

## BGS Civils – Mapping the earth you move

The British Geological Survey (BGS) has recently released a new suite of engineering geology maps called BGS Civils. The maps provide information on the engineering characteristics of the ground primarily to a depth of 2 m. These new products are designed to assist in the preparation of tenders, early project planning and desk studies. In particular, the products are relevant to the utility industry in terms of route planning and perhaps for installation and network management.

### New national maps

The BGS Civils suite includes seven national GIS maps at 1:50 000 scale, each addressing a key issue faced when planning ground engineering projects:

- The **Strength map** indicates the engineering strength of rocks and fine soils, and densities of coarse soils in accordance with BS5930:2015. The dataset provides minimum, maximum and typical estimates of strength.
- The **Discontinuities map**, describes features (bedding, layers, foliation) in the rock that could lead to a reduction in strength and provides information about how the ground may break up, for example, whether it is fractured, bedded or massive.
- The **Excavability map** indicates the type of tool (hand, ripping or blasting tools) needed to dig to 2 m depth. The type of excavation method appropriate largely depends on material strength and mass characteristics (spacing of discontinuities and block size).
- The **Bulking map** describes the likely range of increase in volume of the material following excavation from its in situ location. Bulking factor is influenced by the lithology and strength.
- The **Use as Engineering Fill map** indicates whether excavated material is suitable to be re-used as engineered fill based on the Manual of Contract Documents for Highways Works: volume 1 (series 600).
- The **Corrosivity map** indicates where ground conditions may be aggressive to iron infrastructure. The potential for corrosivity is assessed in consideration of the water content, redox potential, pH, sulfate/sulphide content and the electrical resistivity of the material.
- The **Sulfate-sulfide maps** provide information about potential aggressive ground conditions associated with geological units that contain sulfate and sulfide minerals. Sulfate ions react with some types of cement and concrete structures causing weakening. This product indicates whether aggressive sulfate species or acid ground conditions are likely to form in the near surface.

BGS Civils is based on DiGMapGB-50, the digital 1:50 000 scale geological map of Great Britain. DiGMapGB-50 contains descriptive information about the lithological type and variability of each geological unit. This information, coupled with geotechnical data (BGS National Geotechnical Properties Database), information from the literature and expert knowledge, was used to re-attribute DiGMapGB-50 with descriptions relating to the above themes.

### What is BGS Civils for?

The nature of utility installations both within and between conurbations is such that their routes may pass through many different types of geological units and lithologies. The changes in geology along the route will influence many factors relating to utility installation, for example, the trenching

methods used, the volume and suitability of material excavated from the trench for backfill and the potential for corrosion of the installed assets. BGS Civils provides a rapid, accessible national product providing essential information on these engineering characteristics of the ground. They will be of great value to a range of utility specialists.

*Pipeline route planning:* When planning a pipeline route, BGS Civils along with other BGS products, such as Geosure (geological hazards), allows consideration of many of the geological factors that might affect construction and costs of selecting a route. Also, as a planning or desk study tool it may help in route selection, ground investigation planning and, ultimately, reducing project delivery time, costs and energy inputs. For underground ferrous or concrete assets the corrosivity and sulfate/sulfide products might be used to inform maintenance scheduling and replacement. The product will also help determine where trenchless technologies may be suitable.

*Pipe material selection:* As per above, the corrosivity maps will help you install appropriate pipe types given the ground conditions thereby reducing the potential for later failure. In addition, the maps may help you reduce leakage in established networks by indicating where iron or concrete assets may deteriorate due to corrosion.

*Utility installation cost estimation:* Estimating the cost of utility installation is important for both the utility company and also for contractors. BGS Civils allows trenching progress and also the volume of excavated material to be estimated more accurately and, thus, the planning and costs of re-use onsite, offsite or to waste can be calculated with greater certainty, potentially reducing the cost over-runs.

*Preparing for works:* For operations teams, the products will inform the desk study and will provide geological insight before going to site. This increases efficiency of operations as the correct equipment and infrastructure materials are used on site improving planning of construction.

## **Availability**

BGS Civils is currently supplied by the British Geological Survey as GIS shapefiles and, on request, through a secure web viewer. Contact [digitaldata@bgs.ac.uk](mailto:digitaldata@bgs.ac.uk) for further information or see the BGS website (<https://www.bgs.ac.uk/products/home.html>) where you can download user guides and sample data, and find out more about pricing.

## **An opportunity for you?**

The British Geological Survey would like these products to be used in other applications and tools. We invite developers to innovate with our products and produce commercial applications for industry. For example, could you develop an app that would deliver data to excavator drivers or could you incorporate BGS Civils into software/apps that focus on planning or quote estimation? If this is of interest to you, please get in touch ([enquiries@bgs.ac.uk](mailto:enquiries@bgs.ac.uk)).