . Varies with transmitter ID code from 2.25 seconds (#1=shortest), to 3 seconds (#8=longest)
Update Interval . . . . . Varies with sensor - see individual sensor specs

Barometric Pressure

Resolution and Units	0.01" Hg, 0.1 mm Hg, 0.1 hPa/mb (user-selectable)
Range	16.00" to 32.50" Hg, 410 to 820 mm Hg, 540 to 1100 hPa/mb
Elevation Range	-999' to +15,000' (-600 m to 4570 m) (Note that console screen limits entry of lower elevation to -999' when using feet as elevation unit.)
Uncorrected Reading Accuracy	±0.03" Hg (±0.8 mm Hg, ±1.0 hPa/mb) (at room temperature)
Sea-Level Reduction Equation Used	United States Method employed prior to use of current "R Factor" method
Equation Source	Smithsonian Meteorological Tables
Equation Accuracy	±0.01" Hg (±0.3 mm Hg, ±0.3 hPa/mb)
Elevation Accuracy Required	±10' (3m) to meet equation accuracy specification
Overall Accuracy	±0.03" Hg (±0.8 mm Hg, ±1.0 hPa/mb)
Trend (change in 3 hours)	Change 0.06" (2 hPa/mb,1.5 mm Hg) = Rapidly Change 0.02" (0.7hPa/mb, 0.5 mm Hg)= Slowly
Trend Indication	5 position arrow: Rising (rapidly or slowly), Steady, or Falling (rapidly or slowly)
Update Interval	1 minute or when console BAR key is pressed twice
Current Display	Instant
Current Graph Data	Instant, 15-min., and Hourly Reading; Daily, Monthly, High and Low
Historical Graph Data	15-min. and Hourly Reading; Daily, Monthly Highs and Lows
Alarms	High Threshold from Current Trend for Storm Clearing (Rising Trend Low Threshold from Current Trend for Storm Warning (Falling Trend)
Range for Rising and Falling Trend Alarms	0.01 to 0.25" Hg (0.1 to 6.4 mm Hg, 0.1 to 8.5 hPa/mb)

Clock

Resolution	1 minute
Units	Time: 12 or 24 hour format (user-selectable)
Date	US or International format (user-selectable)
Accuracy	±8 seconds/month
Adjustments	Time: Automatic Daylight Savings Time (for users in North America and Europe that observe it in AUTO mode, MANUAL setting available for all other areas) Date: Automatic Leap Year
Alarms	Once per day at set time when active

Dewpoint (calculated)

Resolution and Units	1°F or 1°C (user-selectable) °C is converted from °F rounded to the nearest 1°C
Range	-105° to +130°F (-76° to +54°C)
Accuracy	±3°F (±1.5°C) (typical)
Update Interval	10 to 12 seconds
Source	World Meteorological Organization (WMO)
Equation Used	WMO Equation with respect to saturation of moist air over water
Variables Used	Instant Outside Temperature and Instant Outside Relative Humidity
Current Display Data	Instant Calculation
Current Graph Data	Instant Calculation; Daily, Monthly High and Low
Historical Graph Data	Hourly Calculations; Daily, Monthly Highs and Lows
Alarms	High and Low Threshold from Instant Calculation

Evapotranspiration (calculated, requires solar radiation sensor)

Resolution and Units	0.01" or 0.1 mm (user-selectable)
Range	Daily to 32.67" (832.1 mm); Monthly & Yearly to 199.99" (1999.9 mm)
Accuracy	Greater of 0.01" (0.25 mm) or ±5%, Reference: side-by-side comparison against a CIMIS ET weather station
Update Interval	1 hour
Calculation and Source	Modified Penman Equation as implemented by CIMIS (California Irrigation Management Information System) including Net Radiation calculation

Current Display Data	Latest Hourly Total Calculation
Current Graph Data	Latest Hourly Total Calculation, Daily, Monthly, Yearly Total
Historical Graph Data	Hourly, Daily, Monthly, Yearly Totals
Alarm	High Threshold from Latest Daily Total Calculation

Forecast

Variables Used	Barometric Reading & Trend, Wind Speed & Direction, Rainfall, Temperature, Humidity, Latitude & Longitude, Time of Year
Update Interval	1 hour
Display Format	Icons on top center of display; detailed message in ticker at bottom
Variables Predicted	Sky Condition, Precipitation, Temperature Changes, Wind Direction and Speed

Heat Index (calculated)

Resolution and Units	1°F or 1°C (user-selectable) °C is converted from °F rounded to the nearest 1°C
Range	-40° to +165°F (-40° to +74°C)
Accuracy	±3°F (±1.5°C) (typical)
Update Interval	10 to 12 seconds
Source	United States National Weather Service (NWS)/NOAA
Formulation Used	Steadman (1979) modified by US NWS/NOAA and Davis Instruments to increase range of use
Variables Used	Instant Outside Temperature and Instant Outside Relative Humidity
Current Display Data	Instant Calculation
Current Graph Data	Instant Calculation; Daily, Monthly High
Historical Graph Data	Hourly Calculations; Daily, Monthly Highs
Alarm	High Threshold from Instant Calculation

Humidity

Inside Relative Humidity (sensor located in console)

Resolution and Units	1%
Range	1 to 100% RH
Accuracy	±3% (0 to 90% RH), ±4% (90 to 100% RH)
Update Interval	1 minute
Current Display Data	Instant (user-adjustable offset available)
Current Graph Data	Instant; Hourly Reading; Daily, Monthly High and Low
Historical Graph Data	Hourly Readings; Daily, Monthly Highs and Lows
Alarms	High and Low Threshold from Instant Reading

Outside Relative Humidity (sensor located in ISS)

Resolution and Units	1%
Range	1 to 100% RH
Accuracy	±3% (0 to 90% RH), ±4% (90 to 100% RH)
Temperature Coefficient	0.03% per °F (0.05% per °C), reference 68°F (20°C)
Drift	±0.5% per year
Update Interval	50 seconds to 1 minute
Current Display Data	Instant (user-adjustable offset available)
Current Graph Data	Instant; Hourly Reading; Daily, Monthly High and Low
Historical Graph Data	Hourly Readings; Daily, Monthly Highs and Lows
Alarms	High and Low Threshold from Instant Reading

Extra Outside Relative Humidity (sensor located inside Temperature/Humidity Station)

Resolution and Units	1%
Range	1 to 100% RH
Accuracy	±3% (0 to 90% RH), ±4% (90 to 100% RH)
Temperature Coefficient	0.03% per °F (0.05% per °C), reference 68°F (20°C)
Drift	±0.5% per year
Update Interval	50 seconds to 1 minute
Current Display Data	Instant Reading (user adjustable)
Alarms	High and Low Threshold from Instant Reading

Leaf Wetness (requires leaf wetness sensor)

Resolution	1
Range	0 to 15
Dry/Wet Threshold	User-selectable
Accuracy	±0.5
Update Interval	46 to 54 seconds
Current Graph Data	Instant Reading; Daily High and Low; Monthly High
Historical Graph Data	Hourly Readings; Daily Highs and Lows; Monthly Highs
Alarms	High and Low Thresholds from Instant Reading

Moon Phase

Console Resolution	1/8 (12.5%) of a lunar cycle, 1/4 (25%) of lighted face on console
WeatherLink Resolution	0.09% of a lunar cycle, 0.18% of lighted face maximum (depends on screen resolution)
Range	New Moon, Waxing Crescent, First Quarter, Waxing Gibbous, Full Moon, Waning Gibbous, Last Quarter, Waning Crescent
Accuracy	±38 minutes

Rainfall

Resolution and Units	0.01" or 0.2 mm (user-selectable) (1 mm at totals ≥ 2000 mm)
Daily/Storm Rainfall Range	0 to 99.99" (0 to 999.8 mm)
Monthly/Yearly/Total Rainfall Range	0 to 199.99" (0 to 6553 mm)
Rain Rate	0 to 96" (0 to 2438 mm)
Accuracy	For rain rates up to 2"/hr (50 mm/hr): ±4% of total or +0.01" (0.2mm) (0.01" = one tip of the bucket), whichever is greater. For rain rates from 2"/hr (50 mm/hr) to 4"/hr (100 mm/hr): ±4% of total or +0.01" (0.25 mm) (0.01" = one tip of the bucket), whichever is greater
Update Interval	20 to 24 seconds
Storm Determination Method	0.02" (0.5 mm) begins a storm event, 24 hours without further accumulation ends a storm event
Current Display Data	Totals for Past 15-min
Current Graph Data	Totals for Past 15-min, Past 24-hour, Daily, Monthly, Yearly (start date user-selectable) and Storm (with begin date); Umbrella is displayed when 15-minute total exceeds zero
Historical Graph Data	Totals for 15-min, Daily, Monthly, Yearly (start date user-selectable) and Storm (with begin and end dates)
Alarms	High Threshold from Latest Flash Flood (15-min. total, default is 0.50", 12.7 mm), 24-Hour Total, Storm Total,
Range for Rain Alarms	0 to 99.99" (0 to 999.7 mm)

Rain Rate

Resolution and Units	0.01" or 0.1 mm (user-selectable) at typical rates (see Fig. 2 and 3)
Range	0, 0.04"/hr (1 mm/hr) to 96"/hr (0 to 2438 mm/hr)
Accuracy	±5% for rates less than 5" per hour (127 mm/hr)
Update Interval	20 to 24 seconds
Calculation Method	Measures time between successive tips of tipping bucket. Elapsed time greater than 15 minutes or only one tip of the rain collector constitutes a rain rate of zero.
Current Display Data	Instant
Current Graph Data	Instant and 1-min. Reading; Hourly, Daily, Monthly and Yearly High
Historical Graph Data	1-min Reading; Hourly, Daily, Monthly and Yearly Highs
Alarm	High Threshold from Instant Reading

Soil Moisture (requires soil moisture sensor)

Resolution	1 cb
Range	0 to 200 cb
Update Interval	77 to 90 seconds
Current Graph Data	Instant Reading; Daily and Monthly High and Low
Historical Graph Data	Hourly Readings; Daily and Monthly Highs and Lows
Alarms	High and Low Thresholds from Instant Reading

Solar Radiation (requires solar radiation sensor)

Resolution and Units	1 W/m^2
Range	0 to 1800 W/m^2
Accuracy	±5% of full scale (Reference: Eppley PSP at 1000 W/m^2)
Drift	up to ±2% per year
Cosine Response	±3% for angle of incidence from 0° to 75°
Temperature Coefficient	-0.067% per °F (-0.12% per °C); reference temperature = 77°F (25 °C)
Update Interval	50 seconds to 1 minute (5 minutes when dark)
Current Graph Data	Instant Reading and Hourly Average; Daily, Monthly High
Historical Graph Data	Hourly Average, Daily, Monthly Highs
Alarm	High Threshold from Instant Reading

Sunrise and Sunset

Resolution	1 minute
Accuracy	±1 minute
Reference	United States Naval Observatory

Temperature

Inside Temperature (sensor located in console)

Resolution and Units	Current Data: 0.1°F or 1°F or 0.1°C or 1°C (user-selectable) °C is converted from °F rounded to the nearest 1°C Historical Data and Alarms: 1°F or 1°C (user-selectable)
Range	+32° to +140°F (0° to +60°C)
Sensor Accuracy	±1°F (±0.5°C), (see Fig. 1)
Update Interval	1 minute
Current Display Data	Instant (user-adjustable offset available)
Current Graph Data	Instant Reading; Daily and Monthly High and Low
Historical Graph Data	Hourly Readings; Daily and Monthly Highs and Lows
Alarms	High and Low Thresholds from Instant Reading

