boreLOG APP

User Manual

Version 1.0

Purpose

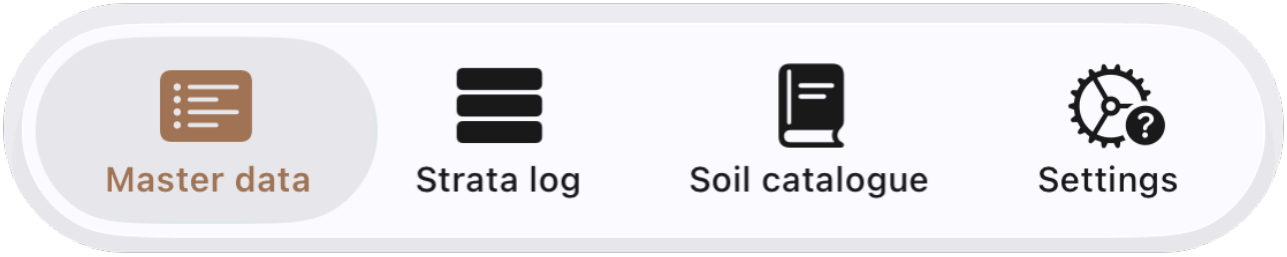
The **boreLOG** APP can be used to record drilling profiles from site investigations and to display and output them graphically in accordance with DIN 4023.

Graphical representation is possible for investigation depths of up to 20 metres below ground level, which is sufficient for most construction projects.

The APP is aimed at civil engineers, small drilling companies / geotechnical offices, as well as interested builders.

Structure of boreLOG

The APP is divided into the following four sections:



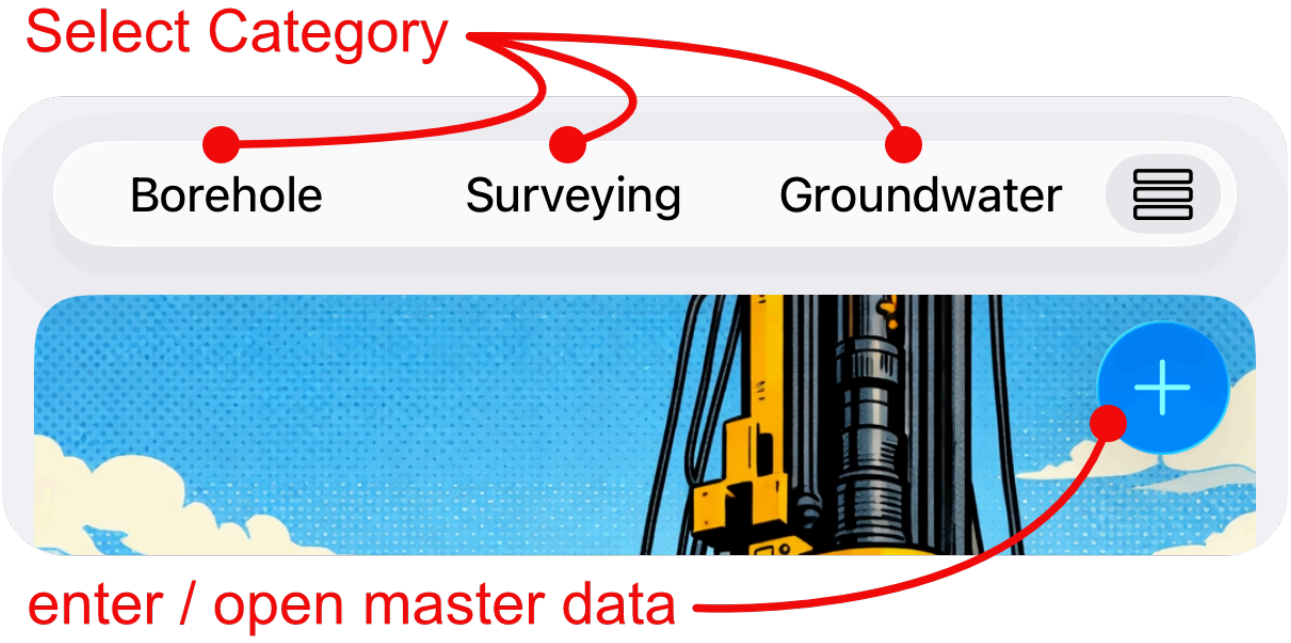
Master data	Entry of master data
Strata log	Input and output of the strata log
Soil catalogue	Soil type according to DIN EN ISO 14688-1 and rock type according to DIN EN ISO 14689
Settings	APP-specific settings

Master data

General information on master data

The master data refers to all data relevant to the borehole, irrespective of the stratigraphic data. The master data has been selected in accordance with DIN EN ISO 22475-1.

The categories ‘Borehole’, ‘Surveying’ and ‘Groundwater’ are available. To navigate quickly between the categories, you can switch to the individual categories using the selection bar. The icon on the right-hand side of the bar resets the category filter.

