Well Logger™ Manual

Version 2.8

Porpoise Media

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CHAPTER 1 - INTRODUCTION

Using This Manual

This manual assumes that you are familiar with the Windows operating system (Windows XP, Vista, 7, or 8) and basic data entry and file management skills. If you need assistance in these areas, please reference your Windows documentation.

This manual is divided into five major sections including this introductory chapter to get you started, a chapter on creating new files (Chapter 2), a chapter on creating and editing layouts (Chapter 3), a section on creating and editing fill patterns (Chapter 4), and a section on printing logs (Chapter 5). A glossary is included at the end of this manual so that you can reference any terms that you are not familiar with.

We suggest that you read the entire manual to become familiar with all of the features of Well Logger™ so that you can use it to its full potential.

Getting Started

To install the Well Logger™ software, insert disk number one of the installation disk series and execute the program named *Setup.exe*. *Setup.exe* will guide you through the installation process.

The first time you run Well Logger™, a registration screen will appear. In this screen, enter the name of the user or the department that is using Well Logger™. Also enter your company name and registration code. Without the registration information entered, Well Logger™ will run in "Demo Mode."

After registering Well Logger™, choose *Select Layout Form* from the *File* menu. It will be necessary for you to choose a layout before being able to print any files that you create (see **Appendix A** for examples of layouts included with Well Logger™).

Features

Some of the features in Well Logger™ include:

- Easy-to-use spreadsheet interface with drop-down boxes for simplifying data entry of each borehole. Entry information includes borehole lithology, samples collected, well construction or borehole backfilling details, and general information about the project and boring.

- Flexible, easy-to-create, user-definable print layouts for use with virtually any printer. Pre-defined layouts are also included to get you started quickly.

- User-definable fill patterns for lithology, sample type, and well construction graphics. Unified Soil Classification System (USCS) and other geological and industrial fill patterns are included.

- Over 70 variables (e.g. Page Number, Site Address, Project Supervisor, etc.) can be included in the page layouts you create.

- Ten user-definable columns for including geotechnical properties, chemical concentrations, or other characteristics of soil samples.

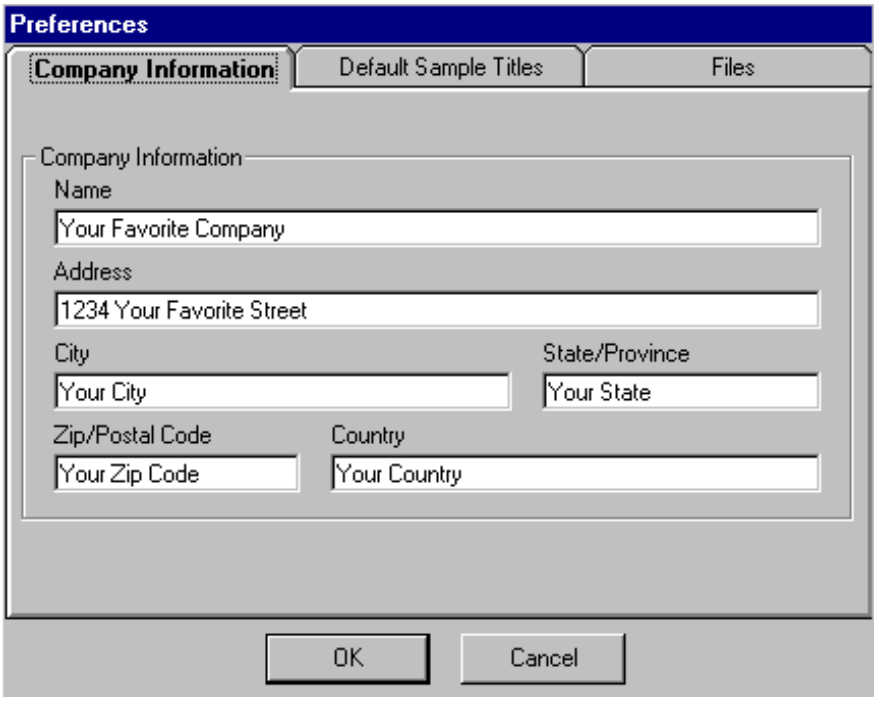
- Adjustable scaling to allow for changing the number of depth units printed on a page.

- Copy logs to Enhanced Windows Metafiles (EMFs) and paste them into your favorite graphics program for editing.

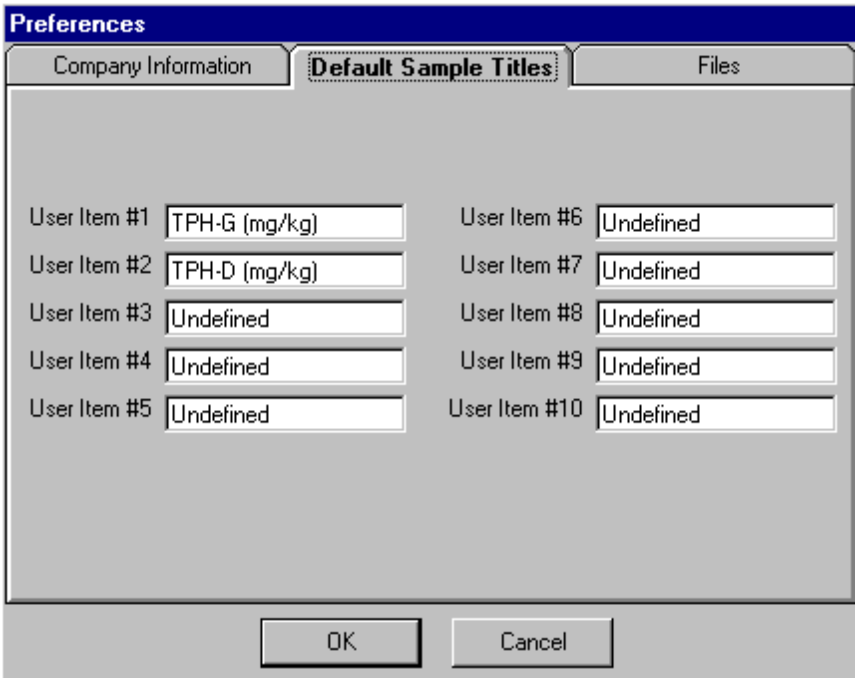
- On-screen print preview.

Preferences

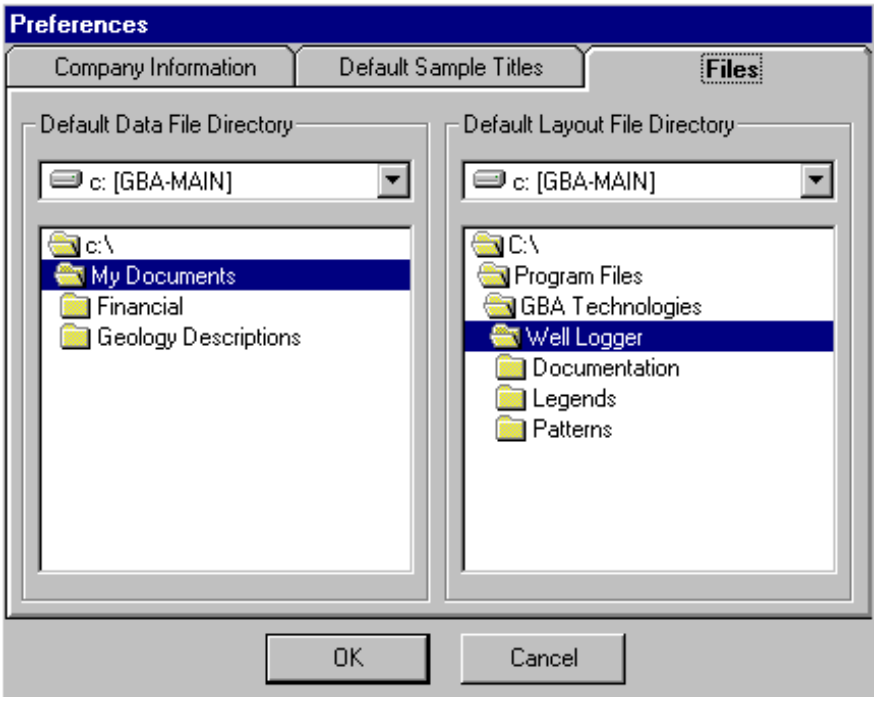
Setting preferences is easy. Select "Edit" from the program menu and choose "Preferences." A dialog box with three tabs will appear. One tab is used for entering information about your company that can appear on the printed log through the use of layout variables (See Chapter 3). The second tab is used for entering the default User-Defined Variables, which are used for sample headings (See Chapter 2). The third tab is used to select default paths for saving and opening data and layout files.



Preferences screen for entering company information.



Preferences screen for entering default User-Defined Variables.



Preferences screen for entering default File and Layout directories.

CHAPTER 2 - CREATING FILES

Creating Files

To create a new file, select *New* from the *File* menu within Well Logger™. You will be requested to enter the name of the file you would like to create. If you create a file while another file is opened, the opened file's data will be saved due to Well Logger™'s "Save-As-You-Go" feature.

A screen will appear that will display a spreadsheet with five tabs above it, as illustrated in the following section. This screen is to be used for entry of boring log information. The tab choices are:

- Lithology
- Samples
- Completion
- Boring Info.
- Project Info.

