rocscience

RSLog

Overview of Features

April 2024

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1. Introduction

For over 25 years, Rocscience has developed innovative solutions for civil, mining, and geotechnical engineers. Combining the latest research with our continuous cycle of software development, our mission is to deliver industry-leading geotechnical tools that are reliable and easy to use.

In February 2022, we released the first version of our cloud-based geotechnical data management software called RSLog. It is designed to manage the field data collected during subsurface investigation in a geotechnical or environmental project.

RSLog is a web application and can be accessed on any device connected to the internet (i.e. no installation needed). In addition to borehole logging, RSLog has a built-in Geographical Information System (GIS) for displaying boreholes and projects, geology maps, and importing external data layers (e.g. KML, KMZ, GPX, Shapefile, etc.). Data exchange features of RSLog allow importing DIGGS, gINT, AGS, and Wincore database files. In addition, RSLog project data could be exported to CSV, Excel, JSON, and Civil3D formats.

2. Borehole Data Management

2.1 Data Collection in the Field

In addition to using browsers, the following data entry methods are available in RSLog:

- **RSLog Excel Templates:** These Excel templates are specifically designed for RSLog and allow data entry without the need for an internet connection. Once the data entry is completed, the user will upload the Excel files to RSLog and a project will be automatically created with accurate borehole data.
- **Mobile App:** See Section 2.2 for details.

The current version of RSLog covers all input data required for civil, mining and transportation projects. RSLog's Settings page provides a wide spectrum of customizations from editing the 'lookup lists' to theme settings, hatch colors, soil and rock classifications, and more (see Section 10).

Several data validation rules are implemented in RSLog data entry forms. This includes validating data types, expected range of data, relevance of certain inputs depending on borehole type, etc. To minimize data entry errors, lookup lists (i.e. dropdowns) are used wherever possible (see Section 11).

2.2 Mobile App

Rocscience is finalizing the development of the OnSite app for field data collection. OnSite works on any tablets with iOS or Android operating system and will work both online and offline.

Using OnSite, the data collected by the field engineers will be uploaded to your RSLog account (if connected to the Internet), providing office engineers access to the latest data (see Appendix A for screenshots). In addition, users will be able to see the overall progress of the drilling program (see Section 3.2.2); this is especially helpful when multiple drill rigs are working concurrently for the same project.

2.3 Data Storage

If data collection is conducted by logging in to RSLog on a browser, the data will be directly saved on the RSLog server.

If the OnSite app is used for data collection, the data will be stored locally on the device until the user syncs the data with their RSLog account. The data will remain on the mobile device until deleted by the user.

For server location options please refer to Section 16.

2.4 Project Photos

Photos taken during site investigation can be uploaded to your RSLog account. A photo can be attributed to the project, a borehole, drill run, field test or a sample. Please see Section 7.5 for the photos report.

2.5 Borehole Data

In RSLog, several pieces of data are collected for a borehole. Examples of top-level borehole data include but are not limited to name, depth, contractor, drilling/excavation equipment, drilling date, logged by, entered by, and reviewed by.

On the RSLog Settings page, users can customize the list of drilling methods, sample types, field tests, piezometer/well types, and more (see Section 10). Examples of borehole types covered by RSLog include all machine drilling methods, hand drilling, and test pit excavation. The following sub-sections provide further details.

Once a borehole is added to the RSLog database, it is automatically added to the GIS map.

2.5.1 Coordinate Reference System (CRS)

To enable RSLog's built-in GIS system, it is critical to enter coordinates for boreholes. The initial version of RSLog supported geographic (WGS 84) and Universal Transverse Mercator (UTM) coordinate systems.

The latest version of RSLog covers an additional 7,500 projected reference systems. This includes all State Plane Coordinate Systems (SPC), with a search feature that helps the user find the CRS based on EPSG code, FIPS code, city, or country (see Appendix A for a screenshot).

2.5.2 Sampling

RSLog covers all sampling methods (user can customize this dropdown list). For each sample, user can enter From Depth, To Depth, Sample Type, Color (supports Munsell colors as well as manual entry), Moisture Level, Core Recovery, RQD, and Notes.

For rock cores, users can specify a comprehensive list of Drill Run input data as well as details of Discontinuities.

2.5.3 Field Testing

RSLog allows users to customize the list of field tests, therefore, technically all field tests are supported by RSLog (link to documentation). For each field test, the user can specify its data columns (e.g. a CPTu test needs at least Depth, q_c, f_S, u_2 columns). In addition, specifically for SPT testing, users can enter Energy Level, Hammer ID, Hammer Weight, Drop Height, and Lifting Mechanism.

Examples of the other common field tests that can be added to RSLog include:

- **Vane Shear Test:** RSLog has a built-in vane shear test that records both peak and residual undrained shear strength values.
- **Pressure-meter Testing (PMT)**: Users can enter the final test results (in this case: Menard modulus, limit pressure, etc.) in RSLog and present them in the boring log. However, processing of the PMT raw data is not covered.
- **Cone Penetration Testing (CPT):** RSLog has a built-in CPTu filed test that covers default columns: q_c, f_S, u_2 and Vs.
- **Flat-Plate Dilatometer**: Similar to the PMT, user can add a Flat-Plate Dilatometer test to RSLog data template and enter the test results.

For other tests such as packer test or in-situ permeability tests, users can add them to the list of field tests and the results will be presented in the borehole log, as long as the processing of raw data is carried out outside of RSLog.

2.5.4 Groundwater

Users can enter two different types of groundwater levels in RSLog:

- **Water Level Observed During Site Investigation:** This is not considered the final, stable groundwater level; however users can enter this data in RSLog and present it on the borehole log.
- **Piezometer / Well:** For each monitoring well, multiple groundwater level measurements (water depth, date, time, weather conditions) are entered in RSLog (see Section 2.5.6). Groundwater measurements can be presented on the borehole log as:
  a) a separate log column, or
  b) a groundwater symbol shown on other log columns, or
  c) a table in the header or footer of the borehole log.

In addition, piezometers are shown graphically in cross-sections beside the boreholes (link to documentation).

2.5.5 Lithologic Description

The lithologic description of soil and rock layers supports the following classification systems (link to documentation):

- **AASHTO Soil Classification System:** RSLog supports the AASHTO Soil Classification System when defining a soil layer. On the Settings page user can assign a hatch pattern for each AASHTO soil type.
- **Unified Soil Classification System (USCS):** RSLog supports USCS when defining a soil layer for a borehole. Each USCS soil type has a built-in hatch pattern.
- **AGS Classification System**: In addition to AASHTO and USCS, RSLog covers all soil and rock classes defined by AGS 4.1.1.
- **Rock**: Users can select various rock types and add detailed lithologic descriptions for a rock layer.

Overall, RSLog covers more than 230 hatch patterns for soil and rock. The upcoming 2024 update of RSLog will include a feature allowing users to upload user-defined hatch patterns.

RSLog has adapted Caltrans' "Soil and Rock Logging, Classification, and Presentation Manual (2022 Edition)" which documents the standard of practice for describing and presenting soil and rock encountered during and after drilling investigations. Utilization of the Caltrans manual is optional for RSLog users (i.e. data entry in *Advanced* mode). This offers a more comprehensive data entry for soil components, drilling observations, isolated layers, interbedded layers, interim changes, borderline symbols, etc. In this method, all these data entries are done using various dropdowns and RSLog compiles them into a layer description. The layer description compiler is configurable (link to documentation).

2.5.6 Instrumentation

RSLog has a separate Instrumentation tab on the borehole data entry page. This includes entering details of the piezometer/well installation. Groundwater levels measured in the piezometers/wells can be recorded in RSLog and will be displayed in the borehole logs and cross-sections.

In addition, the Borehole Survey tab covers any measurements versus depth in a borehole. Examples of a borehole survey include inclinometer data.

2.5.7 Extra Tags

Extra Tags are additional properties you can add to a borehole or project that allows further customization of RSLog. Users can create unlimited Extra Tags on the Settings page.

2.5.8 Comments and Drilling Observations

Comments/remarks may be entered and presented at a specific depth in the borehole log. These general comments are presented in the Comments/Additional Notes log column.

In addition, on the stratigraphy data entry page, Drilling Observations may be added to a stratum. This will be presented at the specified depth in the Lithologic Description log column (only available in *Advanced* data entry mode).

2.5.9 Drilling into Bedrock

For a rock layer, users can also enter Drill Runs and Discontinuities data. RSLog presents this data in the borehole log using different log column types in tabular and graphical formats:

- **Drill Runs:** Input data include depth range, run number, core box number, TCR, RQD, RMR, SCR, TMR, joint spacing, strength level, and more. The program can calculate TCR and RQD. The future version of RSLog will calculate RMR and Q (NGI).
- **Discontinuities:** Input data include depth, a, b, JCR, and defect properties (type, shape, roughness, etc).

2.5.10 Boring Details

The input data collected for Boring Details include depth range, date and time, drilling method, borehole diameter, drill rod, drill bit, casing details, whether an instrument is installed, and general drilling notes.

In some cases, drilling of a borehole may be completed by utilizing more than one drilling method (e.g. started with auger drilling and later switched to core drilling due to refusal).

2.5.11 SPT Hammer Info

You can input SPT hammer data such as hammer ID, equipment type, energy level, drop height, hammer weight, and lifting mechanism. This data can be presented on the borehole log.

3. Field Investigation

3.1 Pre-Investigation Planner

Before commencing field investigation, users can use the Pre-Investigation Planning page to create a list of planned boreholes for the subject project. Users can specify the location, depth, engineer in charge, samples, field tests, etc. for each planned borehole. If necessary, this list can be reviewed and edited prior to field investigation. The list of planned boreholes could be printed for use by field engineers as a reference. In addition, users can import the list of proposed boreholes from an Excel (CSV) file.

The Pre-Investigation Planner tool is integrated with the OnSite app (see Section 2.2).

3.2 Field Data Collection

3.2.1 Team Collaboration

During site investigation, each field engineer enters data in the mobile app or using the browser. This data will be immediately available to all users in your account, including engineers in the office.

3.2.2 Project Monitoring and Tracking

RSLog helps project managers monitor the progress of site investigation with the following features:

a) **Progress Tracking:** On the list of boreholes, a Progress Status is displayed for each borehole. In addition, the overall progress of the field investigation is visualized as a colorful progress bar, indicating the percentage of boreholes with different statuses e.g. 40% Completed, 50% Drilling, and 10% Backfilling.
b) **Draft Logs**: As soon as data is saved or pushed to the server (e.g. by the OnSite app), generating a draft borehole log is just one click away. These boreholes are automatically placed on the GIS map.
c) **Data Cleanup**: If data entry is done using the browser (i.e. user logged in to RSLog) other users in your account can review the data and make corrections. If OnSite is used for data entry, users can review and clean up the data before pushing it to the server. Once the data is on the RSLog server, any user (with the right access level) can review and modify the data.

3.2.3 Review of the Draft Borehole Log

Once data entry for a borehole is completed, you can review data through the following options:

a) Manually reviewing raw data in RSLog,
b) Generating PDF draft borehole logs, then printing them and providing marked-up comments to field engineers,
c) On the Test Hole Logs page in RSLog, users can mark a borehole as 'Reviewed' or 'Approved' and leave comments for the data entry engineer to implement any necessary changes (typos, inconsistency in layer descriptions, etc.).

4. Laboratory Testing

RSLog is designed as a borehole data management system to store all field and lab test data. Although RSLog does not process raw laboratory data, once lab test results become available they can be entered in RSLog either manually or by importing from a CSV file. Lab test results can be presented on the borehole logs.

Like the field tests, the list of laboratory tests is also customizable in RSLog, meaning users can add 'user-defined' laboratory test parameters to RSLog's built-in list of lab tests. The following list shows the major lab test results covered in RSLog:

- **Particle Size Distribution:** Users can enter percent gravel, sand, silt, and clay for a soil sample.
- **Moisture Content & Density:** Users can enter moisture content and dry density.
- **Atterberg Limits:** Users can enter Liquid Limit (LL) and Plastic Limit (PL).
- **Specific Gravity:** Users can enter Specific Gravity (Gs).
- **Organic Content:** Users can enter Organic Content.
- **Chemical Contents:** Users can enter pH, chloride, and sulphate test results.
- **Compaction Tests:** Users can enter compaction test results.
- **Hydraulic Conductivity:** Users can enter hydraulic conductivity test results.
- **Consolidation:** Users can enter consolidation test results including Cc, Cs, Pc.
- **Shear Strength:** Users can enter cohesion (C) and internal friction angle (F).

