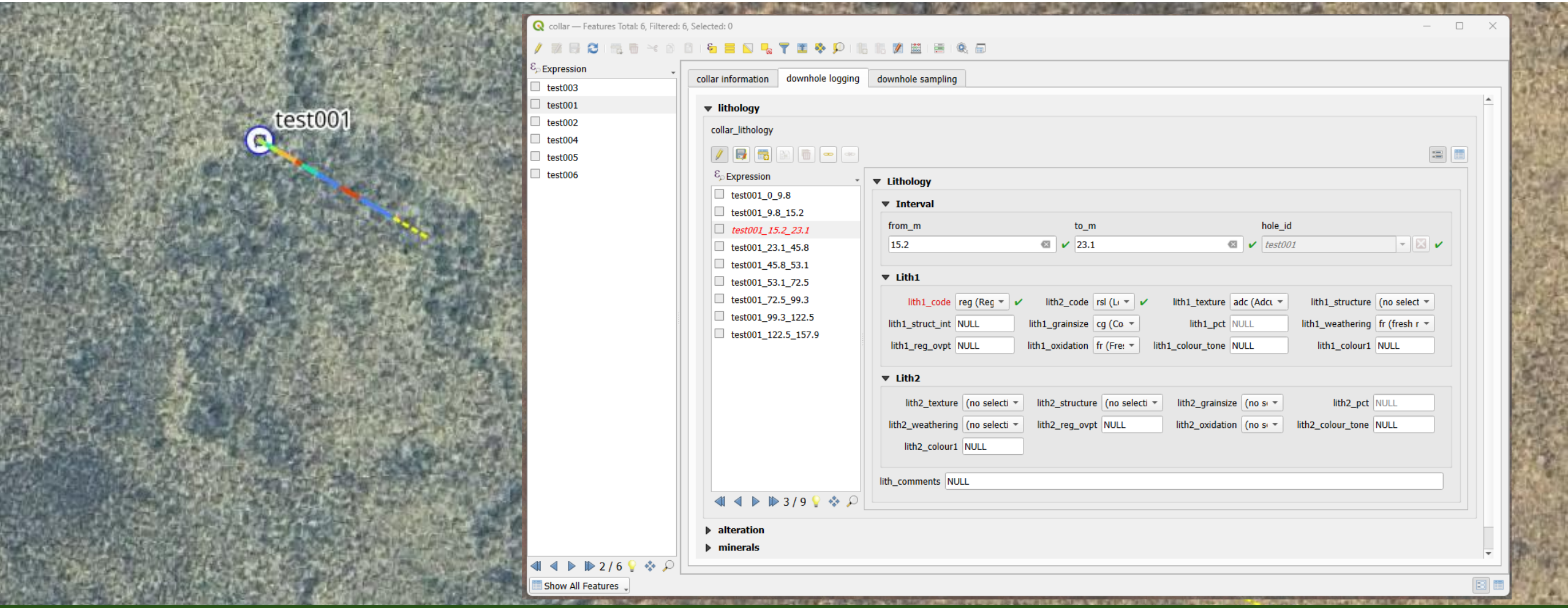
geogeeks

October 2025



Drillhole Data Capture in QGIS

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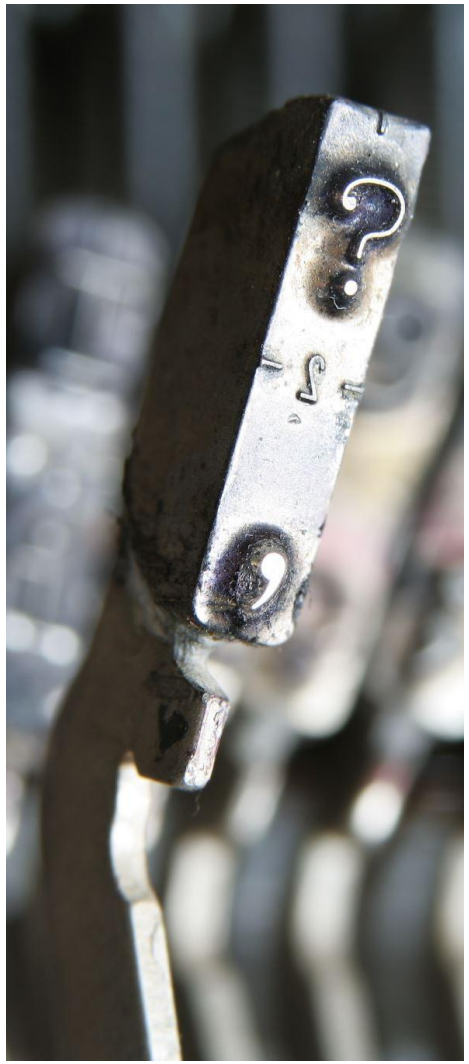
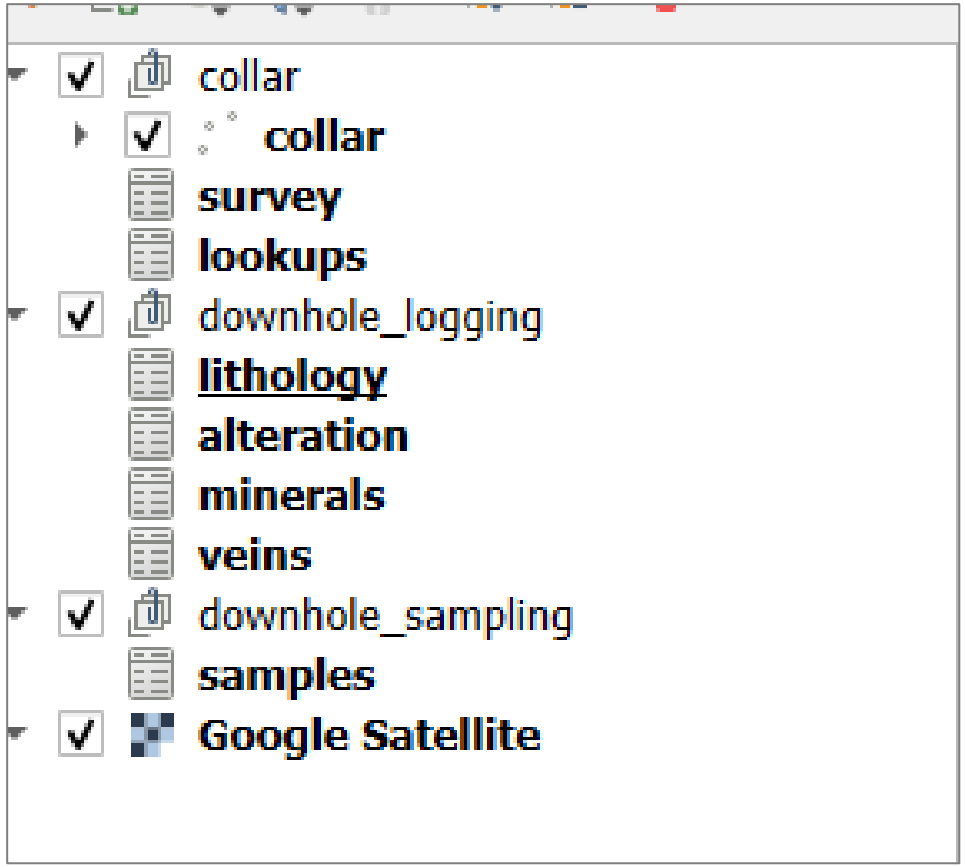
The Objective