Outside Temperature (sensor located in ISS)

Resolution and Units	Current Data: 0.1°F or 1°F or 0.1°C or 1°C (user-selectable) nominal °C is converted from °F rounded to the nearest 1°C Historical Data and Alarms: 1°F or 1°C (user-selectable)
Range	-40° to +150°F (-40° to +65°C)
Sensor Accuracy	±1°F (±0.5°C) above 20°F (-7°C), ±2°F (±1°C) under 20°F (-7°C) (see Fig. 2)
Radiation Induced Error (Passive Shield)	+4°F (2°C) at solar noon (insolation = 1040 W/m^2, avg. wind speed ≤ 2 mph (1 m/s)) (reference: RM Young Model 43408 Fan-Aspirated Radiation Shield)
Radiation Induced Error (Fan-Aspirated Shield)	+0.6°F (0.3°C) at solar noon (insolation = 1040 W/m^2, avg. wind speed ≤ 2 mph (1 m/s)) (reference: RM Young Model 43408 Fan-Aspirated Radiation Shield)
Update Interval	10 to 12 seconds
Current Display Data	Instant (user-adjustable offset available)
Current Graph Data	Instant Reading; Daily, Monthly, Yearly High and Low
Historical Graph Data	Hourly Readings; Daily, Monthly, Yearly Highs and Lows
Alarms	High and Low Thresholds from Instant Reading

Extra Temperature Sensors or Probes

Resolution and Units	Current Data: 1°F or 1°C (user-selectable) °C is converted from °F rounded to the nearest 1°C Historical Data and Alarms: 1°F or 1°C (user-selectable)

Range	-40° to +150°F (-40° to +65°C)
Sensor Accuracy	±1°F (±0.5°C) above 20°F (-7°C), ±2°F (±1°C) under 20°F (-7°C) (see Fig. 1)
Update Interval	10 to 12 seconds (77 to 90 seconds for Leaf Wetness/Temperature and Soil Moisture/Temperature Stations)
Current Display Data	Instant Reading (user-adjustable offset available)
Alarms	High and Low Thresholds from Instant Reading

Temperature Humidity Sun Wind Index (requires solar radiation sensor)

Resolution and Units	1°F or 1°C (user-selectable) °C is converted from °F rounded to the nearest 1°C
Range	-90° to +165°F (-68° to +74°C)
Accuracy	±4°F (±2°C) (typical)
Update Interval	10 to 12 seconds
Sources and Formulation Used	United States National Weather Service (NWS)/NOAA Steadman (1979) modified by US NWS/NOAA and Davis Instruments to increase range of use and allow for cold weather use
Variables Used	Instant Outside Temperature, Instant Outside Relative Humidity, 10-minute Average Wind Speed, 10-minute Average Solar Radiation
Formulation Description	Uses Heat Index as base temperature, affects of wind and solar radiation are either added or subtracted from this base to give an overall effective temperature
Current Graph Data	Instant and Hourly Calculation; Daily, Monthly High
Historical Graph Data	Hourly Calculation; Daily, Monthly Highs
Alarm	High Threshold from Instant Reading

Ultra Violet (UV) Radiation Dose (requires UV sensor)

Resolution and Units	0.1 MEDs to 19.9 MEDs; 1 MED above 19.9 MEDS
Range	0 to 199 MEDs
Accuracy	±5% of daily total
Drift	up to ±2% per year
Update Interval	50 seconds to 1 minute (5 minutes when dark)
Current Graph Data	Latest Daily Total (user resetable at any time from Current Screen)
Historical Graph Data	Hourly, Daily Totals (user reset from Current Screen does not affect these values)
Alarm	High Threshold from Daily Total
Alarm Range	0 to 19.9 MEDs

Ultra Violet (UV) Radiation Index (requires UV sensor)

Resolution and Units	0.1 Index
Range	0 to 16 Index
Accuracy	±5% of full scale (Reference: Yankee UVB-1 at UV index 10 (Extremely High))
Cosine Response	±4% (0° to 65° incident angle); 9% (65° to 85° incident angle)
Update Interval	50 seconds to 1 minute (5 minutes when dark)
Current Graph Data	Instant Reading and Hourly Average; Daily, Monthly High
Historical Graph Data	Hourly Average, Daily, Monthly Highs
Alarm	High Threshold from Instant Calculation

Wind

Wind Chill (Calculated)

Resolution and Units	1°F or 1°C (user-selectable) °C is converted from °F rounded to the nearest 1°C
Range	-110° to +135°F (-79° to +57°C)
Accuracy	±2°F (±1°C) (typical)
Update Interval	10 to 12 seconds
Source	United States National Weather Service (NWS)/NOAA
Equation Used	Osczevski (1995) (adopted by US NWS in 2001)
Variables Used	Instant Outside Temperature and 10-min. Avg. Wind Speed
Current Display Data	Instant Calculation

Current Graph Data	Instant Calculation; Hourly, Daily and Monthly Low
Historical Graph Data	Hourly, Daily and Monthly Lows
Alarm	Low Threshold from Instant Calculation
Wind Direction	
Range	0 - 360°
Display Resolution	16 points (22.5°) on compass rose, 1° in numeric display
Accuracy	±3°
Update Interval	2.5 to 3 seconds
Current Display Data	Instant (user-adjustable offset available)
Current Graph Data	Instant; 10-min. Dominant; Hourly, Daily, Monthly Dominant
Historical Graph Data	Past 6 10-min. Dominants on compass rose only; Hourly, Daily, Monthly Dominants
Wind Speed	
Resolution and Units	1 mph, 1 km/h, 0.4 m/s, or 1 knot (user-selectable). Measured in mph, other units are converted from mph and rounded to nearest 1 km/hr, 0.1 m/s, or 1 knot.
Range	1 to 200 mph, 1 to 173 knots, 0.5 to 89 m/s, 1 to 322 km/h
Update Interval	Instant Reading: 2.5 to 3 seconds, 10-minute Average: 1 minute
Accuracy	±2 mph (2 kts, 3 km/h, 1 m/s) or ±5%, whichever is greater
Maximum Cable Length	240’ (73 m) (See note on page 1)
Current Display Data	Instant
Current Graph Data	Instant; 10-minute and Hourly Average; Hourly High; Daily, Monthly and Yearly High with Direction of High
Historical Graph Data	10-min. and Hourly Averages; Hourly Highs; Daily, Monthly and Yearly Highs with Direction of Highs
Alarms	High Thresholds from Instant Reading and 10-minute Average

Wireless Communications

Transmit/Receive Frequency	
US Models	902-928 MHz FHSS,
EU Models	868.0 - 868.6 MHz FHSS
Japan Models	928.15 - 929.65 MHz FHSS
ID Codes Available	8
Output Power	
US Models	902-928 MHz FHSS: FCC-certified low power, less than 8 mW, no license required
EU Models	868.0 - 868.6 MHz FHSS. CE-certified, less than 8 mW, no license required.
Japan Models	928.15 - 929.65 MHz FHSS, less than 1 mW, no license required.
Range: US & EU models	
Line of Sight	up to 1000 feet (300 m)
Through Walls	200 to 400 feet (60 to 120 m)
Range: Japan models	
Line of Sight	up to 300 feet (100 m)
Through Walls	50 to 200 feet (15 to 60m)
Sensor Inputs	
RF Filtering	RC low-pass filter on each signal line

Sensor Charts

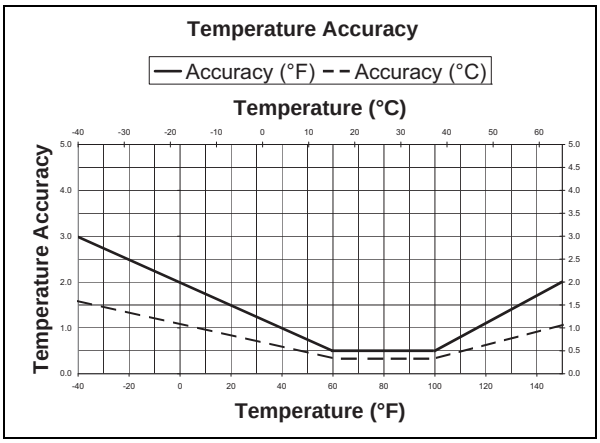


Figure 1. Temperature Accuracy

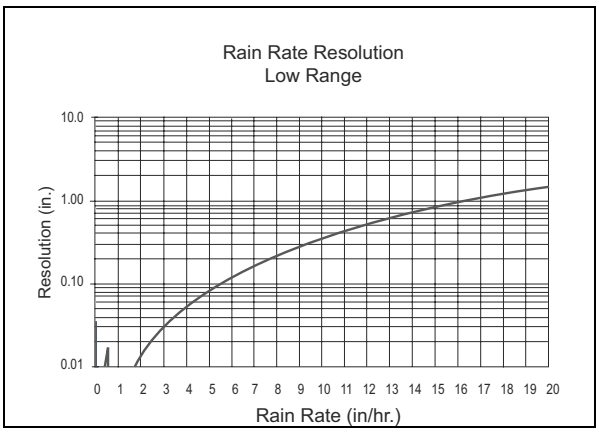


Figure 2. Low Range Rain Rate Resolution

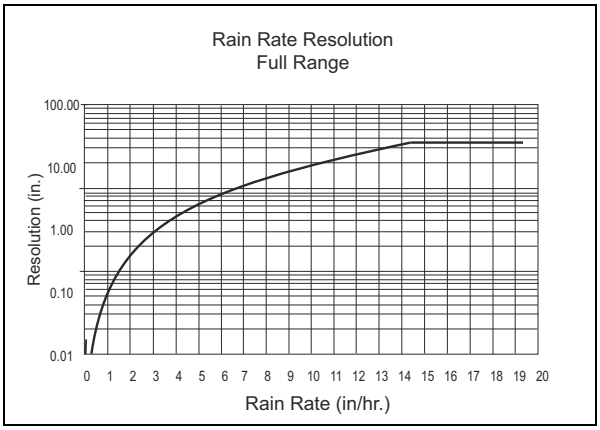


Figure 3. Full Range Rain Rate Resolution

Package Dimensions

Product #	Package Dimensions (Length x Width x Height)	Package Weight	UPC Codes
6152 6152EU 6152UK	17.0" x 11.0" x 13.0" (410 mm x 264 mm x 330 mm)	12.8 lbs. (5.8 kg)	011698 00229 0 011698 00347 1 011698 00348 8
6162 6162EU 6162UK		13.3 lbs. (6.0 kg)	011698 00306 8 011698 00307 5 001698 00308 2
6153 6153EU 6153UK	15.0" x 13.0" x 24.0" (378 mm x 327 mm x 594 mm)	12.8 lbs. (5.8 kg)	011698 00335 8 011698 00336 5 001698 00337 2
6163 6163EU 6163UK		13.3 lbs. (6.0 kg)	011698 00341 9 011698 00342 6 001698 00342 3

Integrated Sensor Suite Installation Manual

For Vantage Pro2™ & Vantage Pro2 Plus™ Weather Stations

Davis Instruments, 3465 Diablo Avenue, Hayward, CA 94545 USA • 510-732-9229 • www.davisnet.com

Contents

Introduction 1
Included Components and Hardware 1
Cabled ISS Assembly 7
Wireless ISS Assembly 9
Preparing the ISS for Installation 13
Installing the ISS 19
Installation Instructions 20
Maintenance and Troubleshooting 25
Appendix 28

FCC Part 15 Class B Registration Warning

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment on and off, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Changes or modification not expressly approved in writing by Davis Instruments may void the warranty and void the user's authority to operate this equipment.

