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Geological Survey**

NATURAL ENVIRONMENT RESEARCH COUNCIL

BGS•SIGMA 2015

External User Guide for BGS•SIGMA Mobile and Desktop Toolbars

Spatial Geoscience and Technologies Programme

Open Report OR/15/029


System for integrated Geoscience Mapping

BRITISH GEOLOGICAL SURVEY

SPATIAL GEOSCIENCE TECHNOLOGIES PROGRAMME

OPEN REPORT OR/15/029

BGS•SIGMA 2015

External User Guide for BGS•SIGMA Mobile and Desktop Toolbars

J Bow

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BRITISH GEOLOGICAL SURVEY

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Foreword

The British Geological Survey began developing digital field mapping systems in 1989. However, it was apparent that the commercially available hardware was not suitable at that time. In 2001, we revisited the topic under the System for Integrated Geoscience Mapping (SIGMA) programme. By 2003, BGS had developed a PDA (personal digital assistant) field system, which was superseded in 2005, when we began deploying a beta system on rugged Tablet PCs. The Tablet PC system, which we called BGS•SIGMA*mobile* was used by BGS in mapping projects across the UK as well as overseas. It first became available in Open Source form, in June 2009 via the BGS website, www.bgs.ac.uk, under an agreement which stipulates that updates and modifications must be supplied to BGS in order to stimulate further developments. In 2011/2012, BGS•SIGMA*mobile* was rewritten in .NET and combined with our office based mapping software BGS•SIGMA*desktop* within ArcGIS 10.x to create BGS•SIGMA 2012. BGS•SIGMA has been updated again to take all of the forms out of Access and are now accessed directly from ArcMap in the latest BGS•SIGMA 2015.

It is envisaged that future releases will be made available from the BGS website incorporating new modules, modifications and upgrades supplied by BGS and external users of the system.

This document has been written to guide users through the installation and use of BGS•SIGMA 2015 (*mobile and desktop*), which is the fourth free release.

We are happy to receive feedback and modifications emailed to sigma@bgs.ac.uk.

Acknowledgements

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Thank-you to K. Adlam, P. Turner and H. Gow for contributions to writing this manual.

Thank you also for the continued support from our Survey Geologists and 'Field Testers'; most influentially: K. Goodenough, L. Hughes, M. Krabbendam, G Leslie, and R. Thomas.

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Introduction

This report serves as an installation and introductory user guide to BGS•SIGMA 2015 which is an application for digital geoscience field data collection and office based mapping. It was developed within the British Geological Survey's SIGMA (System for Integrated Geoscience Mapping) programme within the Earth & Planetary Observation & Mapping Team. SIGMA now sits within the Systems Development Team. This document provides installation instructions, followed by a brief guide to using the application. In BGS we provide our field staff with a two-day training course, and while this guide does not replace that, it is hoped that these instructions will provide a basis for successful use of BGS•SIGMA 2015 in your organisation.

BGS•SIGMA 2015 is designed to run in the field on rugged Tablet PCs and in the office on desktop PCs. The system is a heavily customised ArcGIS 10.x and MS Access application. The user must have, at minimum, a licensed copy of ESRI ArcGIS ArcEditor and MS Access 2007, BGS does not supply these. The system is fully tested on the Windows 7 operating system.

The BGS currently use their *mobile* application on the Panasonic CF-19 Toughbook, Panasonic Toughpad F2-G1 and the GETAC V100 Tablet PCs. This guide does not provide instructions to its use on specific hardware platforms.

BGS staff have used the system for mapping in locations including the UK, Ghana, Madagascar, Tajikistan, the Antarctic and the U.S.A. We use it as part of a workflow of other customised BGS-developed systems that enables us to:

1. automatically collate spatial information from our databases,
2. interpret new data from satellite imagery and digital photogrammetry,
3. take our baseline and interpreted data to the field,
4. populate corporate databases with our field data,
5. build 3D digital models and visualisations,
6. output our data in formats such as maps.

Further information on these steps is available from the BGS website at http://www.bgs.ac.uk/research/technologies_epo.html.

1 Getting Started with BGS•SIGMA 2015

1.1 SOFTWARE REQUIRED FOR BGS•SIGMA 2015:

- ArcGIS 10.1, 10.3 – for creating and using a GIS project (*.mxd)
- Access 2007, 2010, or 2013 – for creating and using a database (DFDC.mdb)

1.2 HARDWARE

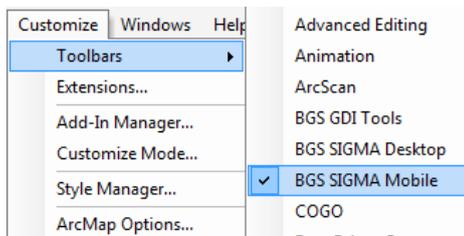
- SIGMA 2015 can be set-up on any PC or Tablet with appropriate hardware/software
- BGS is currently using the following ruggedized tablets:
 - Panasonic Toughpad FZ-G1
 - Panasonic CF-19 Toughbooks
 - GETAC V100

1.3 SET-UP ON YOUR MACHINE OR TABLET:

- Uninstall all previous versions and components of BGS•SIGMA *mobile* and *desktop*, if you have 2012 installed it will be: BGS SIGMA 2012 – v1.0x and the BGS Précis Tool. If you have a prior version then please also uninstall these tools as well: Bearing Tool, BGS GPS Tool, BGS Object Class Extension, BGS Sketch Tool, Capture By Symbol, and the Structure Contour Tool
 - Do this by going to Start – Control Panel – Programs – Uninstall a Program – Select the Program and press the Uninstall Button
- Set Access Macro Security Settings to Low
 - Open Access 2007 - Office Button – Access Options – Trust Centre – Trust Centre Settings – Macro Settings - Enable all Macros – ok - ok
- Install BGS•SIGMA 2015 (There will be slightly different install files for different versions of ArcGIS – choose the one that matches your PC or tablet)
 - Go to: S:\SIGMAToolkit\SIGMA_2015_INSTALL\v1.0x
 - Run: Setup.exe
 - Next
 - Select folder: default or a folder of your choosing
 - Next
 - Close
- You will find the required BGS•SIGMA data files on your computer in the folder you specified above in a sub-folder called BGS; for example: C:\Program Files (x86)\BGS\BGS SIGMA 2015 - v1.0x

1.4 ARCMAP 10 – BGS•SIGMA SET-UP

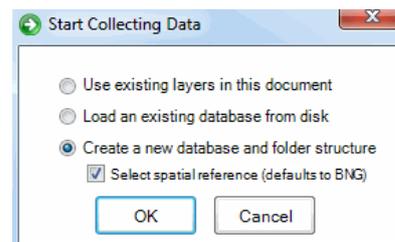
- Open ArcMap 10
- On the main ArcMap toolbar, select: Customize – Toolbars – BGS SIGMA Mobile and/or BGS SIGMA Desktop



- Depending on which part of the process you are using in the BGS•SIGMA workflow the following steps are the same but located on different toolbars
 - For Field Work select Start Collecting from the BGS SIGMA Mobile drop down menu
 - For Office Work select Start Collecting from the BGS SIGMA Desktop drop down menu
 - It should be noted that you can use the tools on either toolbar regardless of where you started collecting from



- From the Start Collecting Data dialog box select one of three options:
 - **Use existing layers in this document**
 - Select this option to continue working on an existing project
 - The database to use is: DFDC.mdb
 - This option is only available if DFDC layers are already loaded within your project
 - **Load an existing database from disk**
 - Select this option to load a DFDC that has been created but whose layers have not yet been added to your Project
 - Navigate to the DFDC you wish to add
 - **Create a new database and folder structure**
 - Select this option to create a new BGS•SIGMA Project and database
 - Navigate to where you wish to store your Project and database and save to your Project folder or 'Make New Folder'
 - It may be useful to create your New Project Folder within Windows first before starting ArcMap
 - Select Spatial Reference: leave unchecked if working in the UK with British National Grid
 - If working outside the UK see [Section 6: Setting up Projects Overseas](#) (page 56)
- **Select Datasets**
 - Select from the list or Select All/Select None – OK
 - Greyed-out options are integral to BGS•SIGMA operations and cannot be unselected



- Please, WAIT ... there may be a small delay while SIGMA loads ...

Point Datasets

- Observations are collected and stored in the DFDC Access Database

Line, Seed, and Polygon Datasets

- Observations are collected and stored within ArcMap
- Line styles creation and display similar to the original SIGMA Desktop (GSD)
- Seed and Polygon creation similar to the original SIGMA Desktop (GSD)
- Marginalia layer for Cartographic purposes

- **User/Project Details Form**

- Start typing your name into the field and your name will appear in a drop down list. Select your name from the list and your BGS ID will be added automatically to the ID field. If your name is not included in the list then type in your full name and ID.
- Enter Map Scale – optional.
 - 1:10000 will automatically appear
- It is advisable to enter your next sample number. If you are adding to a project with previous samples then enter the next valid Sample Number.
- **You must enter your next Locality Number - you will not be able to continue to the next step without it. If you are adding to a project enter the next valid Locality Number.**
 - When continuing on with an existing project both the Sample and Locality numbers will automatically be updated
- Check Field or Desktop or enter Other (ex. Airphoto or Map Sheet Information) as your Data Source
 - For metadata purposes this populates fields in the database tables to show where observations and changes are taking place; i.e. Field or Desktop

- Please, WAIT ... there may be a small delay while SIGMA loads ...

- BGS•SIGMAmobile/desktop is now active and ready for use

1.5 SAVING YOUR BGS•SIGMA PROJECT

Save and name your ArcMap Project to your Project Folder.