- To provide an online/offline, flexible, free and open-source field logging solution that would replicate or exceed the features and functionality provided by current off the shelf solutions.
- The solution would have to be user friendly, customisable, and include extensive data quality checks and constraints to ensure clean and usable data.
- The solution must seamlessly integrate with existing geological databases for the purposes of import, export and library table management.
- Test if the solution is QField (and tablet) compatible.

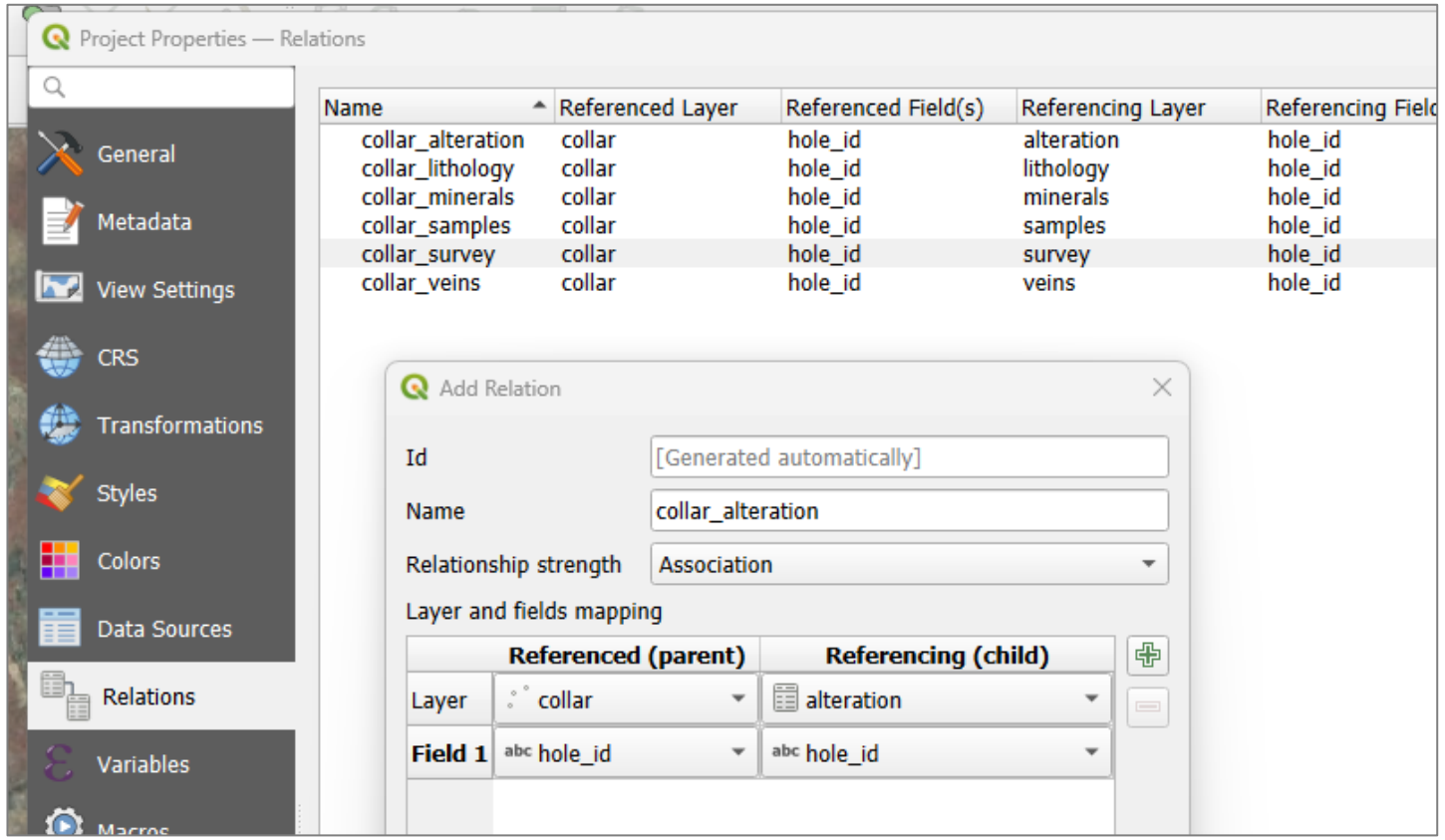
Create Geopackage and Layers

- Create a Geopackage.
- Create your layers (or drag and drop files) and save them to the geopackage.
- Collar table is spatial, rest non-spatial.
- Group tables to your liking.
- Save Project to Geopackage (pick CRS).
- Everything is now contained in a single file, easy to copy and share!
- Add any basemaps or additional layers you find useful.



