

# Ohio DOT's Geotechnical Management System: Drilling Request to GIS

Columbus, Ohio  
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# Segue...Uses for DIGGS

- Send data to others (lab, client, consultant, others)
- Receive data from others
- Internal for data flow (to different software programs, to different data bases)
- **A key component of a geotechnical management system**

# Brief History of ODOT GeoMS



- User Needs Interviews by GeoDecisions
  - Centralized data repository
  - Internal/external secure access
  - Borehole logs
  - Laboratory test data
  - Technical application software
  - Search, input, and export data
  - GIS

# Brief History of ODOT GeoMS



- Document Management Assessment by tsaAdvet
  - Hundreds of 1000's of maps, plans, as-builts, ...
  - Hundreds of \$M in value

The screenshot shows the website for tsaADVET, an advanced enterprise technologies company. The navigation menu includes Home, Products, Demos, Case Studies, About Us, Services, and Support. A "Contacts" button is also visible. The main content area features a large image of a falcon's head on the left. To the right of the image, the text reads "Falcon/DMS [ENTERPRISE-WIDE DOCUMENT MANAGEMENT SOLUTIONS]". Below this, a paragraph describes the product as a comprehensive solution for wide area / local area networks, and Web-based document management efforts. At the bottom of the content area, there are several links: [ Intro ] [ Falcon/DMS ] [ WebSuite ] [ Publisher ] [ Deliver! ] [ Indexer ] [ Geo ]

# Brief History of ODOT GeoMS



- Detailed Assessment by EarthSoft...user survey
  - 2/3 of data is collected on field sheet or notebook
  - 96% of data shared by manual log sheets
  - Almost 2/3 of archived data stored in boxes or warehouse
  - Over 50% of respondents have lost valuable data
  - 97%...important or absolutely necessary to share data
  - 92% prepare, report, archive geotechnical data on paper
  - 96% say it is important or absolutely necessary to store geotechnical data electronically
  - Most commonly used lab data: particle size, moisture content, Atterberg

# Brief History of ODOT GeoMS

- Detailed Assessment by EarthSoft...user survey
  - Results of survey allowed prioritization
  - Phased implementation

## Geotechnical Management System

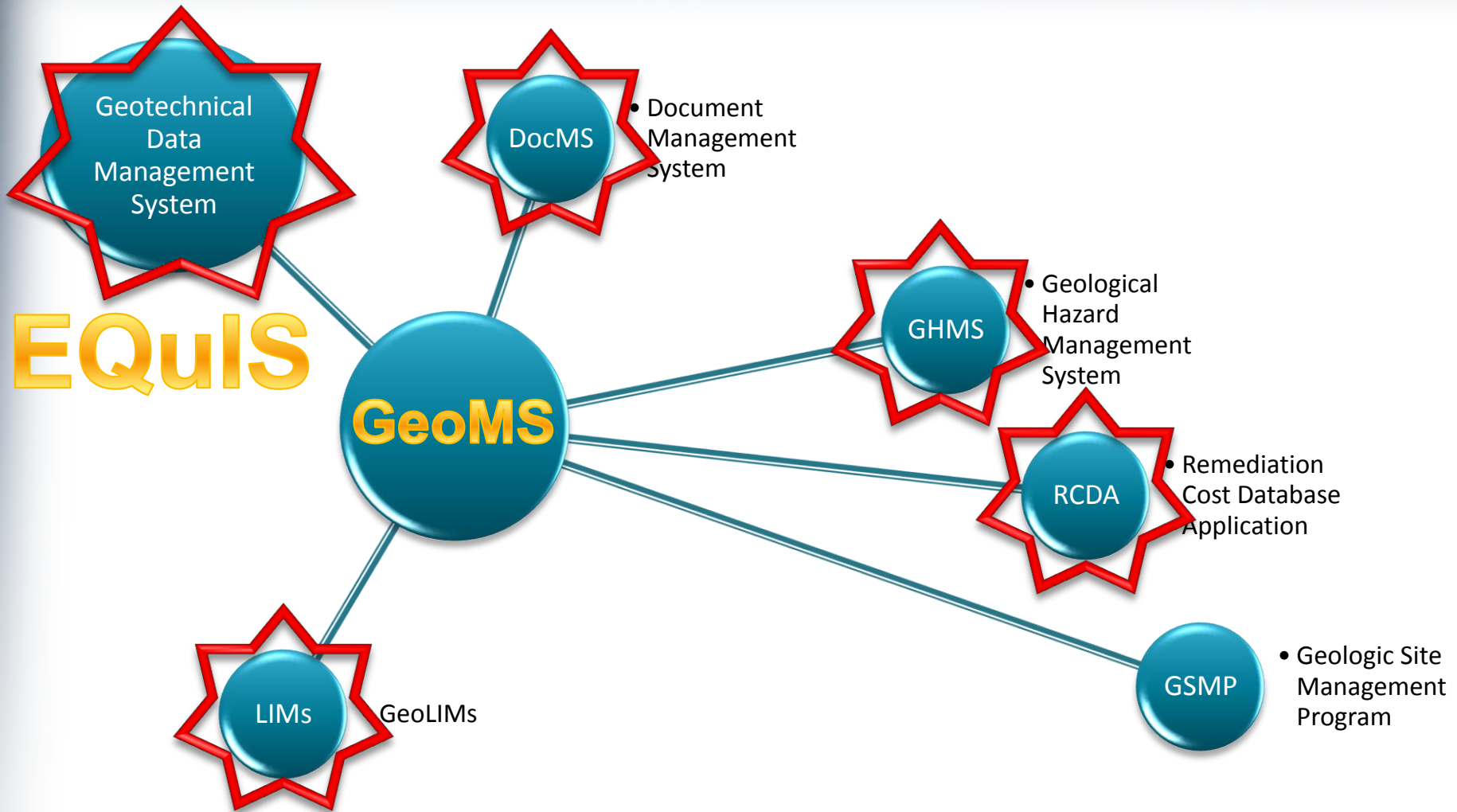


# Brief History of ODOT GeoMS



- Detailed Assessment...user survey
  - Phased implementation
    - Borehole data
    - Drilling data
    - Laboratory test data
    - Integration with Falcon
    - Integration with ESRI GIS
- EarthSoft contracted to build GeoMS on top of EQulS
- A “design/build” approach was adopted, which has proven to be a good thing

# GeoMS Overview



# Brief History of ODOT GeoMS



GIS Software that Gives You  
THE GEOGRAPHIC ADVANTAGE

Home Industries Products Training Support Services Events New

← All Esri Products

## ArcGIS Server

Complete and Integrated Server-Based GIS

### Overview

Key Features

Demos

What You Get

Brochures/White Papers

Common Questions

System Requirements

Success Stories

Pricing

### Overview

**ArcIMS** is a solution for delivering dynamic maps and GIS data and services via the Web. It provides a highly scalable framework for GIS Web publishing.

Using ArcIMS, city and local governments, businesses, and other organizations worldwide share geospatial information both internally and to the public.

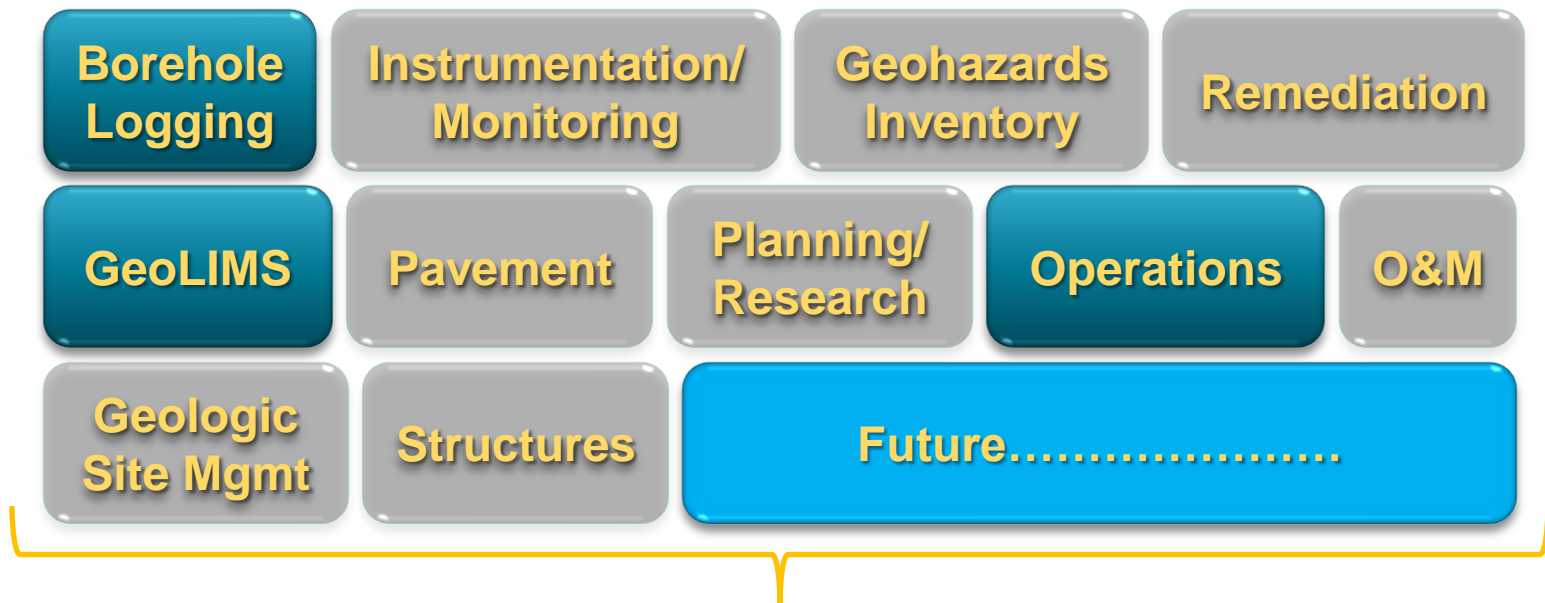
#### With ArcIMS, you can

- Deliver dynamic maps and data via the Web.
- Share data with others to accomplish tasks.

Note: Esri's development of ArcIMS is now limited. Our server GIS development efforts are devoted primarily to [ArcGIS Server](#).

# Brief History of ODOT GeoMS

- Drilling Request System (DRS)
- Security: Centralized Authentication



Login only once to each module

- Enhanced field data collection with EDGE

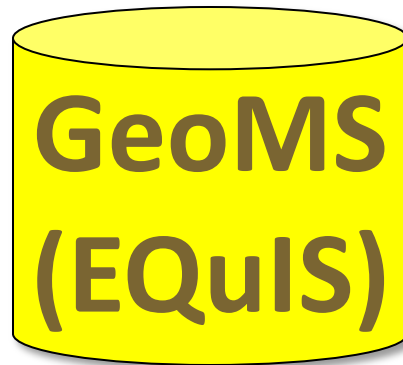
# GeoMS Overview



Field Data Collection

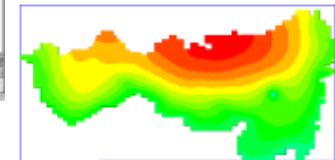
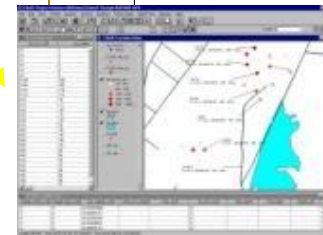
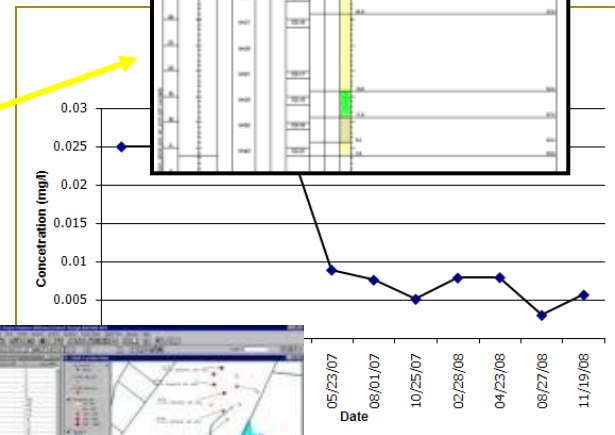
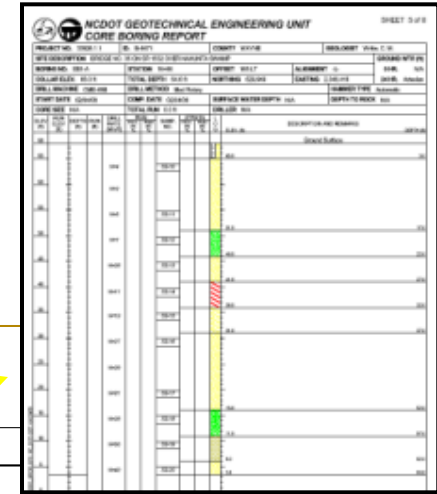


Monitoring/  
Instrumentation



#sys_loc_code	sys_well_code	X_coord	Y_coord
4129-SB008	NONE	620071.4941	3339792.757
4129-SB009	NONE	620085.495	3339809.48
4129-SB010	NONE	619666.5208	3339949.574
4129-SB011	NONE	619505.707	3339908.768
4129-MW005	4129-MW005	619443.7651	3339953.166
4129-MW006	4129-MW006	620133.2989	3340195.292
4129-MW007	4129-MW007	620162.5517	3340127.655
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4129-SB010a	NONE	619666.5208	3339949.574
4129-SB011a	NONE	619505.707	3339908.768
4129-MW005a	4129-MW005	619443.7651	3339953.166
4129-MW006a	4129-MW006	620133.2989	3340195.292
4129-MW007a	4129-MW007	620162.5517	3340127.655

Laboratory Data



# GeoMS Overview

- GeoMS Components
  - EQuIS Schema (Oracle Database)
  - EQuIS Professional
  - EQuIS Enterprise
  - EQuIS Data Processor (EDP)
  - EQuIS Data Gathering Engine (EDGE)
  - EQuIS Sample Planning Module (SPM)