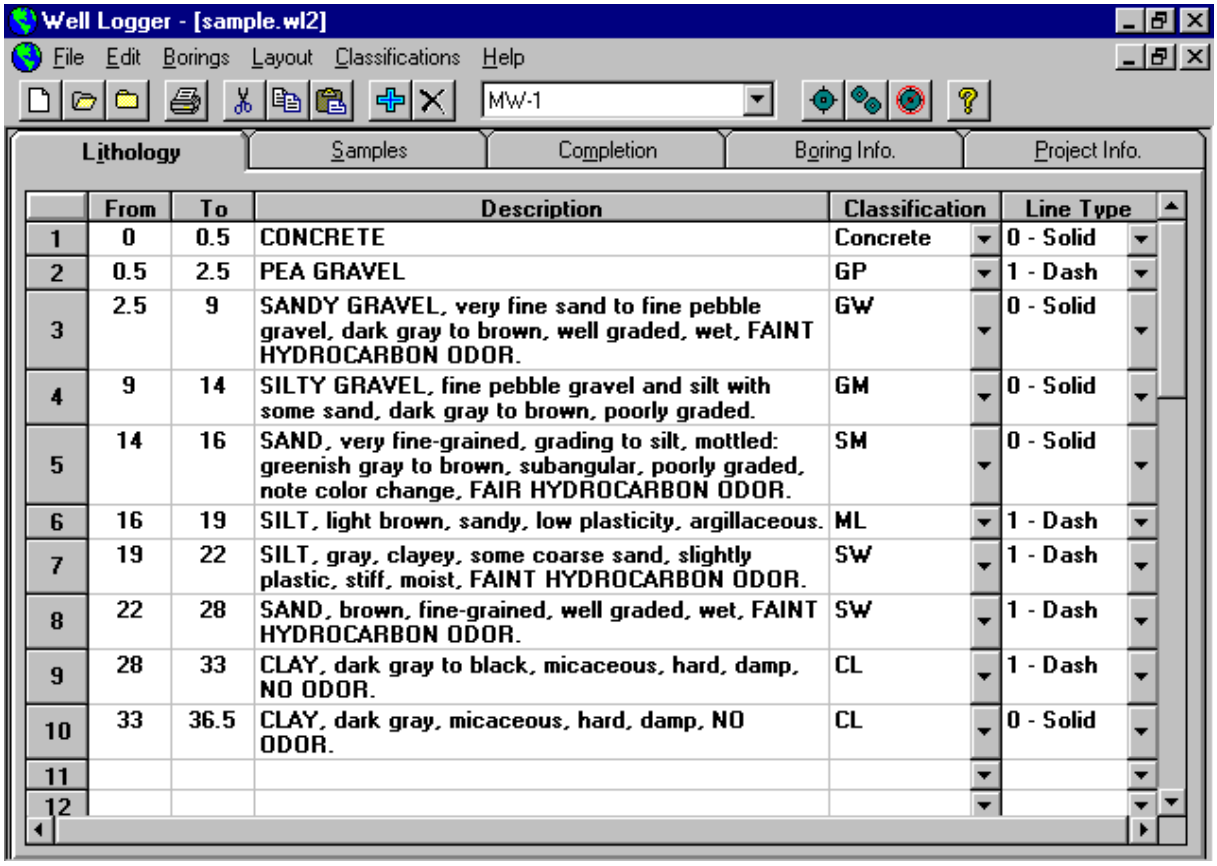
These tabs are described in the following sections.

Depth Units

The depths described by the *To* and *From* columns in the Lithology, Sample, and Completion Entry forms use the values entered into the Depth Units field of the Boring Info. screen. The Depth Units field is also used for other depth measurements such as Ground Elevation, Total Depth, and Static Water Level.

It is recommended that depth units be set in the Boring Info. entry screen.

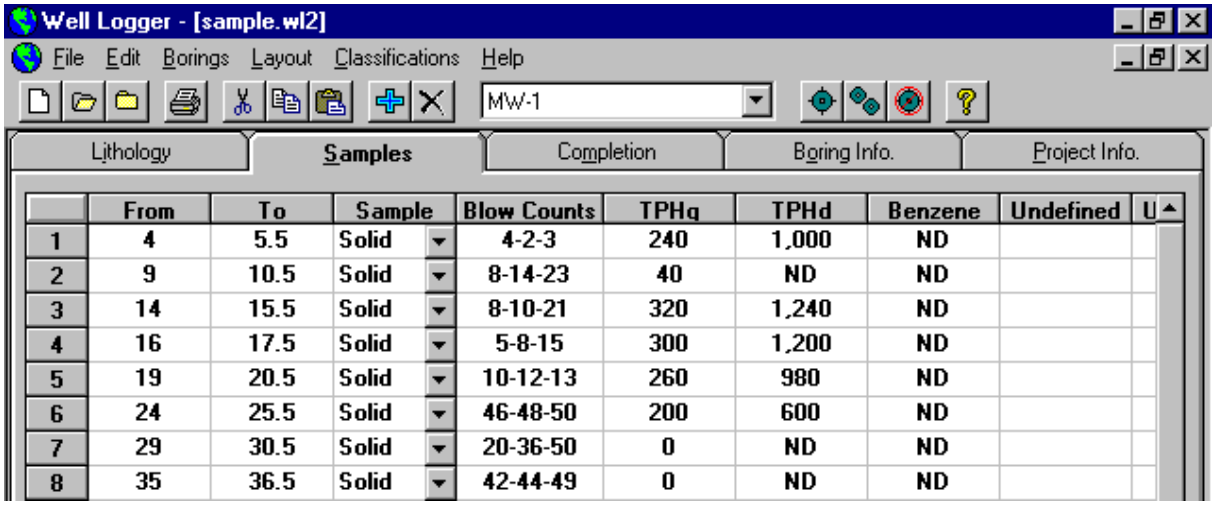
Lithology Entry



	From	To	Description	Classification	Line Type
1	0	0.5	CONCRETE	Concrete	0 - Solid
2	0.5	2.5	PEA GRAVEL	GP	1 - Dash
3	2.5	9	SANDY GRAVEL, very fine sand to fine pebble gravel, dark gray to brown, well graded, wet, FAINT HYDROCARBON ODOR.	GW	0 - Solid
4	9	14	SILTY GRAVEL, fine pebble gravel and silt with some sand, dark gray to brown, poorly graded.	GM	0 - Solid
5	14	16	SAND, very fine-grained, grading to silt, mottled: greenish gray to brown, subangular, poorly graded, note color change, FAIR HYDROCARBON ODOR.	SM	0 - Solid
6	16	19	SILT, light brown, sandy, low plasticity, argillaceous.	ML	1 - Dash
7	19	22	SILT, gray, clayey, some coarse sand, slightly plastic, stiff, moist, FAINT HYDROCARBON ODOR.	SW	1 - Dash
8	22	28	SAND, brown, fine-grained, well graded, wet, FAINT HYDROCARBON ODOR.	SW	1 - Dash
9	28	33	CLAY, dark gray to black, micaceous, hard, damp, NO ODOR.	CL	1 - Dash
10	33	36.5	CLAY, dark gray, micaceous, hard, damp, NO ODOR.	CL	0 - Solid
11					
12					

The lithology entry screen contains five fields: *To*, *From*, *Description*, *Classification*, and *Line Type*. *To* and *From* indicate the depths of the interval being described. *Description* describes the sediments or rock type in the interval. *Classification* puts the sediment or rock type into a category that tells Well Logger™ which fill patterns to use in the Lithology graphic column. The *Line Type* field tells Well Logger™ what type of line to print beneath the text in *Description*.

Sample Entry

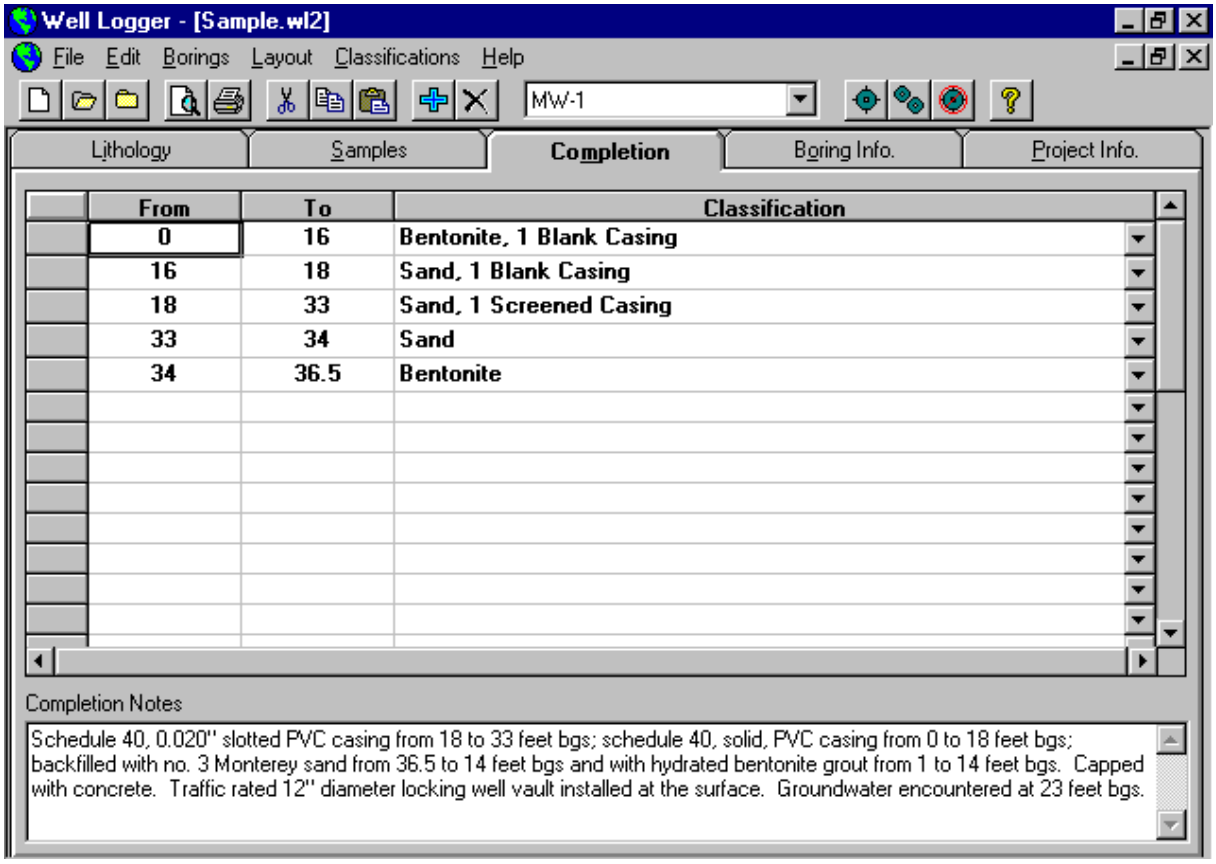


	From	To	Sample	Blow Counts	TPHg	TPHd	Benzene	Undefined	U
1	4	5.5	Solid	4-2-3	240	1,000	ND		
2	9	10.5	Solid	8-14-23	40	ND	ND		
3	14	15.5	Solid	8-10-21	320	1,240	ND		
4	16	17.5	Solid	5-8-15	300	1,200	ND		
5	19	20.5	Solid	10-12-13	260	980	ND		
6	24	25.5	Solid	46-48-50	200	600	ND		
7	29	30.5	Solid	20-36-50	0	ND	ND		
8	35	36.5	Solid	42-44-49	0	ND	ND		

The sample entry screen contains fourteen fields: From, To, Sample Type, Blow Counts, and ten User Fields. To and From describe the depths of the interval being described. Sample Type tells Well Logger what type of fill pattern to use to represent the sample interval. Blow Counts is a record of the number of Blow Counts collected in an interval. The User Fields can be used to represent any type of characteristic of a sample. The figure above demonstrates using these fields to represent organic vapor analyzer (OVA) reading concentrations. These fields can be used for chemical concentrations, geotechnical characteristics, or virtually anything you wish.