A screenshot of the Lab Test Results page is shown in Appendix A.

5. Recommended Workflow

We recommend the following workflow for using RSLog in geotechnical / environmental projects (more details):

1. Use the Pre-Investigation Planner to create a list of proposed boreholes (see Section 3.1).
2. During field investigation, enter data using the OnSite app (see Section 2.2) or web browser.
3. Use RSLog's project monitoring tools to monitor the progress of field investigation (see Section 3.2.2).
4. Generate draft borehole logs and conduct initial reviews and corrections as necessary.
5. Once the lab test results are added to RSLog, generate borehole logs to check that the lab test results do not conflict with field descriptions. A copy of the final borehole logs stays in RSLog's database and can be downloaded at any time.
6. After completion of the project, do any of the following as required (see Section 6):
   a) Archive the project,
   b) Lock the project to avoid accidental editing or deletion of data, or
   c) Transfer the project to a client (e.g. a Department of Transportation).

6. Organizing the List of Projects

Projects in your RSLog account are divided into the following lists for easier data management:

- **Current**: This list shows active projects, meaning projects that are currently in field investigation, design, or review phases. During the course of a project, users can update the status of a project (Planning, Investigation, Design, Review, Completed, Archived, etc.) as necessary.
- **Archived**: Users can archive completed project, providing a 'clean' list of Current projects.
- **Transferred**: Users can digitally transfer projects to another RSLog account. For example, say a consultant is retained by a DoT to carry out field investigation and design for a project. Once the project is completed, the geotechnical/environmental consultant could send the data right to the DoT through RSLog. This guarantees data integrity and a seamless, fast data transfer.

In addition to the above, users can assign a project to certain users, lock a project (read only), and duplicate a project.

7. Generating Reports

All reports generated in RSLog are created as a PDF file and uploaded online for preview. Users can download the PDF file for further edit (if necessary) or for inclusion in the geotechnical report. RSLog covers the following reports:

7.1 Borehole Logs

Borehole logs may be generated with the following methods:

- On the borehole edit page, users can generate individual borehole logs using the Preview feature.
- Users can also generate a log comprising multiple boreholes. This is done through a separate page (Test Hole Log) where the following options are available:
  a) Select multiple boreholes,
  b) Attach standard legend sheets (PDF) to the borehole log,
  c) Leave review comments for a specific borehole log,
  d) Mark a borehole as 'Reviewed' or 'Approved', and
  e) Download a copy of the previous versions of borehole logs generated by the user.

7.2 Site Location Map

This page features a map showing the location of the project. Users can customize the zoom level and switch between Map and Satellite views. To generate the site location map figure, users can enter the figure title and select a figure template (see Section 8.2).

7.3 Boreholes Location Map

This page features a map showing the locations of all boreholes in a project. Users can customize the zoom level, and switch between Map and Satellite views. To generate the borehole's location map figure, user enters the figure title and selects a figure template (see Section 8.2).

7.4 Cross-Section Report

Once the design of a cross-section is completed, in addition to exporting it to DXF and other file formats, users can generate a PDF report by selecting a figure template and entering a figure title.

7.5 Photos Report

In these reports, all project photos can be summarized in a PDF by placing a certain number of photos (i.e. 1, 2, 4, 8) on every page.

7.6 Project Summary Report

Creates a tabular report (Excel and PDF) comprising a list of all boreholes with user configurable general data, such as a list of samples, soil layers, field tests, etc. We expect this feature to be available by the end of Q1 2024.

7.7 Customized Reports

More reports can be easily created using the RSLog template designer by adding log columns such as depth scale, a customized graph showing field or lab tests (e.g. overlay of qc, fs, u2), and -if necessary- lithologic description.

7.8 Other Types of Reports

Rocscience is currently working on a Query Builder feature that allows users to run customized queries by diving deep into the RSLog database. The results would be presented in tabular reports (Excel and PDF), maps, and graphs. We expect this feature to be available by the end of Q3 2024.

8. Designing Report Templates

8.1 Borehole Log Templates

RSLog has a powerful log template designer that allows you to design the borehole logs to match your company style:

- **Paper Settings:** Users can select the paper size and margins,
- **Fonts:** Users can select font styles for each section of the log template,
- **Header/Footer Design:** With advanced graphical user-interface features, header and footer design in RSLog can be quickly mastered by anyone. Adding elements to the header and footer is done by drag & drop, and users can easily edit the properties of an element using a 'property grid' (see Appendix A for example screenshots).
- **Log Columns:** In a borehole log, the depth-related data is shown in various 'log columns.' Examples include samples, lithologic description, elevation, SPT graph, Atterberg limits, lab test results, drill runs, and more. Log columns offer the following features: add/remove, change order of columns, width, header text, and sub-columns. Our team is constantly adding more log columns to the template designer; for example, in our latest release of RSLog we introduced two new log columns: Customizable Graphs, where you can plot up to 4 data series on the same graph, and an Elevation log column with customizable labels and tick marks.

8.2 Figure Templates

A figure template is used for generating other types of reports (see Sections 7.2 to 7.8). Users can select paper settings and design their own header and footer to match their company standards.

8.3 Sharing Templates with Other RSLog Accounts

Templates can be shared between two RSLog accounts. This helps DoT's share their standard templates with consultants for geotechnical and environmental projects (link to documentation).

9. GIS System

9.1 Data Layers

RSLog has a powerful GIS system that shows the locations of all projects and boreholes on the map. The map supports roads, satellite, hybrid, and terrain views with various search options, and it has general features such as zoom, pan, scale bars (Imperial and Metric), tilt, and compass. Other features of the GIS map include a United States geology map, historical public boreholes, and public groundwater data. Major data layers included in RSLog GIS map include:

- **RSLog Boreholes:** Users can see the locations of all their RSLog projects and boreholes on the GIS map.
- **Public Historic Boreholes:** The locations of over 200,000 (and growing) public boreholes collected from various DoT's are available on RSLog GIS map (courtesy of www.geosetta.org).
- **'External' Projects:** These are a user's previous projects (i.e. prior to switching to RSLog) that can be imported via a simple CSV import in RSLog. The locations of 'External' projects should be provided in geographic (WGS 84) as latitude/longitude. Alternatively, users can enter civic address of the location, and RSLog will use 'geocoding' to try and obtain the geographic coordinates automatically.

9.2 Query Boreholes in a Geographic Region

The GIS map shows the locations of all boreholes. Users can zoom to a specific area of the map to view the boreholes within that area. The upcoming Query Builder feature offers comprehensive search and filtering with displaying data on a map.

9.3 Search for a Project

Using the built-in GIS map search, users can find projects that meet a specific search criterion. By selecting a project from the list, the map zooms to the location of that project.

9.4 Import Data

You can import the following data layers into the map:

- Any pre-existing boreholes (e.g. gINT or DIGGS) imported into RSLog (see Section 13.1) will be automatically shown on the GIS map.
- Locations of projects or boreholes using the 'External Projects' feature (see Section 9.1).
- Global and/or project-specific Google Earth (KML, KMZ), Shapefiles, GeoJSON, and GPX files. This can be done through the Layers tab " Uploaded section of the map.
- Link to external maps that are available in Open Geospatial Consortium (OGC) format. Examples of OGC geology maps may be found on USGS and OneGeology websites. This can be done through the Layers tab " Uploaded section of the map.

9.5 Export Data

Users can export the current view of the map to image format (PNG). The map data layers can be exported to Google Earth (KML) format. More export options could be added upon request.

10. Customization

RSLog is designed with flexibility in mind. Various aspects of the program, and almost all dropdowns, may be customized at the account level (i.e. for all users under the same RSLog account). Customization can be done through several tabs on the Settings page.

10.1 General Settings

- **Default Values:** Users can specify default coordinate reference system, unit system, drilling method, sample type, etc. This saves data entry time.

- **Hatch Pattern Colors:** Users can assign a fore-color and back-color to each hatch pattern (USCS, AASHTO, AGS, Rock, and Other).
- **User-Defined Hatch Patterns:** Users are able to upload their own hatch pattern tiles and use it when defining a soil/rock layer.
- **Theme Settings:** Users can select the application font, date format, map markers etc.

10.2 Dropdown Lists

The following customizations apply to the dropdown lists used in various RSLog data entry pages:

- **Status Levels:** Each project and borehole can be assigned a progress status. This helps tracking the progress of the project.
- **Extra Tags:** See Section 2.5.7 for details.
- **Soil / Rock Classifications:** Users can customize particle sizes/angularity/shape/etc., as well as moisture levels, strength levels, weathering levels, defect properties, and more.
- **Sample Types:** Users can edit the list of sample types.
- **Drilling Methods:** Users can edit the list of drilling methods.
- **Field Tests:** Users can add a field test to the list and specify the number of data columns associated to a field test. For example, test results for a pressure-meter test may include Menard modulus (E_m) and limit pressure (P_l).
- **Consistency**: Users can define the criteria for consistency and apparent density (SPT based criteria) of soil.
- **Piezometer Types:** Users can edit the list of piezometer types, and top plug types.

10.3 Rich Text Formatting

The data entry for Lithologic Description (soil and rock) and for log template column-headers support Rich Text format (i.e. multiline text entry and bold, italic and underline styles).

10.4 Report Customization

Create your own figure template and borehole log template using RSLog template designer. With regards to the borehole logs, user can design both header & footer as well as log columns. For more details regarding report customization and various options to report SPT blow counts please see this article.

11. Data Validation

Several data validation rules are implemented in RSLog data entry forms. This includes validating data types, expected range of data, relevance of certain inputs based on borehole type, etc.

To minimize data entry errors, customizable lookup lists (i.e. dropdowns) are used wherever possible. More complex dropdowns allow searching for a specific item in the list.

11.1 Field Level Validation

Examples of field level validations implemented in RSLog include:

- **Data Types:** Depending on the type of data expected for each input data, they accept number or text.
- **Dropdown Lists:** Use of dropdown lists can minimize data entry errors by limiting a user's selection to a pre-defined list.
- **Date/Time Fields:** These input fields have a built-in date-picker and time-picker to avoid inconsistent data entry.
- **Munsell Colors:** Users can select soil/rock colors from the list of Munsell colors (optional). Other colors (e.g. lines and texts) are selected from a color-picker.

11.2 Cross-Check

A proper subsurface characterization comprises three main data components: material description, field testing, and lab test results. The lithologic description presented on the borehole log should be consistent with the field and lab test results. For example, the moisture level and consistency/apparent density (SPT based) in the lithologic description should not conflict with test results. When users enter layer descriptions on the stratigraphy page, RSLog offers cross-checking by presenting a summary of field and lab test results within that layer.

11.3 Spell Checker

This feature is available in all text data entry fields in RSLog. Spell checking becomes more critical for longer texts such as lithologic description (soil and rock), depth-related comments, and location notes.

12. Data Visualization

12.1 Two-Dimensional

Each cross-section provides a Profile View showing the stick logs of all boreholes. RSLog's Cross-Section Designer has its own built-in drafting module where you can create fence diagrams, add annotations, and export to various formats (link to documentation).

a) Cross-sections are presented in three modes: Plan, Profile, and 3D. Users can create multiple cross-sections in a project (see Appendix A).
b) To create a cross-section on Plan view (map), a polyline is drawn by user. The flexible 'buffer zone' of the cross-section on Plan view allows automatic inclusion of nearby boreholes in the cross-section. These boreholes will be projected on the cross-section line, with their offset and distance automatically calculated.
c) On Profile view, users can connect layers together and draw lenses by drawing 'polygons'. Users can indicate the locations of underground utilities, piles, and proposed excavation levels as required.
d) Users can apply USCS, AASHTO, AGS, and Rock hatch patterns and colors to each stratum. Users can also draw groundwater tables, turn on SPT graphs, view piezometer/well data and more.
e) The depth-related datasets such as SPT or CPT, TCP, DCP, and Vs can be presented in graphical or tabular formats beside each borehole (see Appendix A).
f) The cross-section design may be exported to DXF, KMZ, JSON, PNG, SVG, Civil3D and OpenRoads.