# GeoMS Overview

## EQuIS PROFESSIONAL



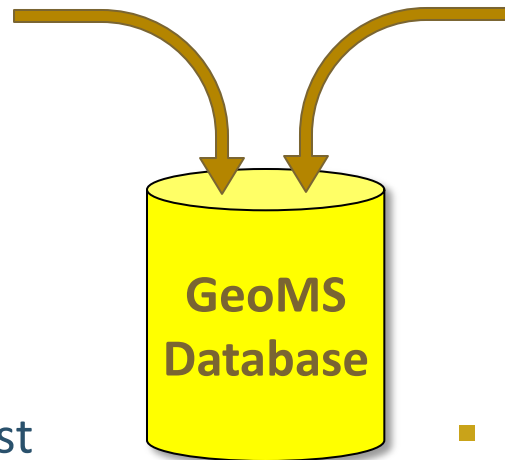
- Data manager, Scientist
- Windows app (installation)
- Data importing, editing
- Advanced analysis, modeling\*
- Ultimate flexibility

\* May require additional third-party software

## EQuIS ENTERPRISE

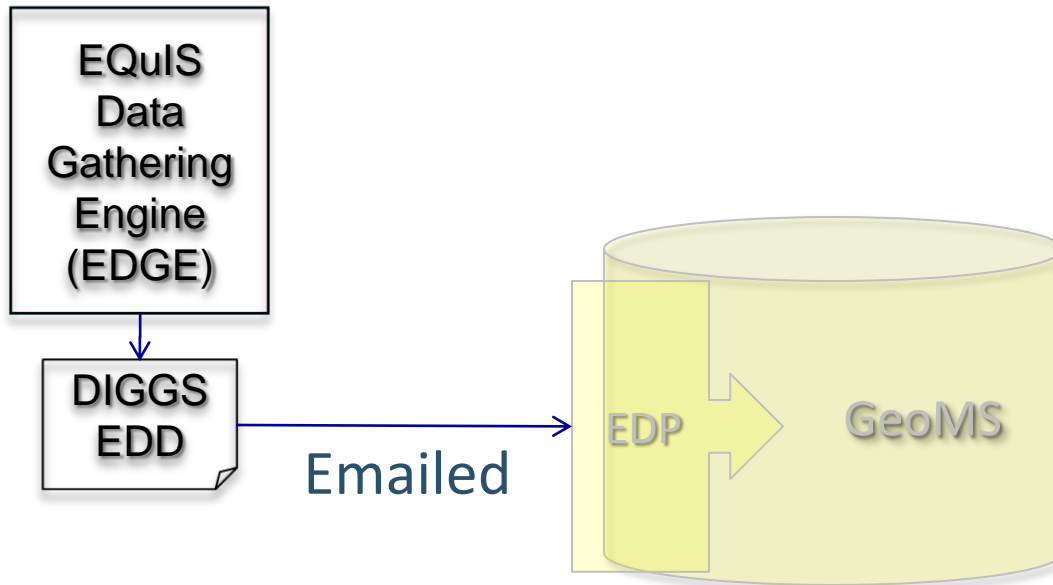


- Manager, Auditor, Public
- Web browser (no install req.)
- Same database, same data
- Simple, quick, easy to use
- Automation



# Field Workflow

- Consultant or ODOT field crew



# EDGE: Field Data Collection

- What is EDGE?

A collection of field tools designed to assist field technicians collect accurate and complete field data using the latest mobile computing technologies.



- Why use EDGE?

Reduce data entry errors in the field and submit

		Date	Time	
1	P1D	7/21	7:00A	20
2	PAI-D		7:22A	20
3				

# EDGE: Field Data Collection

The screenshot displays the EarthSoft EDGE software interface. The top menu bar includes 'Home' and 'Interfaces'. The 'Interfaces' section contains several tool icons: 'Excel' (Copy, Paste, Undo), 'Tablet' (eSketch, Color Scheme), and 'Tools' (Field Sensors, GPS Position, Barcode Scanner, Device Manager). The main window is titled 'EarthSoft EDGE' and features a 'Location Chooser/Filter' sidebar on the left. The central area is a data entry form with tabs for 'Project Info', 'Boring Info', 'Lithology', 'Sample', 'Completion', and 'Well Log'. The 'Boring Info' tab is active, showing a table with the following data:

Field	Value
Bore Hole ID	BH1
X Coord	82.3123
Y Coord	46.3123
Surf Elev	
Coord Type Code	LAT LONG
Observation Date	
Coord Identifier	Primary
Verification Code	
Reference Point	
Loc Name	
Loc Desc	
Loc Type	
Loc Purpose	
Within Facility Yn	
Loc County Code	

The bottom of the interface includes an 'Intelligent Bar' with filter settings and a status bar at the very bottom showing file paths and facility information.

# EDGE: Field Data Collection

The screenshot displays the EarthSoft EDGE software interface. The main window shows a data table with columns for Bore Hole ID, From, To, Description, System, Series, Group, and Member. A 'USCS Wizard' dialog box is open, allowing the user to select soil type and classification parameters.

**Table 1: Bore Hole Data**

Bore Hole ID	From	To	Description	System	Series	Group	Member
BH1	0	3					
BH1	3	6					
BH1	6	8					
BH1	8	12					

**USCS Wizard Dialog Box**

Soil (Cohesive)  Soil (Granular)  Rock  Other

1- Consistency/Moisture | 2- Color/Classification | 3- USCS Symbol

**1- Consistency**

Consistency	N Values
Very Soft	0-1
Soft	2-4
Firm	5-8
Stiff	9-15
Very Stiff	16-30
Hard	31-60
Very Hard	> 60

**2- Moisture**

Moisture	Description
Dry	No moisture
Damp	Soil has moisture
Moist	Grain appeared Darkened but no visible water
Wet	Visible water on larger grain surfaces.

{Consistency}, {Moisture}, {Color}, {Soil Type}, {USCS Code}

Cancel [Ok]

# EDGE: Field Data Collection

USCS Wizard

Soil (Cohesive)     Soil (Granular)     Rock     Other

1- Consistency/Moisture    2- Color/Classification    3- USCS Symbol

**Color**

Color 1	Color 2	Color 3
▶ Light	Blackish	Black
Medium	▶ Brownish	Brown
Very Light	Greenish	▶ Green
Dark	Whitish	White
Very Dark	Bluish	Blue
	Grayish	Gray
	Redish	Red
	Yellowish	Yellow

**Field Classification**

1st	2nd	Type
		Clay
Clayey	Clayey	Silt
Silty	▶ Silty	Sand
Sandy	Sandy	▶ Gravel
▶ Gravelly	Gravelly	Cobble
Cobby	Cobby	Boulder
Bouldery	Bouldery	Other

Soft, Grain appeared Darkened but no visible water, Light Brownish Green, Gravel, {USCS Code}

Cancel    Ok

# EDGE: Field Data Collection

The screenshot displays the EarthSoft EDGE software interface. At the top, there is a ribbon with tabs for 'Home' and 'Interfaces'. The 'Interfaces' tab is active, showing icons for 'eSketch', 'Color Scheme', 'Field Sensors', 'GPS Position', 'Barcode Scanner', and 'Device Manager'. Below the ribbon is a toolbar with various icons for actions like 'Copy', 'Paste', 'Undo', 'Add', 'Remove', 'Auto Fill', 'Refresh', 'Maximize', and 'View'. The main window is divided into several panes. On the left, there is a 'Location Chooser/Filter' pane with a table showing 'sys\_loc\_code' and 'loc\_name', with 'BH1' listed. The main area contains a data table with the following columns: 'Bore Hole ID', 'Sample Id', 'Sample Type', 'Sampling Method', 'N1', 'N2', and 'N3'. The table has three rows of data, all with 'BH1' in the 'Bore Hole ID' column. A dropdown menu is open for the 'Sampling Method' column of the first row, showing options: '3in Ring Sampler', '43mm O.D. Split Tube Sample', '76mm Shelby Tube', '82mm in Split Tube Sample (D & M)', 'Auger', 'Core', and 'Other'. The 'Intelligent Bar' is visible at the bottom of the window.

Bore Hole ID	Sample Id	Sample Type	Sampling Method	N1	N2	N3
BH1	1	N				
BH1	2	N				
BH1	3	N				

# EDGE: Field Data Collection



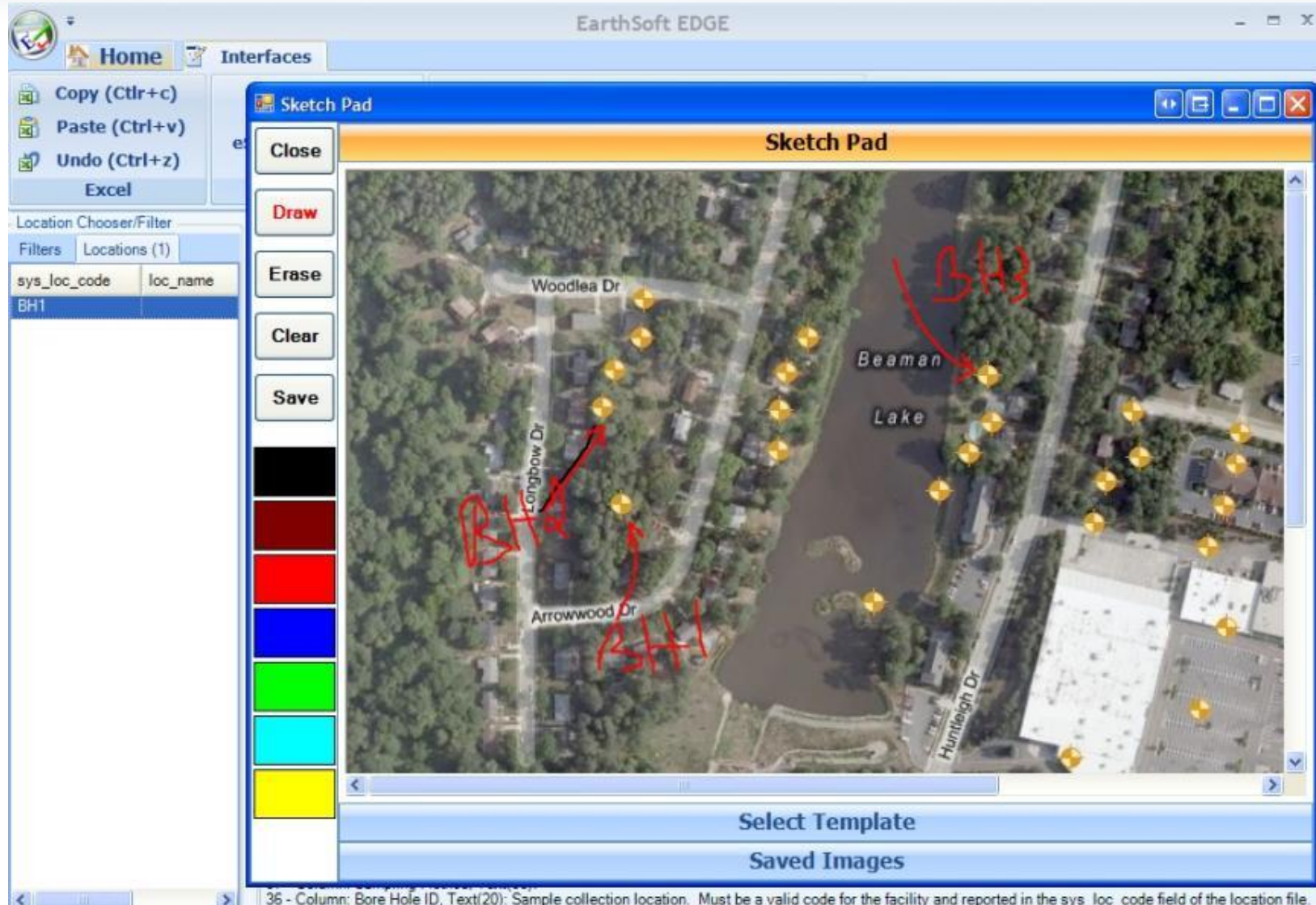
The screenshot displays the EarthSoft EDGE software interface. The main window is titled "EarthSoft EDGE" and features a ribbon menu with tabs for "Home" and "Interfaces". The "Home" tab is active, showing various icons for file operations (New, Open, Save, EDP Export) and task management (Open Format, New Task, Edit Task). The "Interfaces" tab includes "Setup Backups", "Manage Locations", "Facility Info", and "COC".

Below the ribbon, there is a "Location Chooser/Filter" panel on the left, showing a tree view of filters under "Locations (1)". The main data entry area is divided into several tabs: "Project Info", "Boring Info", "Lithology", "Sample", "Completion", and "Well Log". The "Project Info" tab is currently selected, displaying a form with the following fields:

Surf Elev	
Coord Type Code	
Observation Date	
Coord Identifier	
Verification Code	
Reference Point	
Loc Name	
Loc Desc	
Loc Type	BH
Loc Purpose	
Within Facility Yn	
Loc County Code	
Loc District Code	
Loc State Code	HO
Loc Major Basin	
Loc Minor Basin	

At the bottom of the window, an "Intelligent Bar" provides additional context for the "Loc Minor Basin" and "Loc Major Basin" fields, explaining their relationship to HUC codes.

# EDGE: Field Data Collection



35 - Column: Bore Hole ID, Text(20): Sample collection location. Must be a valid code for the facility and reported in the sys\_loc\_code field of the location file.

# EDGE: Field Data Collection

EarthSoft EDGE

EDGE - Import GPS Position

Home

Detect Stop Detection Use Serial Use Bluetooth Start Stop Pause Resume

Hardware GPS Receiver

Hardware Devices GPS Data Satellites NMEA Raw Data

Date/Time: 7/30/2010 5:52:42 PM

UTC Date/Time: Fri, 30 Jul 2010 21:52:42 GMT

Position: 42°02'17.7180"N,082°36'00.3489"W

Latitude: 42.0382550038346

Longitude: -82.6000969282887

Altitude: 145.80 m

Speed: 0.06 kts

Bearing: West

Coordinate Type: LAT LONG

Import GPS Position

Cancel

Connected! Waiting for data...