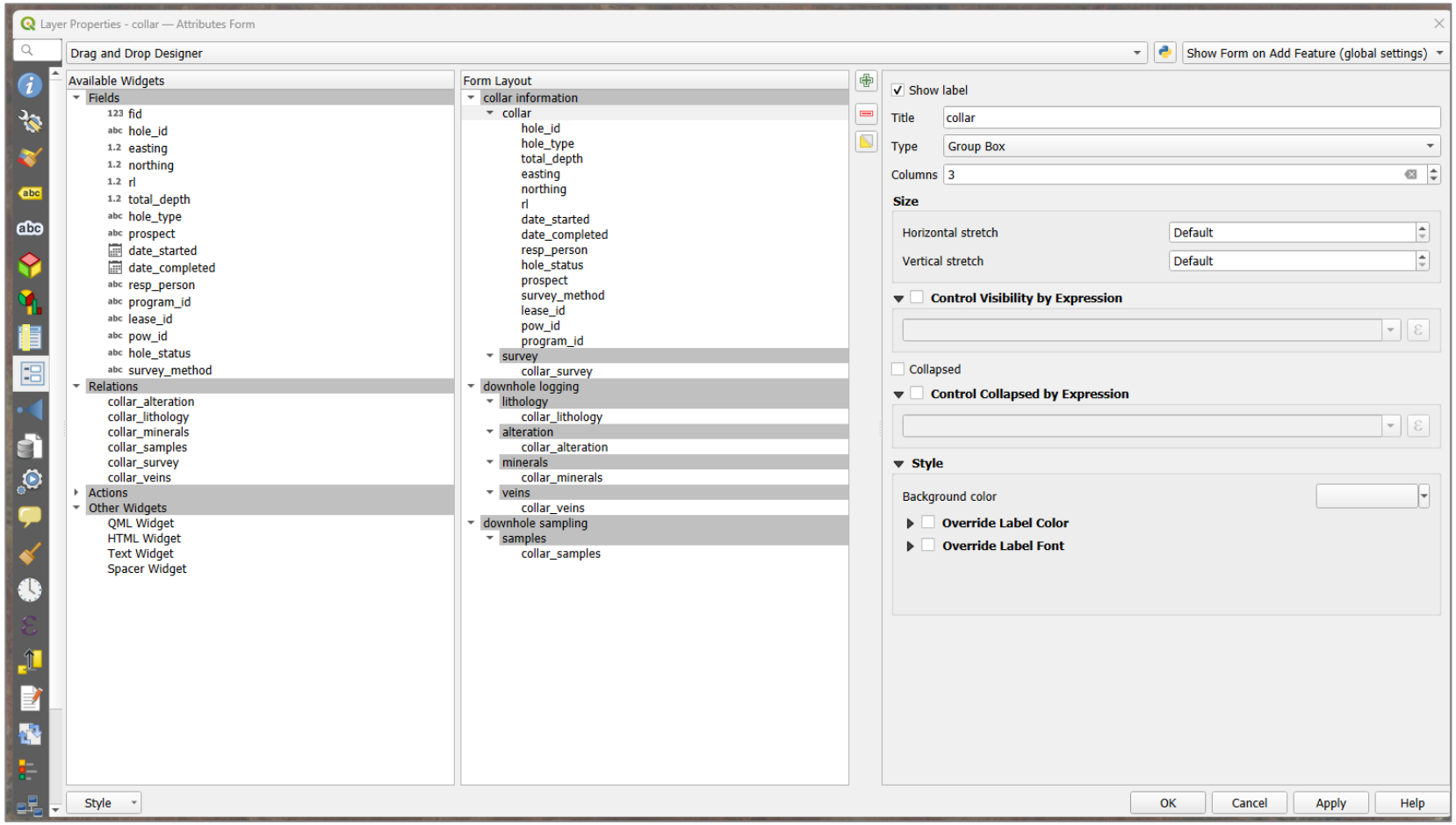
Create the Layer Relationships

- Create relationships between the tables within the Project.
- Define your parent child relationships (think foreign keys).
- Relationship strength: Associated (link) or Composition (cascade delete).
- Repeat for all downhole tables.