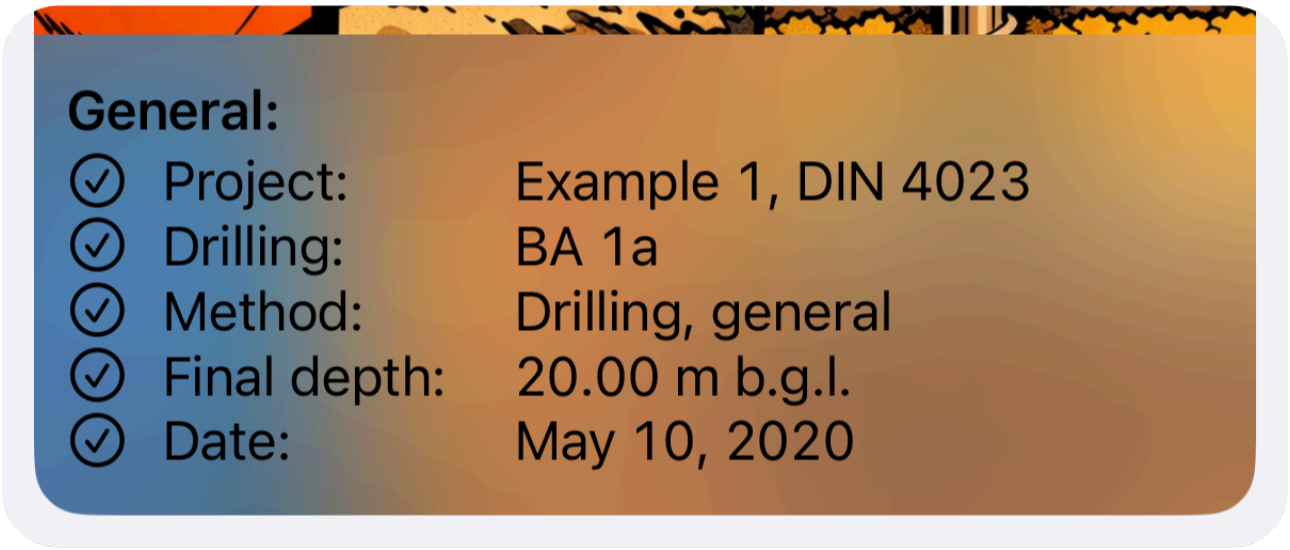


The -button on the respective category tile opens the corresponding input dialogue box.

All fields in the ‘Borehole’ and ‘Surveying’ categories are mandatory; this means that the relevant dialogue box can either only be closed (using the icon in the top left-hand corner) or must be completed in full.

If the fields have been filled in correctly, a small blue tick will appear in front of the value or text. You can now use the navigation bar to move to the next or previous field.

Once all fields have been completed correctly, the relevant dialogue box can be closed using the icon (top right). The data will be saved and displayed in the lower section of the relevant category tile.



The master data is mainly displayed in the header of the drawing 1 but also in the title block 9.

'Borehole' master data

This is where you enter the general details of the borehole or the geological survey. All information about the borehole is mandatory. Information about the company or owner is entered in the settings.

Project: Enter the project name here. The name must consist of at least 3 characters and must begin with a capital letter.

Project no.: The project number (identification number acc. ISO 7200) must consist of at least 3 characters and may contain letters, numbers and the minus sign.

Drill number: The drill number can be set to any value between 1 and 9999. In addition, the suffix ‘a’, ‘b’ or ‘c’ can be entered using the bar displayed above the keypad.

The suffixes must be selected when multiple drilling attempts are required for a single hole.

Method: The drilling method can be selected from the menu (⇕). The abbreviation for the drilling method is placed before the borehole number and represents the borehole designation.

For the drilling methods ‘rotary core drilling’, ‘cable core drilling’ and ‘flush drilling’, the drilling profile is shown with the core-drilled section in accordance with DIN 4023.

Final depth: The final depth must be entered manually, independently of the strata log.

Date: Select the date of the drilling here using the calendar.

‘Surveying’ master data

This is where you enter the details of the location and elevation of the borehole or outcrop.

The location and elevation fields are mandatory. If a project is saved without this data, the ETRS89 / UTM32 N coordinate system and the DHHN2016 height system will be selected automatically upon saving.

Position measurement:

The position reference system is selected via the position measurement menu (⇕).

The easting and northing values are entered in the following two lines. The numerical values have been restricted to ensure that Germany, in particular, is fully covered.

UTM coordinates are specified without leading zone codes in the easting (6 digits). The corresponding EPSG keys are currently 25832, 25833, 32632 and 32633, and can easily be expanded if required (drop an email).

Elevation measurement:

The elevation reference system is selected via the elevation measurement menu (⇕).

The unit for the elevation is automatically added according to the selected elevation reference system. The numerical value for the elevation can be entered between 0 (sea level) and 2962 (elevation of the Zugspitze).