# EDGE: Field Data Collection

EarthSoft EDGE

EDGE - Import GPS Position

Hardware: Detect, Stop Detection, Use Serial, Use Bluetooth

GPS Receiver: Start, Stop, Pause, Resume

Satellite ID	Name	Azimuth	Elevation	Signal Strength
7	Navstar 62	North	Near the horizon	32 DB (Good)
28	Navstar 48	North	Near the horizon	0 DB (None)
23	Navstar 55	North	Near the horizon	0 DB (None)
20	Navstar 47	North	Near the horizon	0 DB (None)
17	Navstar 57	North	Near the horizon	0 DB (None)
26	Navstar 2A-05	North	Near the horizon	0 DB (None)
10	Navstar 2A-17	North	Near the horizon	0 DB (None)
24	Navstar 2A-02	North	Near the horizon	0 DB (None)
8	New Satellite	North	Near the horizon	34 DB (Good)
13	Navstar 43	North	Near the horizon	0 DB (None)
6	Navstar 2A-15	North	Near the horizon	0 DB (None)
122	New Satellite	North	Near the horizon	0 DB (None)
19	Navstar 54	North	Near the horizon	0 DB (None)
4	Navstar 2A-14	North	Near the horizon	0 DB (None)
3	Navstar 2A-16	North	Near the horizon	0 DB (None)
15	GPS 2R-17	North	Near the horizon	0 DB (None)
11	Navstar 46	North	Near the horizon	0 DB (None)
16	Navstar 51	North	Near the horizon	0 DB (None)
134	New Satellite	North	Near the horizon	0 DB (None)
120	New Satellite	North	Near the horizon	0 DB (None)

Connected! Waiting for data...

Cancel

# EDGE: Field Data Collection

The screenshot shows the EarthSoft EDGE software interface. The main window displays a data table with columns: Bore Hole ID, Total Depth, Water Encountered At, Potentiometric Water Level, and Static Water Level. A 'Sign and Submit' dialog box is open, prompting for User Name (Alek), Password, and Facility (ODOT). The 'Save Password' checkbox is checked. The 'Submit' button is visible.

**Sign and Submit Dialog:**

- User Name: Alek
- Password: [Redacted]
- Facility: ODOT
- Save Password
- Submit

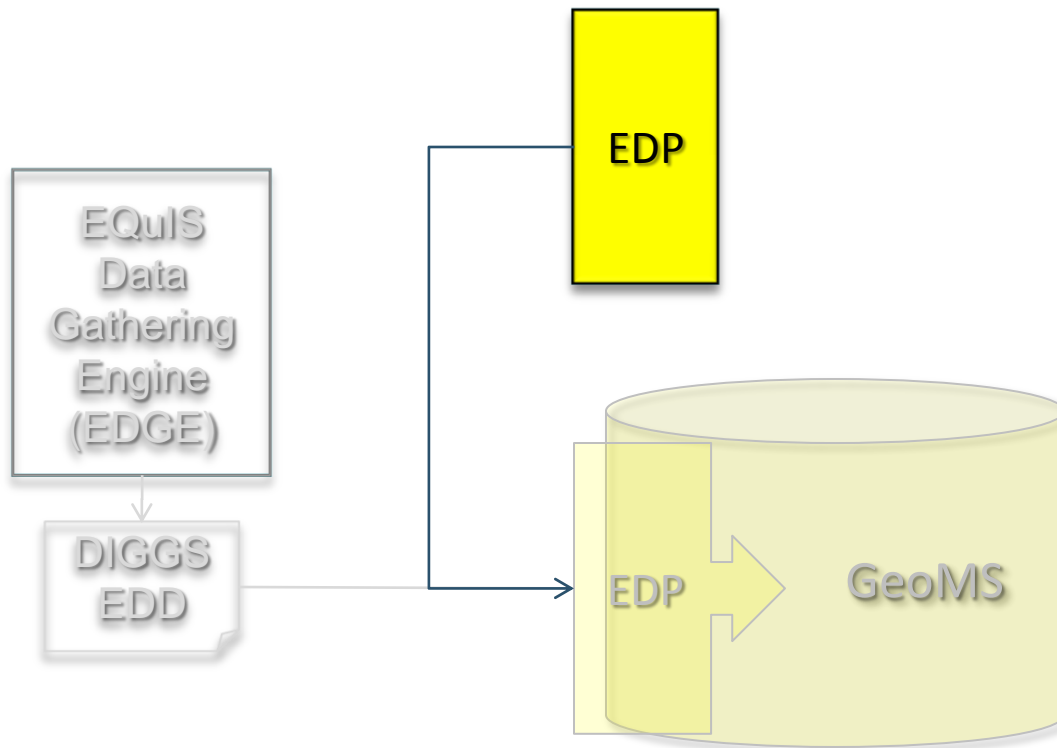
**Table 1: Completion Notes**

Bore Hole ID	Total Depth	Water Encountered At	Potentiometric Water Level	Static Water Level
BH1				
BH1				

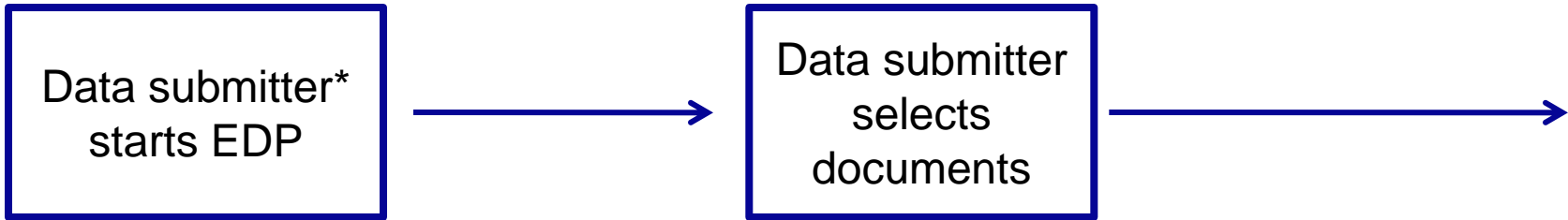
**Table 2: Completion Details**

Bore Hole ID	From	To	Completion Details
BH1			
BH1			

# Document Submission Workflow



# 1. Data Packet Created



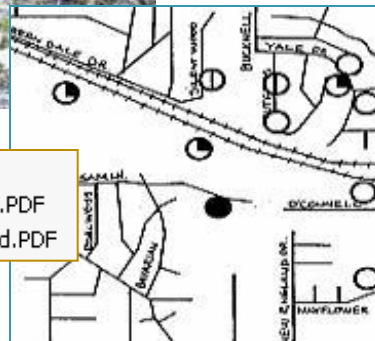
\*Data submitter may be consultant or engineer, typically person or company acquiring data

## Documents may include:

- Images
- Maps
- DGN folder structure
- Documents
- Reports
- Spreadsheets
- Borehole logs
- etc.



- RoadMap1936.PDF
- RoadMap1936Cover.PDF
- RoadMap1936Legend.PDF

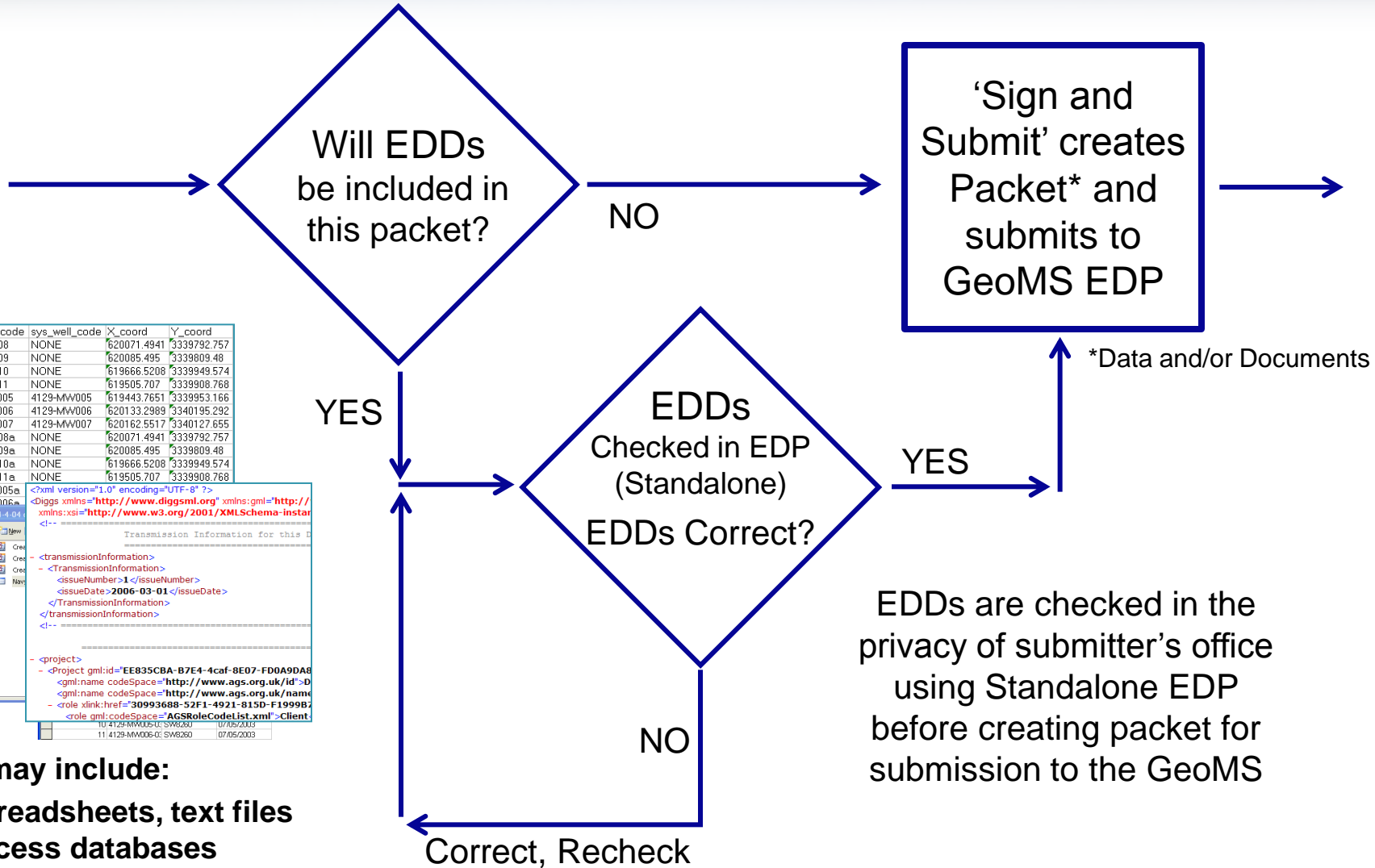


ID	#sys_sample	lab	anal_method	analysis_date
1	4129-MW005-01	SW6260		07/05/2003
2	4129-MW005-01	SW6260		07/05/2003
3	4129-MW005-01	SW6260		07/05/2003
4	4129-MW005-01	SW6260		07/05/2003
5	4129-MW005-01	SW6260		07/05/2003
6	4129-MW005-01	SW6260		07/05/2003
7	4129-MW006-01	SW6260		07/05/2003
8	4129-MW005-01	SW6260		07/05/2003
9	4129-MW006-01	SW6260		07/05/2003
10	4129-MW005-01	SW6260		07/05/2003
11	4129-MW006-01	SW6260		07/05/2003

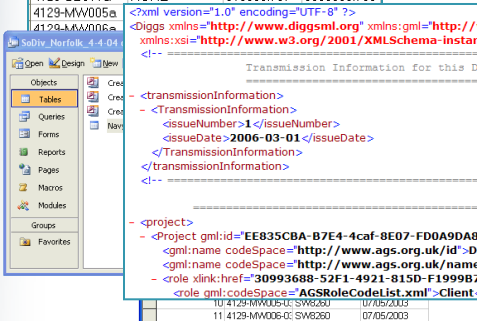
  

#sys_loc_cod				
4129-SB008				
4129-SB009	NONE			
4129-SB010	NONE			
4129-SB011	NONE			
4129-MW005	4129-MW005	619443.7651	3339953.166	
4129-MW006	4129-MW006	620133.2989	3340195.292	
4129-MW007	4129-MW007	620162.5517	3340127.655	
4129-SB008a	NONE	620071.4941	3339792.757	
4129-SB009a	NONE	620085.495	3339809.48	
4129-SB010a	NONE	619666.5208	3339949.574	
4129-SB011a	NONE	619505.707	3339908.768	
4129-MW005a	4129-MW005	619443.7651	3339953.166	
4129-MW006a	4129-MW006	620133.2989	3340195.292	
4129-MW007a	4129-MW007	620162.5517	3340127.655	

# 2. Submitter Checks EDDs



#sys_loc_code	sys_well_code	X_coord	Y_coord
4129-SB008	NONE	620071.4941	3339792.757
4129-SB009	NONE	620085.495	3339809.48
4129-SB010	NONE	619666.5208	3339949.574
4129-SB011	NONE	619505.707	3339908.768
4129-MVW005	4129-MVW005	619443.7651	3339953.166
4129-MVW006	4129-MVW006	620133.2989	3340195.292
4129-MVW007	4129-MVW007	620162.5517	3340127.655
4129-SB008a	NONE	620071.4941	3339792.757
4129-SB009a	NONE	620085.495	3339809.48
4129-SB010a	NONE	619666.5208	3339949.574
4129-SB011a	NONE	619505.707	3339908.768
4129-MVW005a			
4129-MVW006a			