To change the heading of a user column, select "Sample Headings" from the Edit menu or "right-click" on the heading of the column you wish to change.

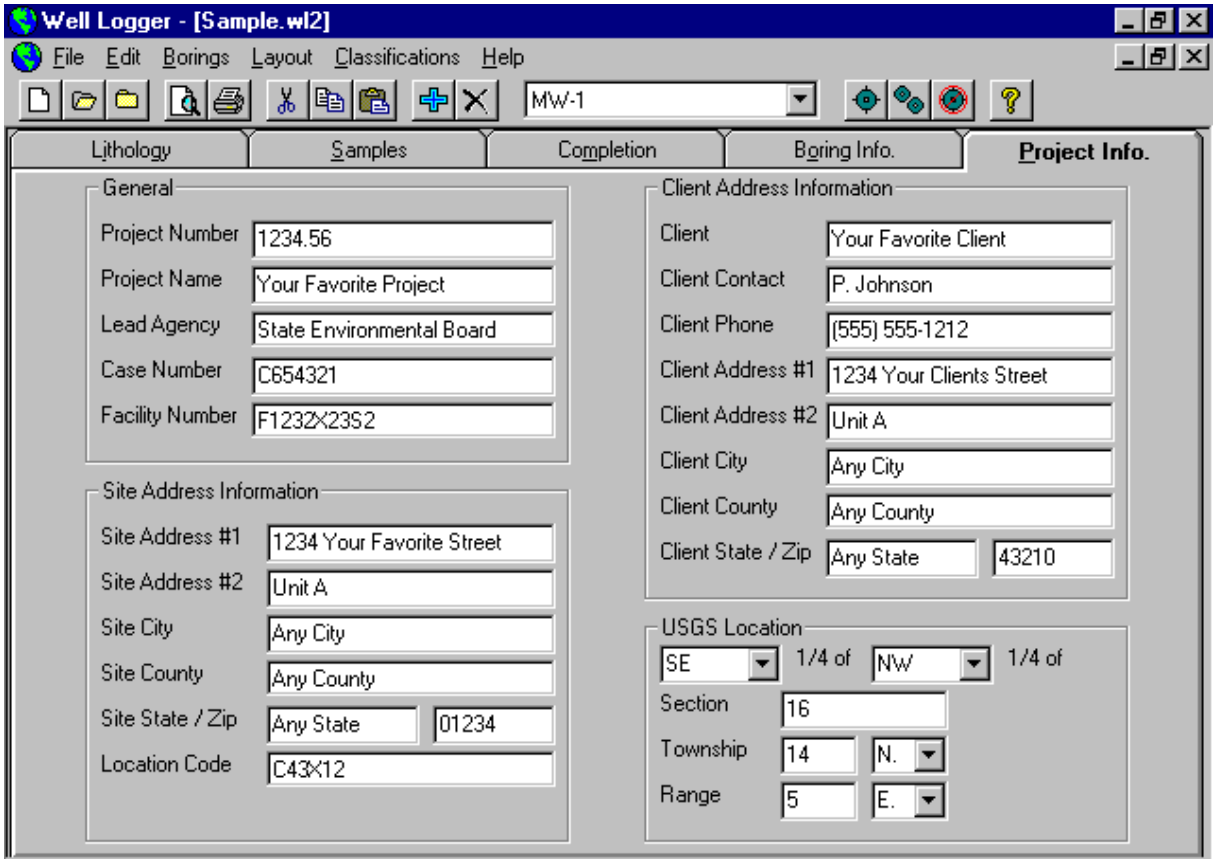
Completion Entry



The completion entry screen contains three fields: *To*, *From*, and *Classification*. *To* and *From* indicate the depths of the interval being described. *Classification* represents the material(s) used in backfilling the borehole or in well construction.

This screen also contains a Completion Notes field, which can be used to enter notes about the log.

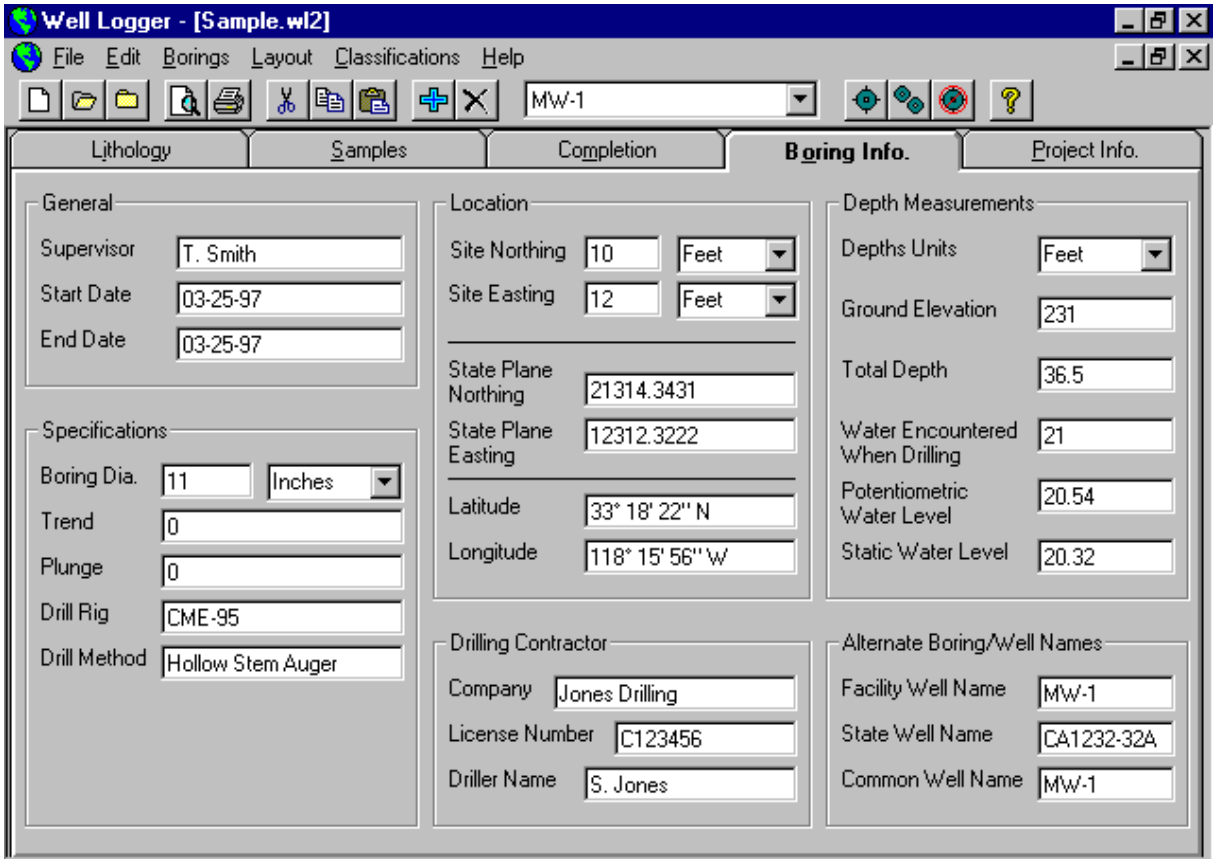
Project Information Entry



This screen includes data fields for the entry of values related to the boring log being created. The values entered into these fields can be used with variables in a layout file (see **Chapter 3** for more details about variables).

Note: Data fields that do not contain data will be represented by a blank space if their corresponding variables are used in a layout file.

Boring Information Entry



This screen includes data fields for the entry of values related to the boring log being created. The values entered into these fields can be used with variables in a layout file (see **Chapter 3** for more details about variables).

Note: Data fields that do not contain data will be represented by a blank space if their corresponding variables are used in a layout file.

CHAPTER 3 - LOG LAYOUTS

Pre-Defined Layouts

Several pre-defined layouts come with Well Logger™. You can use one of these layouts, or you can easily design your own. If you decide that you would like to modify an existing layout, it is suggested that you make a copy of the existing layout file and work with it so that you do not alter the original file. See **Appendix A** for examples of pre-defined layouts.

If you decide to use an existing layout, it will be necessary for you to change the provided logo with your own logo (if the layout you choose contains a graphic). For details, see the section "Graphic Entry" later in this chapter.

Creating Layouts

When creating your own layouts, it is suggested that you draw the layout by hand onto a piece of engineer scale (10 squares to an inch) graph paper before entering information into Well Logger™. This will make it easy to transfer the data into your custom layout file.

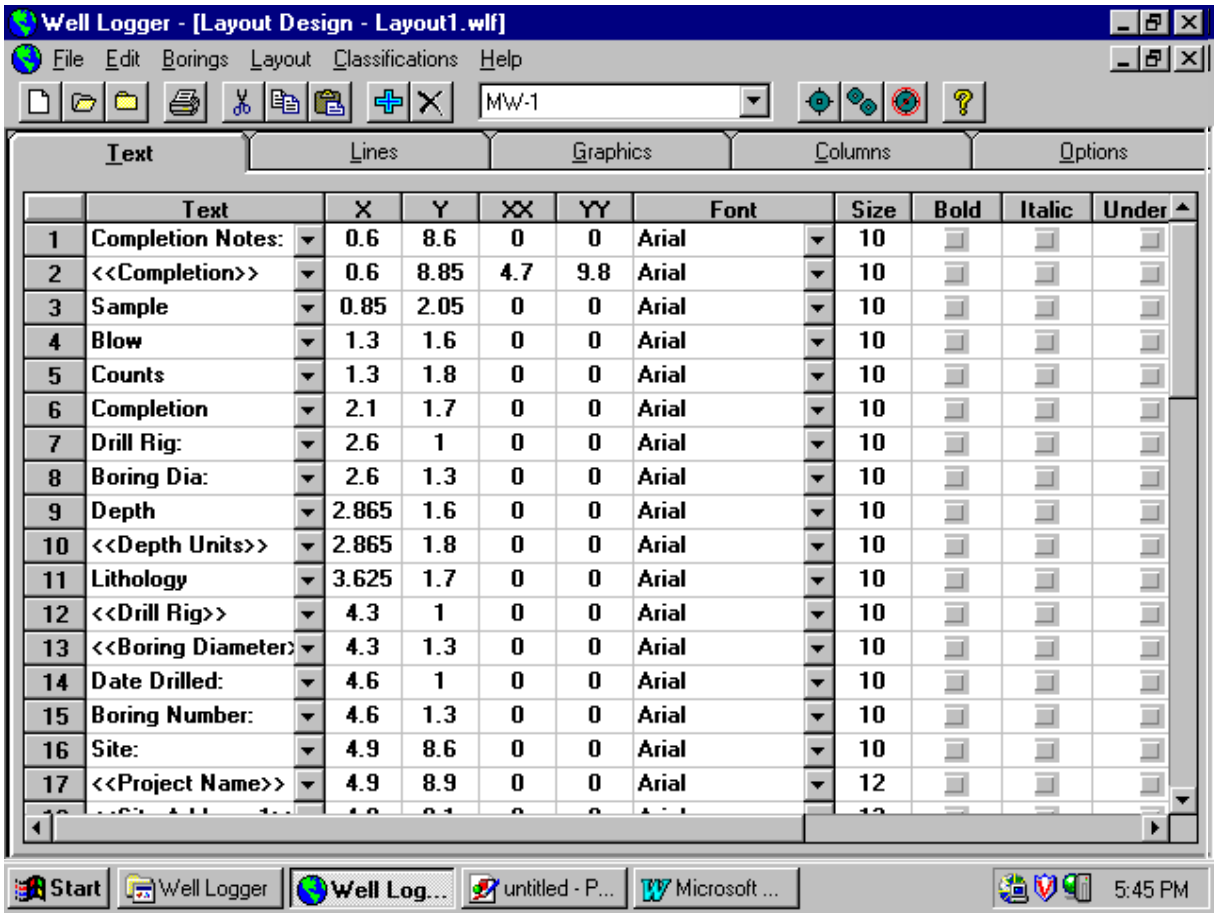
To create a new layout template file, select *Create New Layout* from the *Layout* menu within Well Logger™. You will be requested to enter the name of the file you would like to create. The new layout file will be selected as the active layout file.