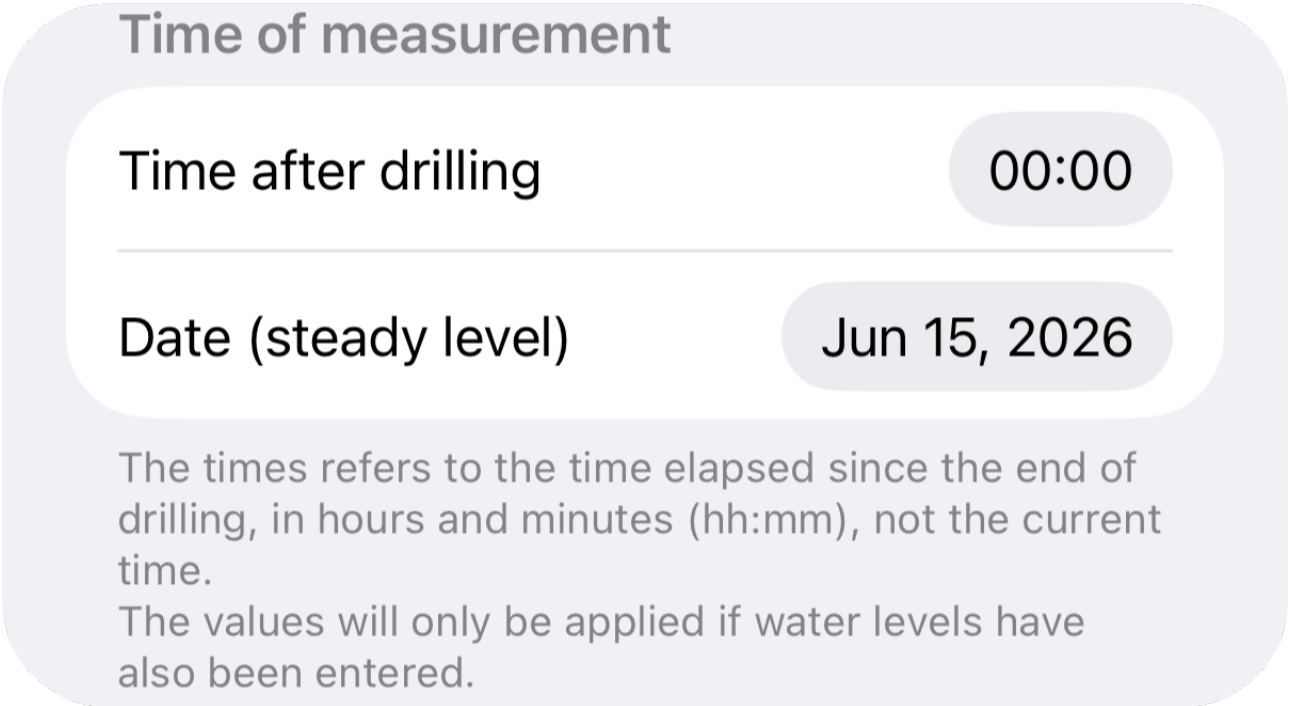
‘Groundwater’ master data

Information on the groundwater level can be entered here. The information are divided into:

- Groundwater surface encountered during drilling
- Groundwater level after completion of drilling
- Steady-state water level

If groundwater has been encountered, one or more of the above details may be entered.

For the groundwater level after drilling was completed or the steady-state water level, the measurement times can also be entered. The time after drilling was completed is specified as a time between 0 and 24 hours; for the steady-state water level, the date is entered.



File menu

Using the file menu (🗀 icon) at the top right of the screen, you can prepare, load, save and share projects, as well as view two illustrative examples.

Projects are saved in JSON format. The project file contains all master and strata data.

The project file does not include the owner, creator or approval person (see title block). These must be specified in the 'Settings' tab and are stored there independently of the project.

New

Selecting the 🗋 menu option deletes all information relating to master and strata data currently stored in memory (RAM).

Load

Selecting the 📥 menu option opens the file selection dialogue, allowing you to load a saved project. A dialogue box will inform you whether the project has been loaded successfully or not.

If any data has been entered beforehand, it will be replaced by the loaded data.

Save

You can save projects using the menu option. This opens the file selection dialogue, where you can choose a storage location. We recommend using a local storage location directly on your mobile phone so that you are not dependent on an internet connection (e.g. when out in the field). You can also use the iOS 'Files' app to copy the project file to a cloud service (e.g. iCloud) at a later date.

By default, the file name is set to 'boreLOG'. Please assign your own meaningful file name before saving. A dialogue box will inform you whether the project has been saved successfully or not.

Share

You can share a project file in various ways (AirDrop, Messages, email, save to files, etc.) via the menu option.

Project files are usually smaller than 5 kB.

Example files

By selecting the menu item , two internal example projects (examples 1 and 2 of DIN 4023) can be loaded. The examples serve to clearly demonstrate the input and output of **boreLOG**.

Strata log

Stratigraphic table

If no project has been loaded, the stratigraphic table is initially empty and the output button cannot be selected.

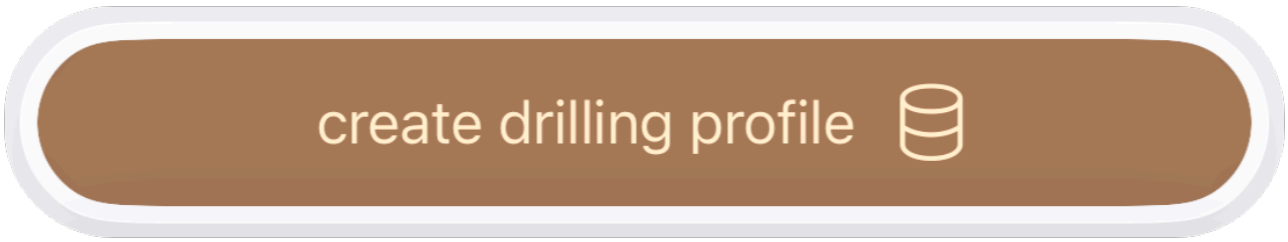
A new soil layer is created using the ⊕ button in the top right-hand corner. This opens a new input window in which the layer details can be entered (see the section below entitled ‘Input’).

Once entered, the layer details appear in the table.

№	Layer description	↓ [m]
①	TOPSOIL SAND, with organic material	0.50

This step is repeated for all soil layers until all layers have been entered.

Once the stratigraphic table has been completed, the output button becomes available and the drilling profile can be generated (see the ‘Output’ section).



Input

Layer data is entered via 13 input fields:

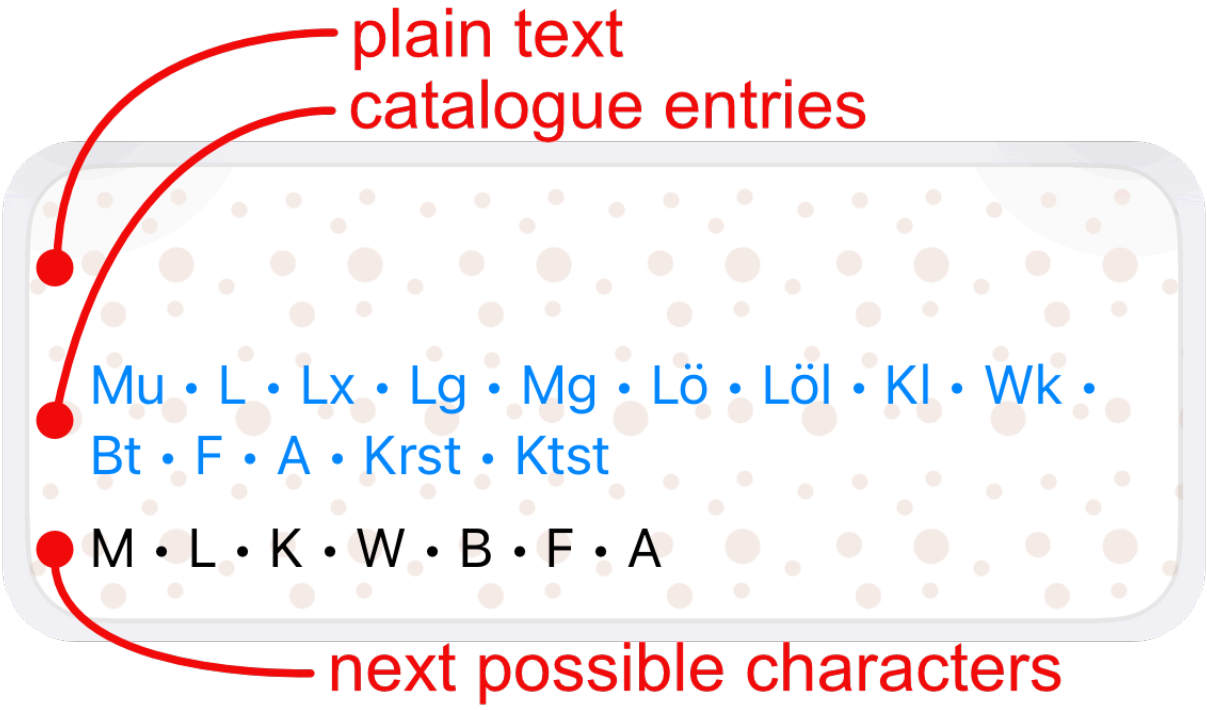
1. to depth below ground level
2. Geological designation
3. Rock type ⚒
4. Main soil type
5. Secondary soil type
6. Admixture
7. Colour
8. Lime content
9. Relative density
10. Consistency
11. Soil moisture
12. Weathering/fissured surface ⚒
13. Soil group

Field 1 (depth) is a mandatory field and must be completed.

Fields 3 and 12 apply to rock and are marked with the symbol '⚒'. If 'rock' is selected, entries for soil and soil-related information are ignored.

Each input field has a ⓘ symbol on the right-hand side, which can be clicked to display an explanatory help text for that field.

The information window is located above the input fields.



The information window is divided into three sections. The top section displays the translated plain text (black or red), the middle section shows the catalogue abbreviations (blue) and the bottom section displays the next possible characters.

In the previous three figures (example: 'Geological designation'), the first step shows the complete catalogue, i.e. the plain text section is empty.

An '**M**' has now been entered. This reduces the catalogue entries by eliminating all items that do not begin with an 'M'. Two items remain – 'Mu' and 'Mg' – but these do not allow for a unique match. A '?' is therefore displayed in the plain text. The red colour indicates that no match has yet been found. The next possible characters are 'u' and 'g'.

Finally, a '**u**' was entered, resulting in a unique match; that is, the plain text area is displayed in black. The catalogue now contains only this one element and there are no further possible characters.

Note:

The keyboard is modified with every keystroke, so that only the next possible characters can be entered. This prevents incorrect entries.

In the example above, after typing 'M', only 'u' or 'g' can be entered; all other keys are disabled.

Please pay attention to upper and lower case, as the keyboard switches to 'uppercase' mode when you move to a new field!

An auto-complete feature is also integrated to ensure efficient operation. If there is only one item left in the catalogue but several characters still need to be entered before a 'match' (black plain text) is found, the auto-complete feature is triggered automatically.

In the 'Geological designation' catalogue above, for example, for 'varved Clay' you only need to enter 'B' instead of 'Bt', or for 'Chalkstone' only 'Kr' instead of 'Krst'.

Input fields 2 to 13 each have their own catalogue. Depending on the input field, additional elements (e.g. transitions, quantifiers or separators) may also be possible. If such additions are permitted during input, they are taken into account for the next possible characters.

Transition symbols can be used to link two elements with 'to' (-) or 'and' (/). For example, the abbreviation for the main soil type 'S/G' stands for 'sand and gravel'.

Quantifiers can be used to specify proportions ranging from 'very little' (1) to 'very much' (5). There is no neutral quantifier (3), as this represents 'normal' behaviour. The plain text for the quantifiers may vary depending on the catalogue. For example, the abbreviation for the secondary soil type 't2' stands for 'slightly clayey'.

Separators (,) separate multiple elements from one another to form independent units. For example, the abbreviation for the secondary soil type 's,u' stands for 'sandy, silty'.

Further information can be accessed via the ⓘ symbol in the relevant input field.

The only mandatory field when entering data is ‘depth’. If anything is entered in any of the other fields, the entry for that field must be correct. This is indicated both by black plain text and by selectable navigation buttons above the keyboard.

Provided all entries are correct, the ‘apply’ button ✓ becomes selectable in the top right-hand corner. Once the soil layer data has been applied, the input window closes and the layer data appears in the stratigraphic table.

Depending on whether ‘Long form’ has been selected in the settings, the layer description appears in either short or long form.

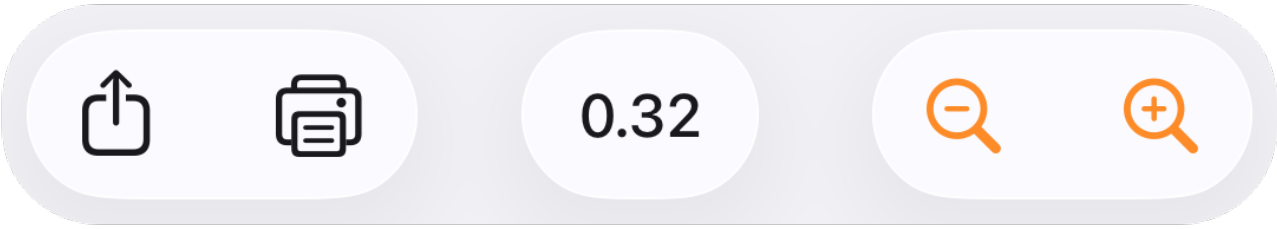
№	Layer description	↓ [m]
①	Mu (S, o)	0.50

You can now enter a new layer or edit the selected soil layer by clicking on a row.