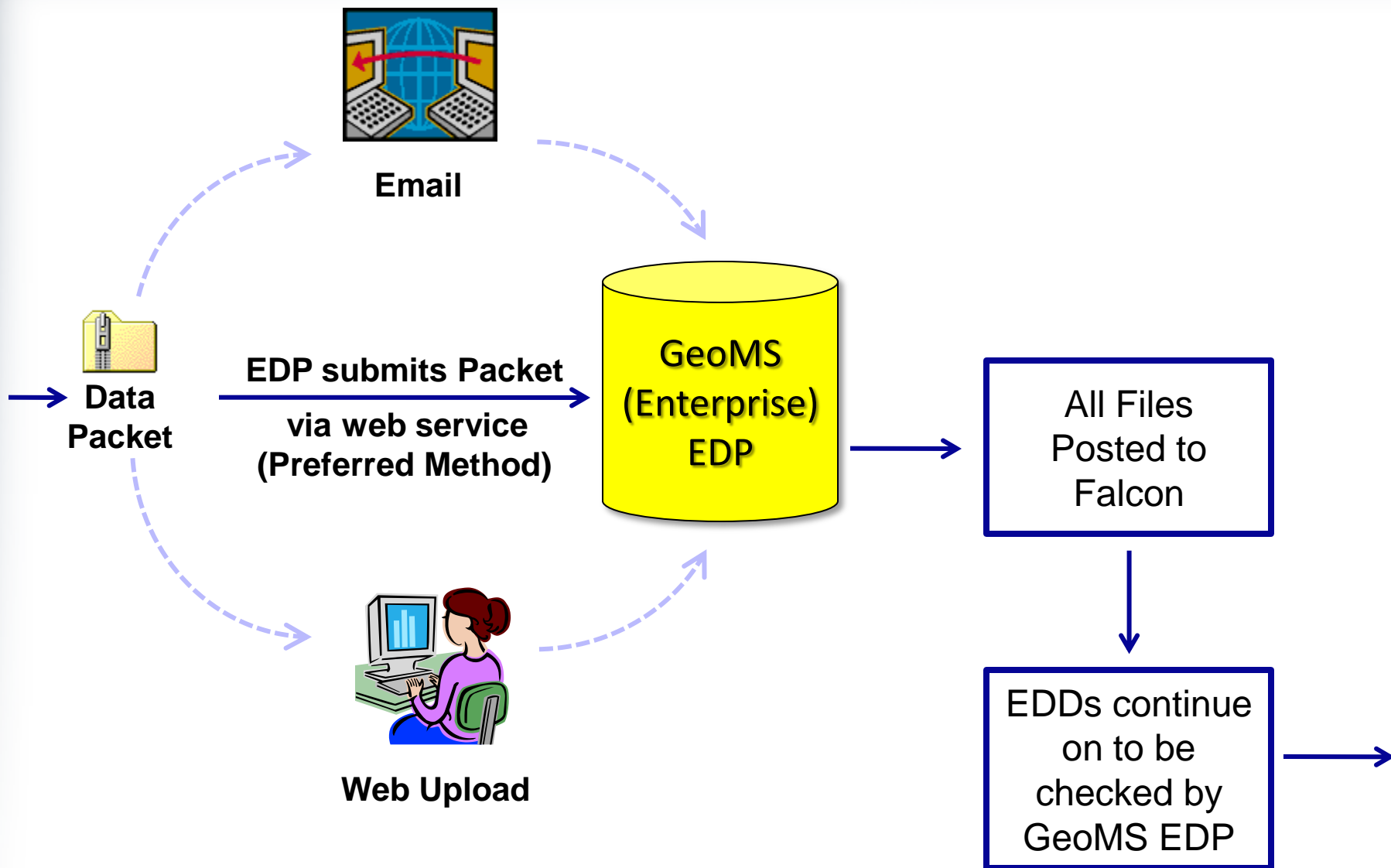


Data may include:

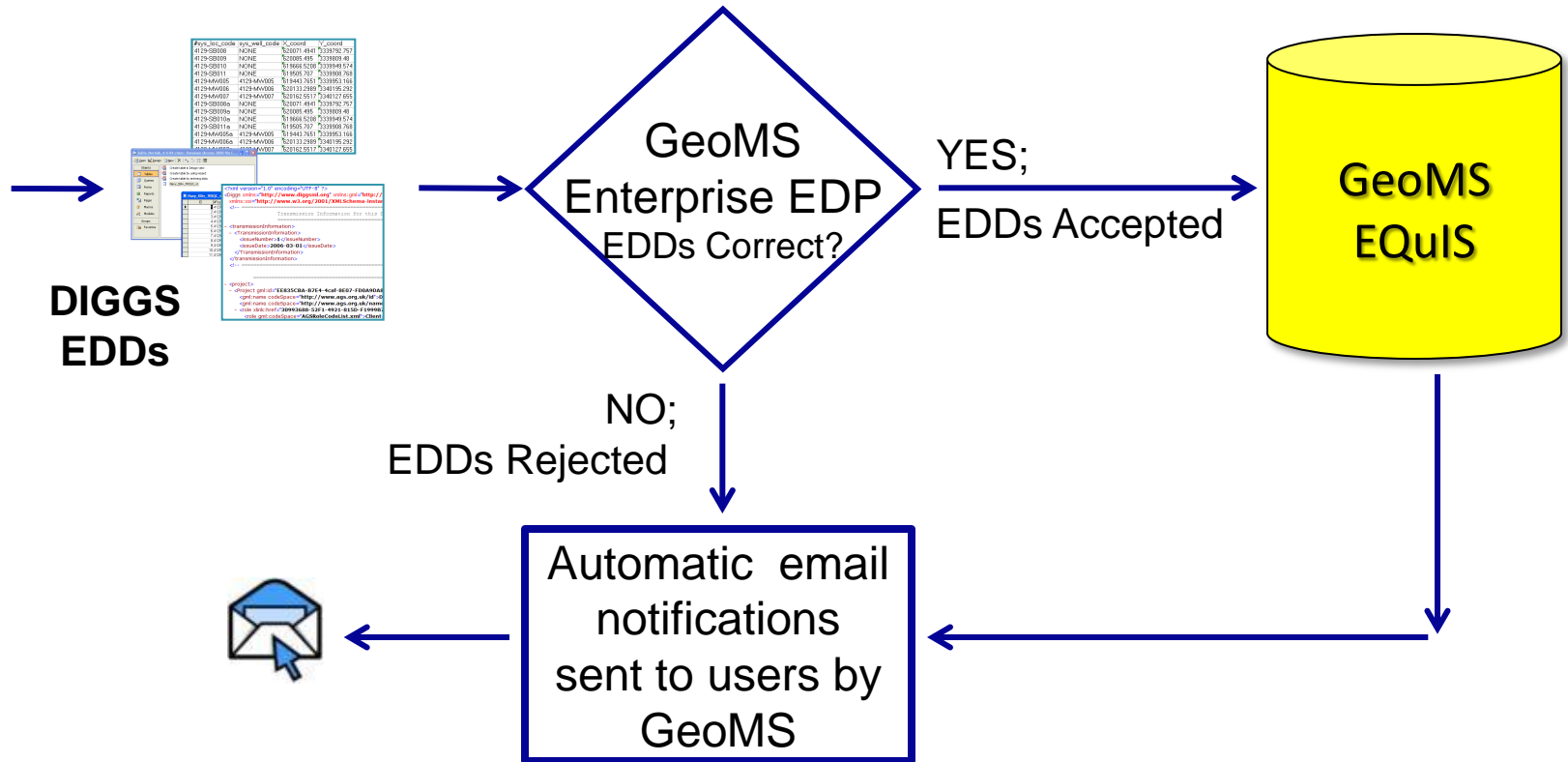
- Spreadsheets, text files
- Access databases
- DIGGS EDDs (XML)

EDDs are checked in the privacy of submitter's office using Standalone EDP before creating packet for submission to the GeoMS

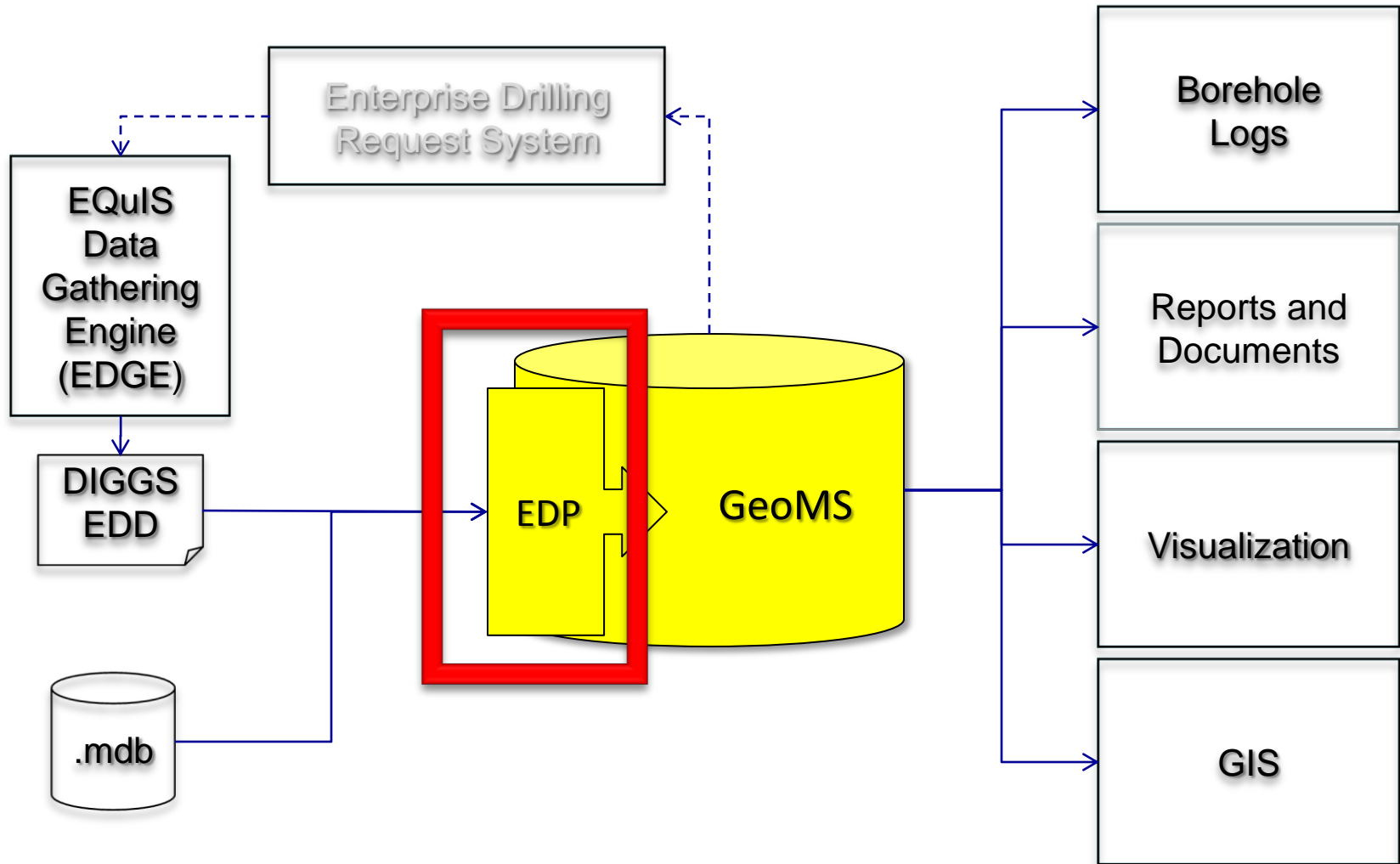
# 3. Packet Submitted



# 4. GeoMS Checks/Loads EDDs



# ODOT Workflow



# EDP: Checking Data

EQUS Data Processor

Home Pro

Format EDD Error Log Summary Comment Rows Filter Column(s) Add New Row Copy Row(s) Set as Comment Row Clear Refresh Find Sort Blank EDD EDD Description Generate Format File Design Format File

Open Error Log View Data Tools

Rows: 49 of 49 [Comment Rows]

Id Sample Number	Lab Sample Number	Hand Penetrometer	Visual Moisture	Lab Moisture	Visual Classification	Use Visual	Lab Classification	Group Index	Spec
	21769	-	Damp	Damp	A-1-B	0	A-1-A	0	2.63
	21770	3.00	Damp	Damp	A-6A	0	A-6A	0	2.63
	21771	4.00	Damp		A-6A	0			2.63
	21772				ROCK	0			2.63
	21773				ROCK	0			2.63
	21774	-	Damp	Damp	A-1-B	0	A-1-A	0	2.63
	21775	3.00	Moist		A-7-6	0			2.63
	21776	3.00	Moist	Moist	A-7-6	0	A-7-6	9	2.63
	21777	2.50	Moist	Moist	A-6B	0	A-6B	11	2.63
	21778	0.75	Moist	Moist	A-6A	0	A-6A	8	2.63
	21779	2.00	Moist		A-6B	0			2.63
	21780	1.75	Moist	Moist	A-6B	0	A-7-5	10	2.63
	21781	4.5+	Damp	Moist	A-6B	0	A-6B	9	2.63
	21782	4.5+	Damp		A-6B	0			2.63
	21783	4.5+	Damp		A-6B	0			2.63
	21784	4.5+	Damp		A-6B	0			2.63
	21785	4.5+	Damp		A-6B	0			2.63
	21786	4.5+	Damp	Damp	A-6A	0	A-6A	8	2.63
	21787	4.5+	Damp		A-6A	0			2.63
	21788	4.50	Damp		A-6A	0			2.63
	21789	4.5+	Damp		A-6A	0			2.63

Visual classification does not match laboratory classification.

Visual classification does not match laboratory classification.