A screen will appear that will display a spreadsheet with five tabs above it. This screen is to be used for entry of the layout information. The tab choices are:

- Text
- Lines
- Graphics
- Columns
- Options

These tabs are described in the following sections.

Text Entry



	Text	X	Y	XX	YY	Font	Size	Bold	Italic	Under
1	Completion Notes:	0.6	8.6	0	0	Arial	10			
2	<<Completion>>	0.6	8.85	4.7	9.8	Arial	10			
3	Sample	0.85	2.05	0	0	Arial	10			
4	Blow	1.3	1.6	0	0	Arial	10			
5	Counts	1.3	1.8	0	0	Arial	10			
6	Completion	2.1	1.7	0	0	Arial	10			
7	Drill Rig:	2.6	1	0	0	Arial	10			
8	Boring Dia:	2.6	1.3	0	0	Arial	10			
9	Depth	2.865	1.6	0	0	Arial	10			
10	<<Depth Units>>	2.865	1.8	0	0	Arial	10			
11	Lithology	3.625	1.7	0	0	Arial	10			
12	<<Drill Rig>>	4.3	1	0	0	Arial	10			
13	<<Boring Diameter>	4.3	1.3	0	0	Arial	10			
14	Date Drilled:	4.6	1	0	0	Arial	10			
15	Boring Number:	4.6	1.3	0	0	Arial	10			
16	Site:	4.9	8.6	0	0	Arial	10			
17	<<Project Name>>	4.9	8.9	0	0	Arial	12			

The text entry screen contains thirteen fields: *Text*, *X*, *Y*, *XX*, *YY*, *Font*, *Size*, *Bold*, *Italic*, *Underline*, *Color*, *Alignment*, and *Angle*. *Text* describes what type of text to print. This text can be user entered, or a variable can be selected from a drop-down combo box (see the next section for a description of variable usage).

X, *Y*, *XX*, and *YY* are the coordinates (in inches) of where to place text. To have text placed about a single point, set *XX* and *YY* equal to zero and have the text placed about the point *X*, *Y*. The text will be justified about the point *X*, *Y* according to the setting under *Alignment*. To have text displayed within a square region, use *X* and *Y* as the upper-left coordinates of the region and *XX* and *YY* as the lower-right coordinates of the region.

Font, *Size*, *Bold*, *Italic*, *Underline*, and *Color* describe characteristics of the text. *Alignment* determines how the text is aligned (Left, Center, or Right). The *Angle* field is used for rotating text. Horizontal text is at 0°. Using a number between 0° and 360° in the *Angle* field will rotate text in a counter-clockwise direction.

Variables

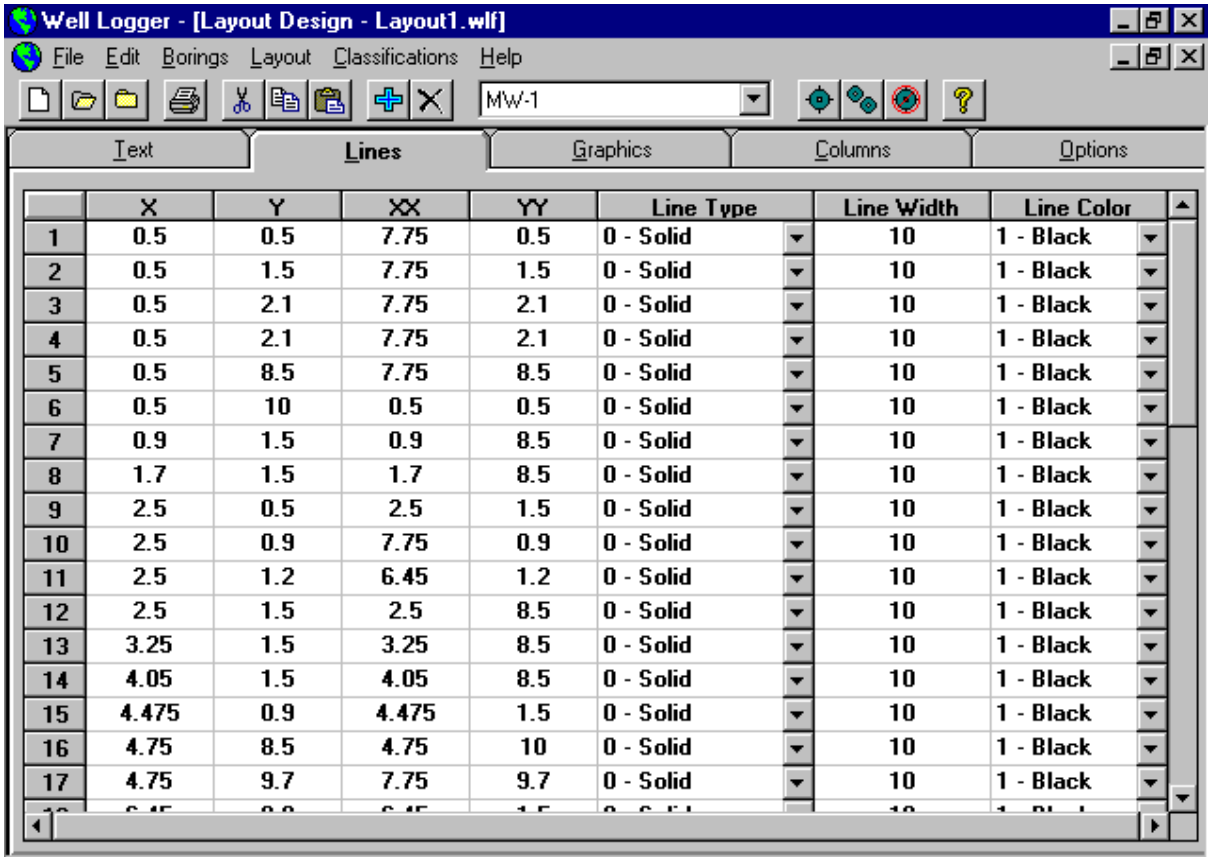
Variables are used within the text section of a layout file to place data from Well Logger™ entry fields onto the printed page. When editing a layout file, a drop-down combo box is available for easy selection of a variable.

Available variables are:

<<Boring Diameter>>
<<Boring Diameter Units>>
<<Boring Diameter>> + <<Boring Diameter Units>>
<<Boring Name>>
<<Case Number>>
<<Client>>
<<Client Contact>>
<<Client Address 1>>
<<Client Address 2>>
<<Client City>>
<<Client City>> + <<Client State>>
<<Client City>> + <<Client State>> + <<Client Zip>>
<<Client Phone>>
<<Client State>>
<<Client Zip>>
<<Common Well Name>>
<<Company Address>>
<<Company City>>
<<Company City>> + <<Company State>>
<<Company City>> + <<Company State>> + <<Company Zip>>
<<Company Country>>
<<Company Name>>
<<Company State>>
<<Company Zip>>
<<Completion>>
<<Date End>>
<<Date Start>>
<<Depth Units>>
<<Drill Method>>
<<Drill Rig>>
<<Drilled Water>>
<<Drilled Water>> + <<Depth Units>>
<<Driller>>
<<Drilling Contractor>>
<<Easting>>
<<Easting>> + <<Easting Units>>
<<Easting Units>>
<<Facility Number>>
<<Facility Well Name>>
<<File Name>>*
<<File Path>>*
<<Ground Elevation>>
<<Ground Elevation>> + <<Depth Units>>
<<Latitude>>
<<Lead Agency>>
<<License Number>>
<<Location Code>>
<<Longitude>>
<<Northing>>
<<Northing>> + <<Northing Units>>
<<Northing Units>>
<<Page Number>>*
<<Plunge>>
<<Potentiometric Water>>
<<Potentiometric Water>> + <<Depth Units>>
<<Print Date>>*
<<Print Date>> + <<Print Time>>*
<<Print Time>>*
<<Project Name>>
<<Project Number>>
<<Qtr Section Primary>>
<<Qtr Section Secondary>>
<<Range>>
<<Range Direction>>
<<Section>>
<<Site Address 1>>
<<Site Address 2>>
<<Site City>>
<<Site City>> + <<Site State>>
<<Site City>> + <<Site State>> + <<Site Zip>>
<<Site State>>
<<Site Zip>>
<<State Plane Easting>>
<<State Plane Northing>>
<<State Well Name>>
<<Static Water>>
<<Static Water>> + <<Depth Units>>
<<Supervisor>>
<<Total Depth>>
<<Total Depth>> + <<Depth Units>>
<<Township>>
<<Township Direction>>
<<Trend>>
<<User 1>> through <<User 10>>
<<USGS Location>>

The variables listed above are used with entry fields from the Project Info. and Boring Info. entry screens that are described in **Chapter 2**. Exceptions are the values marked with a star (*). These values are determined by Well Logger™.