Once you have entered some or all of the layer data, you can generate the drilling profile by clicking the output button. This will open a new output window.

Output

The output window displays the A4-sized drawing in the centre, with the output menu at the top and the toolbar shown below at the bottom.



The output tools are located on the left-hand side of the toolbar. The icon allows you to share the drawing, saved as a PDF, in various ways (AirDrop, Messages, email, save to files, etc.). The icon allows you to print the file.

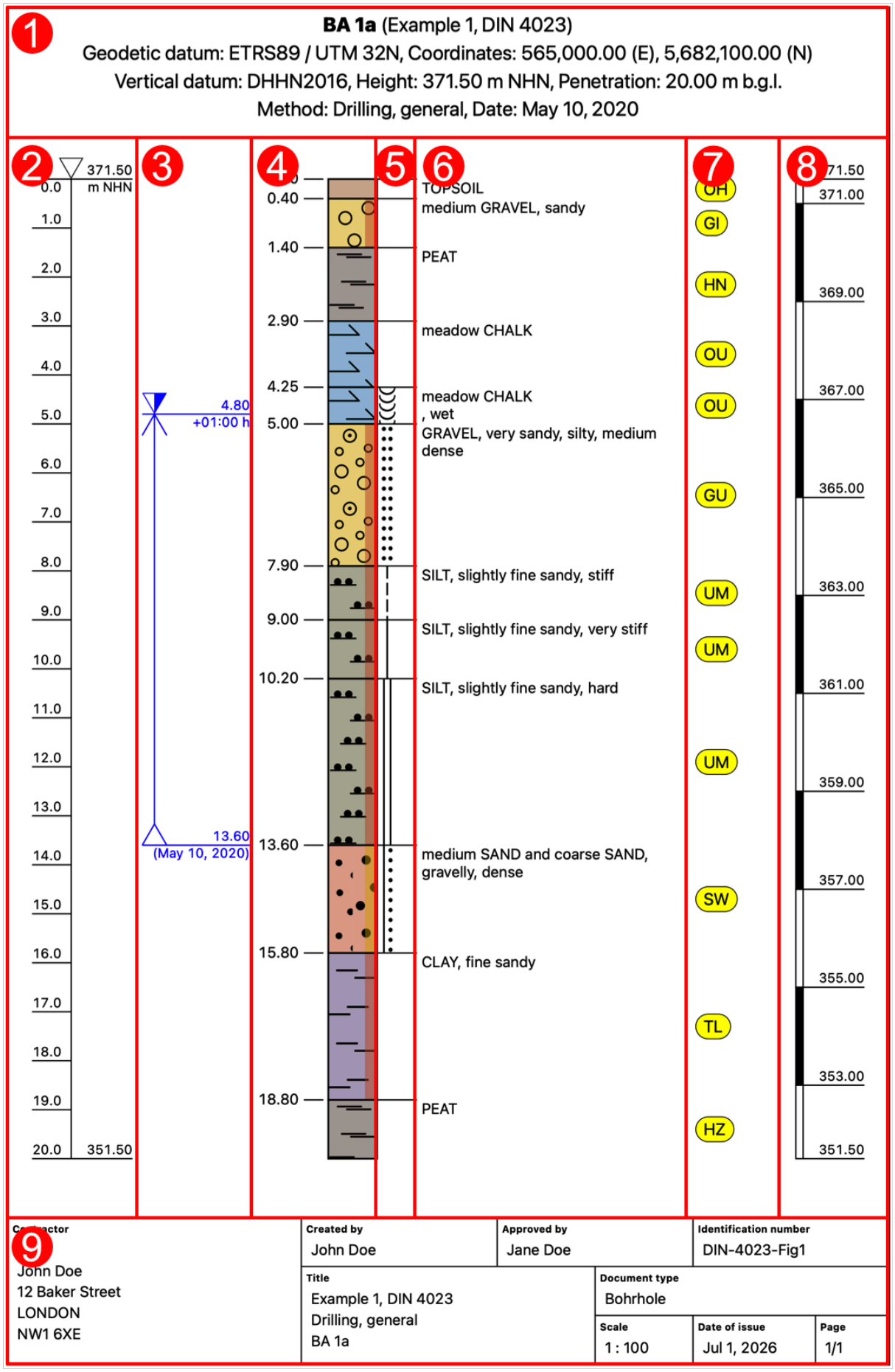
The current zoom level is displayed in the centre. On the right-hand side, the icon allows you to zoom into the drawing in three stages up to a zoom level of 1.0 (100%). The icon zooms out of the drawing once, so that it is fully visible.

Via the export menu, the drawing can be saved (exported) as a PDF or PNG. This opens the file selection dialogue, where you can choose a storage location.

Furthermore, the drawing scale can be adjusted via the export menu. The export menu also contains the export tools.

Tapping and holding directly on the drawing also opens the scale menu.