12.2 Three-Dimensional

By switching to 3D Mode, the entire project site with all boreholes and cross-sections will be shown in an interactive 3D viewer. Users can add 3D terrain to the model; this terrain model is automatically generated by RSLog based on the LiDAR data obtained from various map servers for the subject site (see Appendix A).
The 3D model of the site can then be exported to various 3D graphic formats such as glTF, OBJ, and STL.

13. Integration with Other Systems

13.1 Import

- **DIGGS**: RSLog supports import from DIGGS (see Appendix A). The Rocscience team is planning for a feature to export to DIGGS format.
- **gINT**: RSLog has an import feature that supports gINT and Wincore files. Based on our experience with other gINT users switching to RSLog, users can import most of their data into RSLog. Due to flexible design of gINT database, importing the entire data from gINT files may require customizations for a specific data template.
- **AGS**: The current version of RSLog supports import from AGS 4.1.1 and covers more than 150 AGS hatch patterns. We are working on a new version of AGS import feature that offers a more flexible AGS import, edit, and export process. Our log template designer fully supports AGS borehole logs.
- **General Text**: Any text can be copied and pasted between RSLog and other applications.
- **CADD:** RSLog exports cross-section and stratigraphy data to CSV, DXF, and Civil3D (specific CSV format). The current version of RSLog does not import DXF or DWG files. We see that importing DXF files to RSLog Cross-Section Designer would be beneficial to our users and plan to release the first version of this feature in Q3 2024.
- **RSLog Excel Templates:** These Excel templates are specifically designed for RSLog data entry. Once data entry is completed, users can upload the Excel files to RSLog and a project will be automatically created, with boreholes added based on the uploaded data.
- **Laboratory Test Results**: RSLog does not process raw lab data, however it can import the test results from Excel (CSV) file. Importing data to RSLog is simple if all test results are saved in a single CSV file.

Rocscience is open to discussing customized solutions for import from a specific software, if necessary.

13.2 Export

- **DIGGS:** This feature is currently under development and is expected to launch in Q3 2024.
- **Entire Project Data**: RSLog exports project and borehole data to Excel and our proprietary JSON format. The Excel export uses RSLog Excel Templates (see Section 2.1).
- **All Tables**: All tables in RSLog offer export to CSV, Excel, and PDF formats.
- **Maps**: Depending on the map, it can export data to PNG, KML, GPX and GeoJSON formats.
- **Cross-Section Designs:** The design of cross-sections can be exported to Autodesk DXF, which is a universal format supported by any drafting software. In addition, cross-sections can be exported to KMZ, JSON, PNG, SVG, Civil3D and OpenRoads. 3D view of the boreholes and cross-sections can be exported to Wavefront Object (OBJ, MTL), Lithography (STL) and GL Transmission Format (glTF).

13.3 Rocscience Programs

RSLog is designed as a central database for borehole data and can export data in file formats readable by other analysis programs. RSLog is already integrated seamlessly with Settle3 and Slide2, and more integrations with other Rocscience programs are on the roadmap.

13.4 API Integration

We can provide API integration allowing third-party programs to connect to RSLog. Additional information may be provided upon request.

14. User Management

RSLog offers role-based user management. A role is a set of permissions for actions available within RSLog, such as creating a project or generating a borehole log. Each RSLog user is assigned a Role which defines their level of access to RSLog features. Typically, your RSLog account administrator (i.e. your admin user) is the person who oversees user management.

- **System Roles:** The permissions of System roles cannot be altered by user. The following system roles are available in RSLog:
  a) **Admin role:** Users with this role will have full access to all pages and features in RSLog.
  b) **Viewer role:** User with this role will have read-only access to RSLog projects. RSLog offers a free Viewer user for each paid RSLog user.
- **Default Role:** RSLog comes with a default Engineer role with pre-defined permissions of the Admin role, except the access to user management page.

You can create new roles and add users to your RSLog account. The list of users may be imported from CSV file, if necessary. The maximum number of users allowed for your RSLog account depends on your license.

15. User Guide

RSLog's user interface offers the following help features:

- Context-sensitive help and tooltips on all pages, as required,
- Comprehensive online documentation (user guide) that helps users become familiar with program features and providing details on specific tools/functions, and
- Tutorial videos.

Each page of RSLog has its own documentation which can be accessed by clicking on the Help button at the top-right corner of the page. All documentation can be accessed at https://www.rocscience.com/help/rslog/documentation.

16. Enterprise Licensing Options

Rocscience offers a 20% discount for a purchase of more than 4 licenses, and a customized discount may be offered for more than 15 users. RSLog is available in two different packages:

Hosted by Rocscience: This is the public version of RSLog, with servers located in Canada or the US. Rocscience uses Microsoft Azure and their services to handle data security, backup, and disaster recovery. The cost in this scenario is determined by the number of seats purchased. For the most up to date pricing, please visit our website.

On-Premises Installation: In this scenario, you will be provided with a setup package and installation manual for your IT team to install RSLog on your own server. All maintenance aspects of the server will be handled by your company. Rocscience provides up to 4 updates a year, covering bug fixes and new features at no additional cost. For the On-Premises package, the cost is determined by:

- The initial account setup and server installation package, and
- The maximum number of users with RSLog access in your account.

For a personalized quote please contact our sales team.

17. Training and Troubleshooting

RSLog team provides two free 2-hour training sessions via Microsoft Teams.

For bug reports and troubleshooting, we will set up a Microsoft Teams meeting within 2 business days from the receipt of the support ticket. If the issue cannot be resolved during the meeting, it will be escalated to the development team for implementation of a solution.

18. Software Support and Subsequent Updates

Rocscience is known for excellent customer support. We reply to user emails within 24 hours.

Hosted by Rocscience: The RSLog team deploys updates to the RSLog website, and users will automatically see the most up-to-date version when they login. Users won't be charged for updates unless the new feature is a premium feature.

On-Premises Installation: The cost includes up to 4 updates a year. The update patch will be emailed to your IT team. Rocscience will provide email/phone support during installation.

19. RSLog Roadmap

In addition to the ongoing improvements, RSLog team is currently working on a feature that utilizes Artificial Intelligence (AI) to extract borehole data from PDF or image files. We understand that all Departments of Transportation have thousands of historic borehole logs from older projects that supersede gINT. Some of these logs may only be available in paper copy.

This feature allows users to:

1. Scan historic borehole logs into PDF files.
2. Upload PDF files containing borehole logs.
3. Analyze the format of all pages in the PDF and create a list of unique log templates.
4. Review detected data elements and log columns, and finalize the structure of log templates.
5. Confirm the log templates, then RSLog extracts data from all borehole logs.
6. View the extracted data in your RSLog account. This data will be placed on the GIS map and these boreholes become integral to your RSLog account.

We plan to have this premium feature available by the end of Q2 2024.

Appendix A – RSLog Screenshots

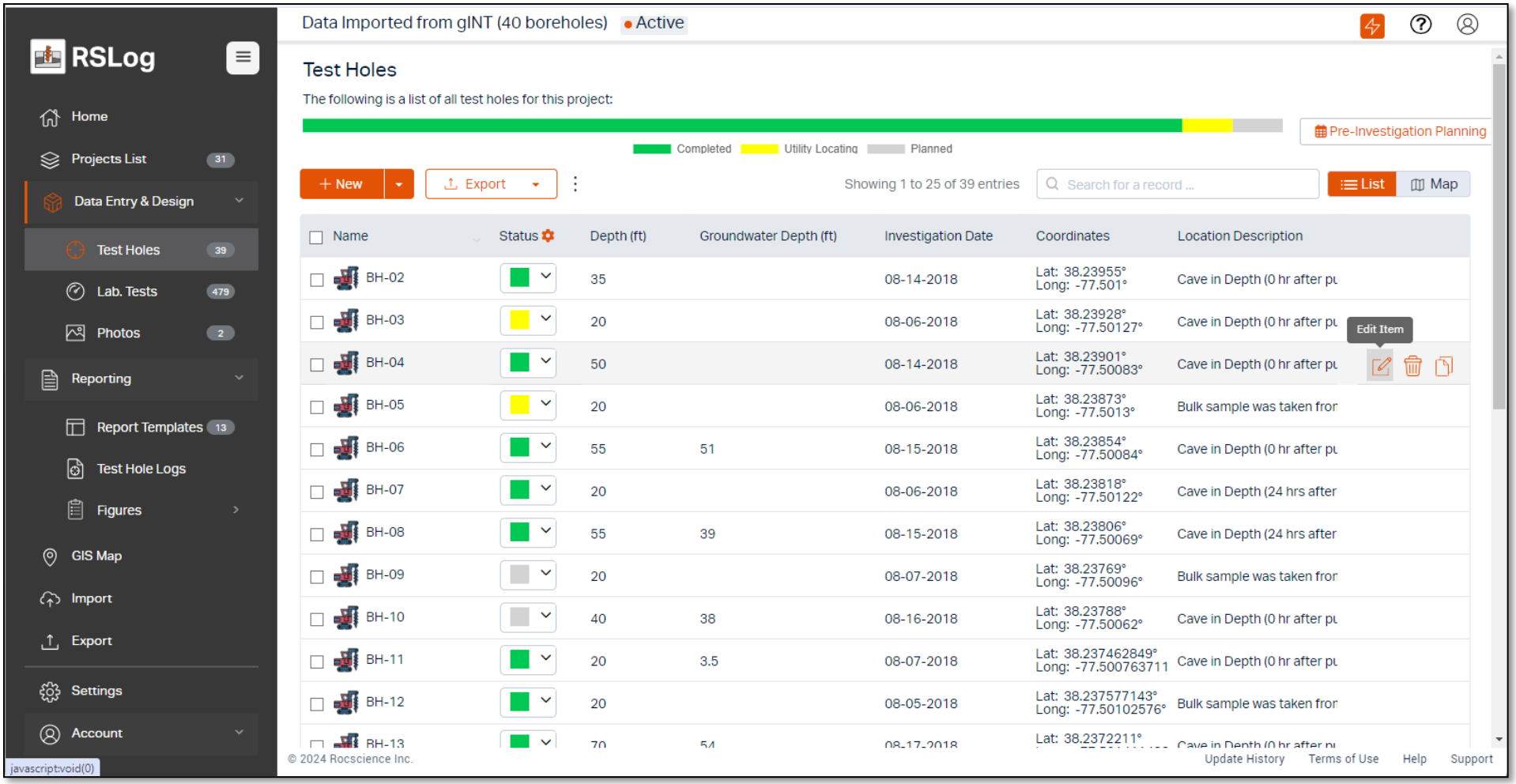

Figure 1: List of boreholes of a project. Note the progress bar for project tracking.