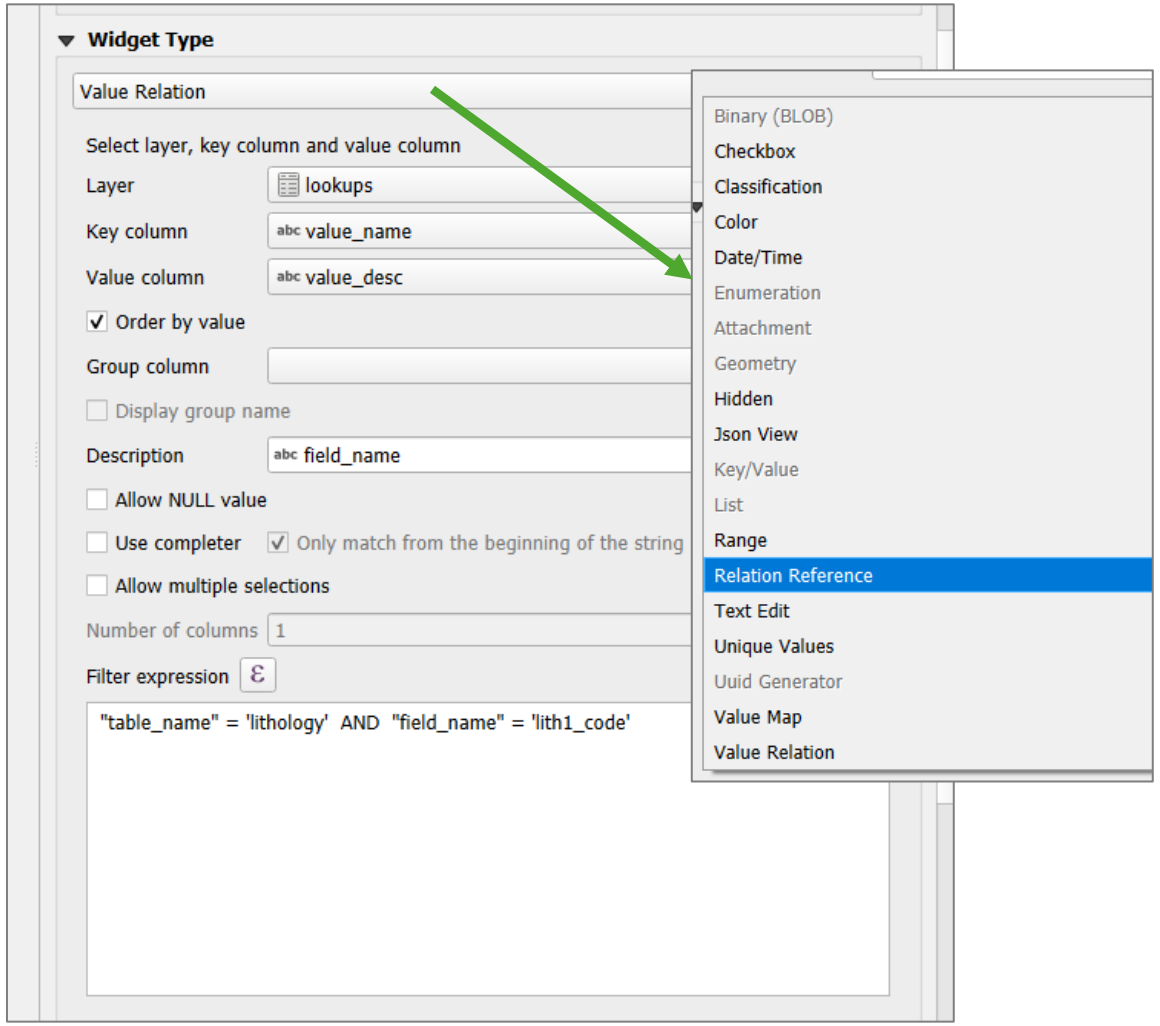
Setup Forms for each Layer

- Adjust form layout using combination of Tab, Group Box or Row options.
- Drop and drag fields on to relevant sections.
- Control visibility or collapse sections based on custom expressions (field values etc.).



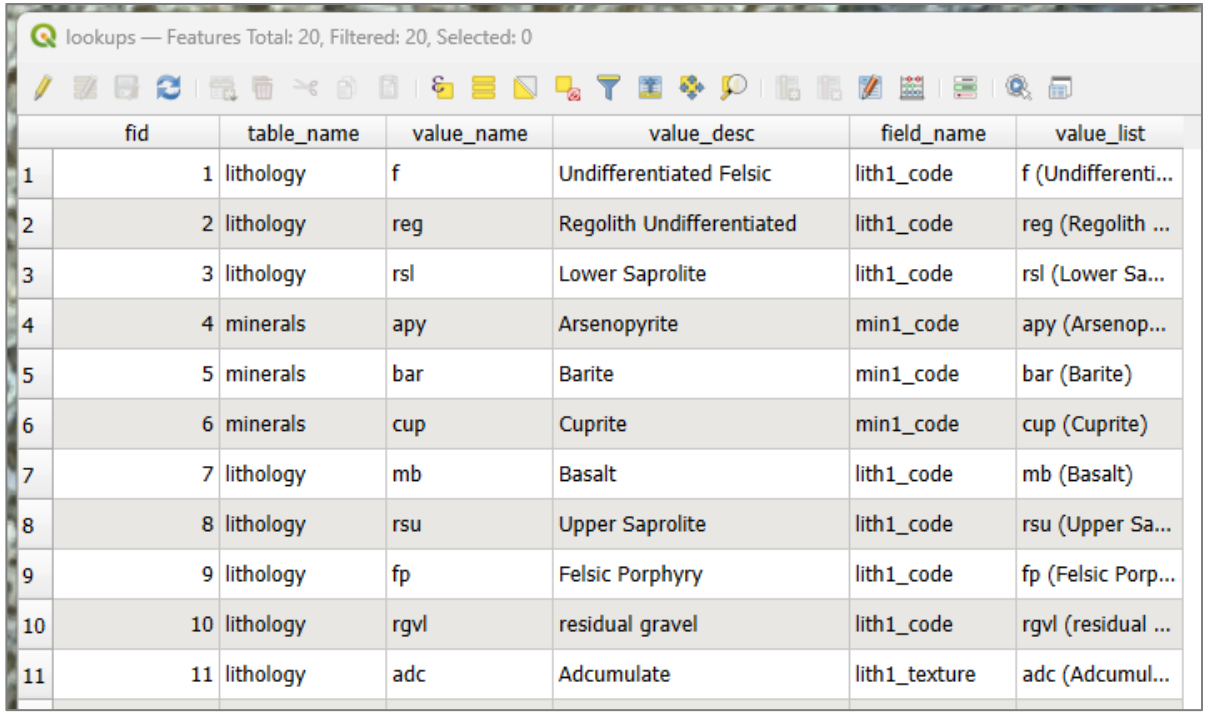
Setup Data Entry Fields

- Forms can contain different widget types (dependent on underlying data type).
- Value relation widget allows you to reference a library table.
- Change fonts and colours to identify required fields and guide the user.
- Use aliases where field names are long or confusing.