FCC ID: IR2DWW6328

IC: 378810-6328

EC EMC Compliance

This product complies with the essential protection requirements of the EC EMC Directive 2004/108/EC; Low Voltage Directive 2006/95/EC; and Eco-Design Directive 2005/32/EC>0.5 watt no-load adapter.

Introduction

The Integrated Sensor Suite (ISS) collects outside weather data and sends the data to a Vantage Pro2 console or Weather Envoy. Wireless and cabled versions of the ISS are available, as well as Standard and Plus versions. The Wireless ISS is solar powered and sends data to the console via a low-power radio. The Cabled ISS sends data and receives power via the console cable.

Note: If you are using a wireless ISS, it can transmit to a Vantage Pro2 console, as well as a Davis Vantage Vue console or Davis Weather Envoy. One ISS can transmit to any number of receivers within its range, so you can add additional consoles to use in different rooms.

The standard version of the ISS contains a rain collector, temperature sensor, humidity sensor and anemometer. In addition to the standard weather features, the ISS Plus adds a pre-installed solar radiation sensor and an ultra-violet (UV) radiation sensor. Temperature and humidity sensors are mounted in a passive radiation shield to minimize the impact of solar radiation on sensor readings. The anemometer measures wind speed and direction and can be installed adjacent to the ISS or apart from it. See "Locating the ISS and Anemometer" on page 17 for siting guidelines.

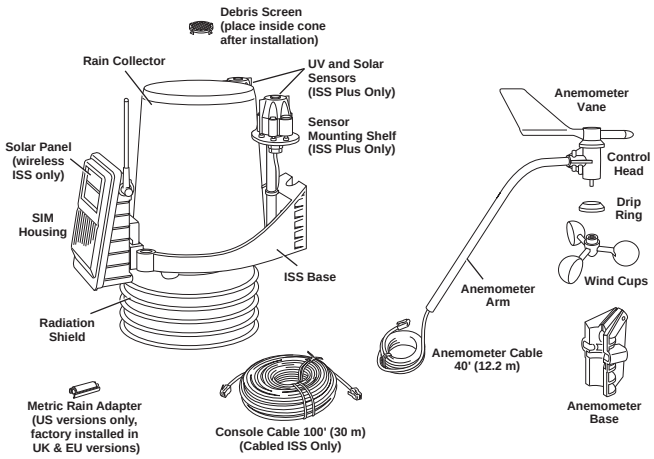
On an ISS Plus, the additional solar and UV sensors are mounted next to the rain collector cone. Separate solar and UV sensors are available to upgrade a standard ISS.

The Sensor Interface Module (SIM) contains the "brains" of the ISS and the radio transmitter. The SIM is located on the front of the radiation shield in the SIM box. The SIM collects outside weather data from the ISS sensors and then transmits the data to your Vantage Pro2 console or Weather Envoy.

Included Components and Hardware

The ISS comes with all the components and hardware shown in the following illustrations. If you purchased your ISS as part of a weather station package containing the Vantage Pro2 console, additional components may be included in the package that are not shown here.

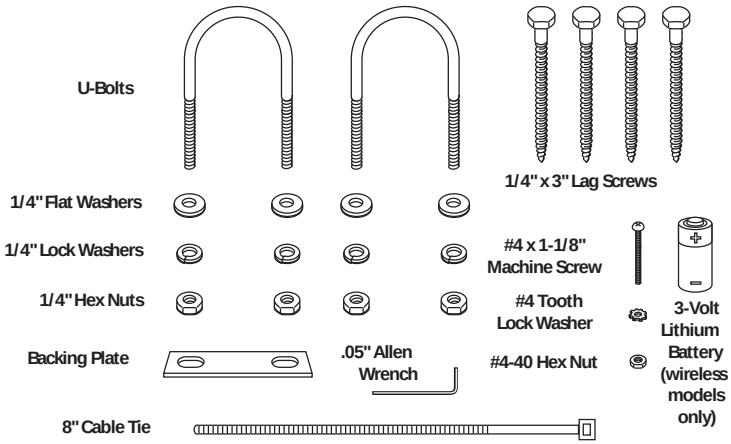
Components



Note: If the ISS is a Plus model and contains UV and solar sensors, do not touch the small white diffusers on top of the sensors. Oil from skin reduces their sensitivity. If you are concerned that you have touched the diffusers at any time during the installation, clean the UV diffuser using ethyl alcohol with a soft cloth. When cleaning the UV diffuser, DO NOT use rubbing or denatured alcohols because they can affect accuracy of the sensor readings. Ethyl alcohol can be procured through an industrial or laboratory supply store. Clean the solar diffuser with a soft damp cloth.

Hardware

The following hardware is included with the ISS and weather station assembly. Some of the hardware is optional based on how the ISS is assembled and installed.



Note: If any of the hardware components are missing or not included, contact Customer Service toll free at 1-800-678-3669 about receiving replacement hardware or other components.

Tools for Setup

The following are additional tools required to set up and install the ISS:

- Small Phillips head screwdriver
- Scissors or wire-cutters
- Adjustable wrench or 7/16" wrench
- Compass or local area map
- Ballpoint pen or paper clip (or other small pointed object)
- Drill and 3/16" (5 mm) drill bit (if mounting on a vertical surface)

Preparing the ISS for Installation

Please follow the steps in the order they are presented. Each step builds on tasks completed in previous steps.

Note: Using a well-lit work table or work area to prepare the ISS for installation is recommended.

The steps to prepare the ISS for installation are:

- Assemble the anemometer.
- Check the factory-installed sensor cable connections to the SIM.
- Connect the anemometer sensor cable to the SIM.

- Apply power to the ISS and test communication with the console.
- Change the Transmitter ID for wireless communication, if necessary.

Assemble the Anemometer

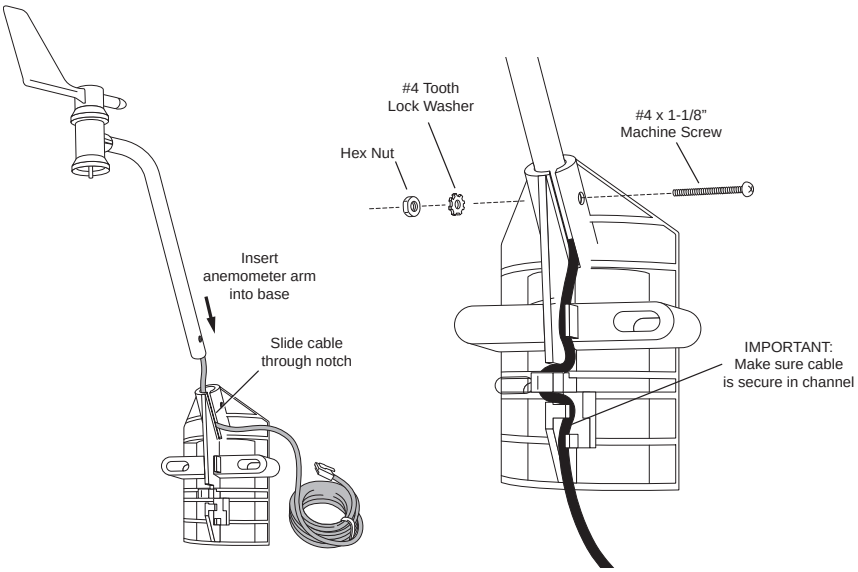
The anemometer measures wind direction and speed. The anemometer arm comes partially assembled with the wind vane attached. The anemometer arm requires assembly before it can be assembled with the rest of the ISS.

Please locate the following parts to prepare the anemometer:

- Anemometer arm (wind vane and cable already attached)
- Anemometer base
- Wind cups
- Drip ring
- Allen wrench (0.05")
- #4 machine screw, #4 tooth-lock washer, #4 hex nut

Attaching Anemometer Arm to Base

1. Insert the anemometer arm into the base, sliding the cable through the notch in the base as shown in illustration.
2. Be sure to line up the small hole in the arm with the holes in the base.
3. Insert the machine screw through the holes in the base and arm.

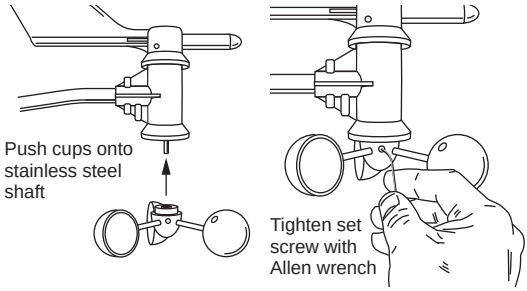


4. Slide the tooth-lock washer and hex nut onto the machine screw. Tighten the hex nut while holding the screw with a Phillips head screwdriver to prevent it from turning.
5. Press the sensor cable firmly and completely into the zig-zagging channel in the base, starting from the arm and progressing downward to the bottom of the base.

Attaching the Wind Cups

1. Push the wind cups up onto the anemometer's stainless steel shaft.
2. Slide the wind cups up the shaft as far as possible.

Note: Make sure to push the cups onto the stainless steel shaft as far up the shaft as possible. Failure to do so will cause the anemometer to function improperly.



Attaching Wind Cups

3. Use the Allen wrench provided to tighten the set screw on the side of the wind cups.
   The wind cups should drop slightly when you let go.

Note: Ensure that the set screw is screwed in fully and very tight. Failure to do so will cause the anemometer to function improperly.

4. Spin the wind cups.
   If the wind cups spin freely, the anemometer is ready and can be set aside while you prepare the rest of the ISS for installation.

Note: If the wind cups don't spin freely, take them off and repeat the wind cup installation process.

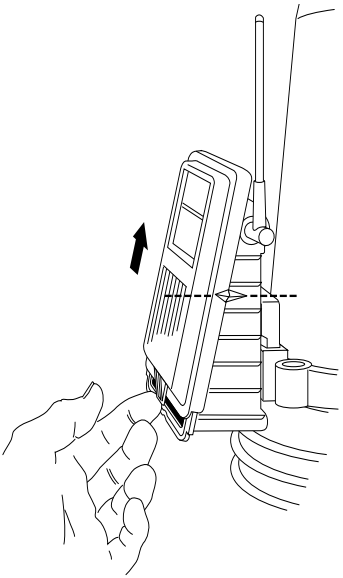
Check SIM Sensor Connections

The SIM is located in the housing on the front of the ISS station. The SIM contains all the connections for the weather sensors of the ISS. Follow the steps below to check the SIM and ensure that all sensors are connected properly.

Open the SIM Box

1. Locate the white box with the solar panel containing the SIM on the front of the ISS unit. The cabled model does not have a solar panel.
2. Locate the white tab at the bottom center of the SIM box cover.
3. Lift the tab away from the box while sliding the cover up.
   Look on the side of the SIM box. The box cover can be easily removed from the box when the alignment indicator on the cover is lined up with the alignment indicator on the box
4. Lift the cover off the box, being careful not to stress the solar panel cable when removing the cover.

   The SIM and sensor connectors are visible once the SIM cover has been removed.

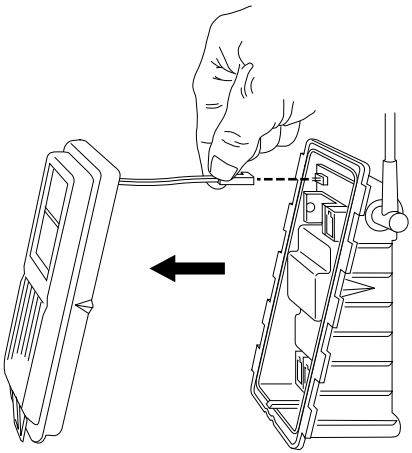


Note: See "SIM Board Display and Contents" on page 29 for information on locating the components and points of interest on the SIM board.