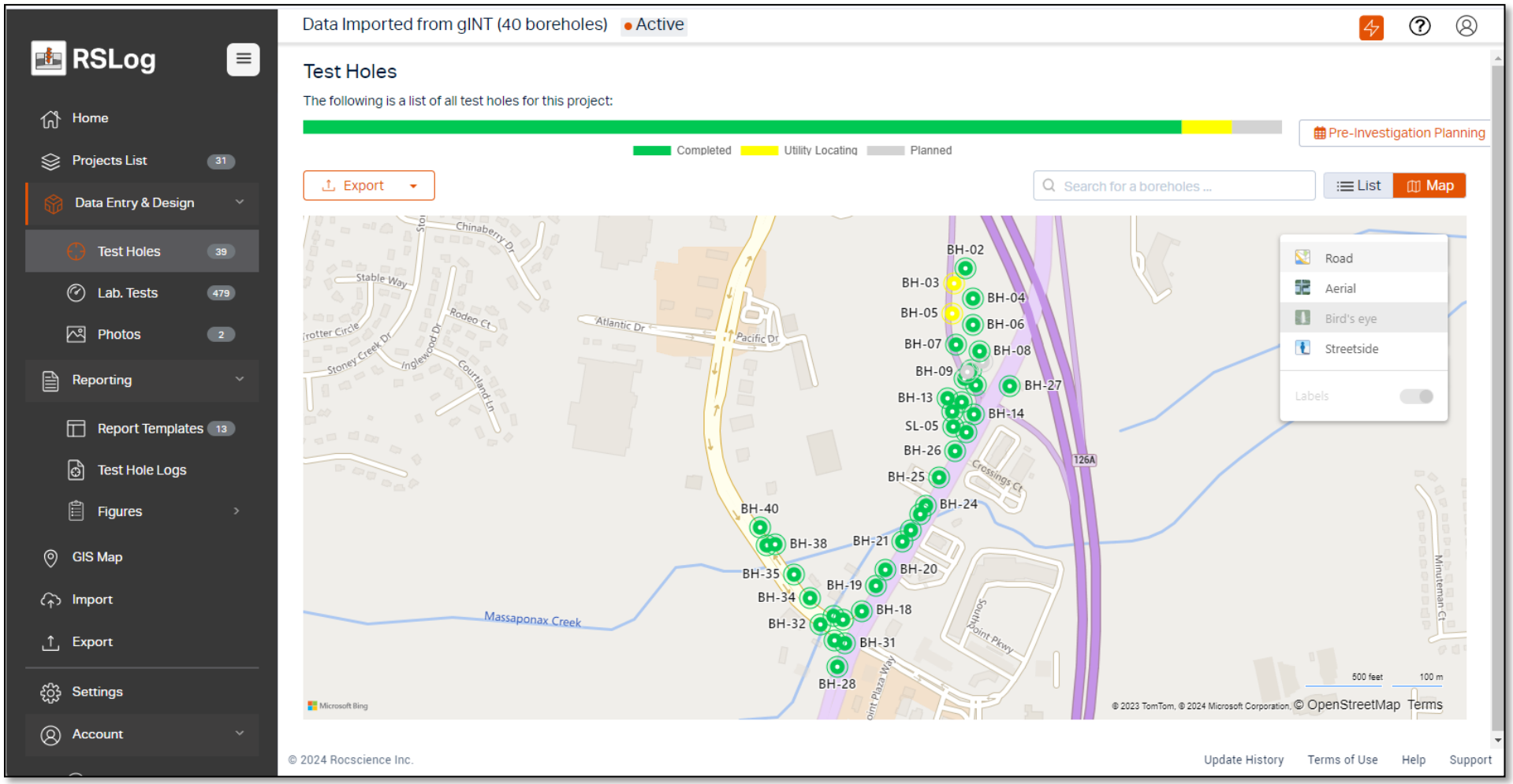

Figure 2: Locations of boreholes of a project on the map.

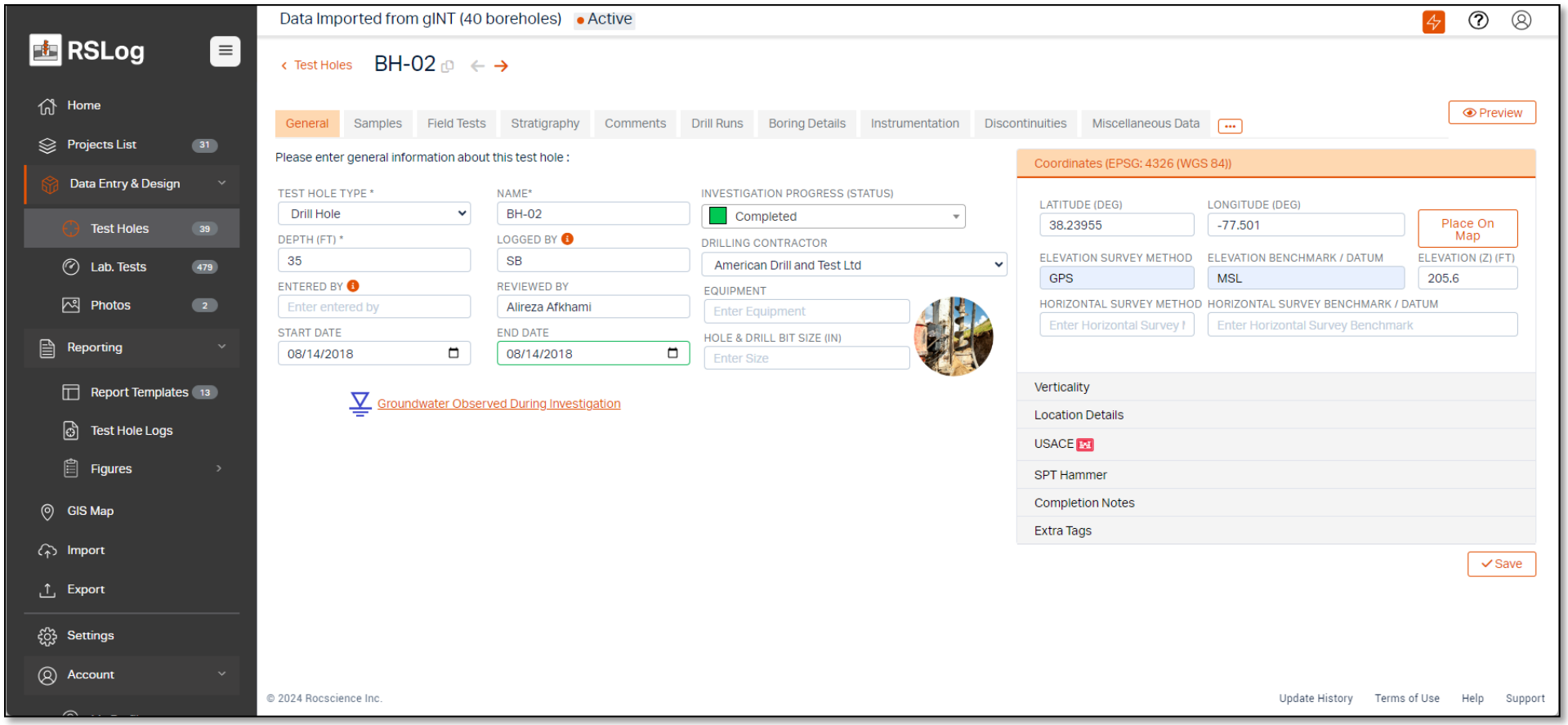

Figure 3: Data entry page for a borehole (General tab).

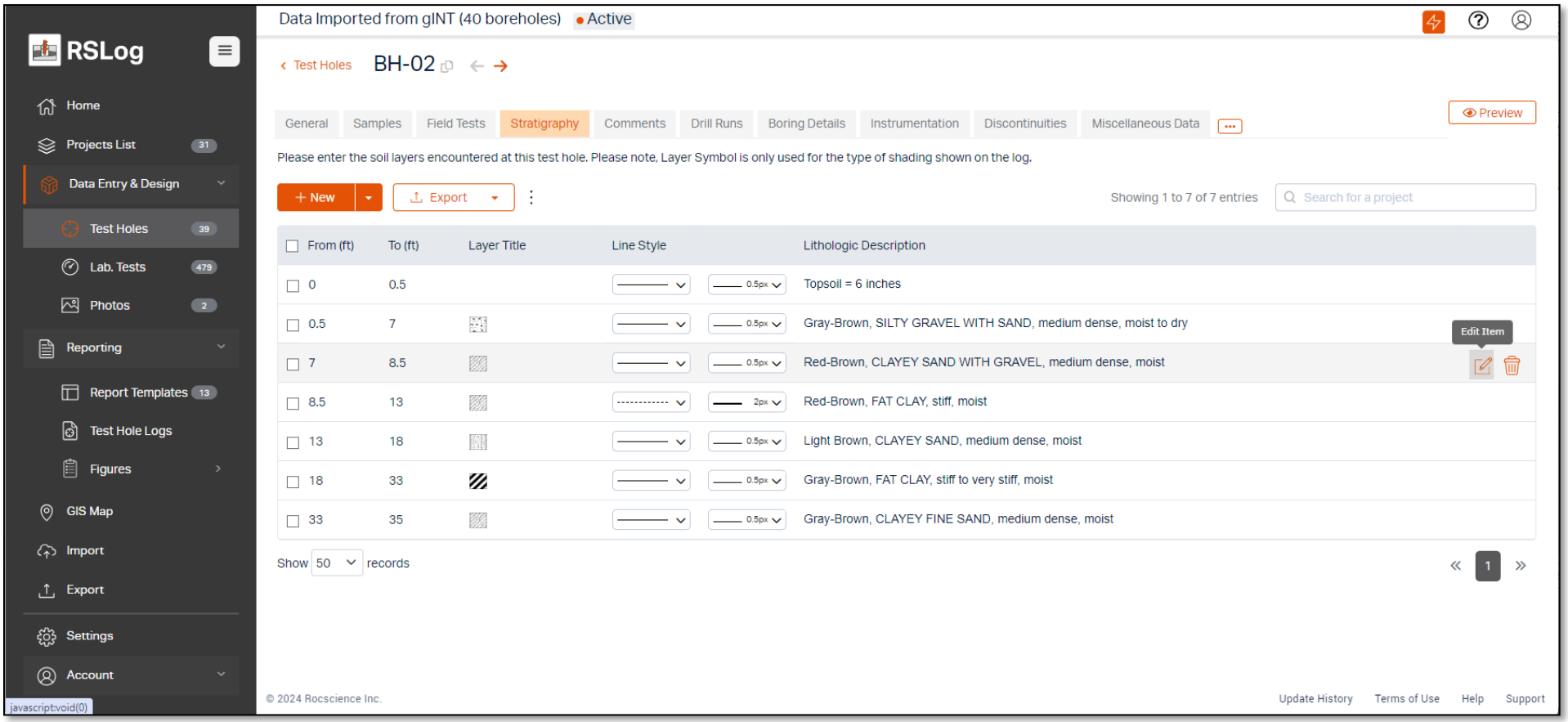

Figure 4: Stratigraphy page with list of soil / rock layers in a borehole.

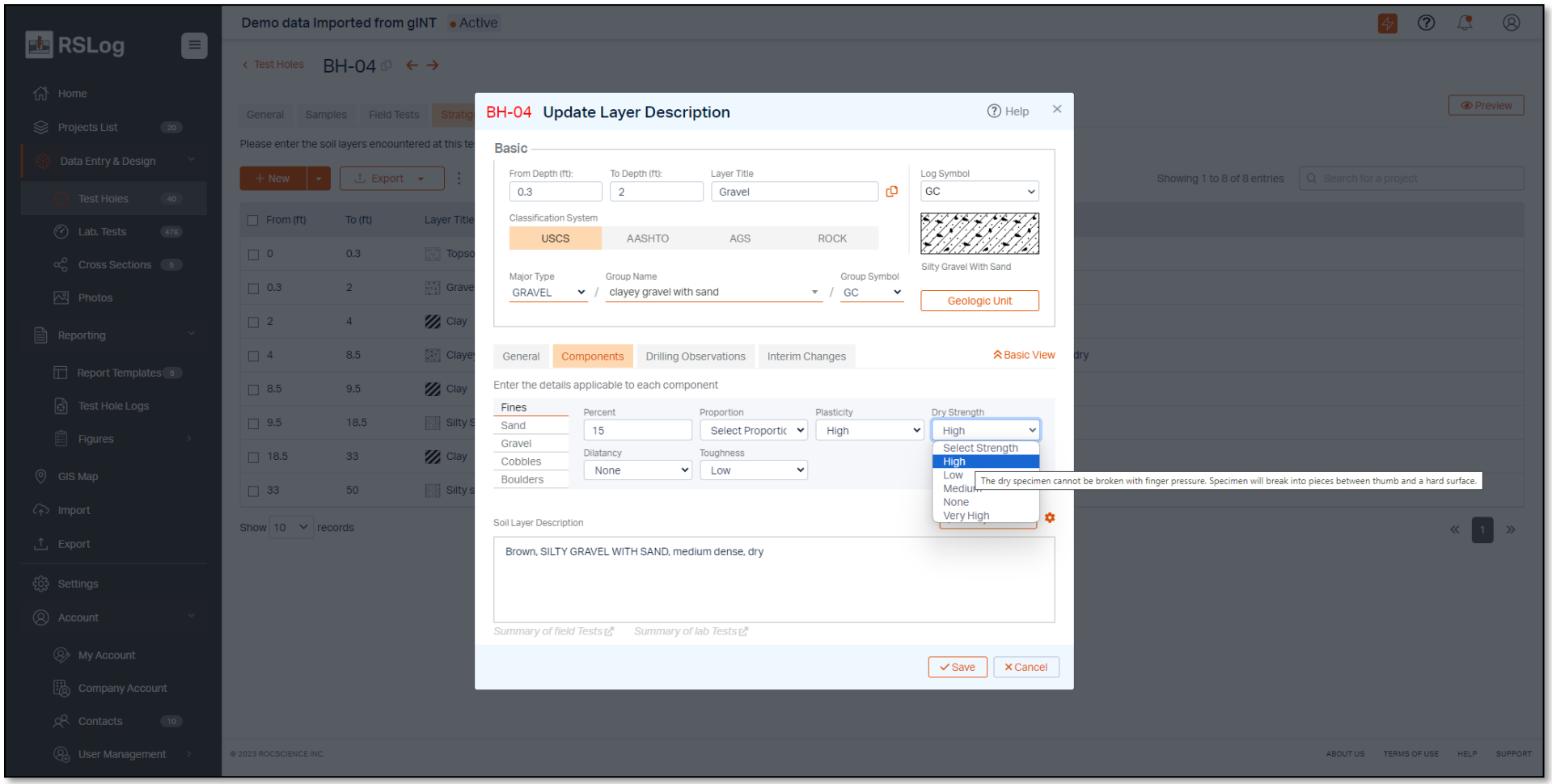

Figure 5: The dialog for editing layer description (Advanced mode).