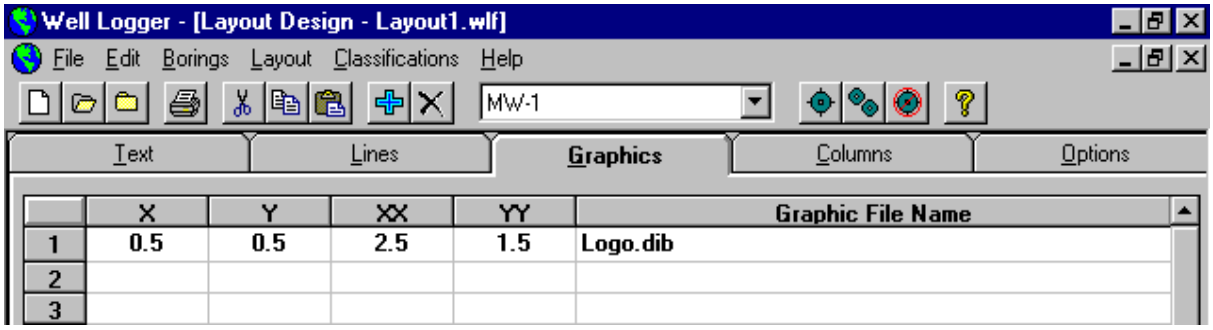
Line Entry



	X	Y	XX	YY	Line Type	Line Width	Line Color
1	0.5	0.5	7.75	0.5	0 - Solid	10	1 - Black
2	0.5	1.5	7.75	1.5	0 - Solid	10	1 - Black
3	0.5	2.1	7.75	2.1	0 - Solid	10	1 - Black
4	0.5	2.1	7.75	2.1	0 - Solid	10	1 - Black
5	0.5	8.5	7.75	8.5	0 - Solid	10	1 - Black
6	0.5	10	0.5	0.5	0 - Solid	10	1 - Black
7	0.9	1.5	0.9	8.5	0 - Solid	10	1 - Black
8	1.7	1.5	1.7	8.5	0 - Solid	10	1 - Black
9	2.5	0.5	2.5	1.5	0 - Solid	10	1 - Black
10	2.5	0.9	7.75	0.9	0 - Solid	10	1 - Black
11	2.5	1.2	6.45	1.2	0 - Solid	10	1 - Black
12	2.5	1.5	2.5	8.5	0 - Solid	10	1 - Black
13	3.25	1.5	3.25	8.5	0 - Solid	10	1 - Black
14	4.05	1.5	4.05	8.5	0 - Solid	10	1 - Black
15	4.475	0.9	4.475	1.5	0 - Solid	10	1 - Black
16	4.75	8.5	4.75	10	0 - Solid	10	1 - Black
17	4.75	9.7	7.75	9.7	0 - Solid	10	1 - Black

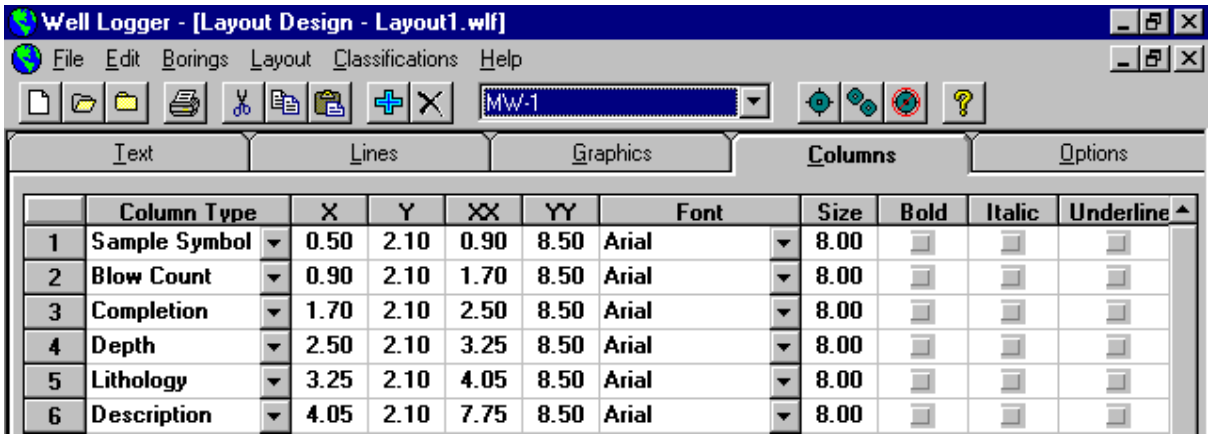
The line entry screen contains seven fields: *X*, *Y*, *XX*, *YY*, *Line Type*, *Line Width*, and *Line Color*. *X*, *Y*, *XX*, and *YY* describe the coordinate of the line (in inches) where *X*, *Y* is one coordinate of a line and *XX*, *YY* is the other coordinate of the line. *Line Type*, *Line Width*, and *Line Color* describe properties of the line.

Graphic Entry



The graphic screen contains five fields: *X*, *Y*, *XX*, *YY*, and *Graphic File Name*. *X*, *Y*, *XX*, and *YY* describe the coordinates of where to place a graphic image (such as a logo). The *Graphic File Name* field describes the path of the file to use as a graphic. The graphic file should be a bitmap (.bmp or .dib) that is created at a size two to three times larger than planned for display. For example, on line one of the entry screen above, the display size of the Graphic File (Logo.bmp) is 2 inches wide by 1 inch tall. We suggest that the actual size of your logo image be 6 inches by 3 inches (3 times larger than the display size). This will enhance the final output of the image.

Graphic Column Entry



The columns entry screen contains fourteen fields: *Column Type*, *X*, *Y*, *XX*, *YY*, *Font*, *Size*, *Bold*, *Italic*, *Underline*, *Color*, *Line Type*, *Line Width*, and *Line Color*. *Column Type* describes what type of column to print. *X*, *Y*, *XX*, and *YY* are the coordinates (in inches) of where to put the column. It is recommended that all *Y* values are the same for all columns and that all *YY* values are the same for all columns. *Font*, *Size*, *Bold*, *Italic*, *Underline*, and *Color* describe characteristics of text to use in a column. These properties are ignored if text is not printed in a column, such as with Lithology and Completion columns. *Line Type*, *Line Width*, and *Line Color* describe characteristics of the lines drawn in the columns. *Line Width* is ignored for use in the Description column due to restrictions imposed by the operating system.

Graphic Column Types

The Graphic Column types available are:

- Classification
- Completion
- Depth
- Description
- Blow Count
- Sample Symbol
- Lithology
- User Text Types

Options Entry

This screen includes data fields for the entry of formatting information for the boring log layout being created. The fields on this screen are:

- Truncate Upper Column Text
- Truncate Lower Column Text

If selected, these options will eliminate text from either the upper or lower portion of the depth column when printed. This feature is useful if your layout is designed so that there is a horizontal line placed in the location where the text would otherwise be placed.

CHAPTER 4 - EDITING FILL PATTERNS

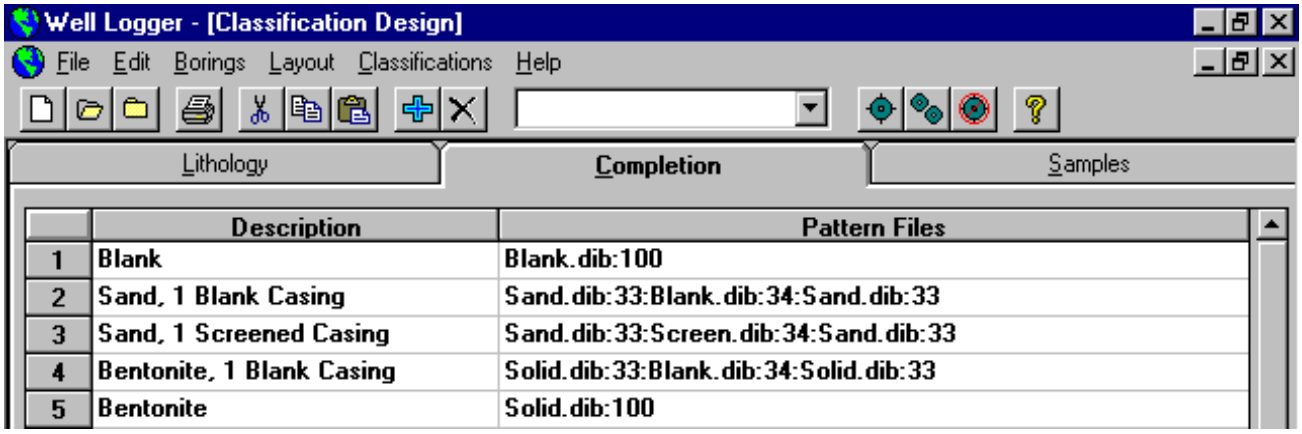
Classification Pattern Files

To edit Classification Pattern Files, select *Edit Classifications* from the *Classifications* menu item. This option is only available if there are no other files open within Well Logger™.

The Pattern Files field in the Lithology, Completion, and Sample fields requires entry in a specific format:

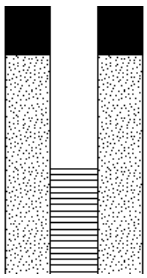
file:percentage [:file:percentage] [:file:percentage] ...

where *file* is the name of a bitmap image that is to be used in the fill pattern and *percentage* is the percentage of the column width to be filled by *file*. The items in brackets are optional. Be careful to ensure that the sum of the *percentage* parameters equals 100.

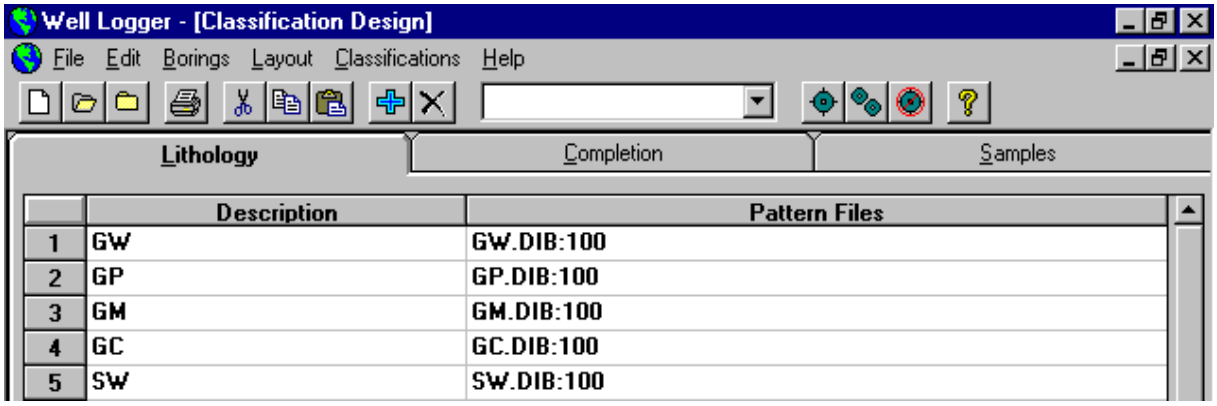


	Description	Pattern Files
1	Blank	Blank.dib:100
2	Sand, 1 Blank Casing	Sand.dib:33:Blank.dib:34:Sand.dib:33
3	Sand, 1 Screened Casing	Sand.dib:33:Screen.dib:34:Sand.dib:33
4	Bentonite, 1 Blank Casing	Solid.dib:33:Blank.dib:34:Solid.dib:33
5	Bentonite	Solid.dib:100

The data in line four (above) was used to create the upper portion of the column in the image below, which represents a single blank casing that has bentonite backfilled around it. The data in line two was used to create the portion below this, which represents a single blank casing that has sand backfilled around it. The data in line three represents the bottom-most portion of the image below. This represents a single screened casing that is backfilled with sand.