1.6 BASELINE DATA

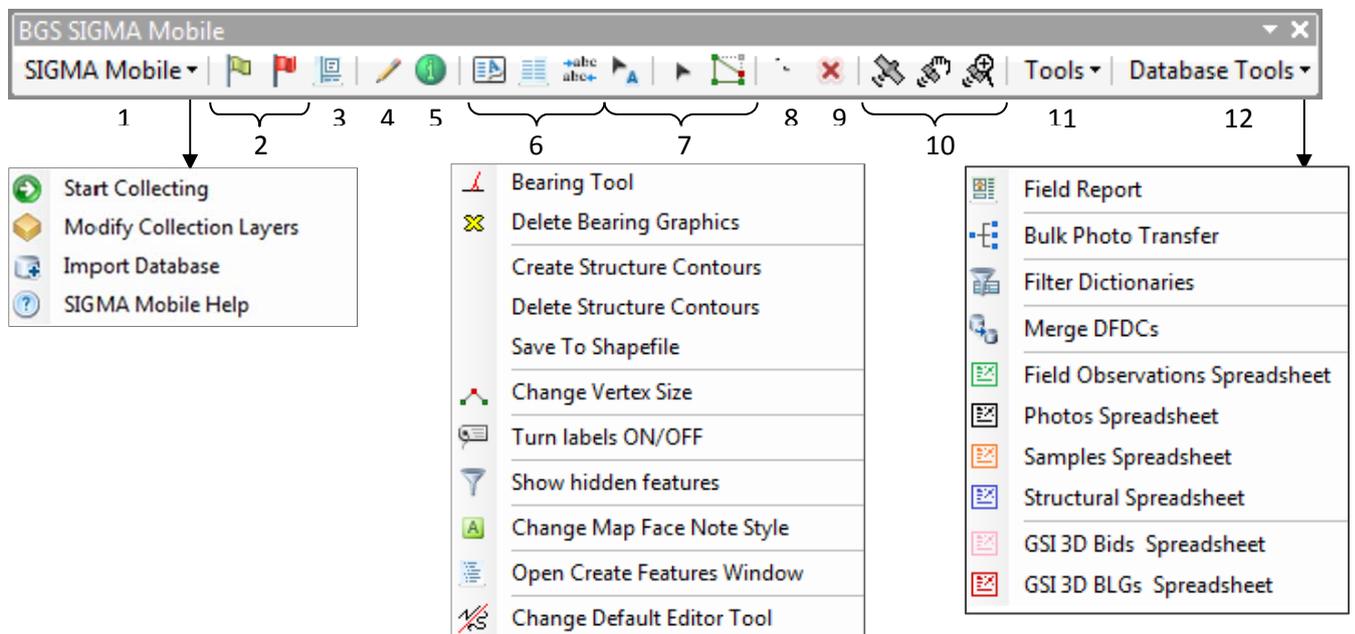
Add all relevant Baseline data that will be required while in the field or office, some examples might include: Topology, Hillshaded Images, Aerial Photography, Contours, Historic Maps and Fieldslips, Boreholes and any other GIS layers that are relevant for your project.

It should be noted that Baseline data should be downloaded to the project folder for transportability in the field but can be linked to your home drives for use in the office.

1.7 DIGITIZING AND EDITING FEATURES

See [Section 2: Digitizing and Editing in SIGMA 2015 \(page 15\)](#).

1.8 THE BGS SIGMA MOBILE TOOLBAR



1. SIGMA Mobile, Data Collection Start-up Menu
 - Start Collecting
 - Modify Collection Layers
 - Import Database
 - SIGMA Help
2. Add and Edit Field Observation Points
3. Show Switchboard
4. Ink Graphics
5. Précis Tool
6. Add, Edit, and Copy Map Face Notes
7. Edit Annotations, Edit Tool and Edit Vertices Tool
8. Label Geofeatures

9. Delete SIGMA Mobile Features

10. BGS GPS Tools

11. Tools Menu

- Bearing Tools
- Structure Contour Tools
- Change Vertex Size
- Turn Labels ON/OFF
- Show hidden features
- Change Map Face Note Style
- Open Create Feature Window
- Change Default Editor Tool

12. Database Tools Menu

- Field Report
- Bulk Photo Transfer
- Filter Dictionaries
- Merge DFDCs
- Field Observation Spreadsheets
- GSI 3D Spreadsheets

See [Section 3](#): *BGS•SIGMAmobile* (page 14).

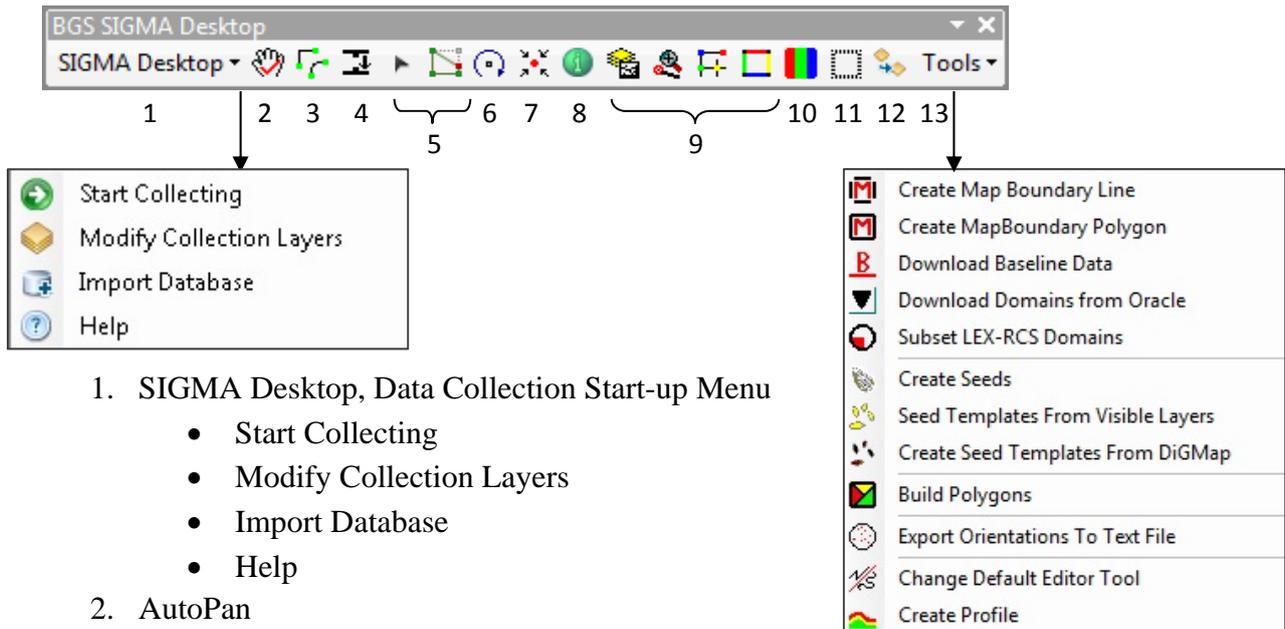
1.9 THE SWITCHBOARD

The SWITCHBOARD interface is displayed in a window with a title bar containing the application name and a close button. The main content area is organized into several sections:

- Locality No:** A dropdown menu showing 'JBOW_100' with a timestamp '(21/04/2015 15:07:27)' and a downward arrow.
- Easting:** A text field containing '200687.0992'.
- Northing:** A text field containing '852934.2052'.
- PAN:** A button located to the right of the Northing field.
- Locality Information:** A section containing:
 - Locality Description:** A large, empty text area with a vertical scrollbar on the right.
 - Summary Label:** A smaller, empty text field.
 - PRECIS:** A button with a green information icon.
 - SAVE:** A button.
- Quick Observations:** A section containing:
 - REPEAT LAST COMMENT:** A button.
 - SHAFT:** A button with a crosshair icon.
 - ADIT:** A button with an upward-pointing arrow icon.
 - SINK:** A button with a red gear icon.
 - EXPOS:** A button with a pencil icon.
- ADD DATA:** A section containing a grid of buttons for data entry:
 - PHOTO
 - SKETCH
 - SAMPLE
 - COMMENT
 - LANDSLIDES
 - LOG / SECTION
 - MANMADE LANDFORMS
 - STRUCTURAL MEASUREMENT
 - SUPERFICIAL LANDFORM
 - BUILDING STONES

See [Section 4](#): The Switchboard, for a detailed look at how to use the Field Observation forms and functions (page 29).

1.10 THE BGS SIGMA DESKTOP TOOLBAR



1. SIGMA Desktop, Data Collection Start-up Menu

- Start Collecting
- Modify Collection Layers
- Import Database
- Help

2. AutoPan

3. BGS Smooth Tool

4. Flip Line Tool

5. Edit Tool and Edit Vertices Tools

6. Rotate Marker Tool

7. Pan Zoom to Mouse

8. Précis Tool

9. Set Map Topology and resulting error checking buttons for nodes and dangles

10. BGS Renderer

11. Hide Features Tool

12. Marine Data Transfer (Disabled – Under Development)

13. SIGMA Desktop, Tools Menu

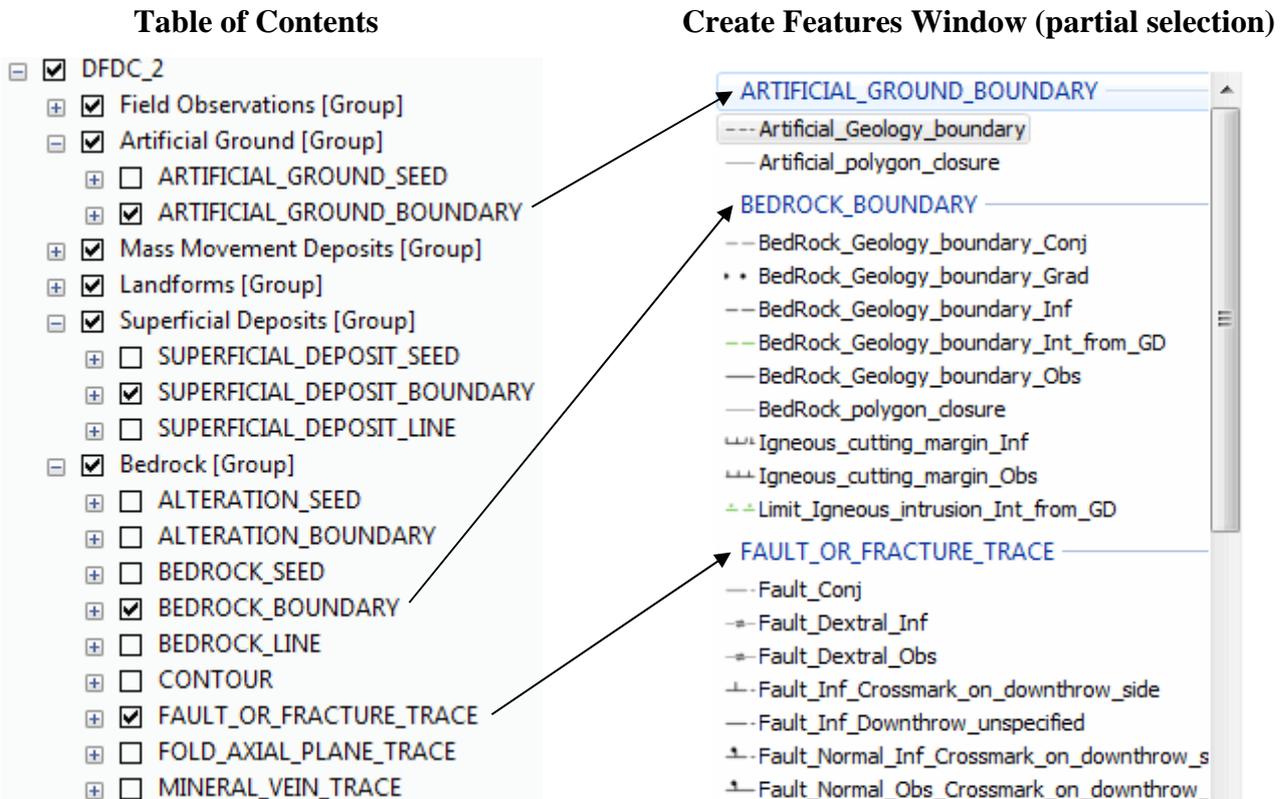
- Create Map Boundary Line
- Create Map Boundary Polygon
- Download Baseline Data
- Download Domains from Oracle
- Subset LEX-RCS Domains
- Create Seeds
- Seed Templates from Visible Layers
- Create Seed Template from DiGMap
- Build Polygons
- Export Orientations to Text File
- Change Default Editor Tool
- Create Profile