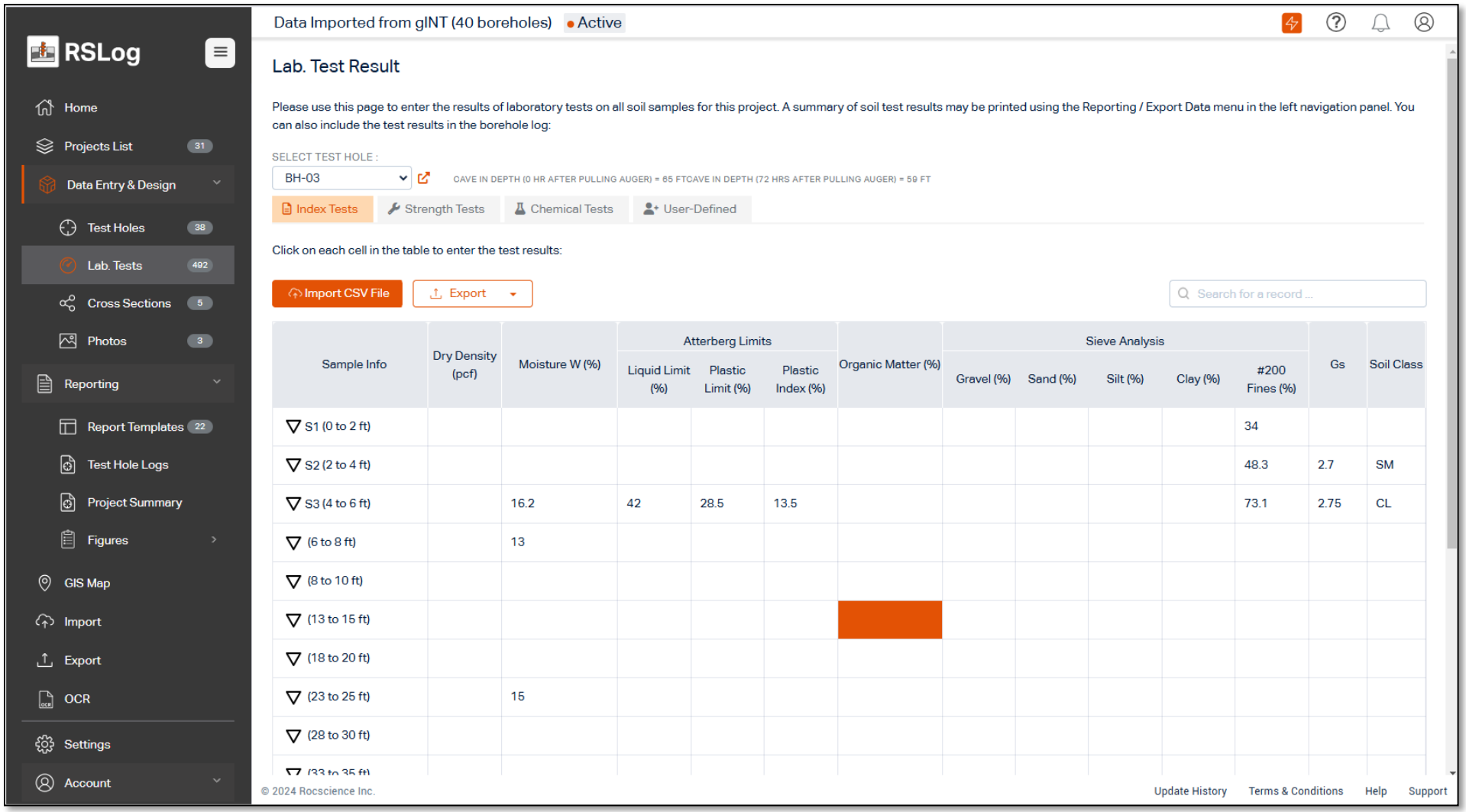

Figure 6: Data entry for lab test results (CSV import is available).

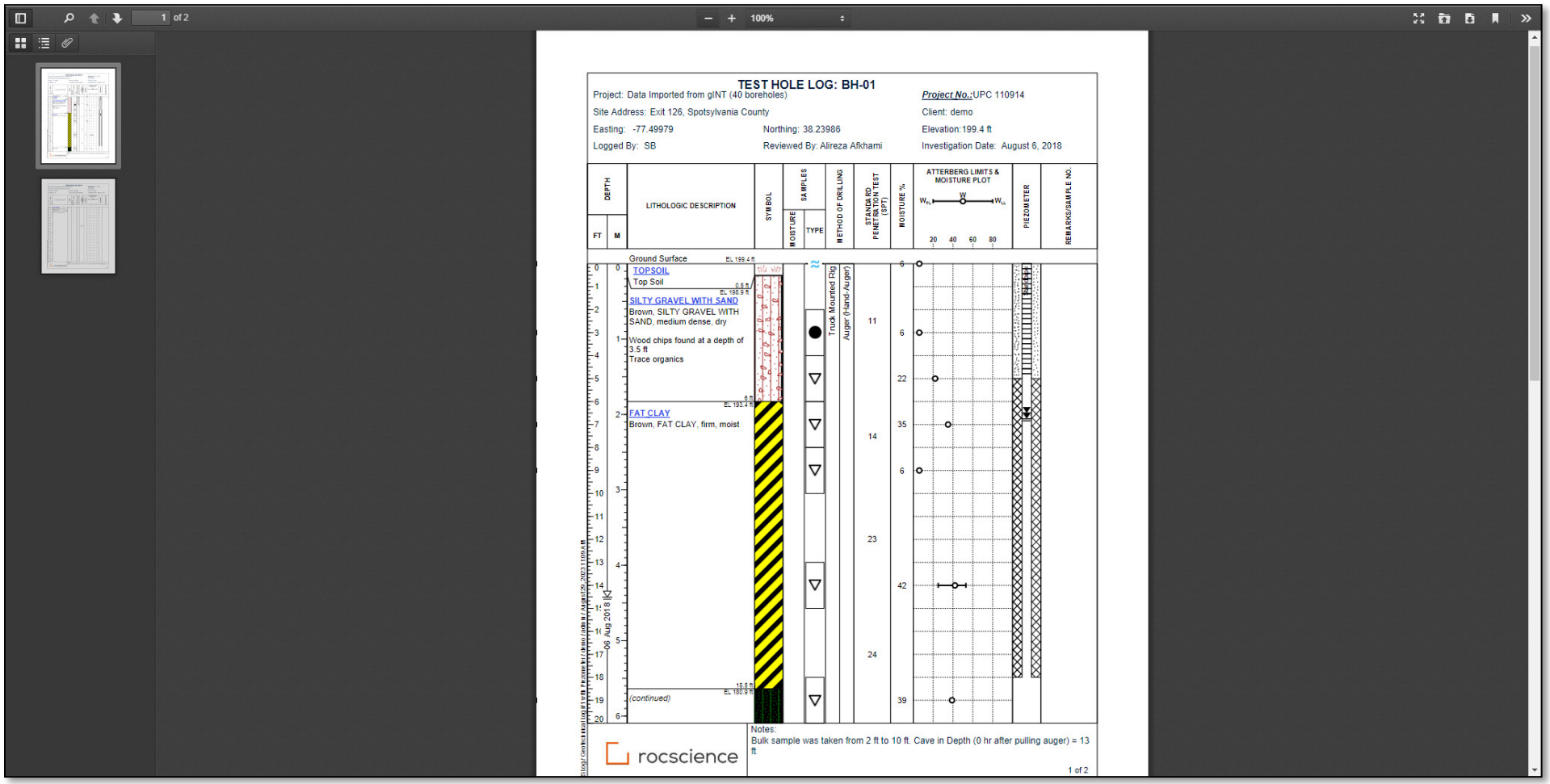

Figure 7: Example of the borehole log generated by RSLog (web PDF viewer).

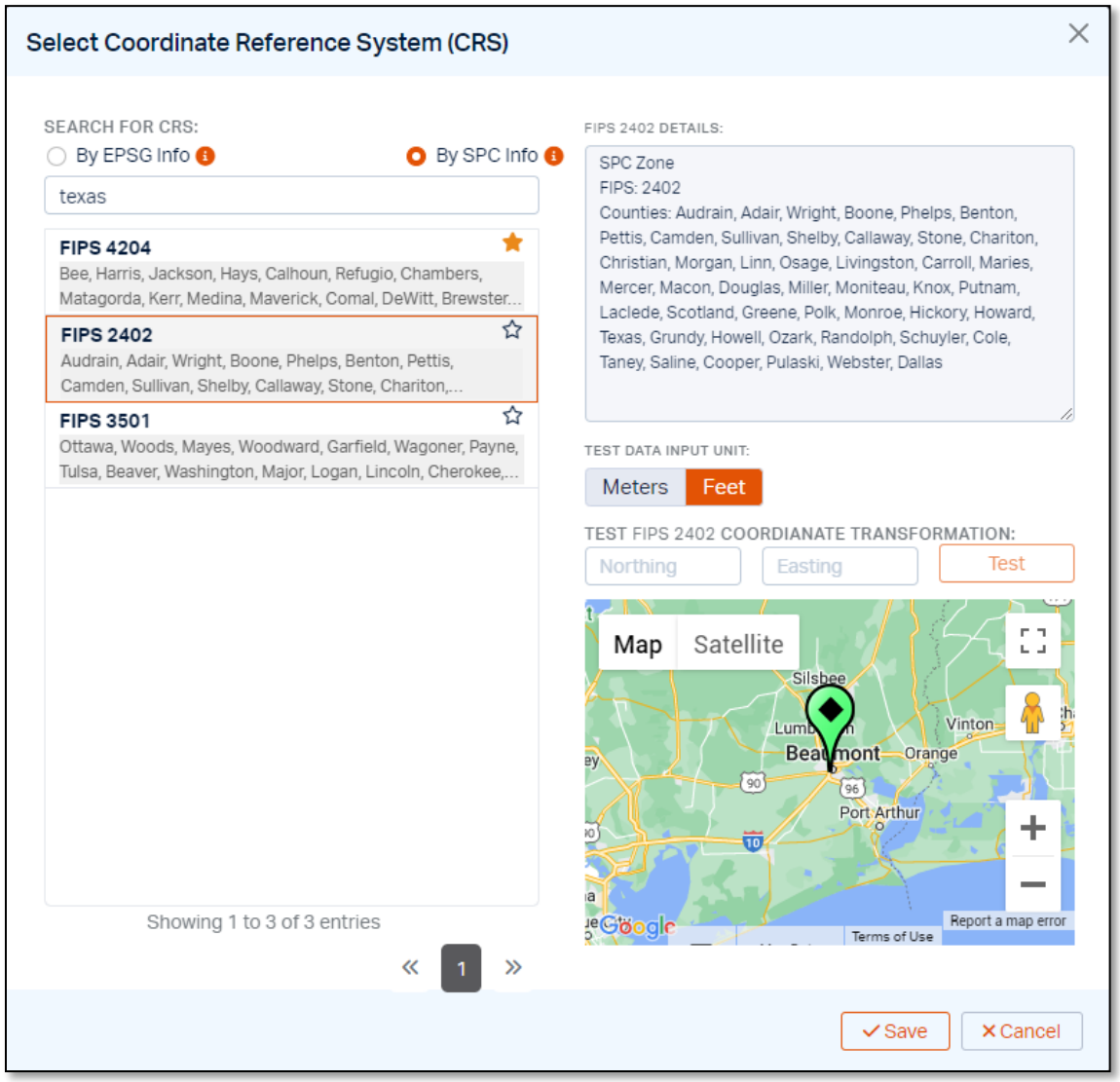

Figure 8: Dialog for selecting project coordinate system (geographic, UTM, EPSG code, SPC zone).