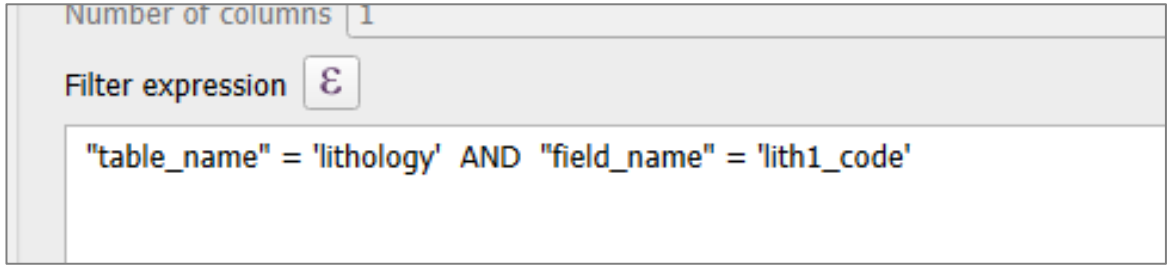


Library Lookups

- Value relation widgets allow forms to reference another layer.
- Use the filter expression in the Attributes form for each value relation widget to restrict the dropdown options.
- Library table can store the key values plus a description to assist the user or improve sorting and filtering etc.

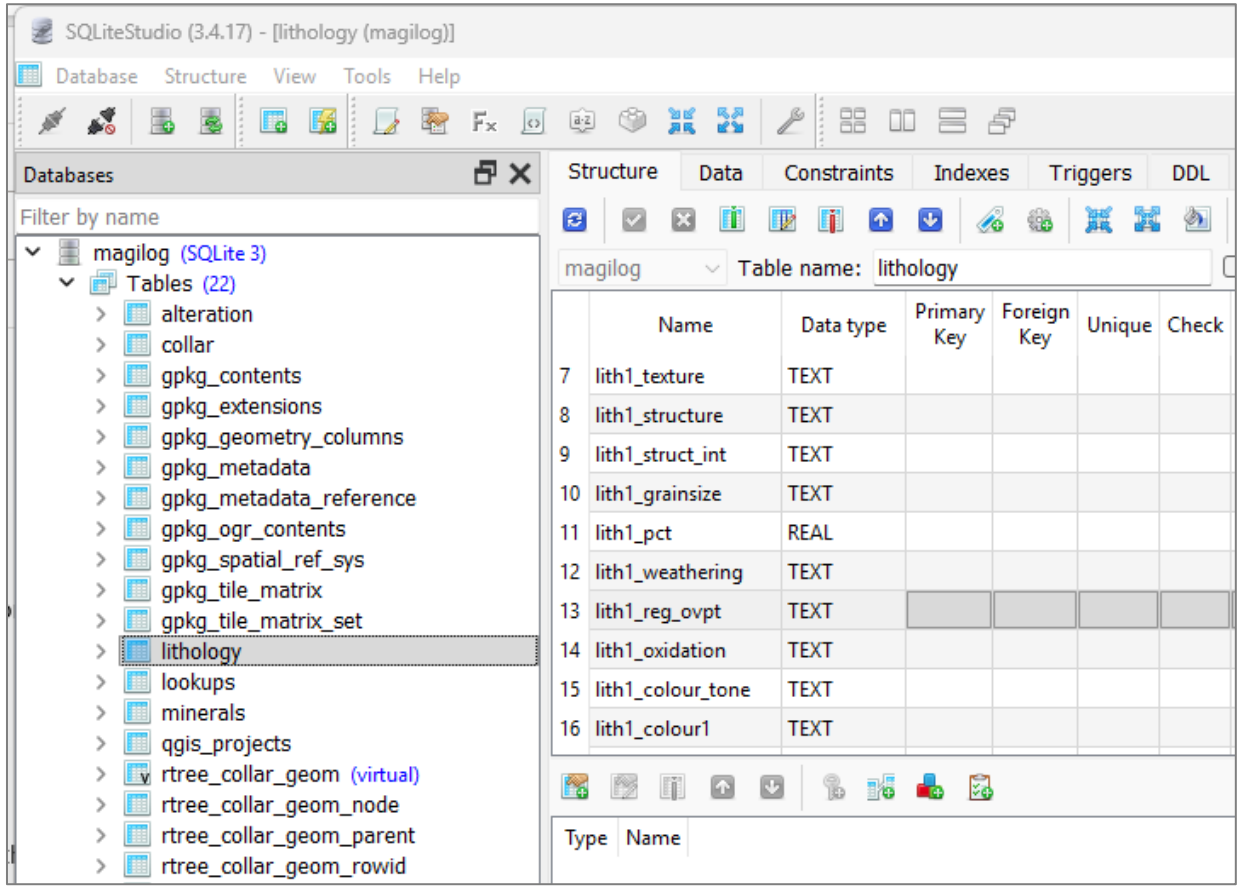


	fid	table_name	value_name	value_desc	field_name	value_list
1	1	lithology	f	Undifferentiated Felsic	lith1_code	f (Undifferenti...
2	2	lithology	reg	Regolith Undifferentiated	lith1_code	reg (Regolith ...
3	3	lithology	rsl	Lower Saprolite	lith1_code	rsl (Lower Sa...
4	4	minerals	apy	Arsenopyrite	min1_code	apy (Arsenop...
5	5	minerals	bar	Barite	min1_code	bar (Barite)
6	6	minerals	cup	Cuprite	min1_code	cup (Cuprite)
7	7	lithology	mb	Basalt	lith1_code	mb (Basalt)
8	8	lithology	rsu	Upper Saprolite	lith1_code	rsu (Upper Sa...
9	9	lithology	fp	Felsic Porphyry	lith1_code	fp (Felsic Porp...
10	10	lithology	rgvl	residual gravel	lith1_code	rgvl (residual ...
11	11	lithology	adc	Adcumulate	lith1_texture	adc (Adcumul...