# EDP: Checking Data

EQUS Data Processor

Home Pro

Format EDD Error Log Summary Comment Rows Filter Column(s) Add New Row Copy Row(s) Set as Comment Row Clear Refresh Find Sort Blank EDD EDD Description Generate Format File Design Format File

Open Error Log View Data Tools

Rows: 49 of 49 [Comment Rows]

Id Sample Number	Lab Sample Number	Hand Penetrometer	Visual Moisture	Lab Moisture	Visual Classification	Use Visual	Lab Classification	Group Index	Spec
	21769	-	Damp	Damp	A-1-B	0	A-1-A	0	2.63
	21770	3.00	Damp	Damp	A-6A	0	A-6A	9	2.63
	21771	4.00	Damp		A-6A	0			2.63
	21772				ROCK	0			2.63
	21773				ROCK	0			2.63
	21774	-	Damp	Damp	A-1-B	0	A-1-A	0	2.63
	21775	3.00	Moist		A-7-6	0			2.63
	21776	3.00	Moist	Moist	A-7-6	0	A-7-6	9	2.63
	21777	2.50	Moist	Moist	A-6B	0	A-6B	11	2.63
	21778	0.75	Moist	Moist	A-6A	0	A-6A	8	2.63
	21779	2.00	Moist		A-6B	0			2.63
	21780	1.75	Moist	Moist	A-6B	0	A-7-5	10	2.63
	21781	4.5+	Damp	Moist	A-6B	0	A-6B	9	2.63
	21782	4.5+	Damp		A-6B	0			2.63
	21783	4.5+	Damp		A-6B	0			2.63
	21784	4.5+	Damp		A-6B	0			2.63
	21785	4.5+	Damp		A-6B	0			2.63
	21786	4.5+	Damp	Damp	A-6A	0	A-6A	8	2.63
	21787	4.5+	Damp		A-6A	0			2.63
	21788	4.50	Damp		A-6A	0			2.63
	21789	4.5+	Damp		A-6A	0			2.63

MISSING DATA!

MISSING DATA!

# EDP: Checking Data

EquiS Data Processor

Home Pro

Format EDD Error Log Summary

Comment Rows Filter Column(s) Add New Row

Errors Only Pin Column(s) Copy Row(s)

Column Chooser Set as Comment Row

Clear Refresh Find Sort

Blank EDD EDD Description Generate Format File

Design Format File

Tools

Rows: 49 of 49 [Comment Rows]

Id Sample Number	Lab Sample Number	Hand Penetrometer	Visual Moisture	Lab Moisture	Visual Classification	Use Visual	Lab Classification	Group Index	Spec
	21769	-	Damp	Damp	A-1-B	0	A-1-A	0	2.63
	21770	3.00	Damp	Damp	A-6A	0	A-6A	9	2.63
	21771	4.00	Damp		A-6A	0			2.63
	21772				ROCK	0			2.63
					ROCK	0			2.63
	21773				ROCK	0			2.63
	21774	-	Damp	Damp	A-1-B	0	A-1-A	0	2.63
	21775	3.00	Moist		A-7-6	0			2.63
	21776	3.00	Moist	Moist	A-7-6	0	A-7-6	9	2.63
	21777	2.50	Moist	Moist	A-6B	0	A-6B	11	2.63
	21778	0.75	Moist	Moist	A-6A	0	A-6A	8	2.63
	21779	2.00	Moist		A-6B	0			2.63
	21780	1.75	Moist	Moist	A-6B	0	A-7-5	10	2.63
	21781	4.5+	Damp	Moist	A-6B	0	A-6B	9	2.63
	21782	4.5+	Damp						2.63
	21783	4.5+	Damp		A-6B	0			2.63
	21784	4.5+	Damp		A-6B	0			2.63
	21785	4.5+	Damp		A-6B	0			2.63
	21786	4.5+	Damp	Damp	A-6A	0	A-6A	8	2.63
	21787	4.5+	Damp		A-6A	0			2.63
	21788	4.50	Damp		A-6A	0			2.63
	21789	4.5+	Damp		A-6A	0			2.63

Visual moisture does not match laboratory moisture.

Visual moisture does not match laboratory moisture.

# EDP: Checking Data

EQiS Data Processor

Home Pro

Format EDD Error Log Summary Error Log

View Comment Rows Errors Only Filter Column(s) Pin Column(s) Column Chooser Add New Row Copy Row(s) Set as Comment Row

Data Clear Refresh Find Sort

Tools Blank EDD EDD Description Generate Format File Design Format File

Rows: 15 of 15 [Comment Rows]

Line	GintRecID	PointID	Depth	Liquid_Limit	Plastic_Limit	Organic	Oven Dried LL	LLO Tare	LLO Wet Wt	LLO Dry Wt
1	1	B-001-0-09	1.5	52	51	0				
2	2	B-001-0-09	6	31	17	0	30	23.7	44.08	39.42
3	3	B-001-0-09	11	23						
4	4	B-001-0-09	16	23	15	0				
5	5	B-001-0-09	18.5	19	14	0				
6	6	B-001-0-09	28.5	0	0	0				
7	7	B-001-0-09	31	0	0	0				
8	8	B-001-0-09	35	23	14	0				
9	9	B-002-0-09	1.5	29	15	0				
10	10	B-002-0-09	6	66	20	0	34	23.05	45.06	39.54
11	11	B-002-0-09	11	24	15	0				
12	12	B-002-0-09	13.5	0	0	0				
13	13	B-002-0-09	21	58	7	0				
14	14	B-002-0-09	23.5	19	12	0				
15	15	B-002-0-09	40	23	12	0				

Plastic limit (PL) should not be greater than 50.

Plastic limit (PL) should not be greater than 50.

# EDP: Checking Data

EQUS Data Processor

Home Pro

Format EDD Error Log Summary  
Open Error Log

View  
Comment Rows  
Errors Only  
Filter Column(s)  
Pin Column(s)  
Column Chooser

Data  
Add New Row  
Copy Row(s)  
Set as Comment Row  
Clear Refresh Find Sort

Tools  
Blank EDD  
EDD Description  
Generate Format File  
Design Format File

Rows: 15 of 15 [Comment Rows]

Line	GintRecID	PointID	Depth	Liquid_Limit	Plastic_Limit	Organic	Oven Dried LL	LLo Tare	LLo Wet Wt	LLo Dry Wt
1	1	B-001-0-09	1.5	52	51	0				
2	2	B-001-0-09	6	31	17	0	30	23.7	44.08	39.42
3	3	B-001-0-09	11	23	25	0				
4	4	B-001-0-09	16	23	15	0				
5	5	B-001-0-09	18.5	19	14	0				
6	6	B-001-0-09	28.5	0	0	0				
7	7	B-001-0-09	31	0	0	0				
8	8	B-001-0-09	35	23	14	0				
9	9	B-002-0-09	1.5	29	14	0				
10	10	B-002-0-09	6	66	20	0	34	23.05	45.06	39.54
11	11	B-002-0-09	11	24	15	0				
12	12	B-002-0-09	13.5	0	0	0				
13	13	B-002-0-09	21	58	7	0				
14	14	B-002-0-09	23.5	19	12	0				
15	15	B-002-0-09	40	23	12	0				

Liquid limit (LL) should not be less than the plastic limit (PL).

Liquid limit (LL) should not be less than the plastic limit (PL).

# EDP: Checking Data

EQiS Data Processor

Home Pro

Format EDD Error Log Summary  
Open Error Log

Comment Rows Filter Column(s) Add New Row  
Errors Only Pin Column(s) Copy Row(s)  
Column Chooser Set as Comment Row

Clear Refresh Find Sort  
Data

Blank EDD Design Format File  
EDD Description  
Generate Format File  
Tools

Rows: 15 of 15 [Comment Rows]

Line	GintRecID	PointID	Depth	Liquid_Limit	Plastic_Limit	Organic	Oven Dried LL	LLo Tare	LLo Wet Wt	LLo Dry Wt
1	1	B-001-0-09	1.5	52	51	0				
2	2	B-001-0-09	6	31	17	0	30	23.7	44.08	39.42
3	3	B-001-0-09	11	23	25	0				
4	4	B-001-0-09	16	23	15	0				
5	5	B-001-0-09	18.5	19	14	0				
6	6	B-001-0-09	28.5	0	0	0				
7	7	B-001-0-09	31	0	0	0				
8	8	B-001-0-09	35	23	14	0				
9	9	B-002-0-09	1.5	29	15	0				
10	10	B-002-0-09	6	66	20	0	34	23.05	45.06	39.54
11	11	B-002-0-09	11	24	0	0				
12	12	B-002-0-09	13.5	0	0	0				
13	13	B-002-0-09	21	58	7	0				
14	14	B-002-0-09	23.5	19	12	0				
15	15	B-002-0-09	40	23	12	0				

Liquid limit (LL) should not be greater than 60.

Liquid limit (LL) should not be greater than 60.

# EDP: Checking Data

EquiS Data Processor

Home Pro

Format EDD Error Log Summary Error Log Error Log View Add New Row Copy Row(s) Set as Comment Row Data Clear Refresh Find Sort Tools Blank EDD EDD Description Generate Format File Design Format File

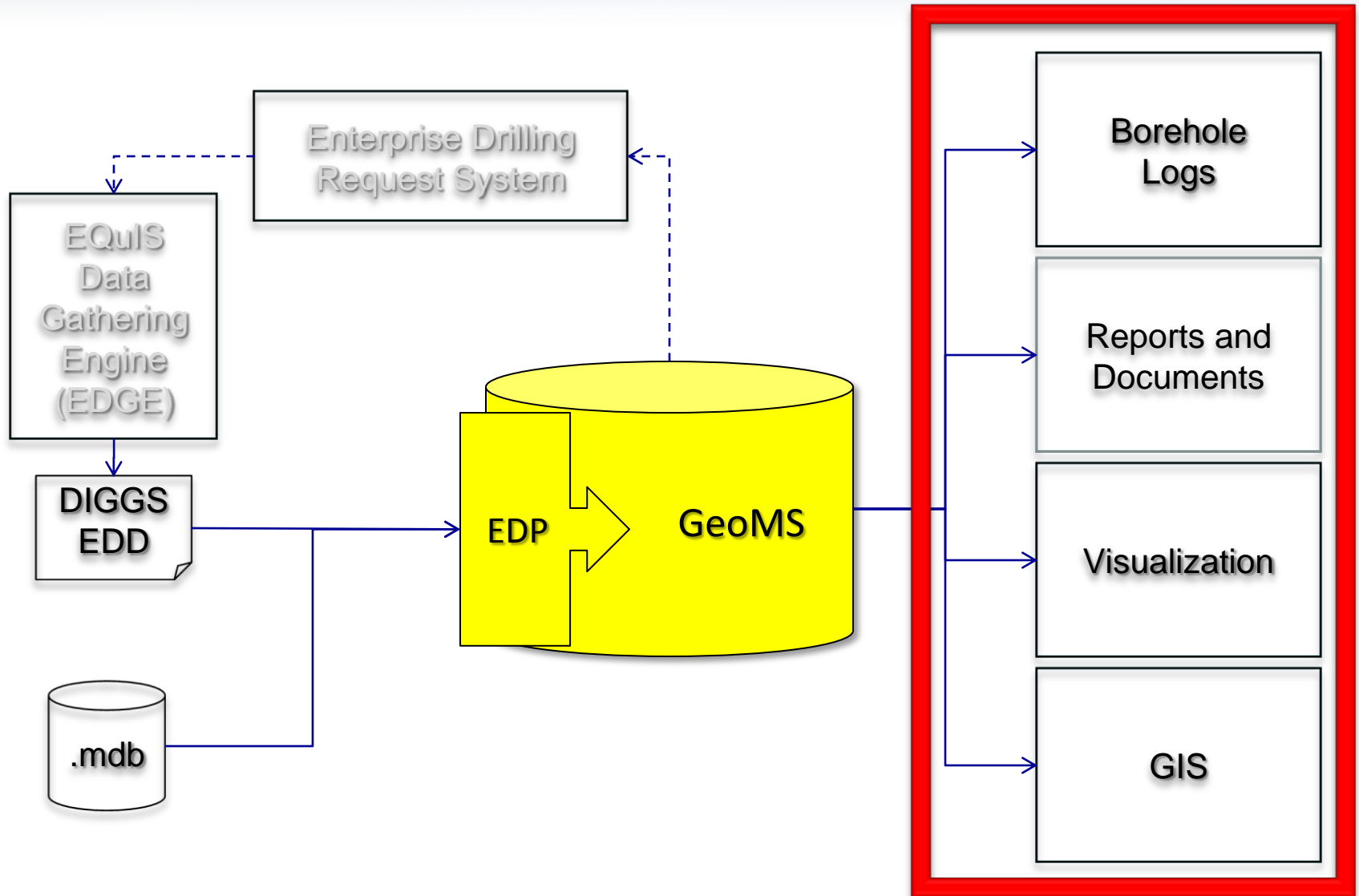
Rows: 15 of 15 [Comment Rows]

Line	GintRecID	PointID	Depth	Liquid_Limit	Plastic_Limit	Organic	Oven Dried LL	LLo Tare	LLo Wet Wt	LLo Dry Wt
1	1	B-001-0-09	1.5	52	51	0				
2	2	B-001-0-09	6	31	17	0	30	23.7	44.08	39.42
3	3	B-001-0-09	11	23	25	0				
4	4	B-001-0-09	16	23	15	0				
5	5	B-001-0-09	18.5	19	14	0				
6	6	B-001-0-09	28.5	0	0	0				
7	7	B-001-0-09	31	0	0	0				
8	8	B-001-0-09	35	23	14	0				
9	9	B-002-0-09	1.5	29	15	0				
10	10	B-002-0-09	6	66	20	0	34	23.05	45.06	39.54
11	11	B-002-0-09	11	24	15	0				
12	12	B-002-0-09	13.5	0	0	0				
13	13	B-002-0-09	21	58	7	0				
14	14	B-002-0-09	23.5	19	12	0				
15	15	B-002-0-09	40	23	12	0				

Plasticity index (PI) should not be greater than 50.

Plasticity index (PI) should not be greater than 50.