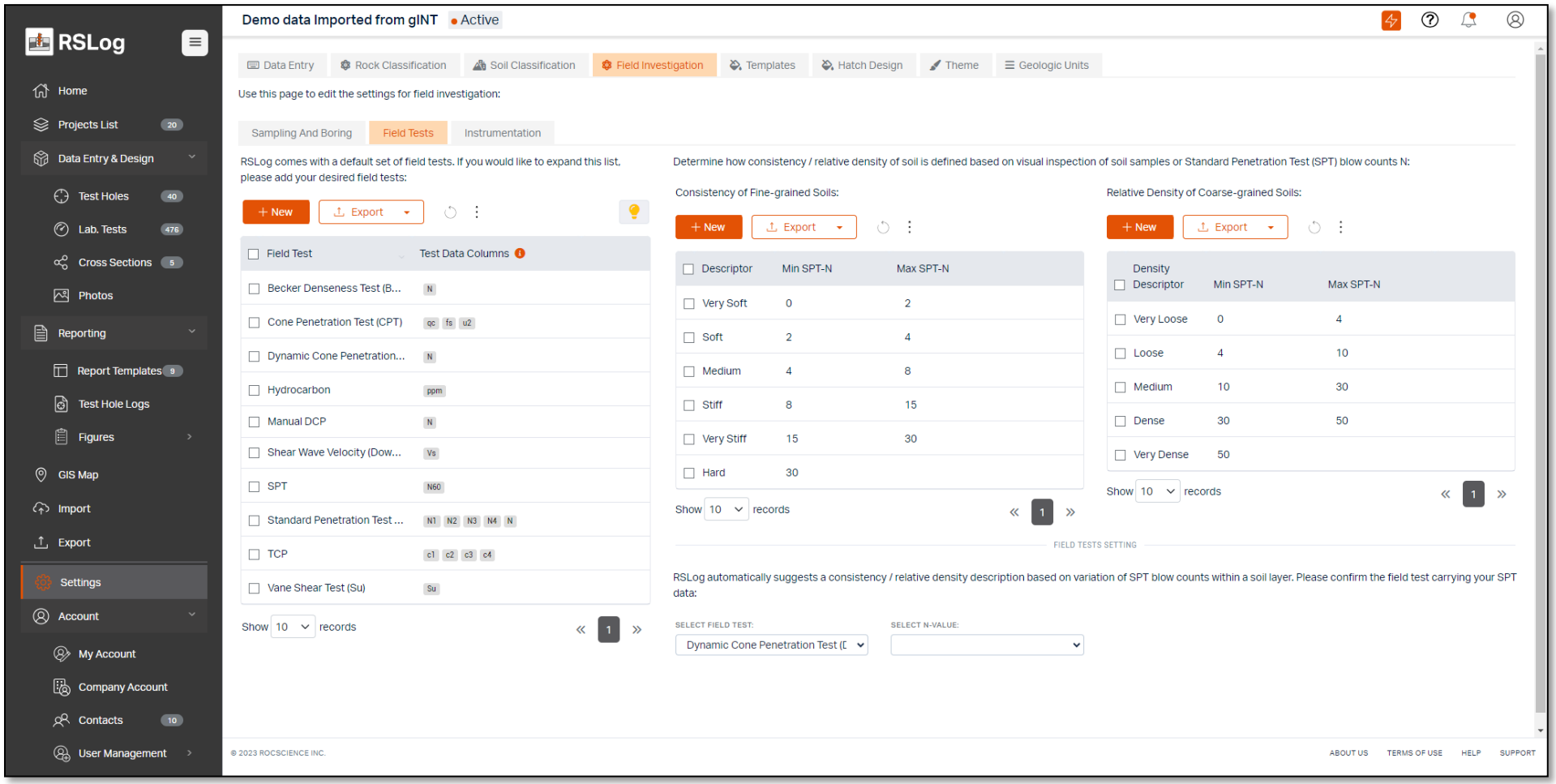

Figure 9: RSLog settings page where user can customize field tests, sample types, drilling methods etc.

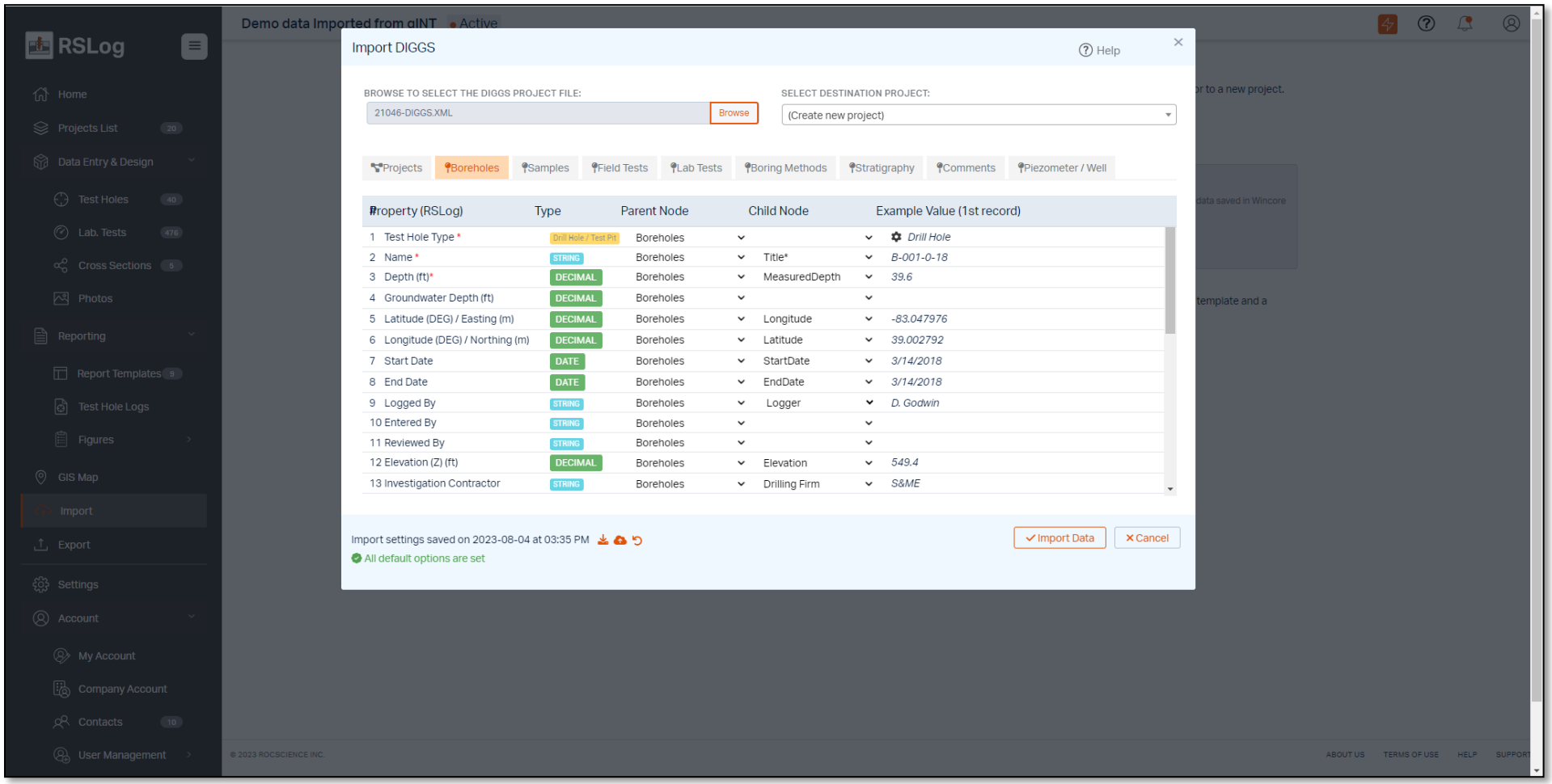

Figure 10: Dialog for importing from DIGGS file.

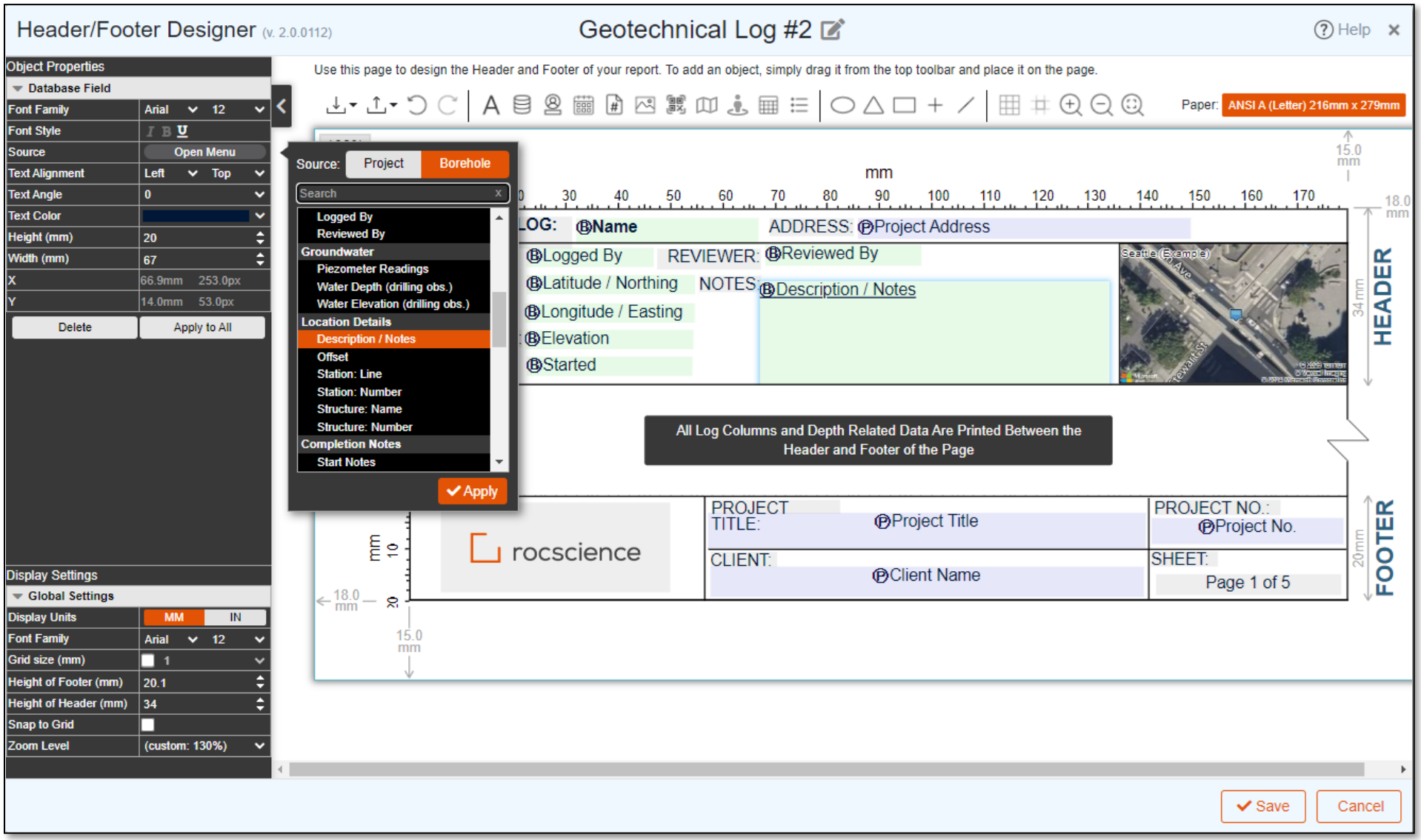

Figure 11: Header/Footer designer for borehole log template design.