See [Section 5: BGS•SIGMA Desktop](#) (page 47).

2 Digitizing and Editing in BGS•SIGMA2015

You should automatically be in Editing mode once SIGMA has loaded from the Start Collecting function and the Create Features Window should be loaded and docked on the right side of the screen. Any layer and its editable features will be listed in the Create Features window. The layers in the Table of Contents and the Create Features window are linked to hide and show available feature styles for selection. For example: If the Artificial Boundary, Bedrock Boundary, and Fault or Fracture Trace Layers are selected in the Table of Contents then the Line Styles attributed to those layers are available for selection in the Create Features Window.

- Select the layers within the Table of Contents that you are currently working on
- To digitize a point, line or polygon select the required feature in the Create Features Window and begin digitizing by clicking/tapping onto the map window to place or draw that feature (double-click/tap to finish your line/polygon using Standard Editing)
- If the Create Features Window is accidentally closed, it can be reopened by two methods:
 - BGS SIGMA Mobile Toolbar – Tools – Open Create Features Window
 - ArcMap – Editor Toolbar – Create Features Button 
- If you have stopped Editing and closed the Create Features dialog box you can reopen them and the Editor toolbar quickly by:
 - Table of Contents – Select any Layer – right-click – Edit Features – Start Editing
- To Hide the Create Features Window, press the push pin in the corner of the blue ribbon and it will tack to the far right margin (to Close press the x)



2.1 SET SNAPPING

Setting the Snapping Environment is an absolute must when digitizing. Snapping reduces many common digitizing errors by snapping lines and polygons together. In BGS•SIGMA^{desktop} the final outcomes are geological polygon layers created from clean and seeded line work, thus the need for cleanly snapped lines.

- Set the **Snapping Tolerances** – allowing lines to snap to themselves
 - On the Main ArcMap Toolbar select: Customize – Toolbars – Snapping
 - On the Snapping Toolbar select: Snap to Sketch
- Double check that Use Snapping is checked from the drop-down menu of the Snapping Toolbar and that all 4 buttons on the Toolbar itself are selected initially. You can turn these snapping tools on and off to suit your preference.
 - Point Snapping – snaps to point features
 - End Snapping – snaps to the first or last node of lines
 - Vertex Snapping – snaps to any vertex on a line or polygon
 - Edge Snapping – snaps anywhere on a line or polygon
- To suspend snapping temporarily, hold down the spacebar while digitizing
- You can also use **Classic Snapping**, which allows you to snap to specific layers
 - Editor Toolbar – Editor drop-down list – Options
 - General Tab – check on, Use classic snapping - OK
 - Editor Toolbar – Editor drop-down list – Snapping – Snapping Window
 - The Window appears in the same location as the Create Features Window and you are now able to check on or off the layers you wish to snap to and check on or off the type of snapping (vertex, edge, or end)
 - Toggle between the Create Features and Snapping Windows using the tabs at the very bottom of the menu just above the cursor location

2.2 SELECT THE EDITING ENVIRONMENT

- Choose your Editing Preference, Standard or Sketch from the BGS SIGMA Mobile or Desktop Toolbars – Tools drop down list – Change Default Editor Tool
 - **Standard Editing** (is the recommended digitizing method)
 - Is the default editor where you click/tap on screen to add nodes/vertices to your line
 - **Sketch Editing**
 - Allows you to draw a continuous line and nodes/vertices are added automatically
 - In this version of the Sketch Editor nodes/vertices are added at reasonably spaced intervals to allow for easy editing of the line
 - Switching between Editors can be done at any time by selecting the Change Default Editor Tool from the BGS SIGMA Mobile or Desktop Toolbars – Tools drop down list
- Select your working layers from the Table of Contents
- Select the Line Style from the Create Features Window
- Draw your line in the ArcMap Window (double tapping/clicking to end your line/polygon using Standard Editing)

2.3 EDITING LINES

Editing is the same as previous ArcMap/SIGMA versions; either select the Edit Tool and Edit Vertices Tool from the ArcMap Editor Toolbar or from the BGS SIGMA Mobile or Desktop Toolbars:

- Use the **Edit Tool**  to select, move, duplicate, and delete features
 - Delete lines and features using the Delete button on the Main ArcMap Toolbar (beside paste)
 - **DO NOT** delete Field Observation Points using this delete button (use the [Delete SIGMA Mobile features button](#)  located on the BGS SIGMA Mobile toolbar – page 15/19)
- Use the **Edit Vertices Tool**  to move, insert, delete, and change vertices of a point, line or polygon
 - See [Section 3.11.3: Change Vertex Size to change the size of the vertex](#) (page 24)

2.4 BGS•SIGMADESKTOP EDITING TOOLS

A number of Editing Tools are available on the BGS SIGMA Desktop Toolbar that may be helpful whilst using BGS•SIGMAmobile. These include: AutoPan, BGS Smooth, Flip Line Tool, and Pan Zoom to Mouse. These are all discussed in [Section 5.8: BGS SIGMA Desktop Toolbar – Partial](#) (page 48-50).

2.5 EDITING SHORT-CUT KEYS

Z key	Zoom in (you can also use the mouse scroll-wheel)
X key	Zoom out (you can also use the mouse scroll-wheel)
C key	Pan (or hold the mouse scroll wheel down to pan)
V key	Show vertices
Esc	Cancel
Ctrl + Z	Undo
Ctrl + Y	Redo
Spacebar	Temporarily Suspend Snapping

2.6 CHANGING LINE ATTRIBUTION

On the Editor Toolbar is a button called: Attributes . When you press this button a dialog box appears which describes the attributes of the line you have just digitized or have selected with the editor tool.

- To change the Feature, for example from Bedrock Boundary Inferred to Bedrock Boundary Observed, press the Feature name and then the small box with 3 dots in it. This will bring up the Choose Symbol dialog box where you will choose your new line style
- Feel free to add names, labels, and comments if necessary

2.7 SAVING AND SAVING EDITS

As always, it is good practice to frequently Save  your Project and to Save any Edits that you have made. To Save Edits, Open the Editor Toolbar (Customize – Toolbars - Editor) and Edit – Save Edits.

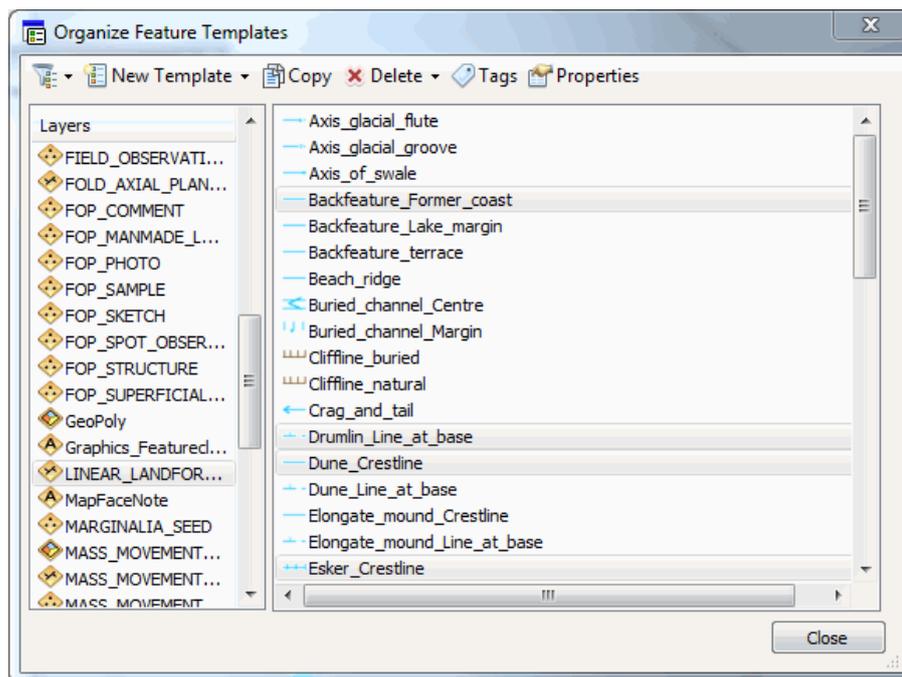
2.8 LAYER SELECTABILITY

It can be useful when editing to alter a layer's selectability. Some examples are: layers that can become accidentally moved, such as your Boundary line/polygon or when editing Superficial Lines, it might be good practice to turn off the selectability of Bedrock and Artificial Line Styles.