Creating Fill Patterns



The Lithology, Completion, and Sample classification tabs shown above each contain columns for entry of a *Description* and for *Pattern Files*. The *Description* column contains data that is displayed during editing and creation of well and boring logs in a drop-down combo box for the respective field. The *Pattern Files* column contains formatted data about which graphic files are to be used in displaying the fill pattern.

For example, in row number one above, the description that would be displayed in the spreadsheet's drop-down combo box while creating a Well Logger™ file would be "GW". The image that would be displayed for this code is GW.DIB. The image in GW.DIB would fill 100% of the width of the column it is displayed in.

You can generate your own bitmaps for use as fill patterns with Well Logger™, if you wish. The bitmap (.bmp or .dib) patterns should be created at a size larger than you would like to have them printed. Well Logger™ will scale the size of the original bitmap by the setting under *Print Options*. This is done to enhance the resolution of the bitmapped image and to improve final print quality.

CHAPTER 5 - PRINTING

Printing

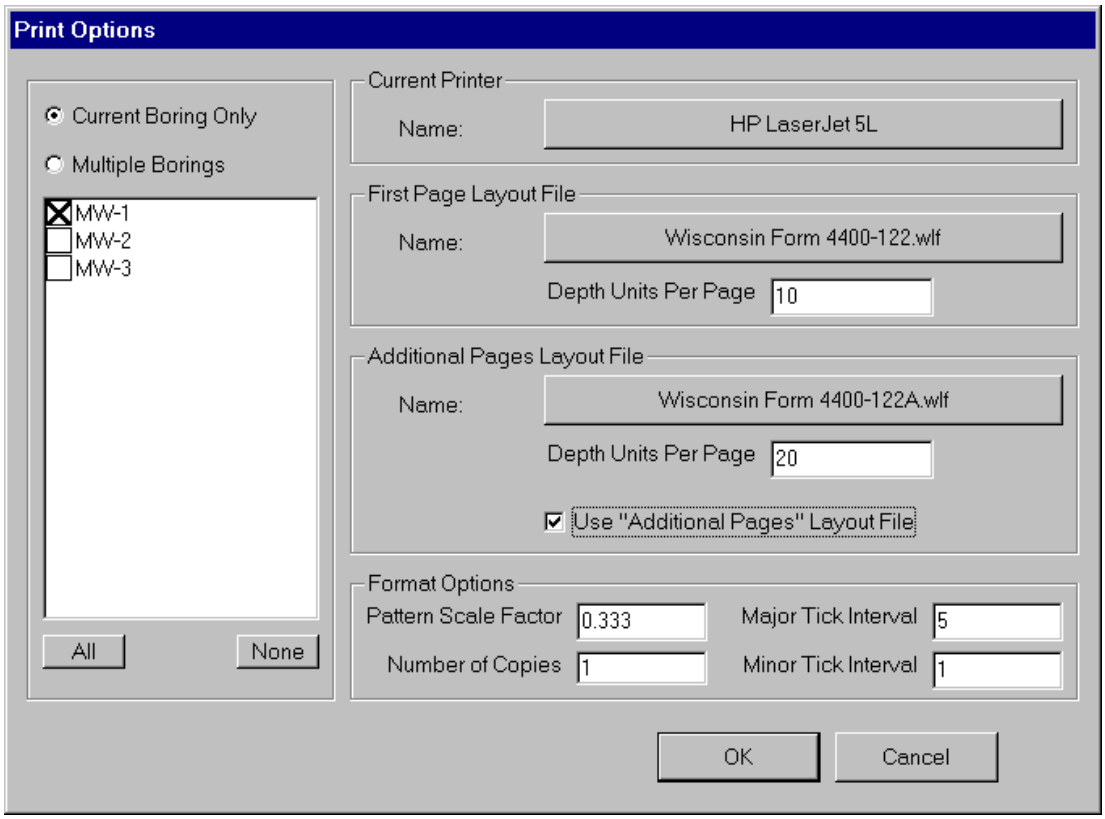
To print files, select *Print* from the *File* menu. If you prefer to preview a Well Logger™ document on the screen, then select *Print Preview* from the *File* menu.

To select the printer for output, or additional printer properties such as page orientation (if your printer supports this option), select *Print Setup* from the *File* menu.

Print Preview

To preview a file, select *Print Preview* from the *File* menu. The preview screen will allow you to change which page is being viewed and to zoom in or out on the current page.

Print Options



The *Print Options* screen appears prior to printing to the printer, or prior to a print-preview action. This screen accepts values for *Units Per Page*, *Pattern Scale Factor*, *Major Tick Interval*, *Minor Tick Interval* and *Number of Copies*.

Major Tick Interval is a value that determines the interval at which major tick marks will be printed on the depth column. This must be set to an integer value. *Minor Tick Interval* is a value that determines the interval at which minor tick marks will be printed on the depth column. This must be set to an integer value that can be evenly divided into the value set for *Major Tick Interval*. *Number of Copies* tells Well Logger™ how many copies of the boring log to print.

To change or configure the current printer, click on the button displaying the current printer's name, located at the top of the *Print Options* screen. To select a layout to be used, click on the button in the *First Page Layout File* section of the screen. If you wish to use a different layout for additional pages, select *Use "Additional Pages" Layout File* and click on the button in the *Additional Pages Layout File* section to choose a layout.

The user can also choose to print more than one boring from a project from this screen, allowing you to print your entire project with a single print command.

Note: When using Print-Preview, only the current boring can be previewed. The option of multiple boring selections is not available for Print-Preview actions.

GLOSSARY

Boring Diameter

The Well Logger™ variable for this field is: <<Boring Diameter>>.
To include Boring Diameter units, use <<Boring Diameter>> + <<Boring Diameter Units>>.

Boring Diameter Units

The Well Logger™ variable for this field is: <<Boring Diameter Units>>.

Boring Name

The name of the boring or well described with the Well Logger™ file.

The Well Logger™ variable for this field is: <<Boring Name>>.

Case Number

If your site is under regulatory review, this field is useful for including a reference to the regulator's case number on your boring logs.

The Well Logger™ variable for this field is: <<Case Number>>.

Classification Description

The Description in the Lithology, Completion, and Sample fields of the Classification edit screen is the text that is displayed in the Well Logger™ file entry drop-down boxes for classification of Lithology, Completion, and Samples.

Client

The Well Logger™ variable for this field is: <<Client>>.

Client Address

There are two fields for entry of the client's address.

The Well Logger™ variables for these fields are: <<Client Address 1>> and <<Client Address 2>>.

Client City

The Well Logger™ variable for this field is: <<Client City>>.

Client Contact

The Well Logger™ variable for this field is: <<Client Contact>>.

Client Phone

The Well Logger™ variable for this field is: <<Client Phone>>.

Client State

The Well Logger™ variable for this field is: <<Client State>>.

Client Zip

The Well Logger™ variable for this field is: <<Client Zip>>.

Common Well Name

The Well Logger™ variable for this field is: <<Common Well Name>>.

Company Address

The Well Logger™ variable for this field is: <<Company Address>>.

Company City

The Well Logger™ variable for this field is: <<Company City>>.

Company Country

The Well Logger™ variable for this field is: <<Company City>>.

Company Name

The Well Logger™ variable for this field is: <<Company Name>>.

Company State

The Well Logger™ variable for this field is: <<Company State>>.

Company Zip

The Well Logger™ variable for this field is: <<Company Zip>>.

Completion

The Well Logger™ variable for this field is: <<Completion>>.

Dates Drilled

There are two fields for the dates drilled -- One for the date the boring advancement began and one for when it ended.

The Well Logger™ variables for this field are: <<Date Start>> and <<Date End>>.

Depth Units

The Well Logger™ variable for this field is: <<Depth Units>>.

Drill Method

The Well Logger™ variable for this field is: <<Drill Method>>.

Drill Rig

The Well Logger™ variable for this field is: <<Drill Rig>>.

Drilled Water

The Well Logger™ variable for this field is: <<Drilled Water>>.
To include depth units, use: <<Drilled Water>> + <<Depth Units>>.

Driller

The Well Logger™ variable for this field is: <<Driller>>.

Drilling Contractor

The Well Logger™ variable for this field is: <<Drilling Contractor>>.

Easting

The number of units east of a reference point that the well is located. If the well is located west of the said reference point, then use a negative number.

The Well Logger™ variable for this field is: <<Easting>>.
To include depth units, use <<Easting>> + <<Easting Units>>.

Facility Number

The Well Logger™ variable for this field is: <<Facility Number>>.

Facility Well Name

The Well Logger™ variable for this field is: <<Facility Well Name>>.

File Name

The Well Logger™ variable for this field is: <<File Name>>.

File Path

The Well Logger™ variable for this field is: <<File Path>>.

Fill Patterns

There are a variety of fill patterns that come with Well Logger™, including fill patterns for use with the Unified Soil Classification System (USCS). Additional fill patterns can be easily created by the end user.

Ground Elevation

The Well Logger™ variable for this field is: <<Ground Elevation>>.
To include depth units, use <<Ground Elevation>> + <<Depth Units>>.

Latitude

The Well Logger™ variable for this field is: <<Latitude>>.

Layout File

Layout files are used by Well Logger™ to determine how to display output. The extension for a layout file is .wlf.

Lead Agency

The Well Logger™ variable for this field is <<Lead Agency>>.

License Number

The drilling contractor's license number.

The Well Logger™ variable for this field is: <<License Number>>.

Location Code

The Well Logger™ variable for this field is: <<Location Code>>.

Longitude

The Well Logger™ variable for this field is: <<Longitude>>.

Major Tick Interval

This value is used to determine the interval at which major tick marks are printed on the depth column. This must be set to an integer value.

Minor Tick Interval

This value is used to determine the interval at which minor tick marks are printed on the depth column. This must be set to an integer value that can evenly be divided into the value set for Major Tick Interval.

Northing

The number of units north of a reference point that the well is located. If the well is located south of the said reference point, then use a negative number.

The Well Logger™ variable for this field is: <<Northing>>.
To include Northing units, use <<Northing>> + <<Northing Units>>.