Figure 12: Cross-section designer module in Plan view.

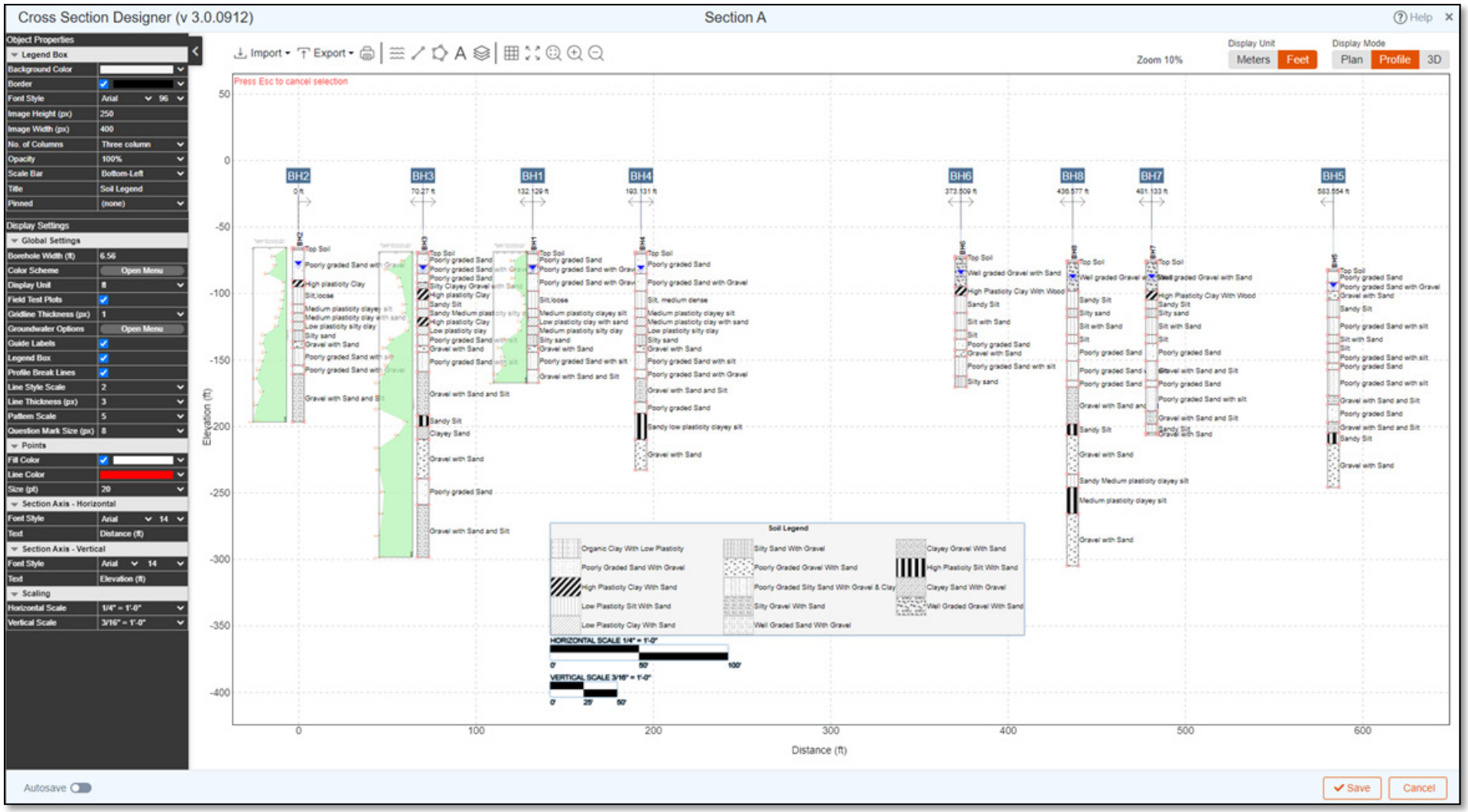

Figure 13: Cross-section designer module in Profile view (showing stick logs).

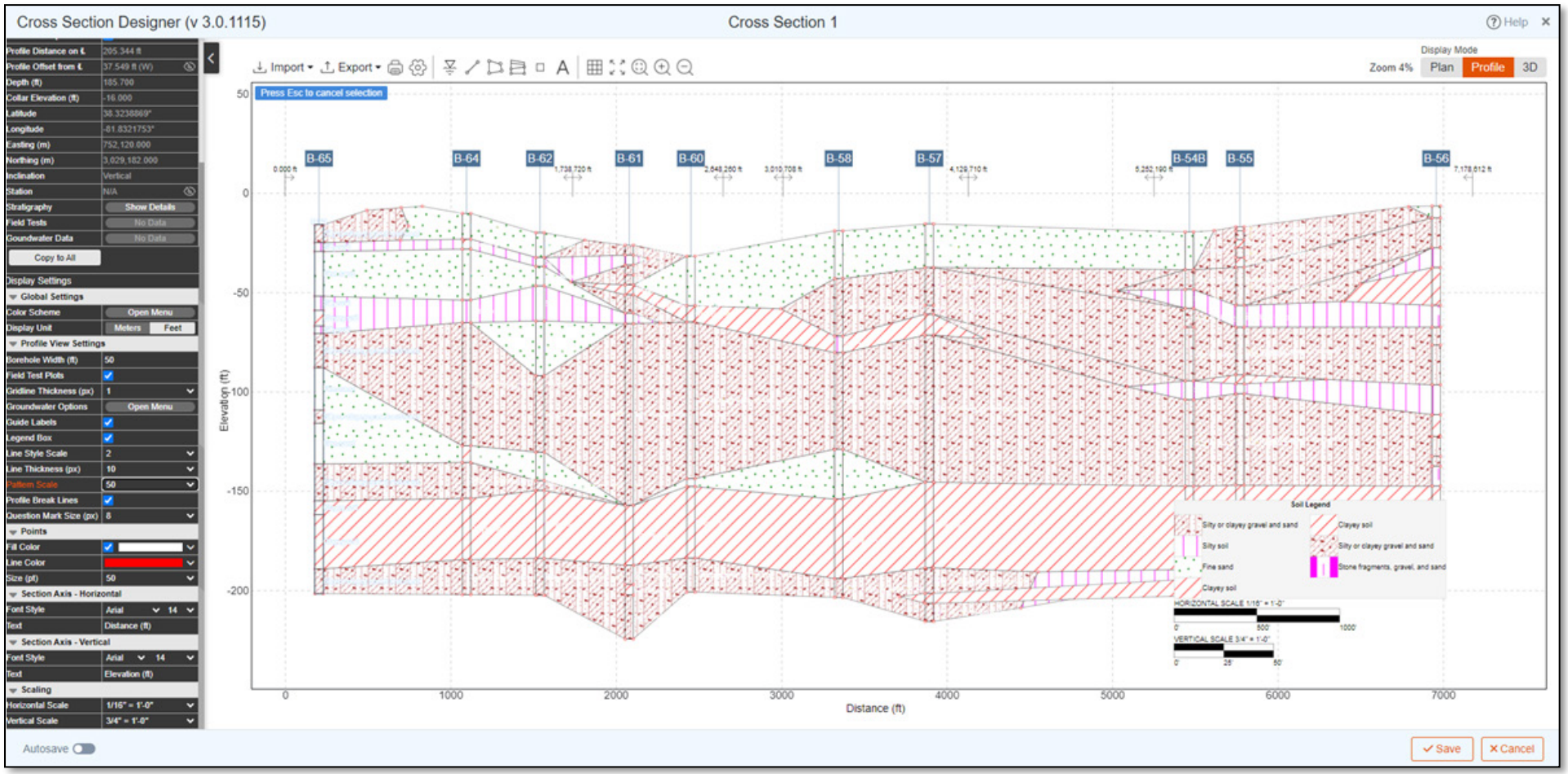

Figure 14: Cross-section designer module in Profile view (showing stratigraphy).

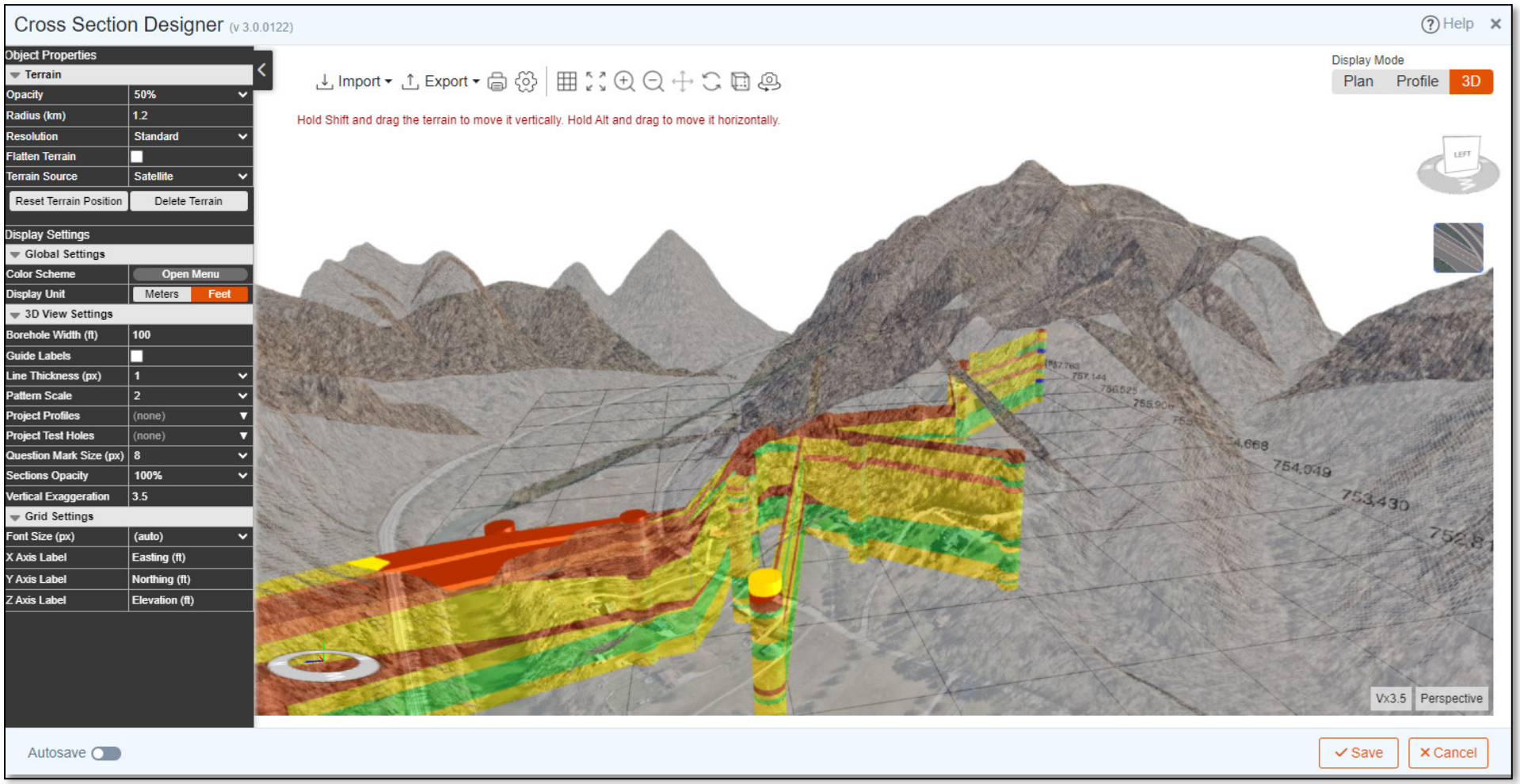

Figure 15: Cross-section designer module in 3D view.