# ODOT Workflow



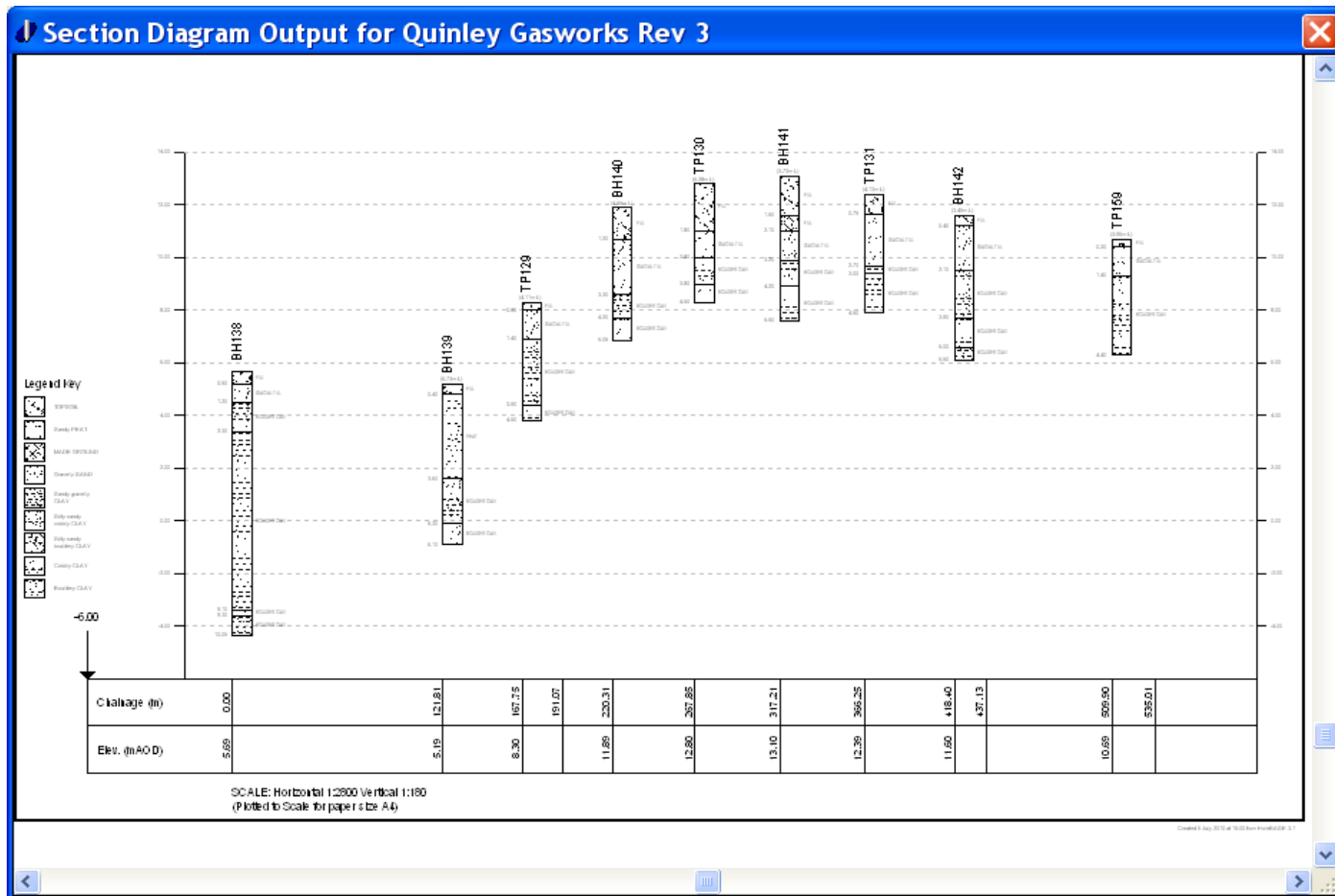
# GeoMS Output



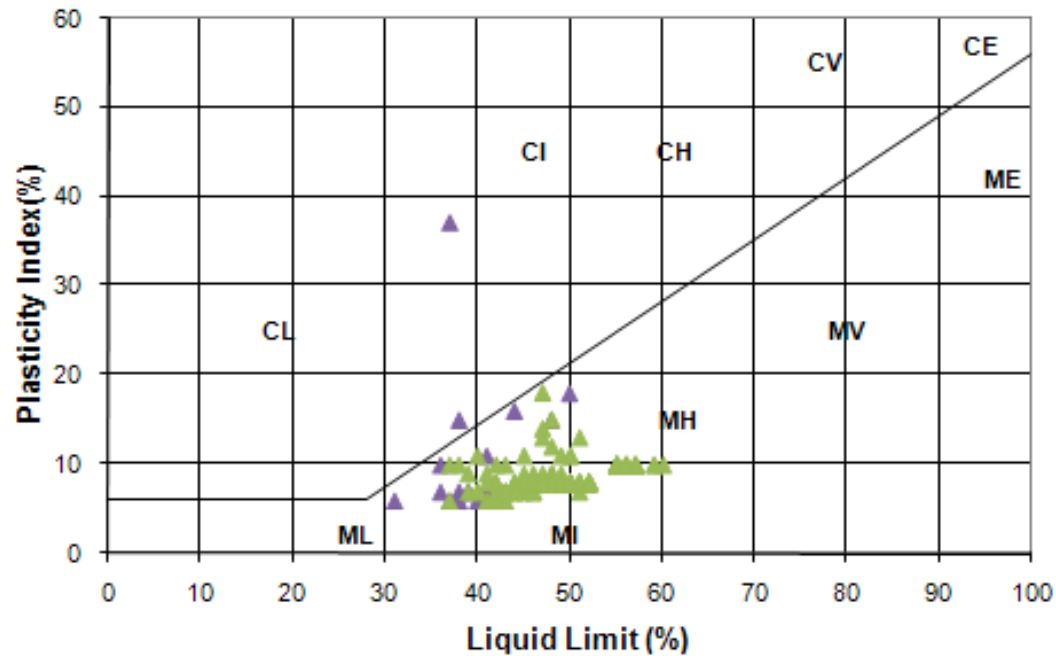
PROJECT: TUS-39-24-30		DRILLING FIRM / OPERATOR: ODOT / PROCTOR		DRILL RIG: CME 75 TRUCK		STATION / OFFSET: 95+37, 9.0 LT		EXPLORATION ID: B-031-0-09													
TYPE: LANDSLIDE		SAMPLING FIRM / LOGGER: ODOT / LEWIS		HAMMER: CME AUTOMATIC		ALIGNMENT: CL SR39		PAGE: 1 OF 2													
PID: 83378 BR ID: N/A		DRILLING METHOD: 3.25" HSA / NQ2		CALIBRATION DATE: 2/20/07		ELEVATION: 970.0 (MSL) EOB: 34.0 ft		COORD: 907211.683 N, 2306979.089 E													
START: 1/5/09 END: 1/6/09		SAMPLING METHOD: SPT / NQ2		ENERGY RATIO (%): 81.9																	
MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/RQD	N <sub>60</sub>	REC (%)	SAMPLE ID	HP (blf)	GRADATION (%)					ATTERBERG			ODOT CLASS (G)	HOLE SEALED				
	970.0							GR	CS	FS	SI	CL	LL	PL	FI	WC					
ASPHALT CONCRETE (5") ON AGGREGATE BASE (13")	968.5	1																			
VERY STIFF, BROWN, SANDY SILT, "AND" STONE FRAGMENTS, LITTLE CLAY, SLIGHTLY ORGANIC, DAMP	968.5	2	6	14	94	SS-1	3.00	50	4	11	20	15	28	18	8	15		A-2-4 (0)			
		3																			
		4	3	4	14	89	SS-2	5.00	-	-	-	-	-	-	-	-	15		A-2-4 (V)		
		5	4	6																	
	968.5	6	4	8	23	100	SS-3	3.00	35	5	24	22	14	23	19	4	11		A-4a (0)		
		7	8	9																	
@10.0'; NO ORGANICS	968.5	8	4	6	15	100	SS-4	2.00	-	-	-	-	-	-	-	-	14		A-4a (V)		
		9	4	5																	
MEDIUM DENSE TO DENSE, BROWN WITH GRAY, STONE FRAGMENTS WITH SAND, LITTLE SILT, TRACE CLAY, DAMP	957.5	10	4	4	16	100	SS-5	2.50	57	6	5	21	11	28	20	8	13		A-2-4 (0)		
		11	4	8																	
@15.0'; GRAY WITH BROWN	957.5	12	7	8	20	100	SS-6	-	48	4	31	13	4	NP	NP	NP	9		A-1-b (0)		
		13	7	7																	
SANDSTONE, GRAYISH ORANGE, HIGHLY WEATHERED, SLIGHTLY TO MODERATELY STRONG, FINE GRAINED, VERY THIN TO THIN BEDDED, MICACEOUS, CONTAINS BLACK LAMINAE; RQD 91%, REC 100%.	951.5	14	5	10	33	100	SS-7	-	-	-	-	-	-	-	-	-	11		A-1-b (V)		
		15	10	14																	
		16	25	26	98	100	SS-8	3.50	-	-	-	-	-	-	-	-	-	5		Rock (V)	
		17	26	46																	
@24.9'; LIGHT GRAY, SLIGHTLY WEATHERED.	951.5	18	33	20	49	89	SS-9	4.00	-	-	-	-	-	-	-	-	7		Rock (V)		
		19	33	16																	
	941.6	20	74	4	25	SS-10	5.00	-	-	-	-	-	-	-	-	-	4		Rock (V)		
	941.6	21																			
	941.6	22																			
	941.6	23																			
	941.6	24																			
	941.6	25																			
	941.6	26																			
	941.6	27																			
	941.6	28																			
	941.6	29	53		78	NQ2-1														CORE	

STANDARD ODOT SOIL BORING LOG (S X 11) - ON DOT DOT - 8/31/09 06 21 - 01846509824 INCLUENTSDOCHOT020661 FILES FROM CLIENT 10000 09