Page Number

This variable is used to print the page number of the output to the page.

The Well Logger™ variable for this field is: <<Page Number>>.

Pattern Scale Factor

This value is used in determining what scale to print fill patterns at. The default value is 0.333. This means that the original graphics used as fill patterns will be printed at 1/3 (or 0.333 times) the original size. The user can adjust this value to change the resolution of the output and to scale the fill patterns.

It may be necessary with certain printers to adjust this value to avoid errors in bitmap scaling.

Plunge

See Trend and Plunge

Potentiometric Water Level

The Well Logger™ variable for this field is: <<Potentiometric Water>>.
To include depth units, use <<Potentiometric Water>> + <<Depth Units>>.

Print Date and Time

These variables will print the date and time at which a log is printed.

The Well Logger™ variables for these fields are: <<Print Date>> and <<Print Time>>.
To print both the date and time, you may combine these fields to form: <<Print Date>> + <<Print Time>>.

Project Name

The Well Logger™ variable for this field is: <<Project Name>>.

Project Number

The Well Logger™ variable for this field is: <<Project Number>>.

Quarter Sections

The Well Logger™ variables for these fields are: <<Qtr Section Primary>> and <<Qtr Section Secondary>>.

Range/Range Direction

The Well Logger™ variables for these fields are: <<Range>> and <<Range Direction>>.

Save-As-You-Go

All files within Well Logger™ are saved as they are created, much like many popular database applications. This feature significantly reduces the possibility of lost data.

Section

The Well Logger™ variable for this field is: <<Section>>.

Site Address

There are two fields for entry of the site address.

The Well Logger™ variables for these fields are: <<Site Address 1>> and <<Site Address 2>>.

Site City

The Well Logger™ variable for this field is: <<Site City>>.

Site State

The Well Logger™ variable for this field is: <<Site State>>.

Site Zip

The Well Logger™ variable for this field is: <<Site Zip>>.

State Plane Easting/Northing

The Well Logger™ variables for these fields are: <<State Plane Easting>>.

State Well Name

The Well Logger™ variable for this field is: <<State Well Name>>.

Static Water Level

The Well Logger™ variable for this field is: <<Static Water>>.
To include depth units, use <<Static Water>> + <<Depth Units>>.

Supervisor

The name of the Supervisor (field or project supervisor) for the construction of the boring or well.

The Well Logger™ variable for this field is: <<Supervisor>>.

Total Depth

The Well Logger™ variable for this field is <<Total Depth>>.
To include depth units, use <<Total Depth>> + <<Depth Units>>.

Township/Township Direction

The Well Logger™ variables for these fields are: <<Township>> and <<Township Direction>>.

Trend and Plunge

These variables indicate the trend and plunge that a boring was advanced upon. Trend is indicated in degrees relative to north (e.g., 0° is north, 90° is east, etc.). Plunge is indicated in degrees from vertical (e.g., 0° is vertical and 90° is horizontal).

The Well Logger™ variables for these fields are <<Trend>> and <<Plunge>>.

Truncate Lower Column Text

If selected, this option will eliminate the lower text of the depth column from being printed. This feature is useful if your layout is designed so that there is a horizontal line placed in the location where the text would otherwise be placed.

Truncate Upper Column Text

If selected, this option will eliminate the upper text of the depth column from being printed. This feature is useful if your layout is designed so that there is a horizontal line placed in the location where the text would otherwise be placed.

Unified Soil Classification System

A standardized system of classifying soils that is commonly accepted in the geological industry.

Units Per Page

This entry field determines how many units will be printed on a page. If the total depth of a well or boring is 58 units and 40 units are printed on a page, then the Well Logger™ output will be a total of 2 pages.

User 1

There are ten user variables. These are the values for the headers in the user-defined columns in the sample entry tab.

The Well Logger™ variables for these fields are: <<User 1>>, <<User 2>>, <<User 3>>, <<User 4>>, <<User 5>>, <<User 6>>, <<User 7>>, <<User 8>>, <<User 9>>, and <<User 10>>.

User Sample Entries

User Sample Entries are used in the User columns within Well Logger™. The data is entered in the Sample Entry screen.

USGS Location

This variable combines the fields of <<Qtr Section Secondary>>, <<Qtr Section Primary>>, <<Section>>, <<Township>>, <<Township Direction>>, <<Range>>, and <<Range Direction>> to form a statement similar to:

NW 1/4 of SE 1/4 of Section 13, T. 26 N., R. 15 E.

The Well Logger™ variable for this field is <<USGS Location>>.

Water Encountered When Drilling

The Well Logger™ variable for this field is: <<Drilled Water>>.

Appendix A

Layout Forms

QUALITY CONSULTING, INC.

BORING LOG

Drill Rig:	CME-95	Date Drilled:	03-25-97	Logged By:	
Boring Dia:	11 Inches	Boring Number:	MW-1	T. Smith	

Sample	Blow Counts	Completion	Depth Feet	Lithology	Description
					SILTY SAND, very fine, medium brown, well graded, slightly moist.
	4-2-3		5		SANDY GRAVEL, very fine sand to fine pebble gravel, dark gray to brown, well graded, wet, FAINT HYDROCARBON ODOR.
	8-14-23		10		SILTY GRAVEL, fine pebble gravel and silt with some sand, dark gray to brown, poorly graded.
	8-10-21		15		SAND, very fine-grained, grading to silt, mottled: greenish gray to brown, subangular, poorly graded, note color change, FAIR HYDROCARBON ODOR.
	5-8-15				SILT, light brown, sandy, low plasticity, argillaceous.
	10-12-13		20		SILT, gray, clayey, some coarse sand, slightly plastic, stiff, moist, FAINT HYDROCARBON ODOR.
	46-48-50		25		SAND, brown, fine-grained, well graded, wet, FAINT HYDROCARBON ODOR.
	20-36-50		30		CLAY, dark gray to black, micaceous, hard, damp, NO ODOR.
	42-44-49		35		CLAY, dark gray, micaceous, hard, damp, NO ODOR.

Completion Notes:

Schedule 40, 0.020" slotted PVC casing from 18 to 33 feet bgs; schedule 40, solid, PVC casing from 0 to 18 feet bgs; backfilled with no. 3 Monterey sand from 36.5 to 14 feet bgs and with hydrated bentonite grout from 1 to 14 feet bgs. Capped with concrete. Traffic rated 12" diameter locking well vault installed at the surface. Groundwater encountered at 23 feet bgs.

Site:

Your Favorite Project
1234 Your Favorite Street
Any City, Any State 01234

Project No.: 1234.56 | Page 1

BORING LOG

QUALITY CONSULTING, INC.

Drill Rig:	CME-95	Date Drilled:	03-25-97	Logged By:	
Boring Dia:	11 Inches	Boring Number:	MW-1	T. Smith	

Sample	Blow Counts	Completion	OVA (ppm)	Depth Feet	Lithology	Description
						SILTY SAND, very fine, medium brown, well graded, slightly moist.
	4-2-3		240	5		SANDY GRAVEL, very fine sand to fine pebble gravel, dark gray to brown, well graded, wet, FAINT HYDROCARBON ODOR.
	8-14-23		40	10		SILTY GRAVEL, fine pebble gravel and silt with some sand, dark gray to brown, poorly graded.
	8-10-21		320	15		SAND, very fine-grained, grading to silt, mottled: greenish gray to brown, subangular, poorly graded, note color change, FAIR HYDROCARBON ODOR.
	5-8-15		300			SILT, light brown, sandy, low plasticity, argillaceous.
	10-12-13		260	20		SILT, gray, clayey, some coarse sand, slightly plastic, stiff, moist, FAINT HYDROCARBON ODOR.
	46-48-50		200	25		SAND, brown, fine-grained, well graded, wet, FAINT HYDROCARBON ODOR.
	20-36-50		0	30		CLAY, dark gray to black, micaceous, hard, damp, NO ODOR.
	42-44-49		0	35		CLAY, dark gray, micaceous, hard, damp, NO ODOR.

Completion Notes:

Schedule 40, 0.020" slotted PVC casing from 18 to 33 feet bgs; schedule 40, solid, PVC casing from 0 to 18 feet bgs; backfilled with no. 3 Monterey sand from 36.5 to 14 feet bgs and with hydrated bentonite grout from 1 to 14 feet bgs. Capped with concrete. Traffic rated 12" diameter locking well vault installed at the surface. Groundwater encountered at 23 feet bgs.

Site:

Your Favorite Project
1234 Your Favorite Street
Any City, Any State 01234

Project No.: 1234.56 | Page 1

BORING LOG

QUALITY CONSULTING, INC.

Drill Rig:	CME-95	Date Drilled:	03-25-97	Logged By:	
Boring Dia:	11 Inches	Boring Number:	MW-1	T. Smith	

Sample	Blow Counts	Completion	OVA (ppm)	Depth Feet	Lithology	Description
						SILTY SAND, very fine, medium brown, well graded, slightly moist.
	4-2-3		240	5		SANDY GRAVEL, very fine sand to fine pebble gravel, dark gray to brown, well graded, wet, FAINT HYDROCARBON ODOR.
	8-14-23		40	10		SILTY GRAVEL, fine pebble gravel and silt with some sand, dark gray to brown, poorly graded.
	8-10-21		320	15		SAND, very fine-grained, grading to silt, mottled: greenish gray to brown, subangular, poorly graded, note color change, FAIR HYDROCARBON ODOR.
	5-8-15		300			SILT, light brown, sandy, low plasticity, argillaceous.
	10-12-13		260	20		SILT, gray, clayey, some coarse sand, slightly plastic, stiff, moist, FAINT HYDROCARBON ODOR.
	46-48-50		200	25		SAND, brown, fine-grained, well graded, wet, FAINT HYDROCARBON ODOR.
	20-36-50		0	30		CLAY, dark gray to black, micaceous, hard, damp, NO ODOR.
	42-44-49		0	35		CLAY, dark gray, micaceous, hard, damp, NO ODOR.

Completion Notes:

Schedule 40, 0.020" slotted PVC casing from 18 to 33 feet bgs; schedule 40, solid, PVC casing from 0 to 18 feet bgs; backfilled with no. 3 Monterey sand from 36.5 to 14 feet bgs and with hydrated bentonite grout from 1 to 14 feet bgs. Capped with concrete. Traffic rated 12" diameter locking well vault installed at the surface. Groundwater encountered at 23 feet bgs.