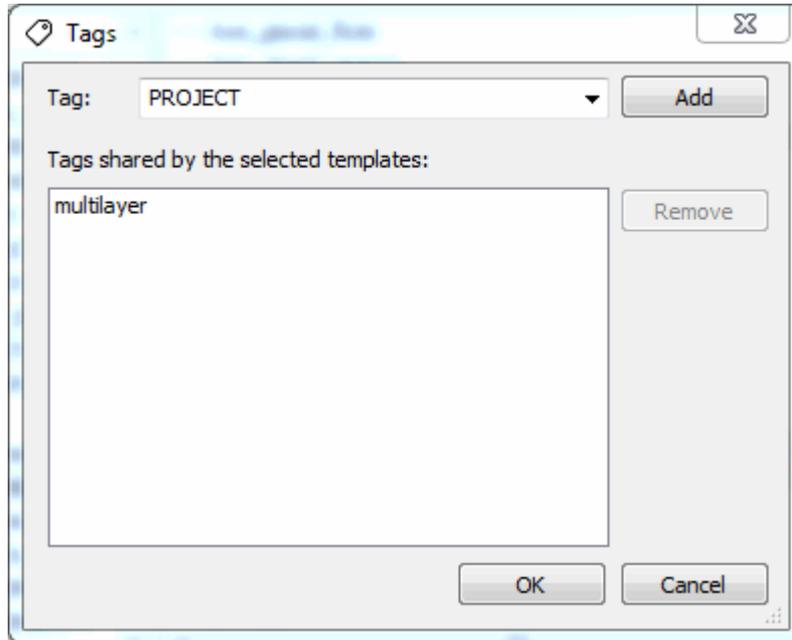
- To alter a layer's selectability – Table of Contents – List by Selection
- Press the 'click to toggle selectable' by the Layer name and the layer will move to the Not Selectable List and vice versa

2.9 CREATING TAGS TO SUBSET THE CREATE FEATURES WINDOW TO YOUR FAVOURITE LINE STYLES:

- Select the Organize Templates Button  under the Create Features Header
- Select a Layer from the Layers Menu on the left – the line styles will appear in the window on the right



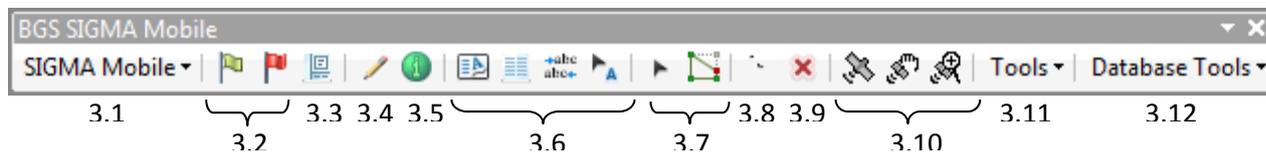
- Holding the Ctrl key on the keyboard (or the Shift key for blocks of line styles), select the line styles to be in your subset, and the Tags Button  Tags
- In Tag: Enter a memorable name, such as a short Project Title or your initials, Press Add and OK



- Continue this process for all of the layers/line styles you wish to have in your subset
 - Using the same tag name to continue adding to the subset
 - Or a different tag name to have multiple subsets
- Close the Organize Features Template Window
- In the **Filter Templates Box** (to the right of the Organize Templates Button) type in the name of your Subset and the list will contain only your chosen tags
 - **Note:** you can also search the entire template using this box, for example typing in backfeature will bring up all Landform line styles with this name

3 BGS•SIGMA*mobile*

The way to think about your BGS•SIGMA*mobile* project is as a digital fieldslip. This should be treated in much the same way as a paper field slip where geologists draw lines and polygons, make map face comments, and draws points with labels to reference their geological notebook observations. Any geological lines or landforms created using BGS•SIGMA*mobile* should be “inked in” using BGS•SIGMA*desktop* on return to the office in much the same way a paper field slip is inked in and a Map created.



3.1 BGS SIGMA MOBILE, DATA COLLECTION START-UP MENU

This is where it all starts with BGS•SIGMA*mobile*.

3.1.1 Start Collecting

- Select this option to set-up a new BGS•SIGMA*mobile* project or to continue with an existing project
- Details of how to do this are outlined in [Section 1.3: ArcMap 10 - BGS•SIGMA Set-up \(page 2\)](#)

3.1.2 Modify Collection Layers

- After you have set-up a project you can use this function to modify the layers you chose in the ‘Select Datasets’ dialog box and within your project

3.1.3 Import Database

- A function to allow you to import previous fieldwork databases or colleagues’ databases for collating
- Pre-2015 databases are currently viewable by the précis tool
- See [Section 3.14: Working with BGS•SIGMA 2012 Databases \(page 27\)](#)

3.1.4 SIGMA Mobile Help

- A link to the BGS•SIGMA manual

3.2 ADD AND EDIT FIELD OBSERVATION POINTS

Observation Points are key for digital field data capture. These tools are the gateways to the DFDC Database which allow you to store numerous types of data for each point of observation.

3.2.1 To Add a Field Observation Point

- Select the Add Field Observation Point Button  from the BGS SIGMA Mobile Toolbar and click within the ArcMap Window where you would like your point to be placed
- Wait for the Switchboard form to load and enter your observed information
- Close the Switchboard by using X in the corner of the form

3.2.2 To Edit a Field Observation Point

- Select the Edit Field Observation Button  from the BGS SIGMA Mobile Toolbar and select the point you wish to Edit

- Wait for the Switchboard form to load and change, update, or add more information to the specified observation point
- Close the Switchboard by using X in the corner of the form
- **NEW** - You can also Edit a Field Observation by opening the Switchboard  from the BGS SIGMA Mobile Toolbar, selecting the Locality No to edit, and make your changes

3.2.3 To Delete a Field Observation Point

- Using the Select Tool on the ArcMap Tools Toolbar , select the observation to be deleted within the ArcMap Window, and press the Delete SIGMA Mobile Features Tool  located on the BGS SIGMA Mobile Toolbar
- **DO NOT** press the ArcMap Delete button as information stored within the database will not be deleted

3.2.4 To Move a Field Observation Point

- Using the Edit Tool  on the BGS SIGMA Mobile Toolbar or the ArcMap Tools Toolbar, Select the Field Observation Point to be moved and drag it to its new location – all of the auxiliary information will be moved and updated automatically

See [Section 4: The Switchboard](#), for a detailed look at how to record Field Observations (page 29)

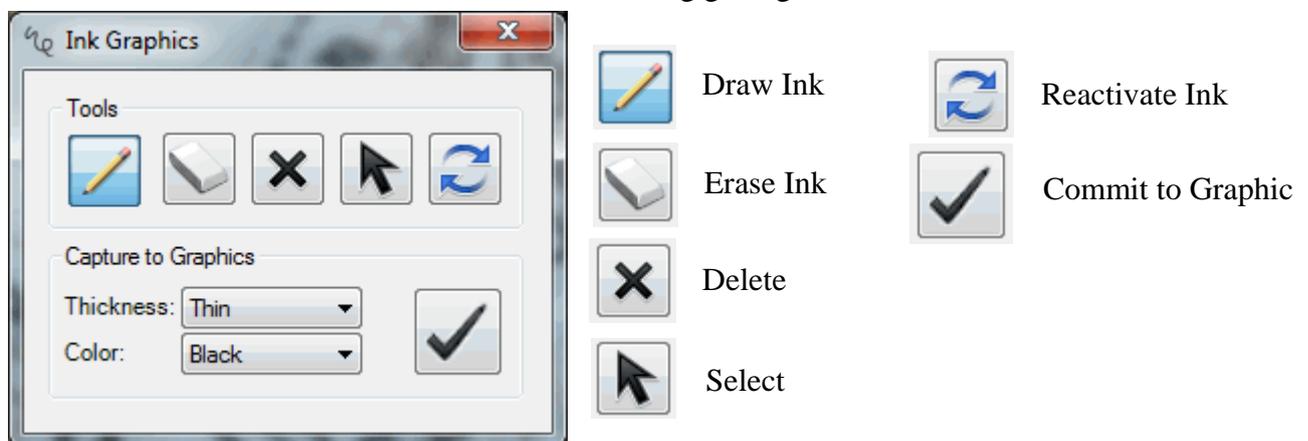
3.3 THE SWITCHBOARD - NEW

The Switchboard can now be opened directly from the BGS SIGMA Mobile Toolbar once a Field Observation has been recorded and any changes can be made to the form/forms at this time.

See [Section 4: The Switchboard](#), for a detailed look at how to record Field Observations (page 29)

3.4 INK GRAPHICS TOOL

The Ink Graphics Tool is an easy way to ‘ink’ in sketches within your Project. The Graphics are stored within the Project DFDC Access Database for future reference. In this version you are no longer able to convert your sketches to digital (vector) lines and thus, it is not recommended for drawing geological linework.



3.4.1 To draw a sketch

- Press the Draw Ink button
- Select the desired Thickness and Colour from the drop down lists
- Sketch within the ArcMap window:
 - Directly with the pen stylus or by
 - Holding the left mouse button down and moving the mouse
- Press the Commit to Graphic button when finished

3.4.2 To erase part of a sketch

- For an active sketch:
 - Press the Erase Ink button and either:
 - Erase the mistake by following the sketch with the pen stylus, or
 - Hold the left mouse button down and erase the mistake
- For an inactive sketch/graphic:
 - Press the Select Ink/Graphic Tool
 - Select the inactive sketch graphic in the ArcMap window
 - Press the Reactivate Ink button
 - Proceed as above
 - Press the Commit to Graphic button when finished

3.4.3 To delete a sketch/graphic

- For an active sketch:
 - Press the delete button
- For an inactive graphic:
 - Press the Select Ink/Graphic Tool
 - Select the graphic in the ArcMap window
 - Press the Delete Ink/Graphic Button

3.4.4 To reactivate a sketch

- Press the Select Ink/Graphic Tool
- Select the inactive sketch graphic in the ArcMap window
- Press the Reactivate Ink button

3.4.5 To change the pen thickness and colour of an existing graphic

- Press the Select Ink/Graphic Tool
- Select the graphic in the ArcMap window
- Press the Reactivate Ink button
- Choose the desired Thickness and Colour from the drop down list
- Press the Commit to Graphic button when finished

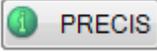
3.5 PRÉCIS TOOL

The Précis Tool gives an overview screen shot of a Field Observation point including, Comments, Sketches, Photos, Samples, and Observations. It can be accessed from the BGS SIGMA Mobile Toolbar  and the Switchboard.