Optional: Disconnect the solar panel connection

The solar panel on the box cover is connected to the SIM by a wire. If the cover cannot be set aside while still connected to the SIM box safely, it should be disconnected from the SIM box. To disconnect the solar power connection:

1. Locate the brown connector for the solar power wire.
2. Pull the connector outward off the brown solar power tab. The solar panel is no longer connected to the SIM.
3. Set the SIM cover aside.



Check the Factory Installed Sensor Connections

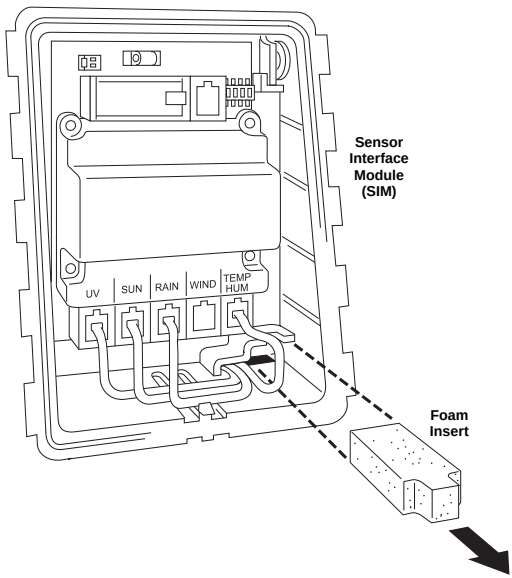
1. Verify that the rain collector and temperature/humidity sensor cables are plugged into the receptacles labeled RAIN and TEMP/HUM on the SIM.
2. If the station includes UV and/or solar radiation sensors, verify that the sensor cables are plugged into the receptacles labeled UV and SUN on the SIM.

Connect the Anemometer Cable to the SIM

1. Unwind the coil of cable enough to work with the anemometer.

Note: Do not unwind the entire coil of anemometer cable at this time.

2. Pull the foam insert out of cable access port in between the cables and set the foam insert aside.
3. Insert the anemometer cable end into the cable access port from beneath the SIM box.
   Slide the cable through the cable access port with the connector lever down.
4. Firmly insert the end of the anemometer cable into the connector labeled WIND. The lever clicks into place.
5. Make sure that the cables lie flat on the bottom of the cable access port.
6. Firmly insert the foam in between the cables and at the top of the cable access port, taking care to ensure that the foam seals the access port entirely, leaving no holes or gaps large enough for weather or insects.



Note: Only Plus models have UV and solar cables already attached.

Note: If you are assembling a cabled station, wait to reinsert the foam until cable assembly is complete. See "Cabled ISS Assembly" on page 8.

Once the sensor connections have been checked and the anemometer cable has been inserted, a connection between the ISS and the Vantage Pro2 console must be made.

7. Follow the instructions that best apply to your ISS and console:
   - See "Cabled ISS Assembly" on page 8 for assembling Vantage Pro2 weather stations that contain a cabled connection between the ISS and the console.
   - See "Wireless ISS Assembly" on page 11 for assembling Vantage Pro2 weather stations that use a wireless connection to transmit and receive data.

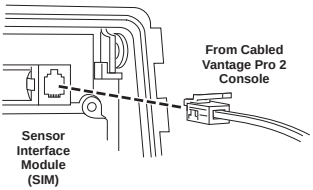
Cabled ISS Assembly

The Cabled ISS system contains a cable for connecting the ISS to a Vantage Pro2 cabled console. Once the anemometer has been installed and the sensors have been checked, a cabled connection between the ISS and the console can be established. Follow the steps below for powering the ISS and connecting to the console.

Applying Power

The 100' (30 m) console cable provides power to the ISS and is used to send data from the ISS to the console. The console cable can be extended up to 1000' (305 m) in length with extension cables purchased from Davis Instruments.

1. Locate the 100' console cable included with your system.
2. Pull the foam insert out of cable access port, if it has been reinserted, and set the foam aside.
3. Insert the console connector cable end into the cable access port from beneath the SIM box. Slide the cable through the cable access port with the connector tab down.
4. On the SIM, firmly insert one end of the 4-conductor cable into the modular connector located apart from the sensor connectors next to the battery insert. This connector is labeled COMM.
   If you haven't powered up the console yet, refer to the installation instructions in the *Vantage Pro2 Console Manual* and apply power to the console.



5. On the back of your console, insert the other end of the console cable into the modular receptacle labeled "ISS."
6. Firmly insert the foam in between the cables and at the top of the cable access port, taking care to ensure that the foam seals the access port entirely, leaving no holes or gaps for weather or insects. See the graphic on page 6 for more information on inserting the foam insert.
   Plugging the console cable into the console powers the ISS and establishes communication between the ISS and the console. The ISS should immediately begin collecting weather data and start sending the data to the console.

Verifying Communication with the Console

Use these steps to verify reception of ISS data at the Cabled Vantage Pro2 console and to test the operation of the ISS sensors.

1. If the console is in Setup Mode, press and hold DONE until the Current Weather screen displays.
   Sensor readings from the ISS should display on the screen.
2. Near the center of the screen, look for the outside temperature.
3. Spin the wind cups to check wind speed, pressing WIND if necessary to alternate between speed and direction in the compass rose.
4. Turn the wind vane and allow five seconds for the wind direction display to stabilize before moving it again.
   Approximately one minute after power-up the outside relative humidity reading should be displayed on the console.

5. If the ISS contains a UV sensor and/or solar sensor, press 2ND and then press RAIN YR for current ultraviolet readings or press 2ND then press RAIN DAY for solar radiation readings.
   The UV reading displays in the center of the console. The solar reading displays in the bottom right corner of the console display. UV and solar readings should be zero or close to zero if the ISS is inside. Zero is a valid reading. Dashes(--) are displayed if no data comes from the sensors.
6. Current weather data displayed on the console confirms communication.
   Once the ISS has been powered and the console has successfully received accurate readings from all the sensors, prepare the ISS for installation. Continue on to "Preparing the ISS for Installation" on page 15 for more information.
   If the communication problems still exist between the cabled ISS and the console, see "Troubleshooting Cabled ISS Communication" below.
   To ease the installation process of ISS at a location, disconnect the console cable from the SIM. Remove the foam and slide the cable out through access port. Once a location for both the ISS and the console has been arranged, reinsert the cable through the access port, into the console connector, and reinsert the foam.

Troubleshooting Cabled ISS Communication

If the console is not receiving sensor readings from the ISS, please try the following troubleshooting procedures.

- Check the console to make sure it is being powered with the AC adapter supplied in the Vantage Pro2 packaged box or three C batteries.

Note: The supplied adapter is a five-volt positive center AC to DC adapter. Other adapters may not work if the voltage or adapter type is different.

- Make sure the cable is firmly plugged into the ISS jack on the console.
- Make sure that the cable is firmly plugged into the correct jack on the SIM.
- Verify that all sensor cables are firmly plugged in.
- An LED indicator light on the SIM flashes each time the ISS transmits, which is about once every 2.5 seconds. If the LED remains dark, there is a problem with the ISS transmitter. Call Technical Support. See "Contacting Davis Instruments" on page 27.

See "SIM Board Display and Contents" on page 29 for information on locating the LED indicator light and the DIP switches.

Note: If the LED is flashing rapidly, call Technical Support. See "Contacting Davis Instruments" on page 27 for more information.

If the console is still not receiving readings, ensure that the console is in Setup Mode and reboot the console by disconnecting the AC power adapter from the console and removing the console batteries for at least 30 seconds. If the console is still not displaying sensor readings from the ISS, please contact Davis Technical Support.

Wireless ISS Assembly

The ISS has a wireless connection to a Vantage Pro2 wireless console. Once the anemometer has been installed and the sensors have been checked, the ISS must be powered and a wireless communication channel must be established between the ISS and the console. Follow the steps below for powering the ISS and establishing a connection to the console.

- Applying Power to a Wireless ISS
- Verifying Communications with the Console
- Verifying Data from the ISS Sensors
- Troubleshooting ISS Reception

Applying Power to a Wireless ISS

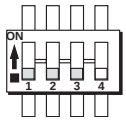
1. Insert the 3-volt lithium battery into the SIM.
   Once powered, the ISS immediately begins transmitting data to the console.

   Be sure to match the "+" sign on the battery with the "+" sign on the SIM. See "SIM Board Display and Contents" on page 29.

   The SIM stores energy from the solar panel for power at night. The battery is an alternative power source the SIM uses when it is depleted of energy.

Checking Transmitter ID

A Vantage Pro2 console can receive data from up to eight different wireless stations. The default Transmitter ID for the ISS and console is 1.



Settings for Transmitter ID 1:
DIP Switch 1 = OFF
DIP Switch 2 = OFF
DIP Switch 3 = OFF

In most cases it will not be necessary to change the Transmitter ID. The console and ISS should begin communicating automatically when power is applied.

Note: If it is necessary to change the Transmitter ID, remember to use the same ID for the ISS and console. See "SIM Board Display and Contents" on page 29 for locating the components and points of interest on the SIM board.

Verifying Communication with the Console

1. Power the console if it does not already have power. Refer to the *Vantage Pro2 Console Manual* and apply power to the console.
   The console automatically enters Setup Mode when powered up.
2. If the console is not in Setup Mode, press and hold DONE then press the down arrow.
   The message RECEIVING FROM... and STATION NO. followed by the Transmitter IDs that the console detects displays on the console screen.
3. Look for the ISS Transmitter ID. The number 1 displays unless the Transmitter ID has been changed. If the console displays the ISS Transmitter ID, the ISS is detected.

Note: If the console does not display the number of the ISS Transmitter ID setting, see "Troubleshooting Wireless ISS Reception" on page 12 for more information. It can take several minutes for the console to acquire and display all the available Transmitter IDs.

4. Press and hold DONE to view ISS data once the ISS Transmitter ID displays.

Verifying Data from the ISS Sensors

Use these steps to verify reception of ISS data at the wireless Vantage Pro2 console and to test the operation of the ISS sensors.

1. Press and hold DONE until the Current Weather screen displays, if the console is in Setup Mode.
   Sensor readings from the ISS should display on the screen.
2. Near the center of the screen, look for the outside temperature.
3. Spin the wind cups to check wind speed, pressing WIND if necessary to alternate between speed and direction in the compass rose.
4. Turn the wind vane, and allow 5 seconds for the wind direction display to stabilize before moving it again.
   Approximately one minute after power-up the outside relative humidity reading should be displayed on the console.
5. If the ISS contains a UV sensor and/or solar radiation sensor, press 2ND and then press RAIN YR for current ultraviolet readings or press 2ND then press RAIN DAY for solar radiation readings.
   The UV reading displays in the center of the console. The solar reading displays in the bottom right corner of the console display. UV and solar readings should be zero or close to zero if the ISS is inside. Zero is a valid reading — dashes are displayed if no data comes from the sensors.
6. Current weather data displayed on the console confirms successful communication.

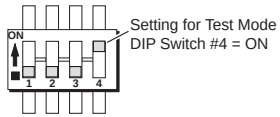
Once the ISS has been powered and the console has successfully received accurate readings from all the sensors, prepare the ISS for installation. Continue on to "Preparing the ISS for Installation" on page 15 for more information.

If the communication problems still exist between the wireless ISS and the console, see "Troubleshooting Wireless ISS Reception."