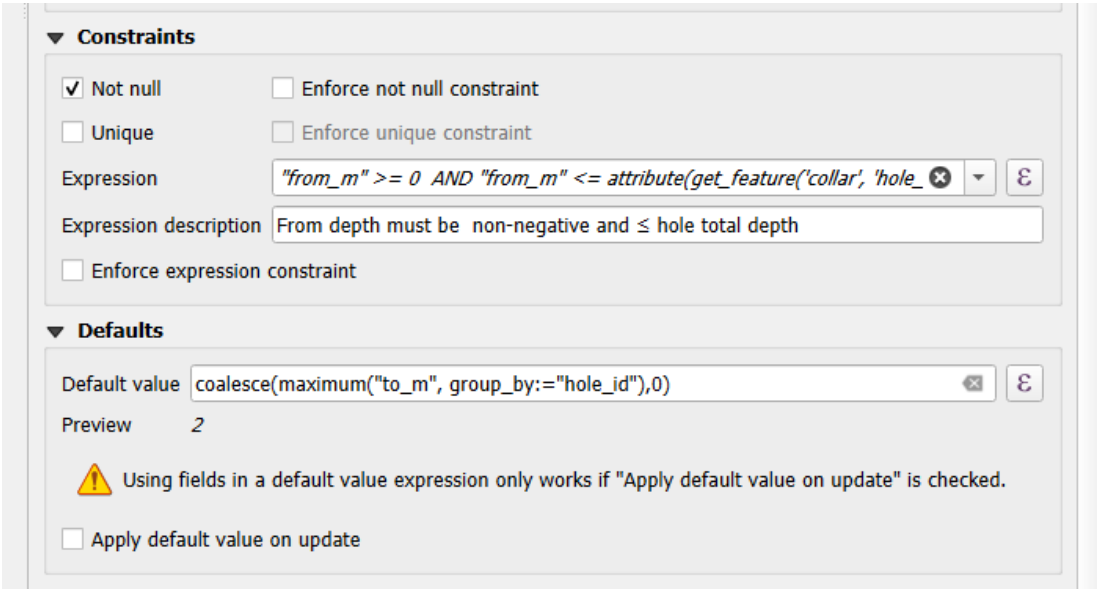
Advanced Geopackage Setup

- Geopackages are SQLite databases.
- There are limitations to what modifications can be made in QGIS (once the table has been created).
- More options are available using SQLiteStudio software.
- Users can change data type, field order, field length etc.
- ODBC to SQLite is an option for simple connectivity.