Drawing


1
BA 1a (Example 1, DIN 4023)
Geodetic datum: ETRS89 / UTM 32N, Coordinates: 565,000.00 (E), 5,682,100.00 (N)
Vertical datum: DHHN2016, Height: 371.50 m NHN, Penetration: 20.00 m b.g.l.
Method: Drilling, general, Date: May 10, 2020
2
371.50
m NHN
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0
11.0
12.0
13.0
14.0
15.0
16.0
17.0
18.0
19.0
20.0
351.50
3
4.80
+01:00 h
13.60
(May 10, 2020)
4
0.40
1.40
2.90
4.25
5.00
7.90
9.00
10.20
13.60
15.80
18.80
5
6
TOPSOIL
medium GRAVEL, sandy
PEAT
meadow CHALK
meadow CHALK
, wet
GRAVEL, very sandy, silty, medium dense
SILT, slightly fine sandy, stiff
SILT, slightly fine sandy, very stiff
SILT, slightly fine sandy, hard
medium SAND and coarse SAND, gravelly, dense
CLAY, fine sandy
PEAT
7
OH
GI
HN
OU
OU
GU
UM
UM
UM
SW
TL
HZ
8
371.50
369.00
367.00
365.00
363.00
361.00
359.00
357.00
355.00
353.00
351.50
9
John Doe
12 Baker Street
LONDON
NW1 6XE
Created by
John Doe
Approved by
Jane Doe
Identification number
DIN-4023-Fig1
Title
Example 1, DIN 4023
Drilling, general
BA 1a
Document type
Bohrhole
Scale
1 : 100
Date of issue
Jul 1, 2026
Page
1/1

The drawing area is divided into the following 9 sections:

1. Drawing header
2. Left-hand, local scale
3. Groundwater section
4. Drilling profile
5. Section for symbols
6. Stratigraphic description
7. Soil groups
8. Right-hand, global scale
9. Title block

The drawing header 1 contains all the master data for the ‘Borehole’ and ‘Surveying’; only the reference number (‘Borehole’ master data) is listed in the title block 9. The master data for ‘Groundwater’ is displayed graphically in the groundwater section 3.

The entries for the stratigraphic record can be found in sections 4 to 7.

The left-hand scale 2 is based on the elevation of the last stratum, whilst the right-hand scale 8 also uses the elevation reference from the ‘Surveying’ master data.

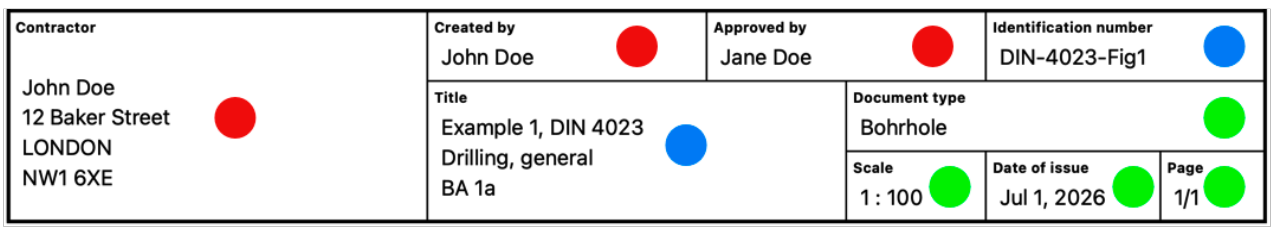
The drawing is created at a resolution of 150 DPI and can be exported as both a PDF and a PNG, as well as shared (AirDrop, email, etc.) and printed.

Title block

The title block complies with DIN EN ISO 7200 and contains all its mandatory fields, as well as an automatically filled-in scale field.

Field name acc. ISO 7200	Input into boreLOG ...
Legal owner	Settings
Identification number	Master data
Date of issue	automatic
Segment/sheet number	automatic
Title	Master data
Approval person	Settings
Creator	Settings
Document type	automatic

The variable issue date is the current date on which the drawing was created. The fixed date of the borehole is displayed outside the title block, above the drilling profile, in the drawing header.



Soil catalogue

The soil catalogue contains the abbreviations, symbols and colours specified in Tables 1 to 3 of DIN 4023 for pure soil types in accordance with DIN EN ISO 14688-1, for rock types in accordance with DIN EN ISO 14689, and for common geological designations of soil and rock.

The search field allows you to search the soil catalogue in real time and filter out irrelevant items.

You can search the soil catalogue by name or abbreviation. Select the icon to do so. In search mode, this icon appears directly in the search field; otherwise, it is located at the top right of the screen.

Using the filter bar, elements can be filtered according to their classification by soil type, rock type or geological designation.

Tapping on an element opens a detailed card showing the corresponding DIN colour code.

Settings

General information

Version

The current version number of **boreLOG** is displayed here. This should normally match the version number of the manual.

Report errors

You can use this feature to report errors or submit suggestions by email. The device's built-in email client is used. An active internet connection is required to send the email.

Legal notice

You can read the legal notice here.

Documents

User manual

The current **boreLOG** user manual is displayed here.

It can also be printed or exported via the icon in the top right-hand corner and the print dialogue that appears.

Example

Here, a practical example and how to enter it into the APP are explained step by step.

This can also be printed or exported using the icon in the top right-hand corner and the print dialogue that appears.

Labelling of soil layers

Long form

The switch (symbol) can be used to switch between the long and short forms of profile labelling in the stratigraphic table and drilling profile; in other words, to choose whether, for example, '**fS**' or '**fine Sand**' is displayed.

Compact format

The compact format is only taken into account if the short form (long form disabled) is activated. The compact format displays only the soil type, but not its properties, in text form.

For example, loose dense fine sand is displayed as **fS**. If the compact format is disabled, **fS**, **lc** is displayed.

Regardless of the setting, the symbols (e.g. for loose dense) are displayed next to the drilling profile.

Filling of the drilling profile

Colour

If this option is selected (✓ symbol), the profile is filled exclusively with the colour code specified in DIN 4023 (Figure 1a).

Symbols

If this entry is selected, the profile is filled exclusively with the DIN 4023 signature (Figure 1b). The soil group symbol is then also displayed in black and white.