3.5.1 To use the précis tool from ArcMap:

- Press the Précis button  from the BGS SIGMA Mobile Toolbar and select the desired Field Observation Point (FOP)

3.5.2 To use the précis tool from the Switchboard:

- Select the Field Observation Point from the drop-down list and press the PRECIS Button  within the Switchboard
 - Open the Switchboard using the Switchboard button  on the BGS SIGMA Mobile Toolbar or you can open the Switchboard for the desired Field Observation Point (FOP) by selecting the Edit Field Observation Button  from the BGS SIGMA Mobile Toolbar

3.6 ADD, EDIT, AND COPY MAP FACE NOTES

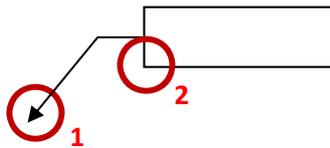
Map Face Notes allow you to quickly add a visible comment or note directly to the ArcMap window. The Map Face Note is also stored within the DFDC database along with its Geographical Coordinates for future reference.

3.6.1 Setting the Map Face Note Colour Scheme

- BGS SIGMA Mobile – Tools – Change Map Face Note Style
- Select the desired arrow and text colour and Close the form
 - The colour scheme can be changed at any time but will only be applied to new Map Face Notes and not existing Map Face Notes

3.6.2 Adding Map Face Notes

- Press the Add Map Face Note Button  from the BGS SIGMA Mobile Toolbar
- Within the ArcMap Window, you will need to click twice with your pen or mouse, once to place the arrow and the other to place your comment



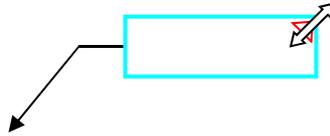
- Enter your note or comment (Press Enter to make a new line) and press the Enter Comment button
- Your note will appear on the ArcMap Window

3.6.3 Editing Map Face Notes - Text

- To Edit a Map Face Note, press the Edit Annotation Button  on the BGS SIGMA Mobile Toolbar, select the Map Face Note to be edited within the ArcMap Window, followed by the Edit Map Face Note Button  located on the BGS SIGMA Mobile Toolbar
- The Edit Map Face Note Form will appear allowing you to make what ever changes you need to your comment
- To submit your changes press the Enter Comment button at the bottom of the Form or close to cancel

3.6.4 Editing Map Face Notes – Size

- To edit the size of one comment, press the Edit Annotation Button  on the BGS SIGMA Mobile Toolbar, select the Map Face Note to be edited within the ArcMap Window, hover over the red triangle until you see a white arrow, and then click, hold and drag the comment to be bigger or smaller in size (you may need to refresh the ArcMap Window)



3.6.5 Editing Map Face Note – Location

- To edit the location of the Map Face Note Leader, Line and/or Box, press the Edit Annotation Button  on the BGS SIGMA Mobile Toolbar, select the element of the Map Face Note to be edited and drag the element to its new location (you may need to refresh the ArcMap Window)

3.6.6 Copying Map Face Notes

- To copy a comment, press the Edit Annotation Button  on the BGS SIGMA Mobile Toolbar, select the Map Face Note to be copied within the ArcMap Window, and press the Copy Map Face Note button  on the BGS SIGMA Mobile Toolbar
- Press OK
- Drag the new Comment Box (by clicking, holding, and dragging the mouse anywhere within the comment box) and Arrow (by the small green box at the arrow tip) to a new location
- You may have to refresh the screen for the new location to be updated

3.6.7 Deleting Map Face Notes

- Select the Map Face Note with the Edit Tool  and either press the Delete Geofeatures button  on the BGS SIGMA Mobile Toolbar or the general delete button  on the ArcMap Main Toolbar

3.6.8 Saving Map Face Notes

- Map Face Notes are Saved automatically every time you add a Field Observation Point and the Close Form button is pressed
- However, it is good practice to Save all of your Edits (Edit Toolbar, Save Edits) and your Project regularly

3.7 EDIT TOOL AND EDIT VERTICES TOOL

These tools are the same as the ArcMap Editing Tools, just placed on this toolbar for ease of access. Choose from either location to edit features.

3.7.1 Edit Tool

- Allows you to select, move, duplicate, and delete features

3.7.2 Edit Vertices Tool

- Allows you to move, insert, delete, and change vertices of a point, line or polygon
- See [Section 3.11.3: Change Vertex Size to change the size of the vertex \(page 24\)](#)

3.8 LABEL GEOFEATURE

The Label Geofeature button  allows you to type a caption or note onto the line style itself.

3.8.1 To Add a label

- Select the line you wish to label with the Edit Tool , press the Label Geofeature button  on the BGS SIGMA Mobile Toolbar, type in your text, and press Add/Remove Label

3.8.2 To Edit your label's text

- Select a labelled line with the Edit Tool , press the Label Geofeature button  on the BGS SIGMA Mobile Toolbar, edit your text, and press Add/Remove Label

3.8.3 To Delete your label

- Select a labelled line with the Edit Tool , press the Label Geofeature button  on the BGS SIGMA Mobile Toolbar, delete your text, and press Add/Remove Label

3.9 DELETE SIGMA MOBILE FEATURES

This currently deletes any Field Observation Points and Map Face Notes plus GeoLines and GeoPolys if you have chosen to use these historic linestyles. [Deleting a Field Observation Point is described in Section 3.2.3 \(page 15\).](#)

3.10 USING THE GPS

The Global Positioning System (GPS) uses a satellite based system to determine your latitude and longitude position anywhere in the world. The GPS Tool takes the location information and offers various tools to help navigate within your BGS•SIGMA Project.

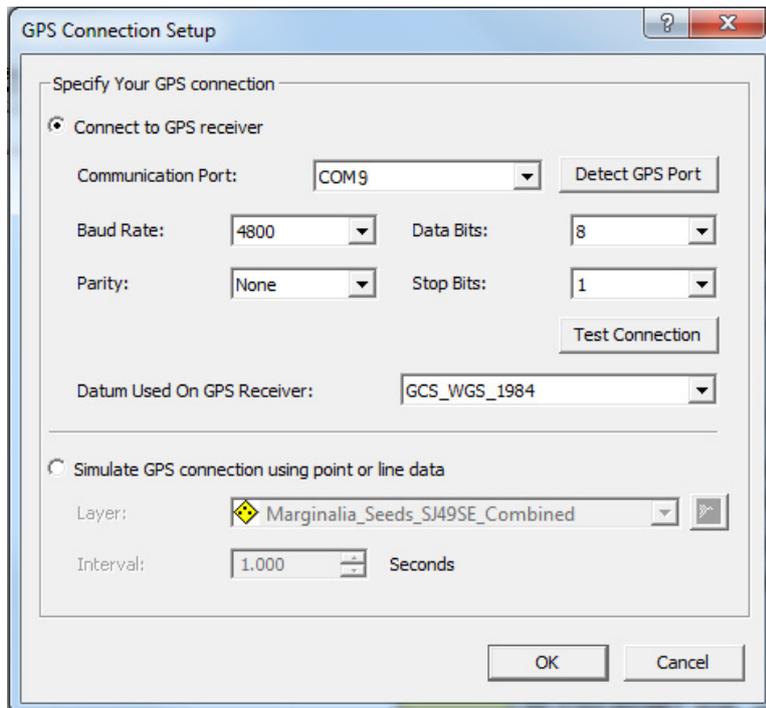
On earlier hardware the BGS GPS Tool was used within SIGMA as it was generally more stable than the ArcMap GPS Tool. However, using the Panasonic Toughbooks the ArcMap GPS Tool works better than the BGS GPS tool. This section explains how to use the ArcMap GPS to capture GPS points to a log. Information about the BGS GPS tool can be found in [Appendix A](#).

On the main ArcMap toolbar, select: Customize – Toolbars – GPS

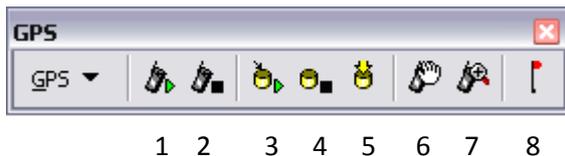
Set the COM Port

The first step in this process is to set the communications (COM) port connection so that the tablet can receive data from the GPS:

- From the ArcMap GPS drop-down menu select GPS - GPS Connection Setup
- Toggle on the Connect to GPS Receiver option
- Set Communication Port to the required COM port
- Click Detect GPS Port. Wait for the conformation window
- Click OK
- Close window



GPS Toolbar Functions:



1. **Open Connection**
 - Opens a GPS connection for updates from the GPS port
2. **Close Connection**
 - Closes the GPS connection to stop updates from the GPS port
3. **Start Streaming to Log**
 - Starts streaming GPS data into the selected log
4. **Stop Streaming to Log**
 - Stops streaming GPS data into the selected log
5. **Stamp Current Position to Log**
 - Stamps the current position to the log
6. **Pan to GPS Position**
 - Pans the active view to display the current GPS position
7. **Zoom to GPS Position**
 - Zooms to the current GPS position
8. **Add Destination**
 - Sets the clicked point on the screen as the destination

Create a New Log

When the GPS is active a log file can be created as a shapefile that can then be loaded into your project to show where you have been tracking.

- On the *ArcMap* GPS toolbar drop-down list click GPS - Log Setup
- Click the New button
- Choose the type of features that you want

- Click Points if you want the log to contain points (default setting) or lines
- A GPS folder needs to be created to store GPS logs
 - Click the Browse button  and navigate to the folder where you want to store your log; this should be your SIGMA project folder (Save As type should be set to Shapefile)
 - Create a GPS folder to store the log file
- Check the fields you want to store in the log.
 - Use the Select All and Clear All buttons to quickly change the selection set
- Click OK
- Add the GPS log shapefile using the Add Data button, to the Table of Contents.