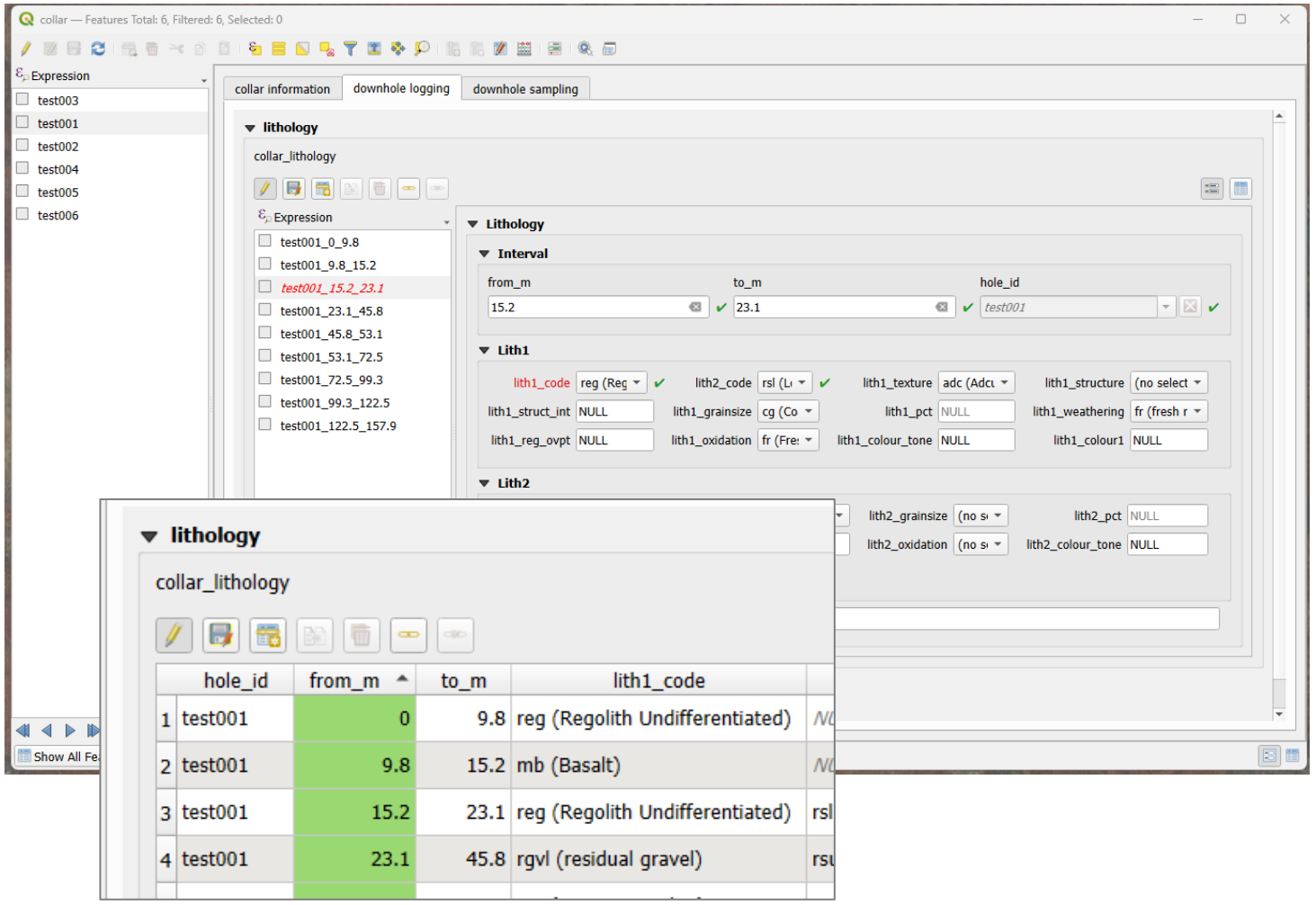
Create Checks and Constraints

- Constraints can be enforced or just issue warnings.
- Some examples are:
  - ✓"dip" >= -90 AND "dip" <= 90,
  - ✓"orig_azimuth" >= 0 AND "orig_azi" < 360
  - ✓lith2_code is null OR lith1_code != lith2_code
  - ✓"to_m" > "from_m" AND "to_m" >= 0 AND "to_m" <= attribute(get_feature('collar', 'hole_id', "hole_id"), 'total_depth')
- Remember case sensitivity!



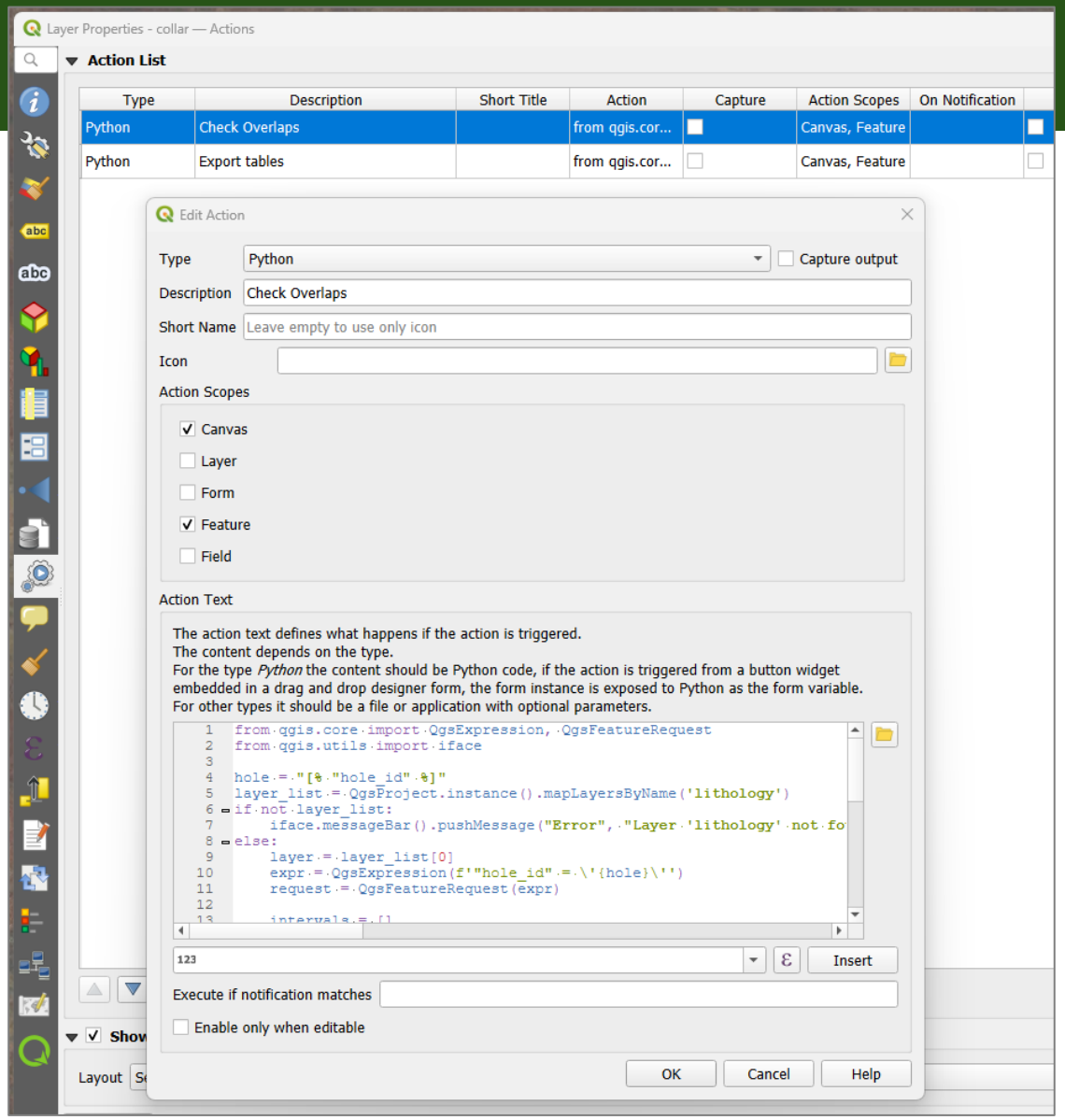
Let's go Logging

- User can select the form or a datasheet data entry layout.
- Data entry errors are highlighted with error or warning messages.
- Holes or downhole intervals selected via the list boxes on the left.
- Setup conditional formatting to assist logging or identify potential issues.