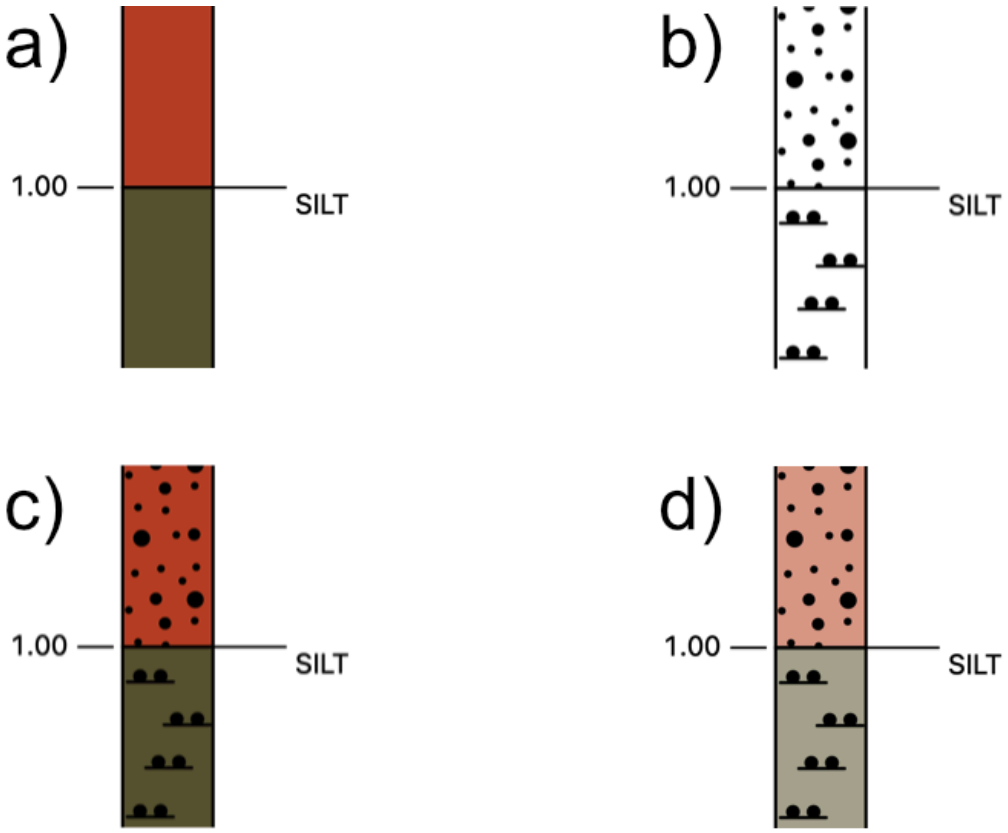


Figure 1: Filling styles for the drilling profile

Colour and symbols

If this entry is selected, the profile is filled with both the colour code and the signature from DIN 4023 (Figure 1c).

The ‘Colour transparency’ button (symbol) sets the colour transparency to 50% to ensure better visibility of the signature (Figure 1 d).

If ‘Colour and symbols’ has been selected, the ‘Colour transparency’ option is recommended.

Drawing options

Separate symbols

If this switch is selected, the symbols are displayed separately in the left and right halves of the profile if there are two main soil types present at the same time and symbol display is switched on (Figure 2, left).

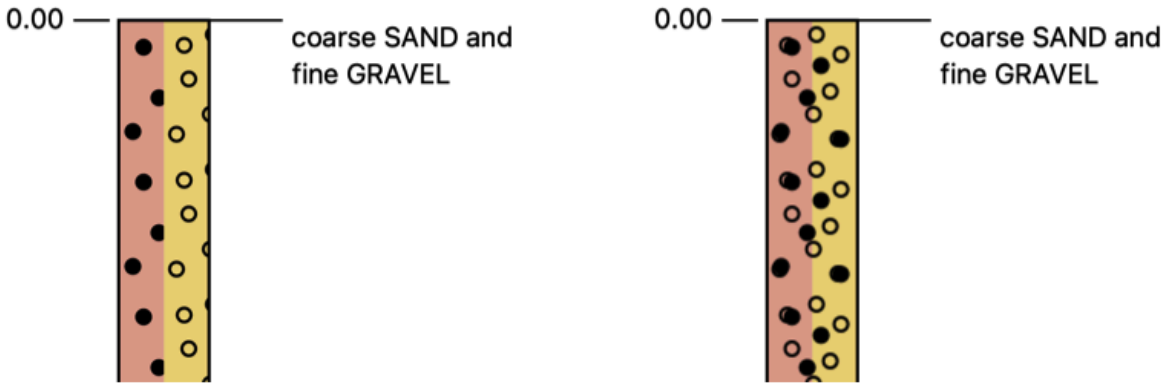


Figure 2: Separate or superimposed symbols

If this option is not selected, the symbols are superimposed across the width of the profile (Figure 2, right).

The separate display is recommended.

Regardless of whether the symbols are separated, the colours are always displayed separately.

Show secondary soil type

If this switch is selected, the first secondary soil type in the right-hand third of the drilling profile is displayed as an overlay colour (Figure 3, right).

The transparency is adjusted in accordance with the 'Colour transparency' setting.

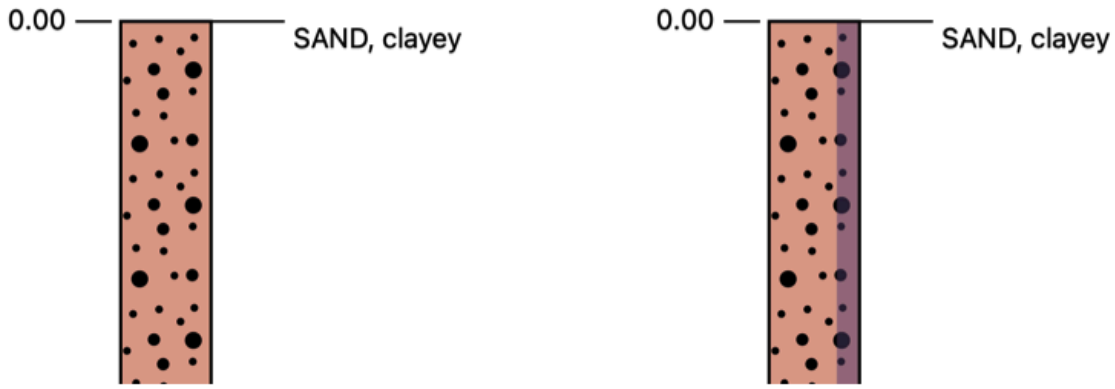


Figure 3: Display of the first secondary soil type

Note:

If, in the case of sand containing organic admixtures, the organic admixture is to be visually identifiable by its colour, it is advisable to enter the admixture as a secondary soil type, i.e. sand, organic.