Troubleshooting Wireless ISS Reception

If the console isn't displaying data from the ISS, perform the following steps:

1. Verify that the console is powered and is not in Setup Mode.
2. Make sure that all ISS sensor cables are firmly connected to the SIM and the ISS battery is properly installed.
3. Walk around the room with the console, standing for a few moments in various locations, to see if you are picking up signals from the ISS. Look on the screen's lower right corner. An "X" toggles on and off when the console receives a transmission.
4. If you do not see the "X" slowly blinking, no matter where you stand with the console, put your ISS in Test Mode.
   - The DIP switch #4 on the SIM is the Test Mode switch. Switch it to the ON position, using a ballpoint pen or paper clip.
   - An LED indicator light on the SIM flashes each time the ISS transmits, which is about once every 2.5 seconds.



Note: If the LED is flashing rapidly, call Technical Support. See "Contacting Davis Instruments" on page 27 for more information.

See "SIM Board Display and Contents" on page 29 for information on locating the components and points of interest on the SIM board.

5. If the LED remains dark, there is a problem with the ISS transmitter. Call Technical Support. See "Contacting Davis Instruments" on page 27.
6. If the LED flashes repeatedly but your console isn't picking up a signal anywhere in the room, it could be related to one of the following causes:
   - You changed the ISS Transmitter ID at the ISS or console, but not at both.
   - Reception is being disrupted by frequency interference from outside sources. Interference has to be strong to prevent the console from receiving a signal while in the same room as the ISS. In high-interference environments, it may be preferable to install the Cabled Vantage Pro2.
   - There is a problem with the console.
7. If a problem with receiving the wireless transmission still exists, please contact Technical Support. See "Contacting Davis Instruments" on page 27.
8. When you are finished testing wireless transmission, set DIP switch # 4 to OFF to take the SIM out of Test Mode.

Note: If the SIM is left in Test Mode, the blinking LED will significantly reduce ISS battery life.

Optional: Changing ISS Transmitter ID

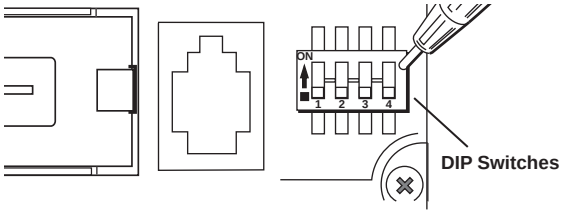
Each wireless transmitting station, including the Integrated Sensor Suite (ISS), uses one of eight selectable Transmitter IDs. DIP switches #1, 2 and 3 on the transmitter control the ID — or channel — the station transmits on. DIP switch #4 is used for transmission testing, not for the Transmitter ID.

Note: The transmitter on the ISS and receiver on the console communicate with each other only when both are set to the same ID.

The default Transmitter ID is 1 for both the ISS and the Vantage Pro2 console, and should work fine for most situations. Change the Transmitter ID if any of the following issues are true:

- Another Davis Instruments wireless weather station operating nearby already uses Transmitter ID 1.
- Additional Vantage Pro2 or Vantage Vue wireless transmitting stations have been purchased with the Vantage Pro2 or Vantage Pro2 Plus and one of the stations has been designated as Station No. 1 instead of the selected ISS.

On the ISS, the Transmitter ID is set using the DIP switches located on the Sensor Interface Module (SIM). To access the SIM, open the SIM housing cover. See "Open the SIM Box" on page 5.



Transmitter ID DIP Switches in Top-right Corner of SIM

To change to another ID, use a ballpoint pen or paper clip to toggle DIP switches #1, 2, and 3. The settings for Transmitter IDs 1 - 8 are shown in the table below.

Set the Vantage Pro2 console to the same ID as the transmitters, as described in the *Vantage Pro2 Console Manual*.

ID CODE	SWITCH 1	SWITCH 2	SWITCH 3
#1 (default)	off	off	off
#2	off	off	ON
#3	off	ON	off
#4	off	ON	ON
#5	ON	off	off
#6	ON	off	ON
#7	ON	ON	off
#8	ON	ON	ON

Using Multiple Transmitting Stations

This table shows the maximum number of each type of station that can be used with a single Vantage Pro2 console. The console can receive signals from a **total** of up to eight transmitters (stations).

.

Station Type	Maximum Number
Integrated Sensor Suite (ISS)	1
Anemometer Transmitter Kit*	1
Leaf & Soil Moisture/Temperature Station	2**
Temperature Station	8
Temperature/Humidity Station	8

*Replaces the ISS anemometer.

**Two are allowable only if both stations are only partially populated. For example, a network can either have both a Leaf Wetness/Temperature station and a Soil Moisture/Temperature station, or it can have one combined Leaf Wetness and Soil Moisture/Temperature station.

Preparing the ISS for Installation

Once all the sensors have been connected and communication between the ISS and the console has been successfully established, continue to prepare the ISS unit for installation. The steps for preparing the ISS for installation are as follows.

- Close the SIM Box
- Prepare the Solar Panel
- Prepare the Rain Collector
- Site the ISS and Anemometer

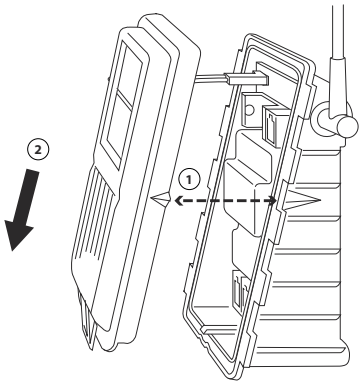
Close the SIM Box

To close the SIM box and continue assembling the ISS:

1. If the solar panel wire was disconnected during ISS assembly, reconnect the wire on the SIM box cover to the solar panel tab on the SIM board.

Note: See "SIM Board Display and Contents" on page 29 for information on locating the solar panel tab.

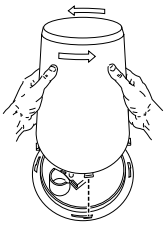
2. Find the two raised alignment indicator lines on both the SIM box and the SIM box cover. Match these alignment indicators as you place the cover against the box.
3. Slide the cover down until it snaps securely in place.



Prepare the Rain Collector

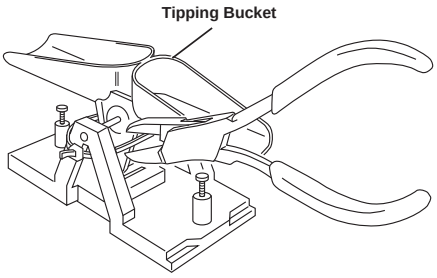
The tipping bucket is secured at the factory to protect it from damage during shipping. To use the ISS properly, the bucket must be released. To release the bucket:

1. Remove the rain collector cone from the ISS base by rotating the cone counter-clockwise. When the cone's latches line up with openings in the base, lift the cone off the ISS base. When new, the cone fits tightly in the base and may require extra pressure to remove. Steady the ISS base between your knees when removing the cone.



Twist to Open

2. Carefully cut and remove the plastic tie that holds the tipping bucket in place during shipping (usually yellow or white in color).
3. On your console screen, look for the DAILY RAIN display. If the console is cabled to the ISS, reconnect the cable and see if the console is receiving rain readings.



4. While watching the daily rain display, tip the bucket until it drops to the opposite side, then wait to see if the display registers a rain reading. Each tip indicates 0.01" or 0.2 mm of rain and may take up to a minute to register at the console. If the bucket is tipped too quickly, the number on the console display may not change.
5. Temporarily reinstall the rain collector cone until you are ready to mount the ISS outside. If you are installing the metric measurement adapter, do not reinstall the rain collector cone.

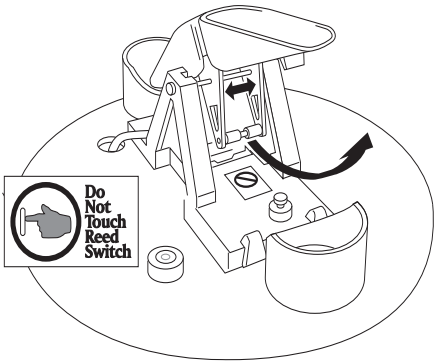
Optional: Insert the Metric Measurement Adapter

The rain collector tipping bucket mechanism contains a standard measurement weight magnet that takes measurements in 0.01" (US versions) or 0.2 mm (UK and EU versions). If you have a US version and would like to convert it to a metric measurement, follow these steps.

Note: EU and UK versions have the metric measurement installed at the factory.

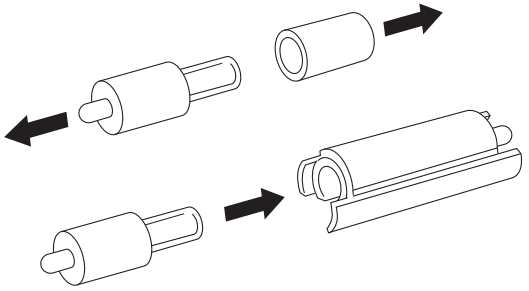
The ISS hardware kit contains a metric adapter that adjusts the weight of the tipping bucket mechanism so that it reports 0.2 mm metric measurements for every tip of the bucket. To install the metric adapter:

1. Find the metric adapter included in the hardware.
2. Locate the magnet between the arms of the bucket.
3. Open the arms slightly with one hand while pulling the magnet out with the other.



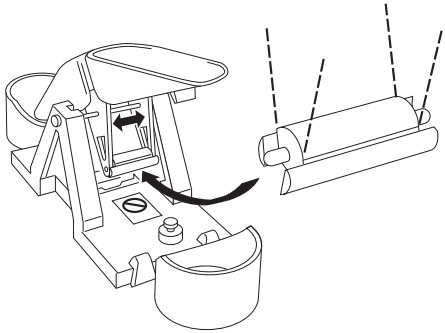
Open plastic tipping mechanism arms, pull out magnet

4. Separate an end cap from one end of the magnet.



Separate magnet from one end cap
Insert magnet with other end cap into metric measurement adapter

5. Slide the magnet, exposed end of magnet first, into the open slot of the metric adapter.
6. Insert the metric adapter and magnet between the arms of the bucket, with the solid side of the metric adapter facing up.



Open plastic arms to insert metric measurement adapter, with adapter in "V" position

Note: The above procedure converts the collector to 0.2 mm measurements. The console must be set accordingly. See the *Vantage Pro2 Console Manual* for more information.

Locating the ISS and Anemometer

For the weather station to perform at its best, use these guidelines to select the optimum mounting locations for the ISS and anemometer. Be sure to take into consideration ease of access for maintenance, sensor cable lengths and wireless transmission range when siting the station.

Note: When selecting a location for installing your ISS, especially on a rooftop, make sure it is a location far from power lines. Seek professional help if you uncertain about the safety of your installation.

General ISS Siting Guidelines

- Place the ISS away from sources of heat such as chimneys, heaters, air conditioners and exhaust vents.
- Place the ISS at least 100' (30 m) away from any asphalt or concrete roadway that readily absorbs and radiates heat in the sun. Avoid installations near fences or sides of buildings that receive a lot of sun during the day.
- Ideally, place the radiation shield of the ISS 5' (1.5 m) above the ground in the middle of gently sloping or flat, regularly mowed grassy or naturally landscaped area that drains well when it rains. For areas with average maximum yearly snow depths over 3' (0.9 m), mount the ISS 2' (0.6 m) above this depth.
- Never install the ISS where it will be directly sprayed by a sprinkler system because it will adversely affect the readings.
- Avoid installations near bodies of water such as swimming pools or ponds.
- Do not locate the ISS under tree canopies or near the side of buildings that create “rain shadows." For heavily forested areas, site the ISS in a clearing or meadow.
- Site the ISS in a location with good sun exposure throughout the day if the ISS is wireless or includes solar radiation or UV radiation sensors.