# GeoMS Output

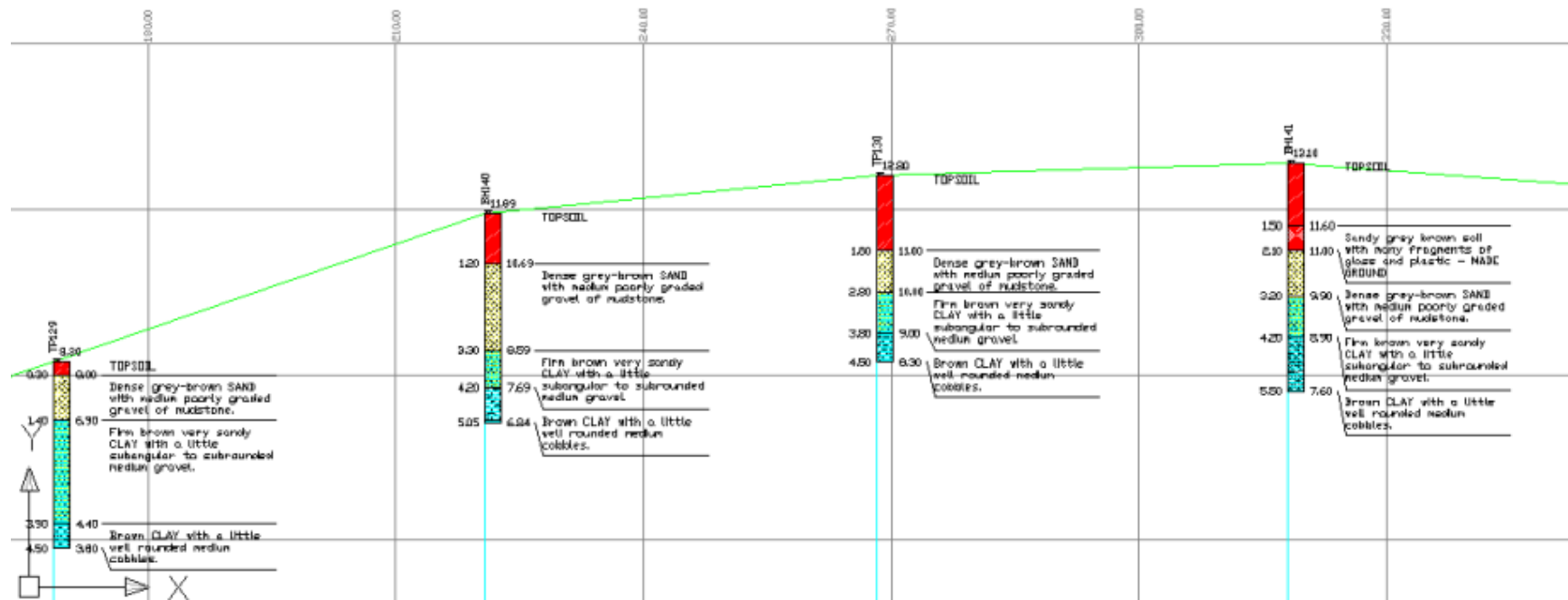


# GeoMS Output

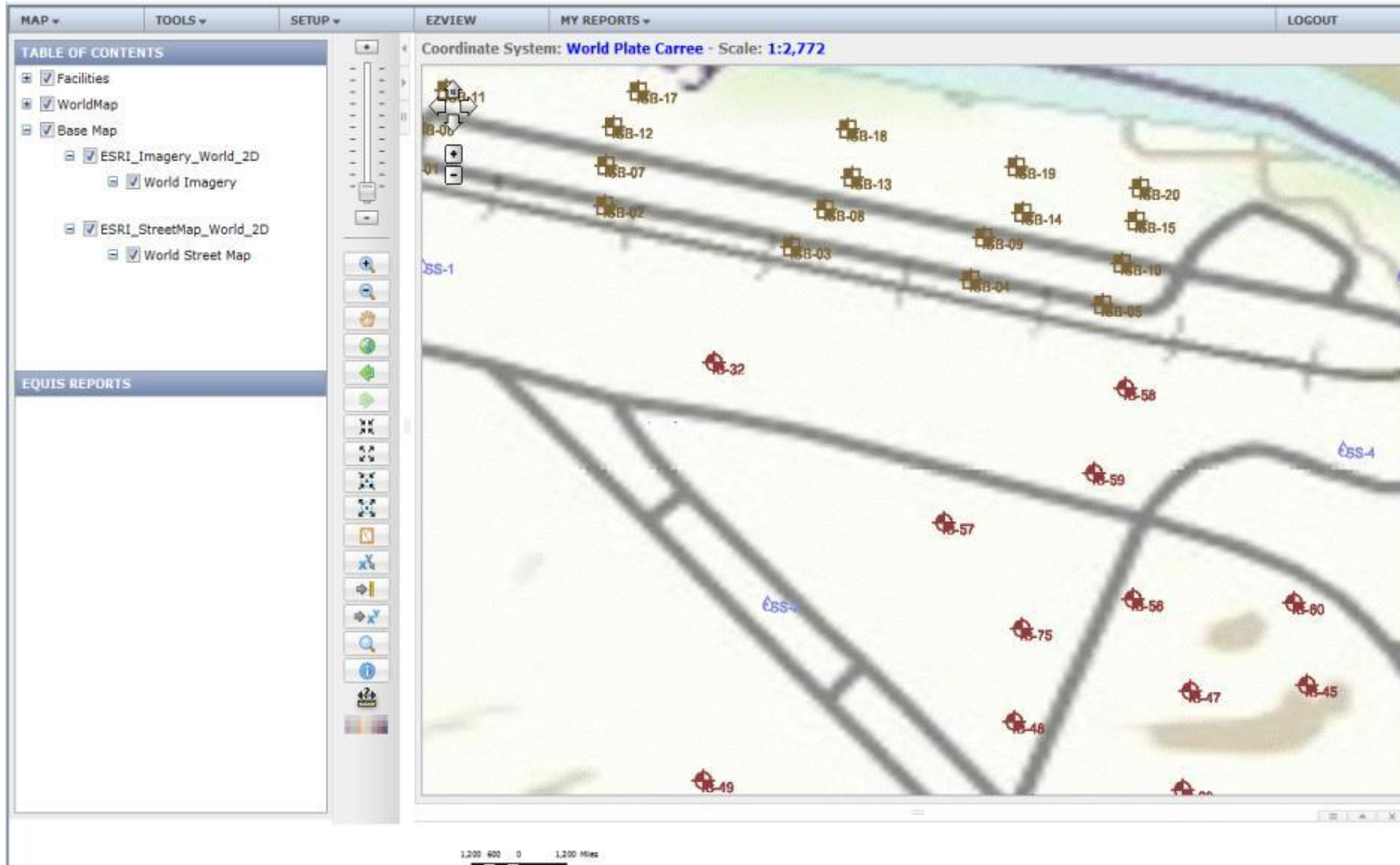


▲ FILL      — Aline  
▲ BOULDER CLAY

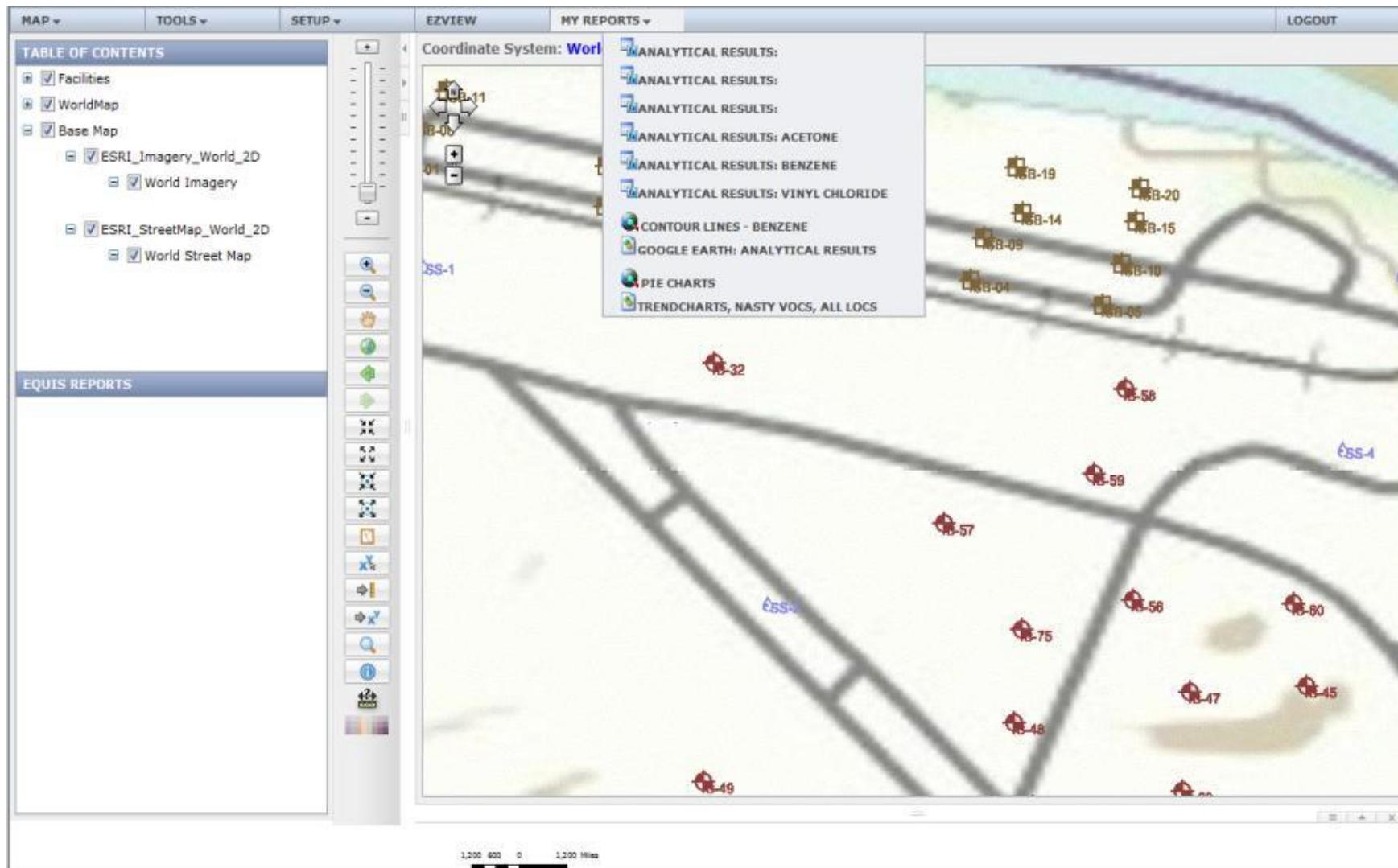
# GeoMS Output



# Web GeoMS



# Web GeoMS

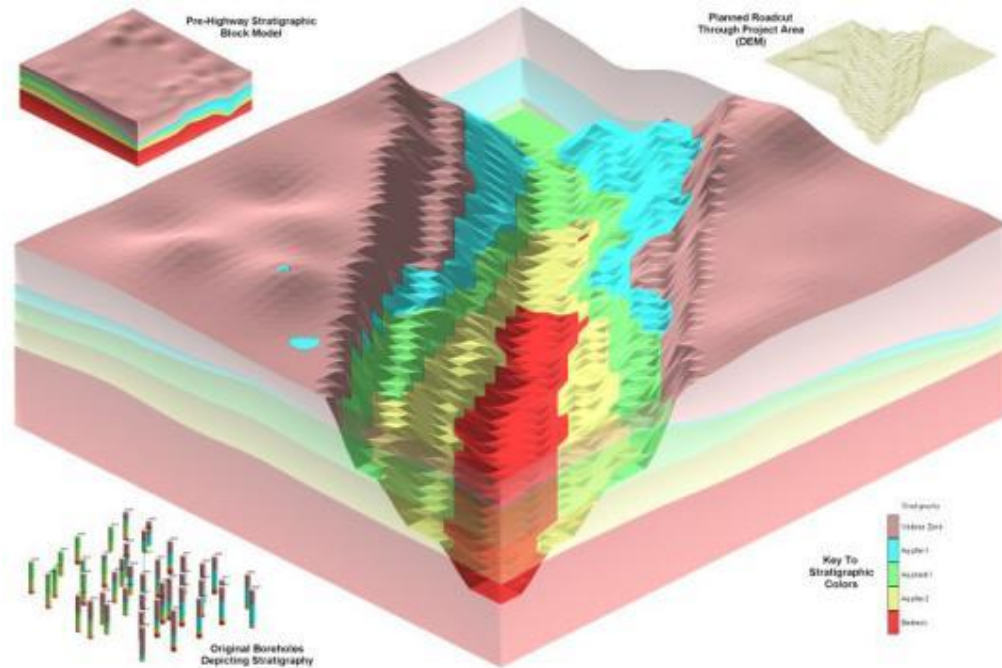
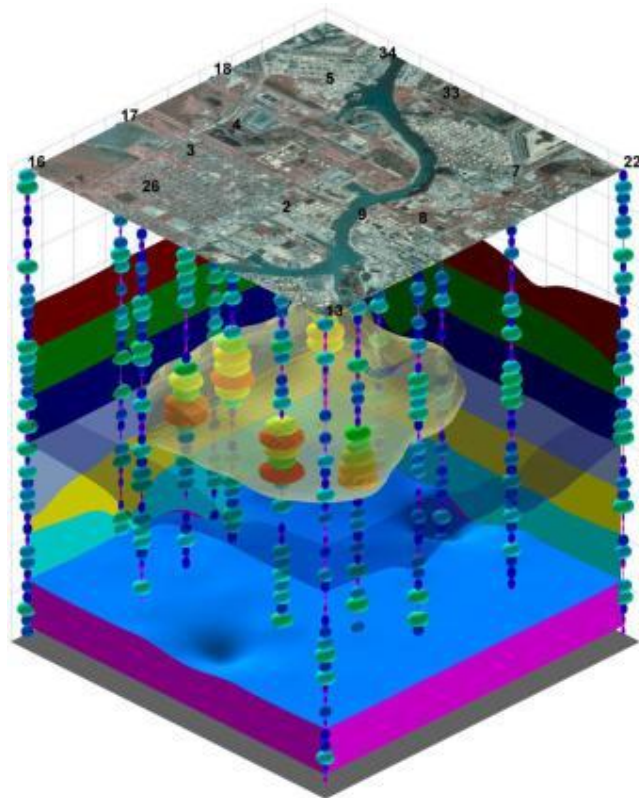


# Web GeoMS

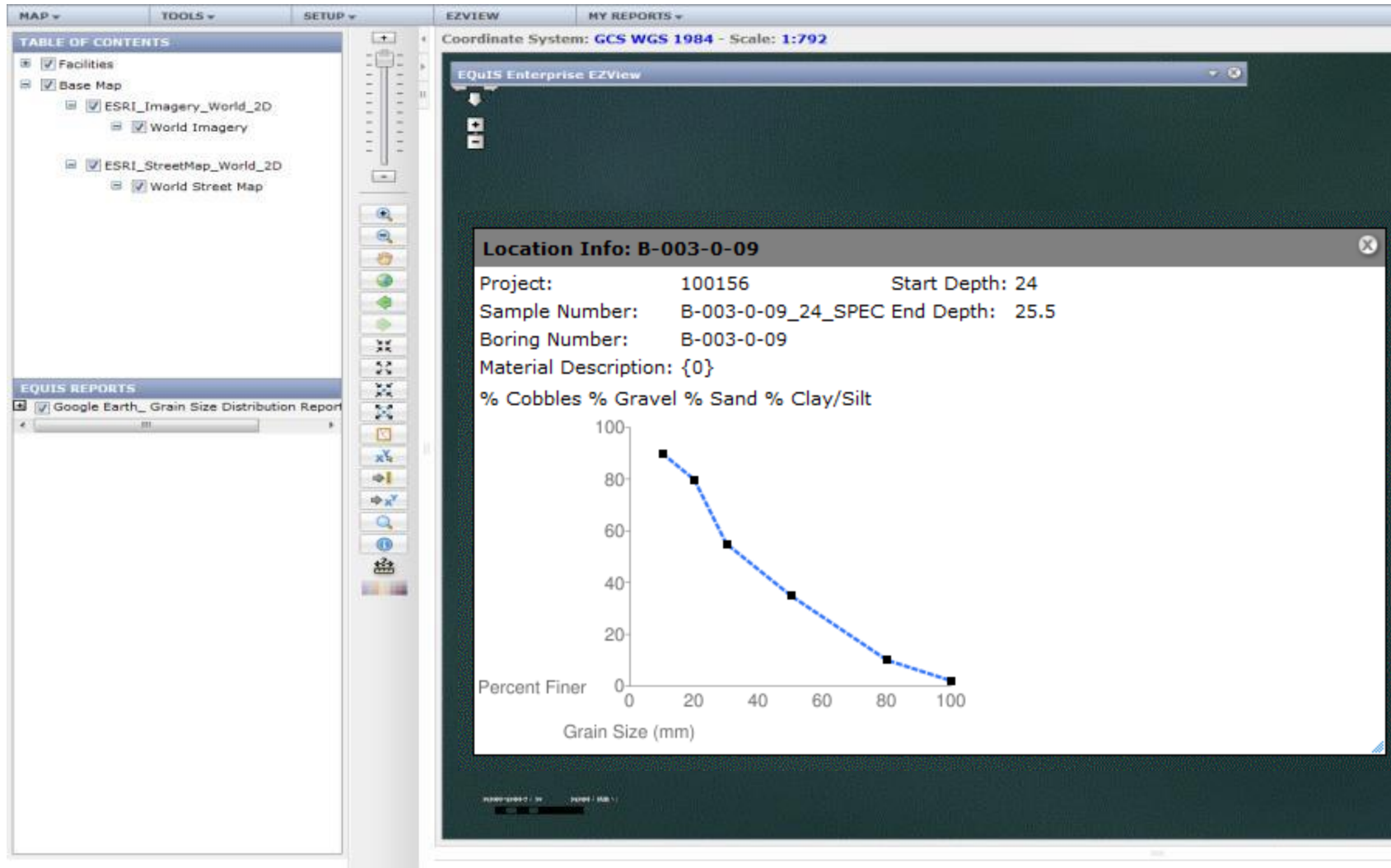
The screenshot displays the Web GeoMS interface. At the top, there are menu tabs: MAP, TOOLS, SETUP, EZVIEW, MY REPORTS, and LOGOUT. The main map area shows a coordinate system of GCS WGS 1984 with a scale of 1:361. A table of contents on the left lists 'Facilities' and 'Base Map' with sub-items like 'ESRI\_Imagery\_World\_2D' and 'World Imagery'. An 'EQus Enterprise EZView' window is open, showing a 'View:' section with a globe icon and a 'Save:' section with a document icon and the text 'Pick Report (EZView)'. Below this, there are two sections: 'Select Build/Pick Report:' with a list of report types including 'Rockworks Data Files (\*.bh)', and 'Build Report: Rockworks Data Files (\*.bh)' with sub-sections for 'Location(s):' (showing 'B-001-0-09 | B-002-0-09') and 'Aquifer/Geologic Unit:' (showing '1'). A file explorer window is also open, showing a directory listing for 'C:\Users\boris\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\SUJEY2X0\Rockworks\_1003\'. The file explorer table contains the following data:

Name	Size	Packed Size	Modified	Created
B-001-0-09.bh	540	279	2010-08-03 21:28	
B-002-0-09.bh	546	282	2010-08-03 21:28	
Lithology.tab	182	84	2010-08-03 21:28	
Stratigraphy.tab	0	0	2010-08-03 21:28	

# Web GeoMS



# Web GeoMS



# Web GeoMS

MAP ▾ TOOLS ▾ SETUP ▾ EZVIEW MY REPORTS ▾ LOGOUT

TABLE OF CONTENTS

- Facilities
- WorldMap
- Base Map
  - ESRI Imagery World 2D
    - World Imagery
  - ESRI StreetMap World 2D
    - World Street Map

EQUIS REPORTS

- Analytical Results
  - v54\_analytical\_results
    - Null
    - 0.31 - 1.29
    - 1.29 - 2.27
    - 2.27 - 3.26
    - 3.26 - 4.24
    - 4.24 - 5.22
    - 5.22 - 6.2
    - 6.2 - 7.18
    - 7.18 - 8.17
    - 8.17 - 9.15
    - 9.15 - 10.13
  - v54\_analytical\_results values
- Map: Locations (Docs & Photos)

Coordinate System: World Plate Carree - Scale: 1:2,772

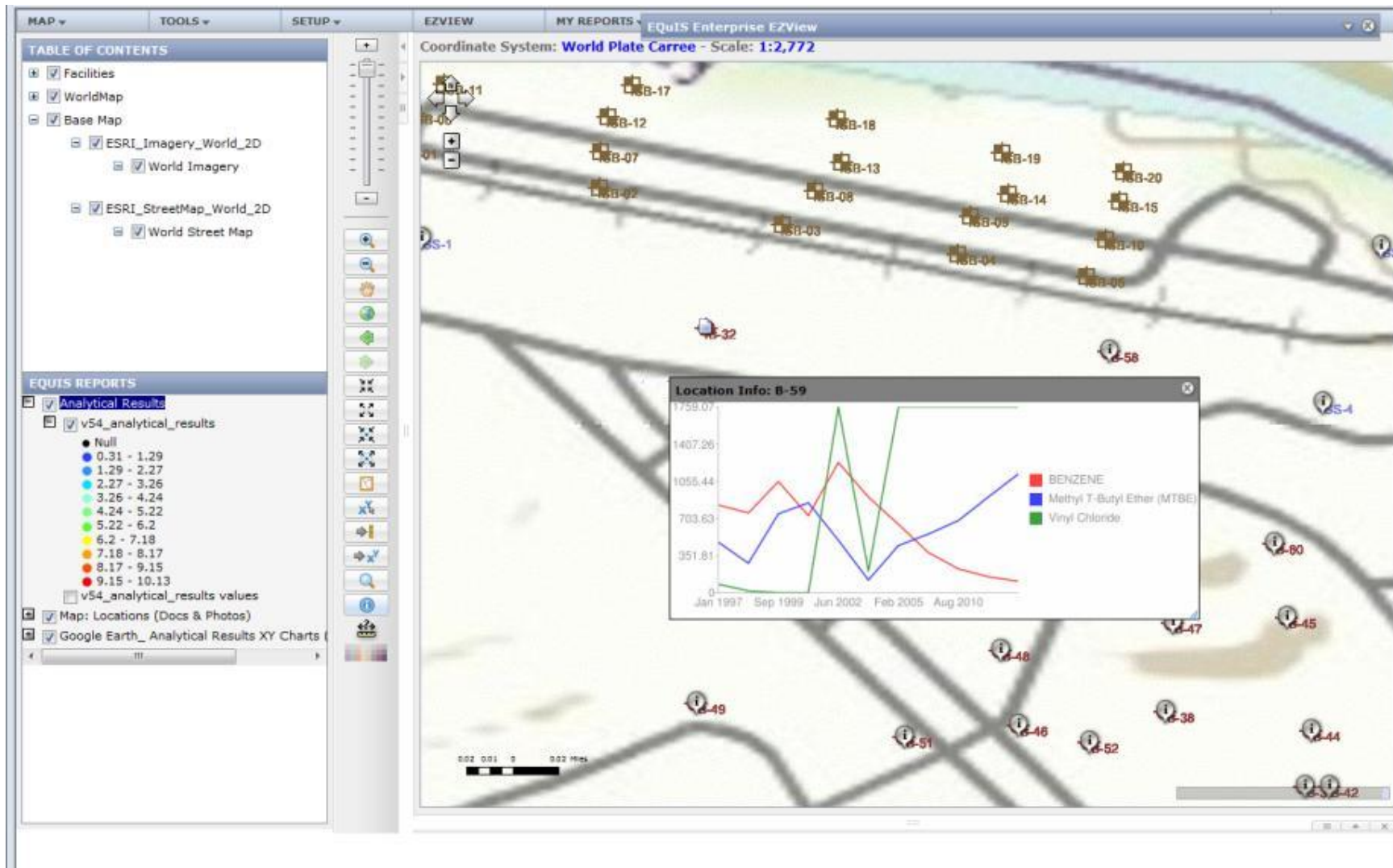
EQUIS Enterprise EZView

Location Info: B-32

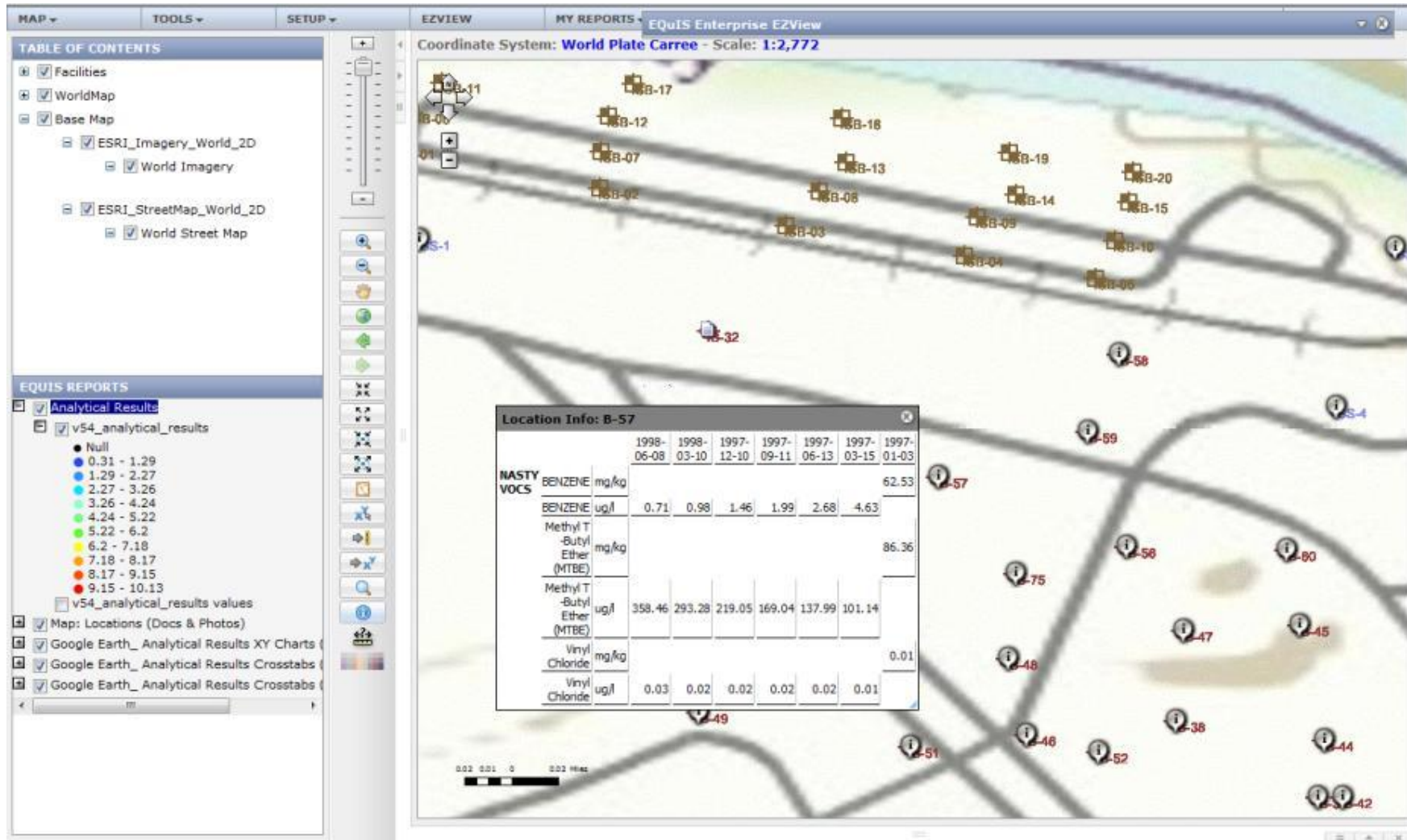
FILE_NAME	FILE_SIZE	FILE_DATE	TITLE	AUTHOR	EMAIL_ADDRESS
B-32_logu.pdf	55408	3/31/2010 10:34:00 AM			
B-32_photo.jpg	3303	3/31/2010 10:35:00 AM			

0.01 0.01 0 0.02 Miles

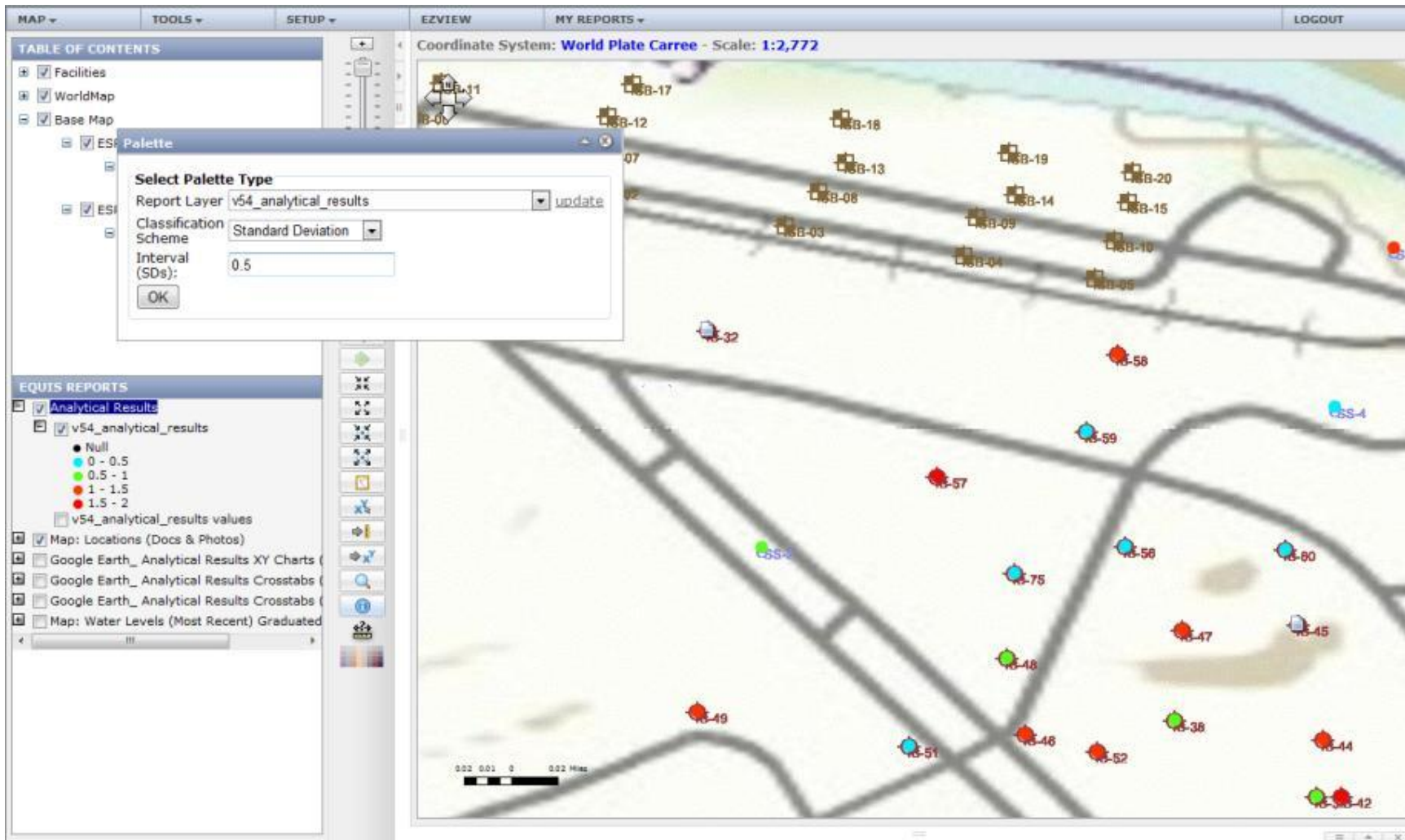
# Web GeoMS



# Web GeoMS



# Web GeoMS



# In Conclusion...

Ohio DOT wants to develop a comprehensive geotechnical management system for the state, but does not want to “reinvent the wheel”

- Ambitious undertaking
- Needs change, technology changes
- First phase nearing completion
- Still a lot of work to be done
- GeoMS “is envisioned and designed not only to meet the geotechnical needs of all units within ODOT, but to be used by all of the geotechnical community throughout Ohio and the surrounding areas” ...becoming a reality.

# Thank you!

## Questions?

[www.earthsoft.com](http://www.earthsoft.com)  
[info@earthsoft.com](mailto:info@earthsoft.com)