Actions

- **Actions** (think macros) - perform tasks or advanced functionality on demand to streamline or automate your workflows.
- Can run python scripts (meaning possibilities virtually unlimited!)
- Actions in this example:
  - ✓Export all tables to csv's with hole ID prefix and date suffix for a selected hole ID.
  - ✓Check for overlapping intervals in all tables.
  - ✓Create samples with automated QAQC

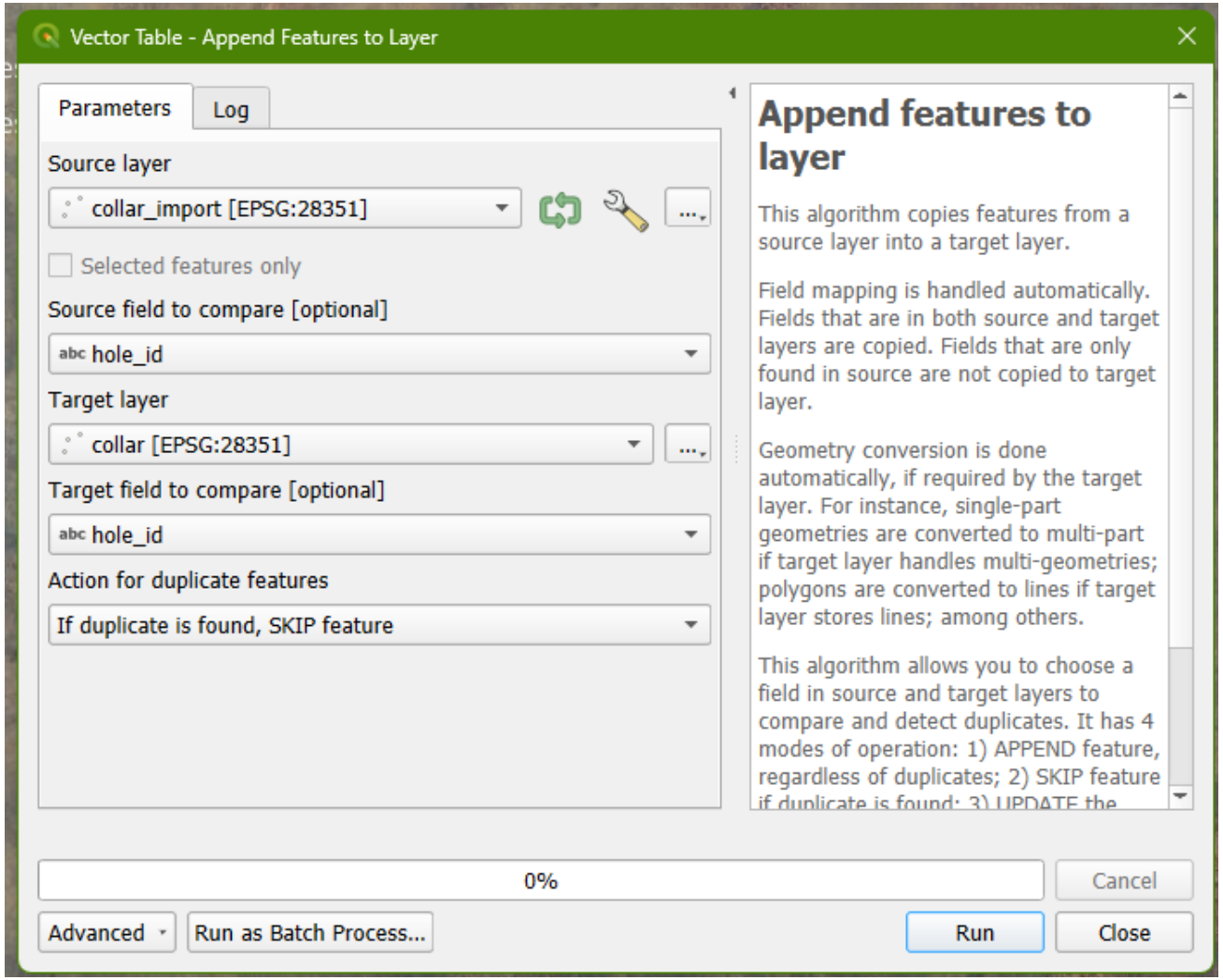


View your Logging on Drill Trace

- Use the **Geoscience** plugin to desurvey the hole and plot downhole logging.
- Display the drill trace (dotted yellow line) to show where no logging exists.
- Dip and azi can be planned from the collar table.
- Check sections while you log.
- View the trace in 3D alongside other drillholes

Easy Data Imports (to get started)

- **Append Features to Layer** plugin allows you to easily import data.
- Plugin checks the target field and allows you to skip, update or append records.
- Columns must match for import to work correctly (mismatched fields ignored).



Next Steps

- Field Testing – currently trialling on ancient Toughbooks now running Linux and KDE Plasma (retired due to win 10). Seems to work great!
- Custom plugins/actions – drillhole and logging data synchronisation.
- Auto populate or validate information spatially – Lease ID, POW, DataSet/Project Code etc.
- Integration with PostGIS and geological databases (library table updates, planned collar imports, logging data synchronisation etc.).
- QField – initial testing suggests it does not support key functionality and likely not able to support this workflow adequately.

THANK YOU!

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