  For *agricultural applications* (important for evapotranspiration (ET) calculations):
  - Install the ISS and anemometer as a single unit with the radiation shield 5' (1.5 m) above the ground and in the middle of the farm between similar crop types (i.e. two orchards, two vineyards or two row crops), if possible.
  - Avoid areas exposed to extensive or frequent applications of agricultural chemicals (which can degrade the sensors).
  - Avoid installation over bare soil. The ET formula works best when the ISS is installed over well-irrigated, regularly mowed grass.
  - If the last three guidelines cannot be met, install the weather station at the edge of the primary crop of interest.

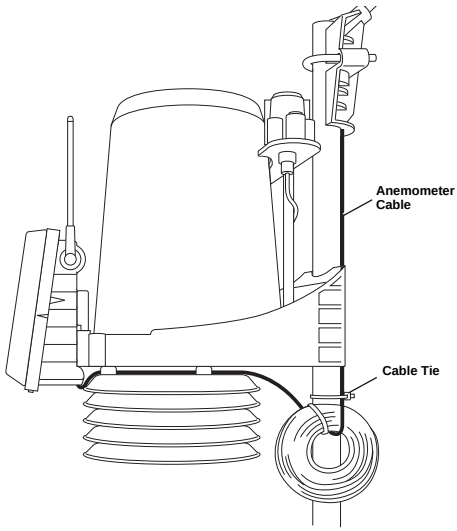
Anemometer Siting Guidelines

- For best results, place the anemometer at least 7' (2.1 m) above surrounding obstructions such as trees or buildings that obstruct wind flow.
- If mounting on a roof, mount the anemometer at least 7' (2.1 m) above the roof apex (when using a Mounting Tripod, install the anemometer at the very top of the pole).
- If mounting the ISS and the anemometer together, such as on a pole or a wooden post, mount the anemometer so it is at least 12" (0.3 m) above the top of the rain collector cone for best results.
- The standard for meteorological and aviation applications is to place the anemometer 33' (10 m) above the ground. Seek professional help for this type of installation.
- The standard for *agricultural applications* is to place the anemometer 6' (2 m) above the ground. This is important for evapotranspiration (ET) calculations.

Note: For roof mounting, and ease of installation, we recommend using the optional mounting tripod (#7716). For other installations, use the Mounting Pole Kit (#7717).

Note: For more detailed siting suggestions, see Application Note #30: Reporting Quality Observations to NOAA on the Davis Support web site (http://www.davisnet.com/support/weather).

Optional: Anemometer Cable Length Considerations



- All Vantage Pro2 stations include a 40' (12 m) cable to go between the ISS and the anemometer. This can be extended up to 540' (165 m) using optional extension cables purchased from Davis Instruments.
- If most of the anemometer cable length is unused, the coiled cable length can be stowed once the anemometer and ISS have been installed on a site. Attaching the anemometer cable to the mounting pole using the supplied cable tie is the recommended option.

  Keep the anemometer cable coiled if possible during the ISS and anemometer assembly so that it is easily stowed once installation is complete.
- The Cabled Vantage Pro2 includes a 100' (30 m) cable to go between the console and the ISS. This can be extended up to 1000' (300 m) using optional cables.

Optional: Wireless Transmission Considerations

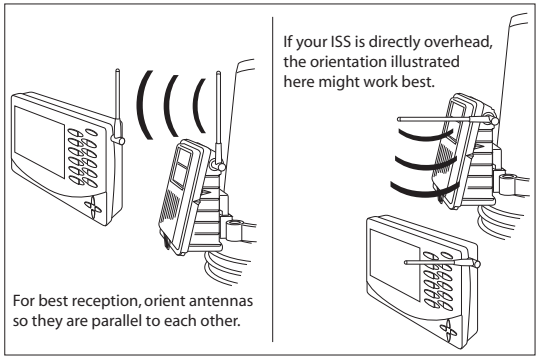
The range of the radio transmission depends on several factors. Try to position the transmitter and the receiver as close as possible for best results.

Typical maximum ranges include:

- Line of sight: 1000' (300 m).
- Under most conditions: 200 - 400' (60 - 120 m).

Other range and transmission considerations include:

- Range may be reduced by walls, ceilings, trees, foliage, a metal roof or other large metal structures or objects such as aluminum siding, metal ducts, and metal appliances, such as refrigerators, televisions, heaters, or air conditioners.
- Frequency interferers also reduce transmission distance. Cordless phones (900 Mhz) are a common example of frequency interference.
- Transmission between wireless units may be obscured by something unidentifiable, or by some obstacle that can't be worked around.
- For best results, orient the ISS antenna and the console antenna so that the orientation and angles of the antennas are parallel to each other.



- If possible, align the pivot joints of both the ISS and the console antennas so that they are facing each other for maximum signal strength.
- The ISS and console antennas do not rotate in a complete circle. Avoid forcing the antennas when rotating it.
- Turn the gain on to improve reception of a weak signal. Refer to the *Vantage Pro2 Console Manual* for information on setting the console gain.
- Consider using a Wireless Repeater (#7626 or #7627) or Long-Range Wireless Repeater (#7653 or #7654) to strengthen the signal or to increase the distance between the ISS and the console.

Testing Wireless Transmission at ISS Location

After a suitable place has been found for the wireless ISS, it is very important to test reception from the installation location before permanently mounting it there.

1. Set the ISS in the desired installation location.
2. Set the console in the desired location.
3. Press and hold TEMP and press HUM to display statistical and reception diagnostics on the console.
   - It's a good idea to test the console's reception anywhere that you might want to use or mount it now or in the future. Take your time. If you aren't picking up a strong signal where you intend to place your console, try rotating the antenna on the console and ISS or try moving the console and ISS to different positions.
   - Irregular terrain in the area may interfere with the signal. For example, if the ISS is mounted downhill from the console, the ground may block a large percentage of the transmitted signal.
4. Press and hold DONE to return to the Current Weather Mode when finished testing.

Note: See the Troubleshooting section of the Vantage Pro2 Console Manual for information on how to check wireless signal strength and for more information on troubleshooting reception problems.

Installing the ISS

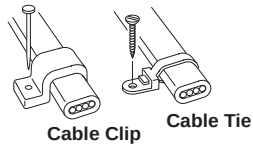
The anemometer and the main part of the ISS can be installed either together as a single unit on a pole, or apart from each other. The main part of the ISS includes the rain collector, the temperature and humidity sensors, the radiation shield, and the SIM housing. Use the U-bolts to install the ISS and anemometer together or separately on a pole. Use the lag screws to install them separately on a flat, vertical surface.

- The anemometer comes with a 40' (12 m) cable for flexibility in configuring the system to monitor wind conditions. For example, the anemometer could be mounted at the highest point of a roof, and the ISS could be mounted on a fence closer to ground level.

General ISS Installation Guidelines

- Install the ISS as level as possible to ensure accurate rain measurements. Use the built-in bubble level (under the rain collector cone, near the tipping bucket mechanism) or carpenter's level to make sure the ISS is level.
- In the Northern Hemisphere, the solar panel should face south for maximum sun exposure.
- In the Southern Hemisphere, the solar panel should face north for maximum sun exposure. Either install the ISS and anemometer separately, each facing north, or mount them as a single unit with solar panel facing north and the wind vane re-oriented to the South.

Optional: Guidelines for Securing Cables



- To prevent fraying or cutting of cables, secure them so they will not whip about in the wind.
- Secure cable to a metal pole using cable ties or by wrapping tape around both the cables and the pole.
- Place clips or ties approximately every 3' – 5' (1 – 1.6 m).
- Mounting clips, cable ties or additional hardware not included with your station can be easily obtained at a hardware or electronics store.

Note: Do not use metal staples or a staple gun to secure cables. Metal staples — especially when installed with a staple gun — have a tendency to cut the cables.

Orient the Wind Vane

The wind vane rotates 360° to display current and dominant wind directions on the compass rose of the console display. To obtain accurate readings, the vane must be *correctly oriented* when mounting the anemometer outside. By default, the wind vane reports the correct wind direction if the anemometer arm points true north.

To ensure correct orientation of the wind vane, mount the anemometer so that the arm points true north.

The wind vane will be ready for use immediately.

If your anemometer arm cannot be mounted aiming true north, you will need to calibrate the wind direction on your console to display accurate wind directions. See your *Vantage Pro2 Console Manual.*

Installation Instructions

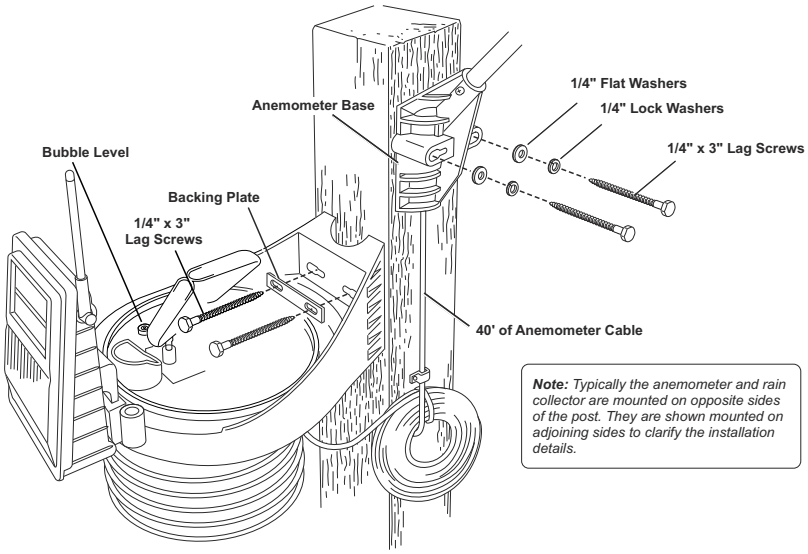
There are several ways to mount and install the ISS unit. The following are installation types that Davis Instruments recommends. Individual ISS locations and installations may vary.

- Installing the ISS on a flat surface
- Installing the anemometer on a post or flat surface
- Installing the ISS on a pole

Note: All installations require that the rain collector cone be removed for assembly. Use the built-in bubble level to ensure the main part of the ISS is level.

Installing the ISS on a Flat Surface

Refer to the following illustration to install the ISS on a post or flat, vertical surface.



Option 1: Installing the ISS on a Post or Flat Surface

1. With a 3/16" (5 mm) drill bit, drill two holes approximately $2\frac{1}{8}$" (54 mm) apart. Use a carpenter's level to ensure the holes are level.
   Use the metal backing plate as a guide when marking the holes.
2. Remove the rain collector cone if it is installed on the ISS mounting base.
3. Insert the 1/4" x 3" lag screws through the metal backing plate and the holes in the mounting base into the post. Make sure the ISS is level by checking the built-in bubble level.
4. Tighten the lag screws using an adjustable wrench or 7/16'' wrench.
5. Re-attach the rain collector cone. Set the cone back on the base so its latches slide downward into the latch openings on the base. Rotate cone clockwise.
6. Place the debris screen (shown in the illustration on page 1) inside the cone, "feet-down" over the funnel hole.