Start Collecting

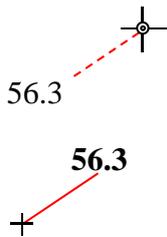
- Add the GPS shapefile to the project
- Click Open Connection  on the GPS toolbar, to start the GPS device on your tablet
- Click on Start Streaming  to log your position into the log file
 - The log file will collect GPS points and display them in the project
- To stop streaming click on Stop Streaming To Log 
- Click on Close Connection  to stop the GPS device

3.11 BGS SIGMA MOBILE, DROP DOWN TOOLS MENU

3.11.1 Bearing Tool

This tool allows the user to quickly derive and draw their compass bearings (lines of sight and backsight) within ArcMap.

- Select the Bearing Tool  from the BGS SIGMA Mobile Toolbar, Tools drop down list (you will notice the pointer will change to )
- Click/tap on the screen where you would like to start your bearing from. As you hover and swivel the cursor around that point you will see a dashed red line in the ArcMap Window and the compass bearing appearing in the bottom left hand corner of the screen (underneath the ArcMap Table of Contents)
- Double click to create a graphic of your bearing
 - You can create as many bearing graphics as you wish
- **To Delete** all bearing graphics, select the Delete Bearing Graphics Tool  from the BGS SIGMA Mobile Toolbars, Tools drop down list
- **To Turn Off** the Bearing Tool, select a different function or tool



3.11.2 Structure Contour Tools

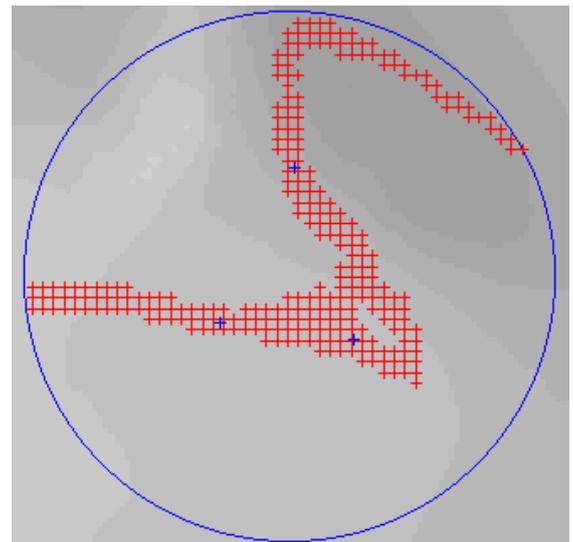
The Structure Contour Tool allows the user to estimate where a geological bed will outcrop. Generally, it uses the angle and dip from one field observation point or three observed outcrop points to calculate the plane of bed and bed elevation and compares this to the digital terrain model to predict where the bed will next outcrop.

- From the BGS SIGMA Mobile Tools drop-down list, select Create Structure Contours and the following dialog box will appear

- Using the drop-down arrow, select your **Digital Terrain Model (DTM)** from the list, such as nextmap_dtm
 - Use the multiple layers as DTM button if your search area covers more than one DTM (check appropriate layers)
 - The drop-down list contains all the raster images contained within your project including topographic maps – only select a layer or layers which contains elevation information
- Choose either the Single Observation Point or the Three Points Calculation Method
 - **Single Observation Point**
 - Choose one of three data entry options: click on the map at your observation to automatically derive eastings and northings, enter them manually, or use the switch to small inputs form to click on the map at your observation and press Back to Main Form
 - Enter the observed Dip (from 0-90) and Azimuth (from 0-360) manually into the box or use the sliders to the right of the box to enter
 - Enter the Elevation in metres manually or choose Get Elevation from DTM
 - **Three Observed Outcrop Points**
 - Point 1 Tab - Choose one of three data entry options: click on the map at your observation to automatically derive eastings and northings, enter them manually, or use the switch to small inputs form to click on the map at your observation and press Back to Main Form
 - Enter the Elevation in metres manually or choose Get Elevation from DTM
 - Select the Point 2 Tab and repeat steps 1 and 2
 - Select the Point 3 Tab and repeat steps 1 and 2
- Choose your **Tool Parameters**

These three input values are parameters that affect how the tool calculates and displays structure contours. Each input is initially given a default value.

- **Tolerance:** At various points in the search area the tool calculates the predicted elevation of the bed and compares it with the ground elevation value from the DTM to see if they are the same. The tolerance value defines how close (in metres) these two values need to be to be declared 'the same'. This value can be typed in manually or populated using the slider to the right of the Tolerance text box. To move the slider small amounts click just to the left or just to the right of the slider's pointer and it will move 1 metre in that direction. A non-integer value (e.g. 0.5) can be entered as the tolerance, but this must be entered manually.
- **Sample Resolution:** Large search areas can take a long time to process as calculations are made every 5 metres (the resolution of NEXTMap). The speed of the tool can be improved by increasing the distance between the calculations. A sample resolution of 2 means calculations will be made every 10 metres, whilst a sample resolution of 3 means calculations will be made every 15 metres and so on. Obviously increasing the sample resolution may decrease the number of resulting points. Values can be typed in manually or populated using the slider to the right of the Sample Resolution text box.
- **Point Colour:** Select one of four colours from the drop-down list for the display results. By choosing different colours it is possible to display the results from several structural contour calculations on the map at the same time.
- Enter in your **Search Area Parameters** to define a circular search area
 - Either manually enter in the Eastings and Northings of the centre point or press the Use Observation Point or Centre of Three Points Button
 - Select your Radius in metres from the drop-down list or enter manually
- Press **Calculate**
- The Results
 - The blue circle is the extent of your Search Area
 - The blue crosses are your observation points or observed point
 - The red crosses are your estimated outcrop locations (or more formally, where the estimated bed elevation is within the tolerance value of the ground elevation – forming a structure contour)
 - The results are displayed as a graphic on screen
- To **Save** the Structure Contour Display Graphic as a Shapefile go to the BGS SIGMA Mobile Tools drop-down list and select Save to Shapefile 
 - Browse to the folder location, name, and press Save
 - The shapefile will automatically be added to your Project as a point file



- To **Delete All** the Structure Contour Display Graphics go to the BGS SIGMA Mobile Tools drop-down list and select Delete Structure Contours 
- Create another Structural Contour Display by going to the BGS SIGMA Mobile Tools drop-down list, select Create Structure Contours, and enter in the required information

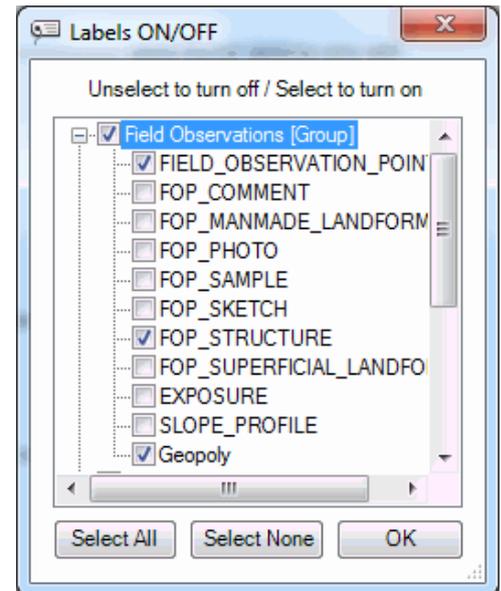
3.11.3 Change Vertex Size

This tool lets the user determine the size of the editor node/vertex using a sliding scale from 4 to 20.

3.11.4 Turn Labels ON/OFF

Allows the user to turn on and off labels by selecting them in the dialog box

- Check layers you want to view or hide (check mark shows labels/unmarked box hides labels), Select All Layers (shows all labels), or Select None (hides all labels) and press OK



3.11.5 Show Hidden Features

Allows the User to Hide or Show certain features within the ArcMap Window by changing the visibility within the database tables, for example, to only show bedding measurements within the FOP_STRUCTURE layer

Alter the database tables within ArcMap

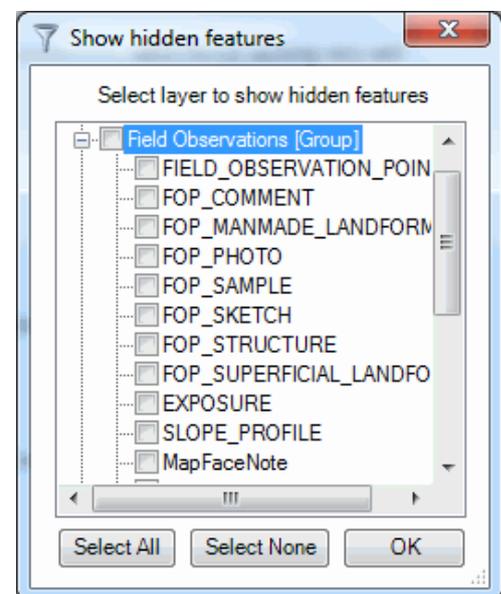
- On the BGS SIGMA Mobile Toolbar, Tools drop down list, Select “Hide” Definition Query ON/OFF and turn off any layers you wish to modify
 - This will show any previously hidden database rows
- Within the ArcMap Table of Contents Select the layer you wish to modify, right-click, and select Open Attribute Table
- Scroll to the Hide column (0=visible/1=invisible), sort the column if you wish, and enter 1 into each item in the column you wish to hide

To Hide database items in the ArcMap Window

- On the BGS SIGMA Mobile Toolbar, Tools drop down list, Select “Hide” Definition Query ON/OFF and turn on any layers you have modified

To Show all database items in the ArcMap Window

- On the BGS SIGMA Mobile Toolbar, Tools drop down list, Select “Hide” Definition Query ON/OFF and turn off any layers you have modified



3.11.6 Change Map Face Note Style

See [Section 3.6.1: Setting the Map Face Note Colour Scheme \(page 17\)](#).

3.11.7 Open Create Feature Window

Opens the Create Features Window for line-type selection.

3.11.8 Change Default Editor Tool

This tool allows you to change from Standard to Sketch Editing.