Site:

Your Favorite Project
1234 Your Favorite Street
Any City, Any State

Project No.: 1234.56 | Page 1

Layout3.wlf **8.5" x 11" Portrait**

MW-1

Your Favorite Project	1234 Your Favorite Street	Any City, Any State

Project Number	1234.56	Drill Rig	CME-95
Geologist	T. Smith	Ground Elevation	231 Feet
Date Drilled	03-25-97	Total Depth of Borehole	36.5 Feet
Borehole Diameter	11 Inches	Depth to Water	21 Feet

Graphic Log	Description	Depth	Sample	TPHg (mg/kg)	Blow Counts
	SILTY SAND, very fine, medium brown, well graded, slightly moist.				
	SANDY GRAVEL, very fine sand to fine pebble gravel, dark gray to brown, well graded, wet, FAINT HYDROCARBON ODOR.	5		240	4-2-3
	SILTY GRAVEL, fine pebble gravel and silt with some sand, dark gray to brown, poorly graded.	10		40	8-14-23
	SAND, very fine-grained, grading to silt, mottled: greenish gray to brown, subangular, poorly graded, note color change, FAIR HYDROCARBON ODOR.	15		320	8-10-21
	SILT, light brown, sandy, low plasticity, argillaceous.			300	5-8-15
	SILT, gray, clayey, some coarse sand, slightly plastic, stiff, moist, FAINT HYDROCARBON ODOR.	20		260	10-12-13
	SAND, brown, fine-grained, well graded, wet, FAINT HYDROCARBON ODOR.	25		200	46-48-50
	CLAY, dark gray to black, micaceous, hard, damp, NO ODOR.	30		0	20-36-50
	CLAY, dark gray, micaceous, hard, damp, NO ODOR.	35		0	42-44-49

Completion

C:\Program Files\GBA Technologies\Well Logger\sample.wl2

Quality Consulting

Layout4.wlf **8.5" x 11" Portrait**

MW-1

Your Favorite Project	1234 Your Favorite Street	Any City, Any State

Project Number	1234.56	Drill Rig	CME-95
Geologist	T. Smith	Ground Elevation	231 Feet
Date Drilled	03-25-97	Total Depth of Borehole	36.5 Feet
Borehole Diameter	11 Inches	Depth to Water	21 Feet

Graphic Log	Description	Depth	Sample	TPHg (mg/kg)	Blow Counts
	SILTY SAND, very fine, medium brown, well graded, slightly moist.				
	SANDY GRAVEL, very fine sand to fine pebble gravel, dark gray to brown, well graded, wet, FAINT HYDROCARBON ODOR.	5		240	4-2-3
	SILTY GRAVEL, fine pebble gravel and silt with some sand, dark gray to brown, poorly graded.	10		40	8-14-23
	SAND, very fine-grained, grading to silt, mottled: greenish gray to brown, subangular, poorly graded, note color change, FAIR HYDROCARBON ODOR.	15		320	8-10-21
	SILT, light brown, sandy, low plasticity, argillaceous.			300	5-8-15
	SILT, gray, clayey, some coarse sand, slightly plastic, stiff, moist, FAINT HYDROCARBON ODOR.	20		260	10-12-13
	SAND, brown, fine-grained, well graded, wet, FAINT HYDROCARBON ODOR.	25		200	46-48-50
	CLAY, dark gray to black, micaceous, hard, damp, NO ODOR.	30		0	20-36-50
	CLAY, dark gray, micaceous, hard, damp, NO ODOR.	35		0	42-44-49

Completion

C:\Program Files\GBA Technologies\Well Logger\sample.wl2

Quality Consulting

Layout5.wlf **8.5” x 11” Portrait**

MW-1

Your Favorite Project	1234 Your Favorite Street	Any City, Any State

Project Number	1234.56	Drill Rig	CME-95
Geologist	T. Smith	Ground Elevation	231 Feet
Date Drilled	03-25-97	Total Depth of Borehole	36.5 Feet
Borehole Diameter	11 Inches	Depth to Water	21 Feet

Graphic Log	Description	Depth	Sample	TPHg (mg/kg)	TPHd (mg/kg)	Benzene (mg/kg)
	SILTY SAND, very fine, medium brown, well graded, slightly moist.					
	SANDY GRAVEL, very fine sand to fine pebble gravel, dark gray to brown, well graded, wet, FAINT HYDROCARBON ODOR.	5		240	1,000	ND
	SILTY GRAVEL, fine pebble gravel and silt with some sand, dark gray to brown, poorly graded.	10		40	ND	ND
	SAND, very fine-grained, grading to silt, mottled: greenish gray to brown, subangular, poorly graded, note color change, FAIR HYDROCARBON ODOR.	15		320	1,240	ND
	SILT, light brown, sandy, low plasticity, argillaceous.			300	1,200	ND
	SILT, gray, clayey, some coarse sand, slightly plastic, stiff, moist, FAINT HYDROCARBON ODOR.	20		260	980	ND
	SAND, brown, fine-grained, well graded, wet, FAINT HYDROCARBON ODOR.	25		200	600	ND
	CLAY, dark gray to black, micaceous, hard, damp, NO ODOR.	30		0	ND	ND
	CLAY, dark gray, micaceous, hard, damp, NO ODOR.	35		0	ND	ND

Completion

C:\Program Files\GBA Technologies\Well Logger\sample.wl2

Quality Consulting

Layout6.wlf **8.5" x 11" Portrait**

MW-1

Your Favorite Project	1234 Your Favorite Street		Any City, Any State
Project Number	1234.56	Drill Rig	CME-95
Geologist	T. Smith	Ground Elevation	231 Feet
Date Drilled	03-25-97	Total Depth of Borehole	36.5 Feet
Borehole Diameter	11 Inches	Depth to Water	21 Feet

Graphic Log		Description	Depth	Sample	TPHg (mg/kg)	TPHd (mg/kg)	Benzene (mg/kg)	Completion
	SM	SILTY SAND, very fine, medium brown, well graded, slightly moist.						
	GW	SANDY GRAVEL, very fine sand to fine pebble gravel, dark gray to brown, well graded, wet, FAINT HYDROCARBON ODOR.	5		240	1,000	ND	
	GM	SILTY GRAVEL, fine pebble gravel and silt with some sand, dark gray to brown, poorly graded.	10		40	ND	ND	
	SM	SAND, very fine-grained, grading to silt, mottled: greenish gray to brown, subangular, poorly graded, note color change, FAIR HYDROCARBON ODOR.	15		320	1,240	ND	
	ML	SILT, light brown, sandy, low plasticity, argillaceous.			300	1,200	ND	
	SW	SILT, gray, clayey, some coarse sand, slightly plastic, stiff, moist, FAINT HYDROCARBON ODOR.	20		260	980	ND	
	SW	SAND, brown, fine-grained, well graded, wet, FAINT HYDROCARBON ODOR.	25		200	600	ND	
	CL	CLAY, dark gray to black, micaceous, hard, damp, NO ODOR.	30		0	ND	ND	
	CL	CLAY, dark gray, micaceous, hard, damp, NO ODOR.	35		0	ND	ND	

C:\Program Files\GBA Technologies\Well Logger\sample.wl2

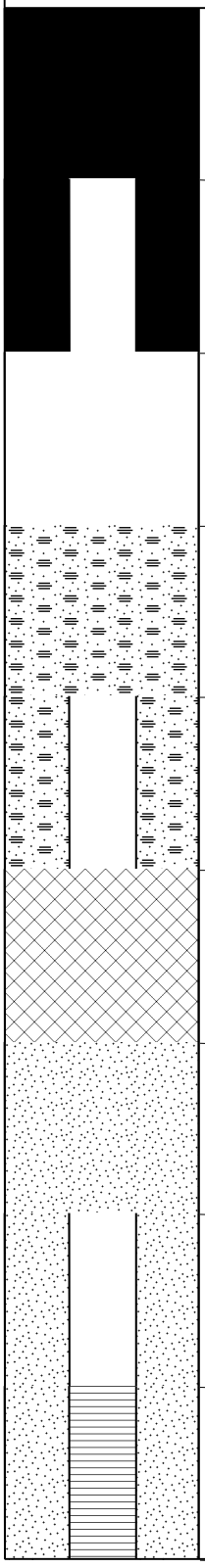
Quality Consulting

Layout7.wlf **8.5" x 11" Portrait**

Appendix B

Patterns

Completion Patterns



Bentonite

Bentonite, 1 Blank Casing

Blank

Concrete

Concrete, 1 Casing; 1 Blank

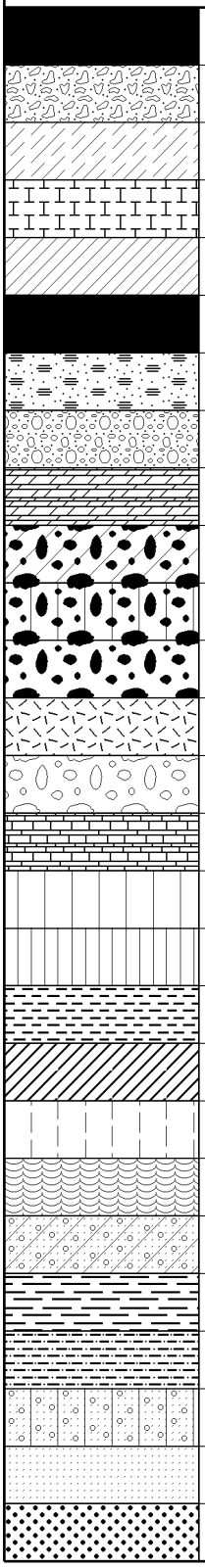
Hatch

Sand

Sand, 1 Blank Casing

Sand, 1 Screened Casing

Lithology Patterns



ASPHALT

BRECCIA

CH - INORGANIC CLAYS OF HIGH PLASTICITY, ORGANIC SILTS.

CHALK

CL - INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS.

COAL

CONCRETE

CONGLOMERATE

DOLOMITE

GC - CLAYEY GRAVELS, GRAVEL SAND-CLAY MIXTURES.

GM - SILTY GRAVELS, GRAVEL, SAND-SILT MIXTURES.

GP - POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES.

GRANITE

GW - WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES.

LIMESTONE

MH - INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR SILTY SOILS, ELASTIC SILTS.

ML - INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS, OR CLAYEY SILTS WITH SLIGHT PLASTICITY.

MUDSTONE

OH - ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS.

OL - ORGANIC CLAYS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY.

PT - PEAT AND OTHER HIGHLY ORGANIC SOILS.

SC - CLAYEY SANDS, SAND-CLAY MIXTURES WITH OR WITHOUT GRAVEL.

SHALE

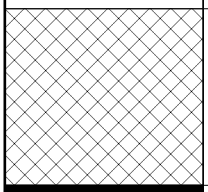
SILTSTONE

SM - SILTY SANDS, SAND-SILT MIXTURES WITH OR WITHOUT GRAVEL.

SP - POORLY GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES.

SW - WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES.

Sample Patterns

	BLANK
	HATCH
	SOLID