Option 2: Installing the Anemometer on a Post or Flat Surface

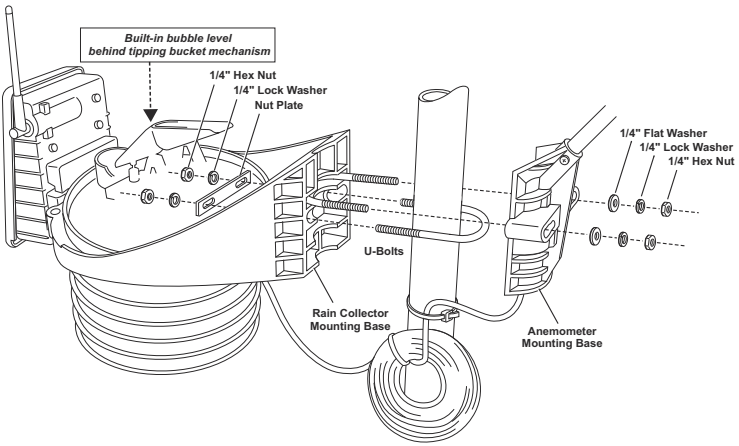
1. With a 3/16" (5 mm) drill bit, drill two holes approximately $2^1/_8$" (54 mm) apart. Use a carpenter's level to ensure the holes will be level.
2. Insert the 1/4" x 3" lag screws through the flat washers and the holes in the anemometer mounting base into the post.
3. Tighten the lag screws using an adjustable wrench or 7/16" wrench.

Note: If your anemometer cannot be mounted aiming true north, you will need to calibrate the wind direction on your console to display accurate wind directions. See your *Vantage Pro2 Console Manual.*

Installing the ISS on a Pole

When installing the ISS on a pole, the rain collector and radiation shield section of the ISS can be mounted as a single unit with the anemometer section, or the two sections can be mounted separately.

Refer to the following illustration when installing the ISS and/or anemometer on a pole.



Accessories for Pole Mounting

- Use the Mounting Tripod (#7716) for easy roof-mounting.
- Use the Mounting Pole Kit (#7717) to raise the installation height of the ISS by up to 37.5" (0.95 m).

General Guidelines for Installing on a Pole

- With the supplied U-bolts, the ISS and anemomter can be mounted on a pole having an outside diameter ranging from $1^1/_4$" to $1^3/_4$" (32 – 44mm).
- Larger U-bolts (not supplied) can be used to mount to a pole with a maximum outside diameter of $2^1/_2$" (64mm).
- To mount on a smaller pole, obtain a U-bolt that fits the base openings but that has a shorter threaded section. If mounting on a smaller pole with the included U-bolts, the bolt interferes with the rain collector cone.
- Use the built-in bubble level to ensure ISS is level.

Guidelines for Installing the ISS on a Pole

- When mounting the ISS and anemometer together on opposite sides of the pole, remember that whichever side is mounted first, the U-bolt from the opposite side must also be placed around the pole before tightening the U-bolts. (If it is not, there is no way to slide it in later.)
- In each side's mounting base, there is a groove to accommodate the other's U-bolt.
- Once the two sides of the ISS have been loosely mounted together on the pole, swivel the unit to the correct direction and then tighten the hex nuts. The desired height can also be achieved by sliding the ISS vertically.

Option 1: Installing ISS and Anemometer Together

Try to install the ISS so the anemometer arm is aiming north.

Note: If your anemometer arm cannot be mounted aiming true north, you will need to calibrate the wind direction on your console to display accurate wind directions. See your *Vantage Pro2 Console Manual.*

1. Place the U-bolt for the anemometer around the pole so that its round end fits in the top groove of the side of the rain collector side's plastic mounting base. The groove is right above two large holes.
2. While holding the mounting base of the rain collector against the pole, place the two ends of the remaining U-bolt around the pole and through the two holes in the base.
3. Slide the metal backing plate over the bolt ends as they stick out over the rain collector base. Secure the backing plate with a lock washer and hex nut on each of the bolt ends as shown previously.

Note: Do not tighten the hex nuts yet. Leave the hex nuts loose to swivel the ISS base on the pole.

4. The two ends of the anemometer's U-bolt should now be pointing away from the mounted rain collector side. Slide the anemometer's mounting base over the protruding bolt ends. Place a flat washer, a lock washer and a hex nut on each of the bolt ends as shown above. Do not tighten the nuts yet.
5. Raise the ISS unit to the desired height on the pole and swivel it so the anemometer arm is pointing north.
6. Using an adjustable wrench or 7/16" wrench, tighten all four hex nuts until the ISS is firmly fastened on the pole.
7. Re-attach the rain collector cone by setting the cone back on the base so its latches slide downward into the latch openings on the base, then rotate cone clockwise.
8. Place the debris screen (shown in the illustration on page 1) inside the cone, "feet-down," over the funnel hole. When installing the ISS as a single unit, we recommend tucking the coil of anemometer cable between the rain collector cone and the ISS base.

Option 2: Installing ISS Only

1. While holding the mounting base against the pole, place the two ends of a U-bolt around the pole and through the two holes in the base.
2. Slide the metal backing plate over the bolt ends as they stick out toward the rain collector cone. Secure the backing plate with a washer, a lock washer, and a hex nut on each of the bolt ends. Do not tighten the nuts yet.

For the wireless ISS, swivel the ISS base so the solar panel is facing south (in the Northern Hemisphere), or north (in the Southern Hemisphere).

3. Tighten the hex nuts using an adjustable wrench or 7/16" wrench.
4. Re-attach the rain collector cone.
   Set the cone back on the base so its latches slide downward into the latch openings on the base. Rotate the cone clockwise.
5. Place the debris screen (shown in the illustration on page 1) inside the cone, "feet-down," over the funnel hole.

Option 3: Installing Anemometer Only

1. While holding the mounting base against the pole, place a U-bolt around the pole and through the two holes in the base.
2. Place a flat washer, a lock washer and a hex nut on each of the bolt ends.
3. Swivel the anemometer until the arm is pointing north.

Note: If your anemometer arm cannot be mounted aiming true north, you will need to calibrate the wind direction on your console to display accurate wind directions. See your *Vantage Pro2 Console Manual.*

Finishing the Installation

Level the Solar and UV Sensors

If you have a Vantage Pro2 Plus station that includes a solar radiation or UV sensor, use the bubble level on the sensors as a guide to verify that the sensors are level.

Adjust the level by tightening or loosening the screws that hold each sensor onto the shelf.

Note: If you are installing the solar or UV sensors separately, see the Sensor Mounting Shelf installation manual and the Solar Radiation and UV Sensor installation manuals for more information.

Clearing Data Collected During Testing and Installation

Now that the ISS is mounted outside, any data that was collected in the Vantage Pro2 console during testing and mounting can be cleared.

To clear all the collected data on the console:

1. Press WIND so that graph icon appears adjacent to the wind data on the display. Confirm that wind speed is displayed on the compass rose.
2. Press 2ND, then press and hold CLEAR for at least six seconds and until you see "CLEARING NOW" in the console ticker display.

Additional Mounting Option

Extending Wireless Transmission Range

Optional repeater stations can be used to extend the wireless transmission range.

- Wireless Repeater, AC-Powered (#7626)
- Wireless Repeater, Solar-Powered (#7627)
- Long-Range Wireless Repeater, AC-Powered (#7653)
- Long-Range Wireless Repeater, Solar-Powered (#7654)

Extending the Console Cable (Cabled ISS Only)

A cabled ISS can be extended up to 1000' (300 m) away from the console by using Davis Instruments extension cables (#7876).

Relocating the Anemometer

Using Extension Cables:

Note: Not all cables are compatible with your Vantage Pro2 system. To be sure they will work, order Davis extension cables from your dealer or directly from Davis Instruments.

The anemometer can be extended further than 40' from the ISS by using Davis Instruments extension cables (#7876).

Be aware that the maximum measurable wind speed reading decreases as the total length of cable from the anemometer to the ISS increases.

Note: If the cable length is greater than 540' (165m), the maximum measurable wind speed may be less than 100 MPH (161 km/h).

Using the Anemometer Transmitter Kit (Wireless ISS Only)

Use the Anemometer Transmitter Kit (#6332) to add an independent wireless transmitter to the anemometer. The kit allows the anemometer to function as a transmitter station sending wind data directly to the console, instead of transmitting via the ISS.

Remote Mounting the Solar Radiation and UV Sensors

The solar radiation and UV sensors have a 3' (0.9 m) cable. If you wish to install these sensors away from the ISS, you can extend the length of the sensor cables up to 125' (38 m) with Davis Instruments extension cables (#7876).

Optional Wireless Stations

You may use our optional wireless sensor stations to collect weather measurements, without the inconvenience of routing cables.

- Wireless Temperature Station (#6372)
- Wireless Temperature/Humidity Station (#6382)
- Wireless Leaf & Soil Moisture/Temperature Station (#6345)

For more details, please visit our website or see the most recent *Davis Precision Weather Instruments* catalog.

Maintenance and Troubleshooting

Maintaining UV and Solar Radiation Sensors

If the ISS is a Plus model and contains UV and solar radiation sensors, do not touch the small white diffusers on top of the sensors. Oil from skin reduces their sensitivity. If you are concerned that you have touched the diffusers at any time, clean the UV diffuser using ethyl alcohol with a soft cloth. When cleaning the UV diffuser, DO NOT use rubbing or denatured alcohols because they can affect accuracy of the sensor readings. Ethyl alcohol can be procured through an industrial or laboratory supply store. Clean the solar diffuser with a soft damp cloth.

Due to the sensitivity of ultraviolet and solar radiation sensors it is common practice for manufacturers to recommend re-calibration after a period of time. Users demanding high accuracy typically recalibrate their sensors annually. Here at Davis Instruments, we have seen less than 2% drift per year on the readings from these sensors.

Contact Technical Support about returning your sensor for calibration. See "Contacting Davis Instruments" on page 27.

Cleaning the Radiation Shield

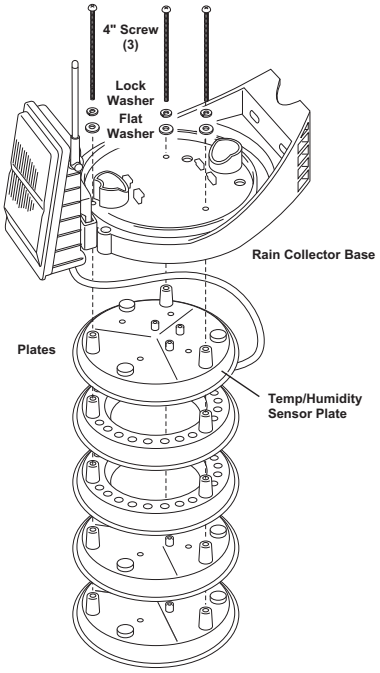
The outer plating of the radiation shield should be cleaned when there is excessive dirt and build-up on the plating. Use a damp cloth to clean the outer edge of each ring.

Note: Spraying down or using water excessively to clean the radiation shield can damage the sensitive sensors or alter the data and readings the ISS is transmitting.

Check the radiation shield for debris or insect nests at least once a year and clean when necessary. A buildup of material inside the shield reduces its effectiveness and may cause inaccurate temperature and humidity readings.

To thoroughly clean the radiation shield:

1. Remove the rain collector cone.
2. Using a Phillips head screwdriver, loosen the three 4" (~100mm) screws holding the radiation shield plates together.
3. Taking care to maintain the order in which the five plates are assembled, separate the plates as shown and remove all debris from inside the shield.



Note: For some models of the ISS, the order in which the five radiation shield plates are assembled may be slightly different than the order shown in the figure on page 25. For this reason, ensure that you always reassemble the plates in the same order in which they were disassembled.

4. Reassemble the plates in the same order in which they were disassembled, and fasten them together using a Phillips head screwdriver to tighten the 4" screws, as shown in the illustration.

Cleaning the Rain Collector Cone

To maintain accuracy, thoroughly clean the rain collector several times a year.

Note: Cleaning the rain collector and tipping buckets my cause false rain readings. Unplug the RAIN sensor from the SIM before cleaning so that no inaccurate readings are logged, or clear the weather data that was logged on the Vantage Pro2 console after cleaning is complete. See your *Vantage Pro2 Console Manual* for instructions on clearing weather data.