Standard Editing

- Is the default editor where you click/tap on screen to add nodes/vertices for your line

Sketch Editing

- Allows you to draw a continuous line and nodes/vertices are added automatically
 - In this version of the Sketch Editor nodes/vertices are added at reasonably spaced intervals to allow for easy editing of the line

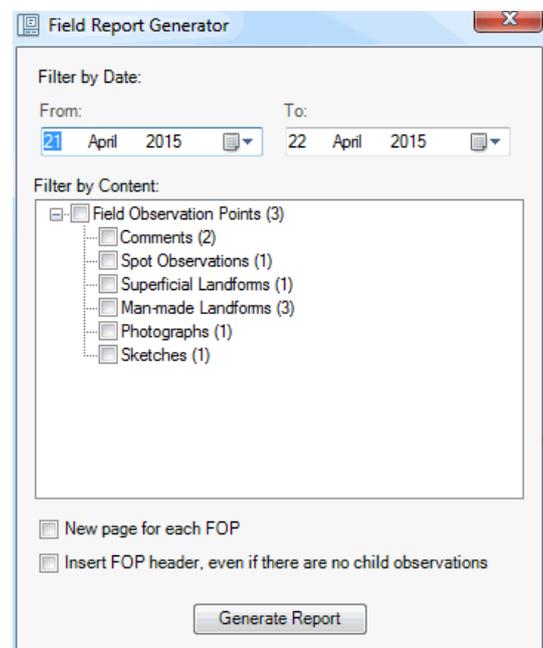
3.12 BGS SIGMA MOBILE, DROP DOWN DATABASE TOOLS MENU

3.12.1 Field Report

- The Field Report is a Word Document Review of all Field Observations
- Choose to Filter by Date and/or by Content
- New pages and Headers are also selectable options

3.12.2 Bulk Photo Transfer

- The difference between the Photos and the Bulk Photo Transfer is the Bulk Photo Transfer only holds database items yet to be Linked
- Once Photographs are Linked to the observation point they will disappear off of the database view list
- See [Section 4.4: Photos \(page 31-32\)](#), for detailed information on the Photos form and linking Photographs



3.12.3 Filter Dictionaries

Filter dictionary values used in SIGMA Mobile by toggling the 'Project Control' or 'Field Determinable' checkboxes

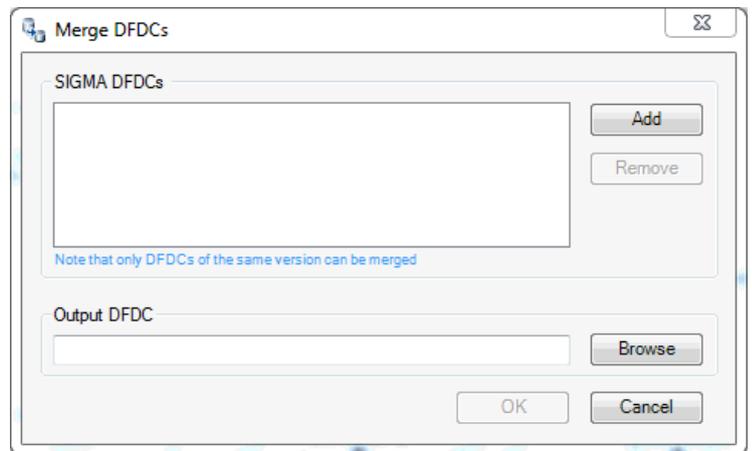
Filter BGS_DIC_ROCK_ALL
 Filter BGS_LEX_LITHOSTRAT_UNIT_V3

	CODE	DESCRIPTION	TRANSLATION	PROJECT_CONTROL	FIELD_DETERMINABLE
▶	-	NOT APPLICABLE	Not applicable	<input type="checkbox"/>	<input type="checkbox"/>
	!	Applicable, but try as we mi...	Not Available	<input type="checkbox"/>	<input type="checkbox"/>
	?	We have not assigned a val...	Not Entered	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	AANDLV	LAVA, AUGITE-ANDESITE	Augite-andesite lava	<input type="checkbox"/>	<input type="checkbox"/>
	AFGN	ALKALI-FELDSPAR-GRANI...	Alkali-feldspar-granite	<input type="checkbox"/>	<input type="checkbox"/>

- Filtering dictionaries is a useful tool when working with Lithologies, such as within the Logs or Superficial Landform Forms
- In these forms is a Lithology drop-down list that lists the BGS_DIC_ROCK_ALL dictionary alphabetically but for some common entries at the top
- You can filter this dictionaries to remove certain entries from the drop-down list or move entries to the top of the drop down list
 - Tick **Project Control** in the Filter Dictionaries to move entries to the top of the drop down list (Lithologies that are commonly found within your Project Area)
 - Tick **Field Determinable** in the Filter Dictionaries to remove entries from the drop down list
 - Remaining entries are listed alphabetically below your Project Control List

3.12.4 Merge DFDC's

- Allows the user to Merge DFDC databases of the same version
- Add datasets by using the Add button and browsing to their locations
- To save your Output DFDC, browse to a location on your computer, type in a name, and press OK
- Press the OK button to run the Merge
- A dialog box of progress will appear which will inform the user of Layers that were or were not appended



3.12.5 Field Observations Spreadsheet

- Creates a Field Observation Summary Spreadsheet in the Project Folder
- Fields are: Location Number, X, Y, Summary Label, Location Description, User Name, and Date Made

3.12.6 Photos Spreadsheet

- Creates a BGS Specific Photography Spreadsheet in the Project Folder/ PHOTOGRAPHS containing all fields required for BGS Photo Submission
- Fields are: Unique Locality ID, Unique Image ID, Locality Number, Summary Label, Observation Date, SIGMA Image Name, X, Y, Locality Description, Photo Description, Photo Media, Original Image Filename, Camera Frame Number, and Photo Direction

3.12.7 Samples Spreadsheet

- Creates a BGS Specific Samples Spreadsheet in the Project Folder containing all fields required for BGS Sample submission

- Fields are: Location Number, Collector Sample Number, Sample Type, Easting, Northing, Summary Label, Location, Lithological Information, Geological Remarks samples, Formation/Group or Suite Information, Sample Orientation/Dip Direction, Sample Orientation Dip, and 50K Sheet

3.12.8 Structural Spreadsheet

- Creates a Structural Spreadsheet in the Project Folder
- Fields are: UUID, Location Number, Summary Label, Location Description, X, Y, Feature, Secondary to Fourth Attributes, Grouping, Comments, Azimuth, Dip, Data Source, and Date Made

3.12.9 GSI 3D Bids Spreadsheet (Index information)

- Creates a spreadsheet for exporting into GSI 3D in the Project Folder
- Fields are: REGN, X, Y, Start Height, Drilled Length, Date Known, and Log ID
- Users will need to edit the Excel spreadsheet to calculate base depth values

3.12.10 GSI 3D BLGs Spreadsheet (Interval information)

- Creates a spreadsheet for exporting into GSI 3D in the Project Folder
- Fields are: REGNO, Unit Thickness, Unit Depth, Lithology Code, Unit Description, Interpreter, Base of Bed Code, and Log ID
- Users will need to edit the Excel spreadsheet to calculate base depth values

3.13 BACKING UP DATA IN THE FIELD

It is good practice to back up your data EVERY EVENING of field data collection.

- Using Windows, create a New Folder in your Project Area, called Back_Up (or equivalent)
- Copy the Project .mxd and DFDC.mdb to the New Folder and rename with an _ and the date
- If something was to happen to your Project – copy the most recent back-up back to your Project Folder and rename them to their original format

3.14 WORKING WITH BGS•SIGMA 2012 DATABASES

Data collected with a BGS•SIGMA 2012 Database can be imported by BGS•SIGMA 2015 through the: BGS SIGMA Toolbar – Start Collecting – Import Database ([Section 3.1.3, page 14](#)).

Information collected in the previous database will be imported into the ArcGIS Table of Contents where you can view the localities and any attribute information.

- The Edit Field Observation Point Tool will not display 2012 Database information due to the change in forms from 2012 to 2015
- The Précis Tool will display 2012 information but new categories to 2015 (LOG and STRUCTURE) may be listed under the wrong attribute headings
- The new Field Report Tool will not create a Field Report for the 2012 Database
 - However, you can still run the old Tool from within the 2012 DFDC Access Database by double clicking on the 2012 DFDC.mdb file in Windows Explorer

The BGS have written some FME conversion files that convert older versions to 2012/5. Contact us on: sigma@bgs.ac.uk for more information.

3.15 ARCHIVING

The BGS are working towards having an Archiving System in place to store completed digital fieldslips to be retrieved by anyone in the organisation.

4 The Switchboard

New to SIGMA 2015 is the Switchboard and all of its forms. The Switchboard will be similar to the old Access environment but will call the forms more quickly from within ArcMap. The SIGMA Developers have worked hard to streamline, simplify, and unify the new forms into a more user-friendly environment. All data will still be held within the DFDC Access Database. The Switchboard is the hub of all Field Observations and the place to enter, edit, compile, store, and view Field Observation Information.

The SWITCHBOARD interface is displayed in a window with a title bar containing the application name and a close button. The main content area is organized into several sections:

- Locality No:** A dropdown menu showing 'JBOW_100 (21/04/2015 15:07:27)'.
- Easting:** A text field containing '200687.0992'.
- Northing:** A text field containing '852934.2052'.
- PAN:** A button located to the right of the Northing field.
- Locality Information:** A section containing:
 - Locality Description:** A large, empty text area with a vertical scrollbar.
 - Summary Label:** A smaller, empty text field.
 - PRECIS:** A button with a green circular icon.
 - SAVE:** A button.
- Quick Observations:** A section containing:
 - REPEAT LAST COMMENT:** A button.
 - SHAFT:** A button with a crosshair icon.
 - ADIT:** A button with an upward-pointing arrow icon.
 - SINK:** A button with a red gear icon.
 - EXPOS:** A button with a pencil icon.
- ADD DATA:** A section containing a grid of buttons for data entry:
 - PHOTO
 - SKETCH
 - SAMPLE
 - COMMENT
 - LANDSLIDES
 - LOG / SECTION
 - MANMADE LANDFORMS
 - STRUCTURAL MEASUREMENT
 - SUPERFICIAL LANDFORM
 - BUILDING STONES

4.1 LOCALITY INFORMATION

Locality Number (No)

- Each Field Observation is automatically given a Locality Number
- If you wish to view or modify another Field Observation while the switchboard is open, then Select the Field Observation (Locality Number) from the Drop-down list

Easting and Northing

- Are automatically derived

Pan

- Pans to the selected Locality Number within the ArcMap Window (the locality will be located in the centre of the ArcMap Window at the same scale)

Locality Description

- Enter in a description of your location
- Press Save

Summary Label on Map

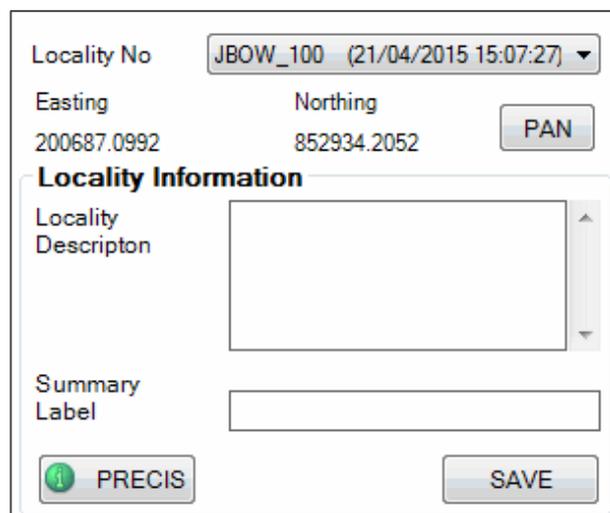
- Enter in a short summary or code that you wish to see beside your Field Observation Point within the ArcMap Window
- Press Save

Save

- Saves the Locality Description and the Summary Label to the Database

Précis

- The Précis Tool gives an overview screen shot of a Field Observation point including, Comments, Sketches, Photos, Samples, and Observations. The Précis Tool can also be accessed from the BGS SIGMA Mobile Toolbar by pressing the  button.
- See [Section 3.5: Precis Tool \(page 16-17\)](#).