Title block

Creator

The creator (a) of the drilling profile is entered here.

Approval person

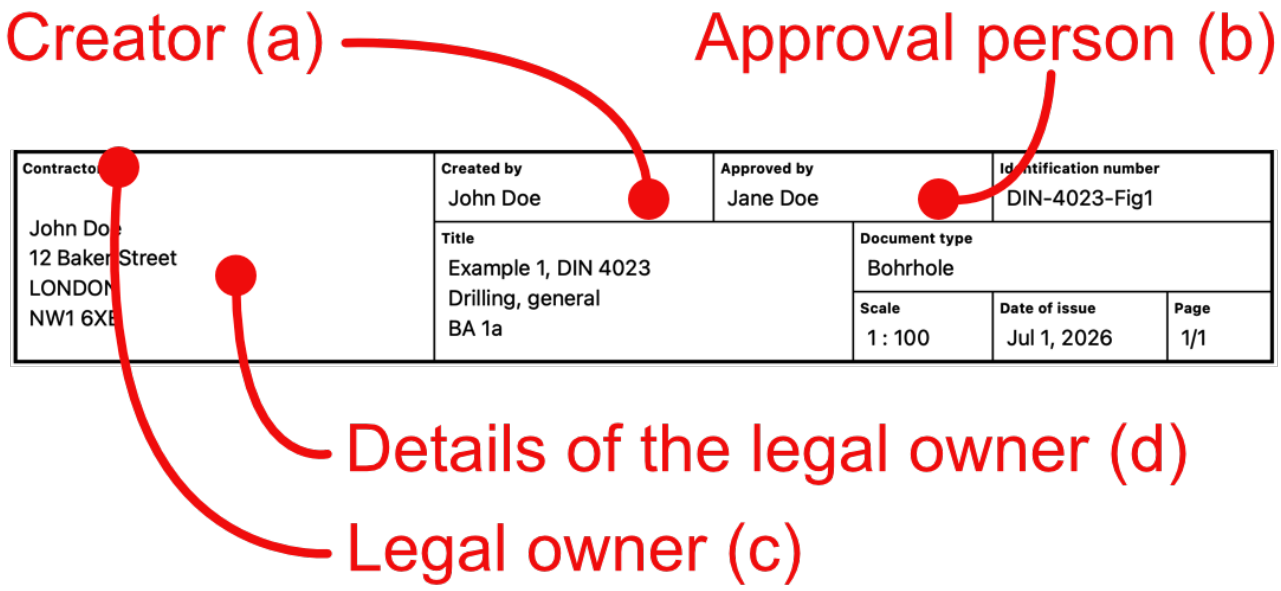
The person who approved (b) the drawing is entered here.

Legal owner

The owner (c) can be selected here via a menu. The available options are ‘Company’, ‘Contractor’, ‚Building contractor’ and ‘Owner’.

Information about the owner

This is where the details of the owner (d) – generally the address – are entered.



Options

Check navigation buttons

When entering master data, navigation buttons are displayed above the keyboard, allowing you to move to the next or previous field. This is particularly advantageous when filling in numeric fields, as the numeric iOS keyboard does not have a 'Next' button.

If the 'Check navigation buttons' switch is activated, the entries in the text fields are checked immediately and the shortcut keys are either enabled or disabled.

Regardless of the navigation keys, it is always possible to tap a field.

Case Sensitivity

This switch enables or disables case sensitivity checking in the soil catalogue.

For example, if 'mG' is entered into the search field set to abbreviations, 'Medium gravel (mG)' is displayed when the switch is in the active position, whilst 'Glacial till (Mg)' is also displayed when the switch is in the inactive position.

Show popovers

If this switch is activated, the detailed information (tapping 👆 on an element) are displayed in the soil catalogue in a speech bubble style directly next to the selected element; otherwise, they appear at the bottom of the screen.

Scheme

Here, you can select various schemes for the master data background images.

System Requirements

General

The **boreLOG** APP was developed for the iPhone and iPad and supports operating system versions starting with iOS 18 and iPadOS 18 and later.

In addition, the APPp also runs on Mac computers with M-series chips. However, this is not a standalone Mac version, but rather a “Designed for iPad” emulation. An operating system version of macOS 26 or later is recommended for this.

Special Notes

If the iPad is held in landscape orientation, the keyboard may cover the input fields for strata data. In such cases, set the keyboard to “floating” by pinching the keyboard with two fingers from the edges. Alternatively, enter the strata data in portrait orientation.

In the Mac version, the “Share” function calls the Shortcuts app rather than the operating system’s built-in function. This is due to the emulation and cannot be changed at this time. Save the file and then share it as usual via Finder.

The navigation keys on the virtual keyboard are hidden in the Mac version. Additionally, the File menu can also be accessed via the Mac menu bar.

Concluding remarks

On a personal note

The **boreLOG** APP is a leisure project and took over a year to develop before its first release. For example, all signatures and fill symbols were created by hand – or rather, using a mouse – as vector graphics; numerous DIN standards were studied; Apple programming documentation was pored over; and various programming approaches were explored. The APP's source code is, of course, free from any artificial intelligence.

However, the greatest difficulty in porting such a software to a mobile phone lay in finding a workable compromise between comprehensiveness/functional scope and ease of use. I hope this has been achieved and that you, the user, find the APP intuitive to use.

Disclaimer

The APP was programmed and tested with great care by a civil engineer for civil engineers and those with an interest in geotechnical engineering. However, it cannot be guaranteed that it is completely free of errors.

Users should have sufficient knowledge of the subject and of geotechnical engineering in general.