1. Separate the cone from the base by turning it counter-clockwise.
2. Use a soft, damp cloth to remove any debris from the cone, cone screen, and tipping bucket.
3. Use pipe cleaners to clear the funnel hole in the cone and drain screens in the base.
4. When all parts are clean, rinse with clear water.
5. Re-attach the cone and replace the debris screen.

Troubleshooting

If a Sensor Functions Intermittently

Carefully check all connections from the sensor to the ISS. See “Check SIM Sensor Connections” on page 4.

Loose connections account for a large portion of potential problems. Connections should be firmly seated in receptacles and plugged in straight. To check for a faulty connection, try jiggling the cable while looking at the display. If a reading displays intermittently on the console as the cable is jiggled, the connection is faulty. Try removing and then re-installing the cable to correct the faulty connection. If the sensor still functions intermittently contact Technical Support. See “Contacting Davis Instruments” on page 27.

Most Common Rain Collector Problem

If the rain collector seems to be under-reporting rainfall, remove the rain collector cone to clean the tipping bucket and clear out any debris. Make sure the cable tie around the tipping bucket has been cut and removed.

Most Common Anemometer Problems

“The anemometer head is tilted when I mount the anemometer.”

With the Allen wrench provided in the supplied hardware, loosen the screws holding the anemometer head on the arm. (The screws are on the bottom of the anemometer head, by the wind cups.) Turn the anemometer head so it is straight and then tighten the screws.

"The wind cups are spinning but my console displays 0 mph."

The signal from the wind cups may not be making it back to the display. Remove the cups from the anemometer (loosen the set screw). Put the cups back onto the shaft and make sure to slide them up the shaft as far as possible. Check your cables for visible nicks and cuts. Look for corrosion in the WIND connector on the SIM and on splices in the cable. If using an extension cable, remove it and test using only the anemometer cable. Contact Technical Support and ask for a wind test cable if the problem has not been resolved.

Note: If the anemometer is sending no data, the wind display indicates 0 speed and a north direction.

"The wind direction is stuck on north, or displays dashes."

It is likely that there is a short somewhere between the wind vane and the display. Check the cables for visible nicks and cuts. Look for corrosion in the "WIND" jack on the SIM and on splices in the cable (if any). If possible, remove any extensions and try it with the anemometer cable only. If none of these steps get the wind direction working, contact Technical Support and ask for a wind test cable.

"The wind cups don't spin or don't spin as fast as they should."

The anemometer may be located where wind is blocked by something, or there may be friction interfering with the cups' rotation. Remove the wind cups (loosen the set screw) and clear out any bugs or debris. Turn the shaft the cups rotate on. If it feels gritty or stiff, contact Davis Technical Support.

Note: Do not lubricate the shaft or bearings in any way. When replacing the cups, make sure they are not rubbing against any part of the anemometer head.

"Readings aren't what I expected them to be."

Comparing data from your ISS to measurements from TV, radio, newspapers, or a neighbor is NOT a valid method of verifying your readings. Readings can vary considerably over short distances. How you site the ISS and anemometer can also make a big difference. If you have questions, contact Technical Support.

Contacting Davis Instruments

If you have questions about the ISS or Vantage Pro2 system, or encounter problems installing or operating the weather station, please contact Davis Technical Support.

Note: Please do not return items to the factory for repair without prior authorization.

(510) 732-7814 – Technical Support phone, Monday – Friday, 7:00 a.m. – 5:30 p.m. Pacific Time.

(510) 670-0589 – Technical Support Fax.

support@davisnet.com – E-mail to Technical Support.

info@davisnet.com – General e-mail.

www.davisnet.com – Download manuals and specifications from the Support section. Watch for FAQs and other updates. Subscribe to the e-newsletter.

Appendix

Specifications

Complete specifications for the ISS and other products are available in the Weather Support section of our website at www.davisnet.com.

Cabled ISS

Temperature range:	-40 to 150° Fahrenheit (-40 to 65° Celsius)
Power input:	Console cable from Vantage Pro2 console Optional Vantage Pro2 AC power adapter

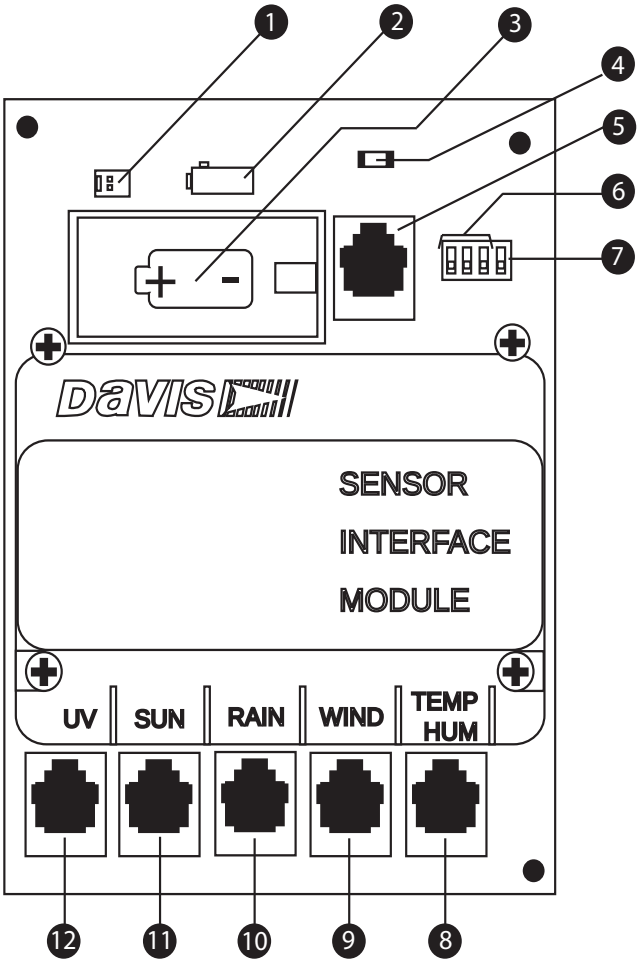
Wireless ISS

Temperature range:	-40 to 150° Fahrenheit (-40 to 65° Celsius)
Transmission frequency:	902 - 928 MHz FHSS for North America 868.0 -868.6 MHz FHSS for overseas versions: EU, UK, and OV
Transmitter ID codes:	8 user-selectable
License:	Low power (less than 8 mW), no license required
Primary power:	Solar power – Davis solar charger
Backup power:	CR-123A 3-volt lithium battery (8 months without sunlight- greater than 2 years depending on solar charging)
Alternate power	AC power adapter

ISS Weather Variable Update Intervals (Transmitter ID Dependent)

Wind speed:	2.5 to 3 seconds
Wind direction:	2.5 to 3 seconds
Accumulated rainfall:	20 to 24 seconds
Rain rate:	20 to 24 seconds
Outside temperature:	10 to 12 seconds
Outside humidity:	50 seconds to 1 minute
Ultraviolet radiation:	50 seconds to 1 minute
Solar radiation:	50 seconds to 1 minute

SIM Board Display and Contents



1. Solar Panel Tab
2. AC Adapter Socket
3. Battery Socket
4. Test LED
5. Cabled Connection
6. Transmitter ID DIP Switch
7. Test DIP Switch
8. Temperature/Humidity Sensor Connector
9. Wind Sensor Connector
10. Rain Sensor Connector
11. Solar Radiation Sensor Connector
12. UV Sensor Connector

Vantage Pro2 Integrated Sensor Suite Installation Manual

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For Vantage Pro2 Plus Weather Stations #6152C, 6162C, 6152, 6162, 6153, 6163

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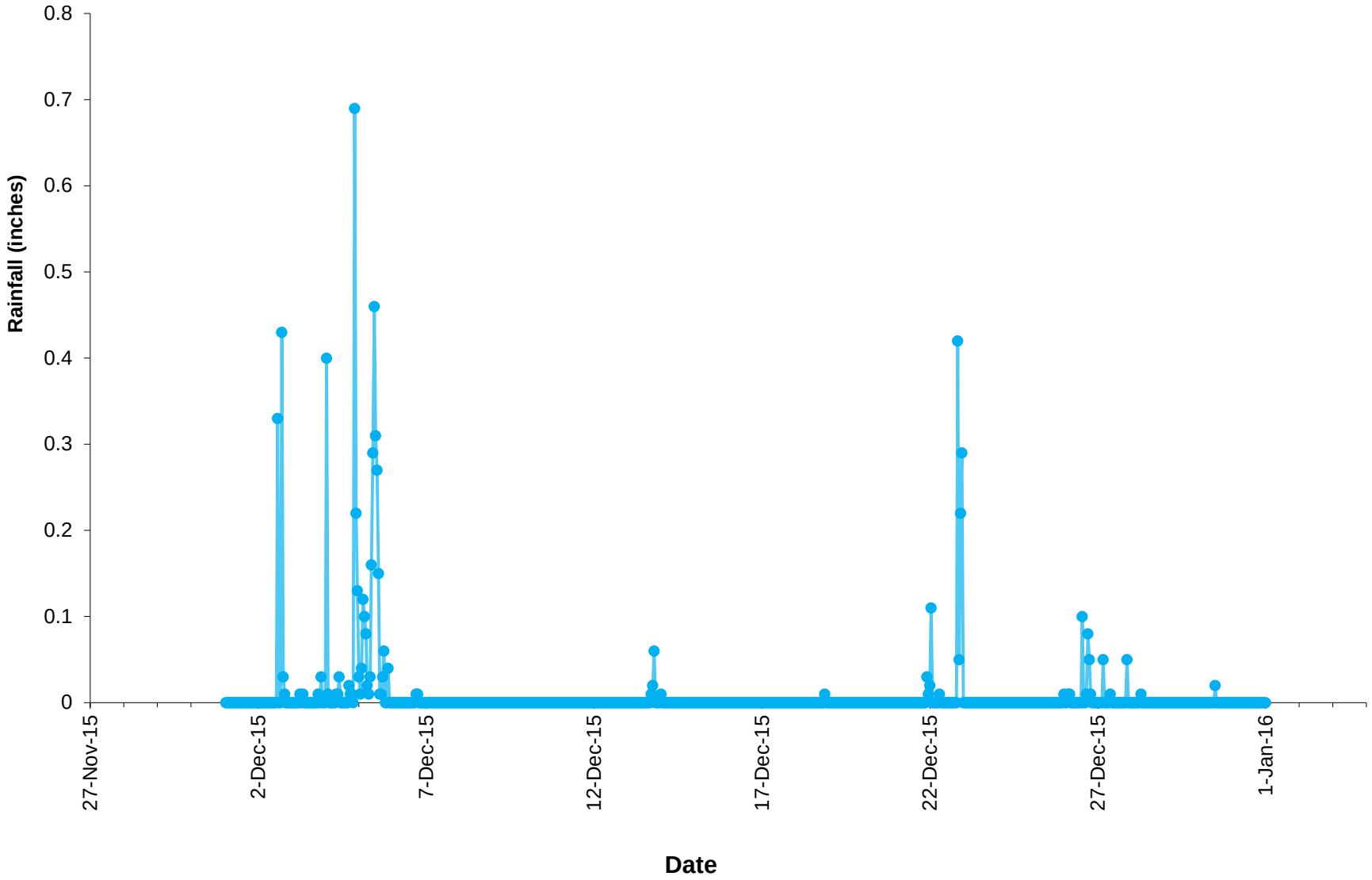
APPENDIX G

Rainfall Monitoring Data and Graphs

December Rainfall