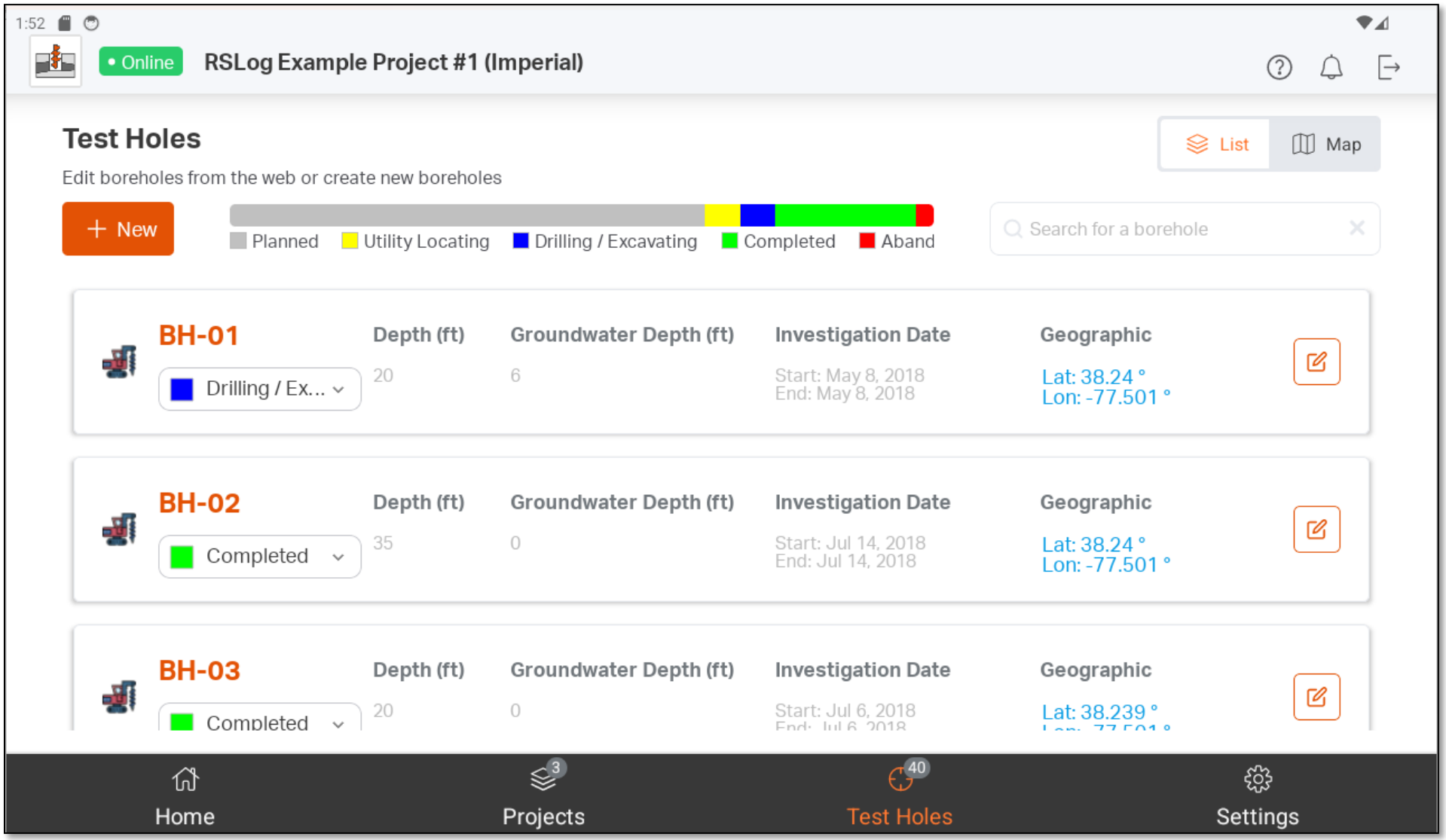

Figure 16: OnSite app (iOS/Android): list of boreholes created for a project during drilling.

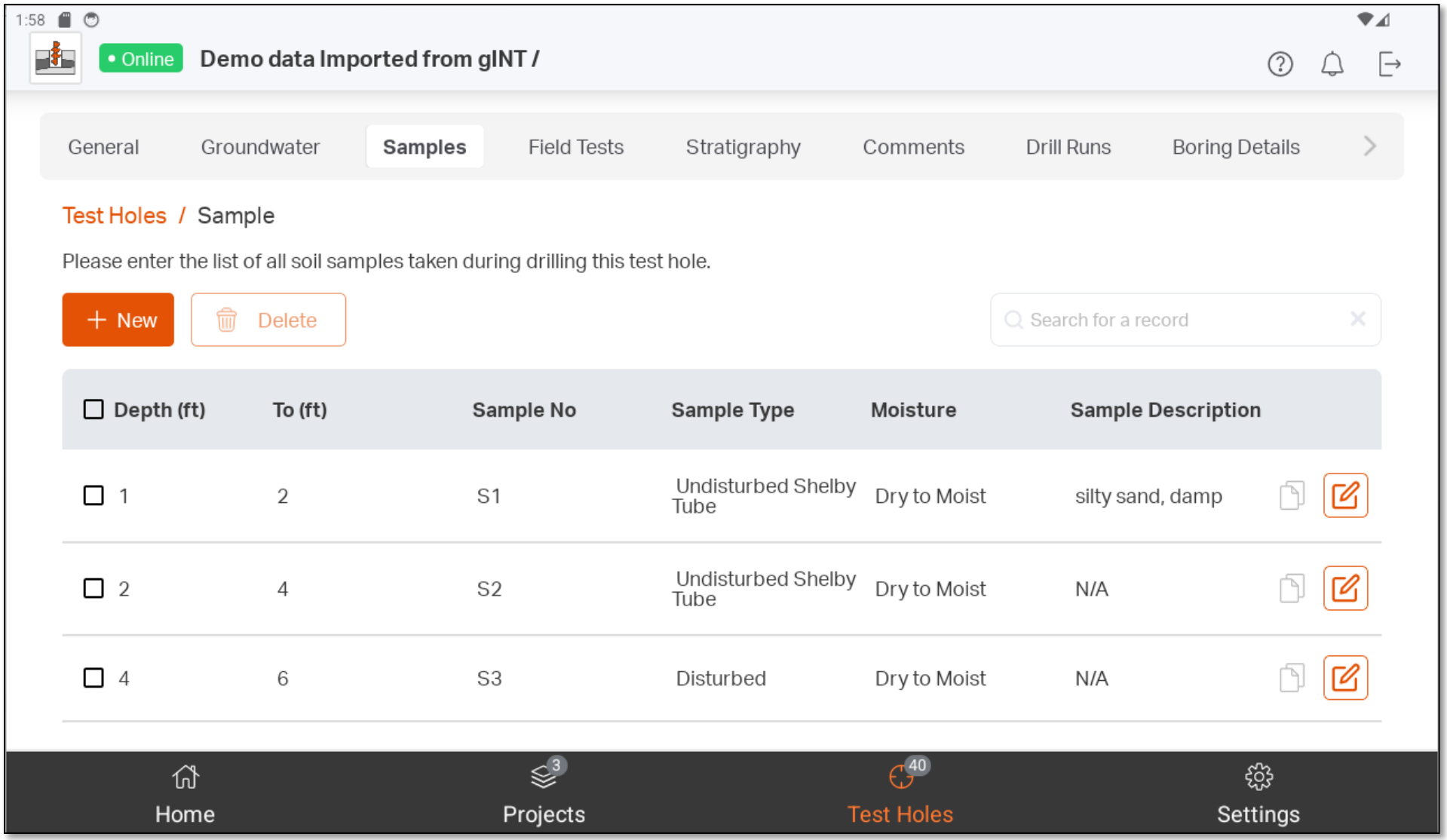

Figure 17: OnSite app (iOS/Android): data entry for list of samples in a borehole.

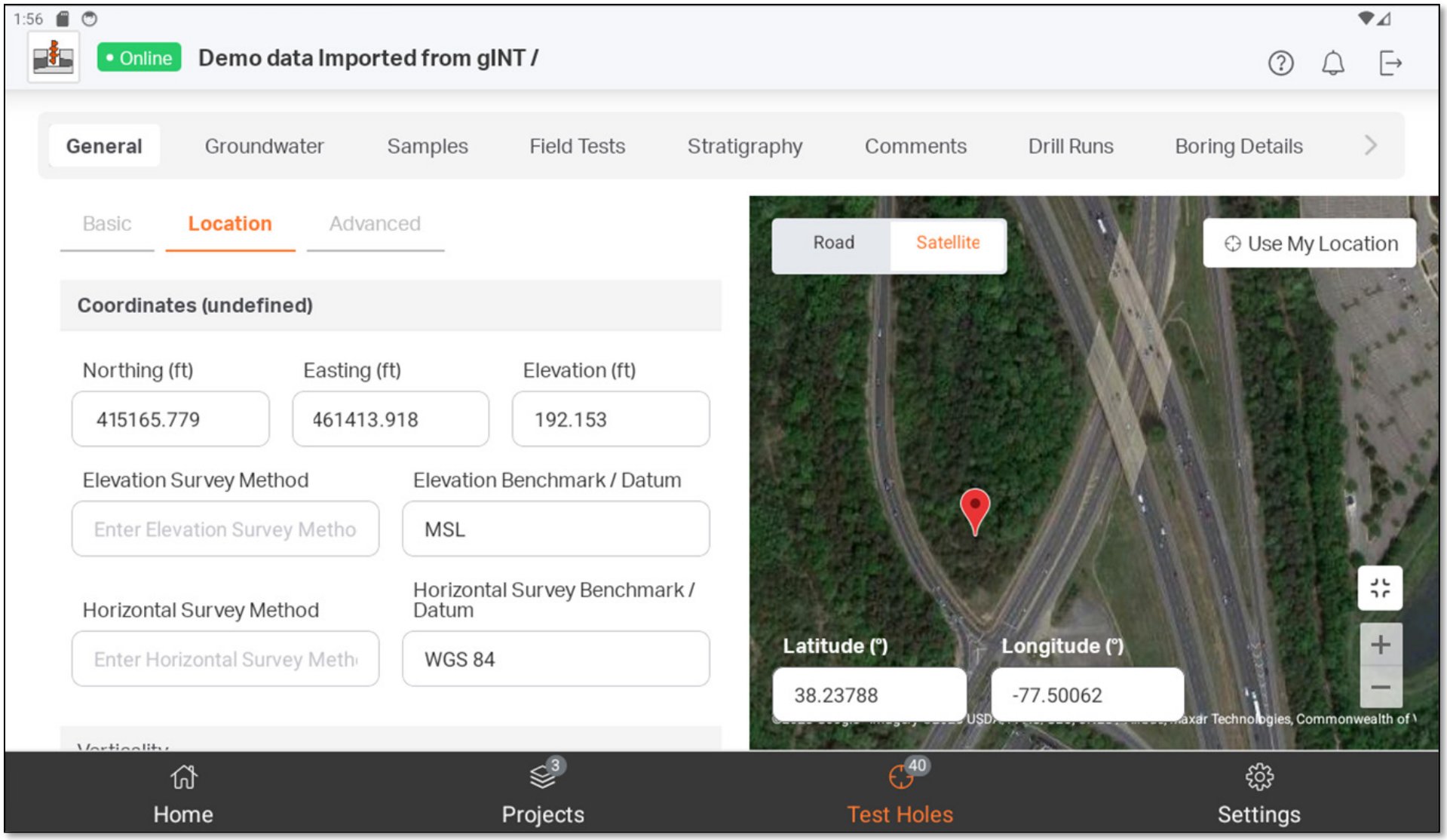

Figure 18: OnSite app (iOS/Android): data entry page for borehole location.