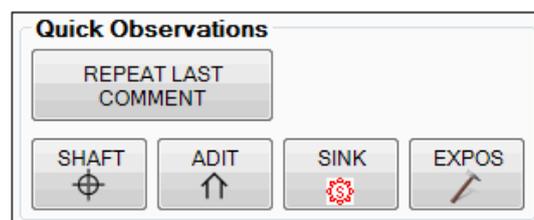
The screenshot shows a form titled 'Locality Information'. At the top, there is a dropdown menu for 'Locality No' with the value 'JBOW_100' and a timestamp '(21/04/2015 15:07:27)'. Below this are two input fields: 'Easting' with the value '200687.0992' and 'Northing' with the value '852934.2052'. To the right of these fields is a 'PAN' button. The main section of the form is a large text area for 'Locality Description'. Below the text area is a 'Summary Label' input field. At the bottom left is a green circular icon with an 'i' and the text 'PRECIS'. At the bottom right is a 'SAVE' button.

4.2 QUICK OBSERVATIONS

Click on the button/buttons to make a Quick Observation, if required.

Repeat Last Comment

- Duplicates the last comment in the database
- You will find the comment in the Comments form



The screenshot shows a toolbar titled 'Quick Observations'. It contains five buttons: 'REPEAT LAST COMMENT', 'SHAFT' (with a crosshair icon), 'ADIT' (with an upward arrow icon), 'SINK' (with a gear icon), and 'EXPOS' (with a pencil icon).

Shaft

- Adds a Shaft Observation
- You will find the Shaft (Abandoned) in the Manmade Landforms form, if you wish to add more detail

Adit

- Enter in an Azimuth (Save and Close) and an Adit Observation is created
- You will find the Adit in the Manmade Landforms form, if you wish to add more detail

Sink

- Adds a Sink Observation
- You will find the Sink (Doline_Sinkhole) in the Superficial Landforms form, if you wish to add more detail

Exposure

- Type in a lithology comment (Save and Close) and an Exposure Observation is created
- You will find the Exposure within the Spot_Observation Table in the ArcGIS Table of Contents

4.3 ADD DATA

Click on the button/buttons to enter in the data for your Field Observations.

ADD DATA

PHOTO	SKETCH
SAMPLE	COMMENT
LANDSLIDES	LOG / SECTION
MANMADE LANDFORMS	STRUCTURAL MEASUREMENT
SUPERFICIAL LANDFORM	BUILDING STONES

4.4 PHOTO

PHOTOGRAPHS

JBOW_102

NEW COPY SAVE CANCEL DELETE HIDE

Frame No:

SIGMA Photo Name:
JBOW_102_2015422_01

Original Photo Name:

Photo Facing

Pano

Plan

N/A

N
W E
S

Description

Link Photo

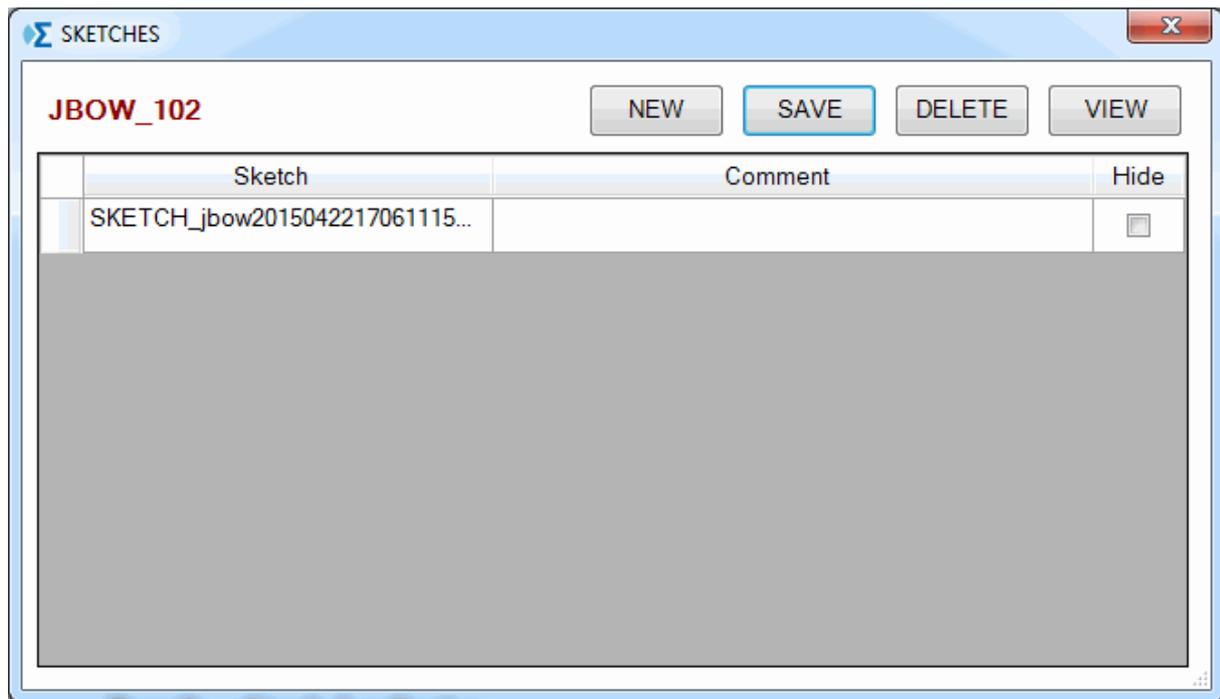
View Photo

Name	Original Name	Description	Hide	Frame No	Direction
JBOW_102_2015422_01			<input type="checkbox"/>		

- Press the **NEW** button and a Photographic entry is created in the database
 - A read-only snap-shot of the database (database view) is located at the bottom of the form
 - Highlight the database view rows for Copying, Saving, Deleting and etc. but you can only change the information within the database view using the form boxes

- Enter in a **Frame Number** (No), if required
 - This is a helpful tool for linking the camera photo number to the Observation Point
- Select a **Photo Facing**
 - Pano - Panoramic
 - Plan – Plan View
 - N/A – Not Available/Applicable
 - Direction – click a directional point
- Enter in a detailed **Description** of the photo taken
- To Link your photo to the Observation Point: highlight the row in the database view , press the **Link Photo** button, browse to the Photo Location using Windows, select your file and press Open
- To View your linked photo: highlight the row in the database view and press the **View Photo** button (Close the photograph using the red X)
- To **Edit** any record, first highlight the row in the database view , change the information within the form, and press the **SAVE** button
 - Multiple files can be edited at once by highlighting the rows in the database view
 - The Frame Number, Description, and Direction will all be updated
- **Copy** - To create a new Photo record with the same description: highlight the row to be copied in the database view and press the **COPY** button
 - The new record will be created at the bottom of the database view
- **Save** – Any changes within the form will need to be saved (or cancelled) before you can move on to the next step (**SAVE** button)
- **Cancel** - Any changes you have made to the form, before saving, can be cancelled using the **CANCEL** button
- **Delete** – To delete a record, highlight the row in the database view and press the **DELETE** button
 - Multiple files can be deleted at once by selecting them in the database view and pressing the **DELETE** button
- **Hide/Show** – If you do not wish to see the Photo location on the Map Face (ArcMap Window) then select the **HIDE** button or check the box in the database view
 - To show the record on the Map Face, highlight the row in the database view and press the **SHOW** button
 - (To view Hidden records generally on the MapFace, See [Section 3.11.5: Show hidden features, page 24](#))
- A spreadsheet of all of your Project Photos (for Asset Bank) can be generated from the BGS SIGMA Mobile Toolbar – Database Tools – Photos Spreadsheet
 - See [Section 3.12.5: Photos Spreadsheet, page 26](#)

4.5 SKETCH



- Press the **NEW** button and the Sketch is created in the database and the Sketch Pad is opened
- After you have created your Sketch it is recommended that you enter in a **Comment** within the Form, press **SAVE**
- If you do not wish to see the Sketch location on the Map Face (ArcMap Window) then check the **Hide** box within the database view
 - Edit the Hide/Show by checking the box on or off for any record
 - (To view Hidden records generally on the MapFace, See [Section 3.11.5: Show hidden features, page 24](#))
- **Save** both your Sketch and your entry into the form by pressing the **SAVE** button in both locations
- To **Delete** the sketch, first highlight the row in the database view and press the **DELETE** button
 - Multiple files can be deleted at once by selecting them in the database view and pressing the **DELETE** button
- To **View** the sketch, first highlight the row in the database view and press the **VIEW** button
- To **Edit** any record, first highlight the row in the database view , change the information within the form, and press the **SAVE** button
- Numerous Sketches can be created for one observation by pressing the **NEW** button (and then the **SAVE** button)
- Instructions on how to use the **Sketch Pad** are found in the following Section

4.5.1 Sketch Pad

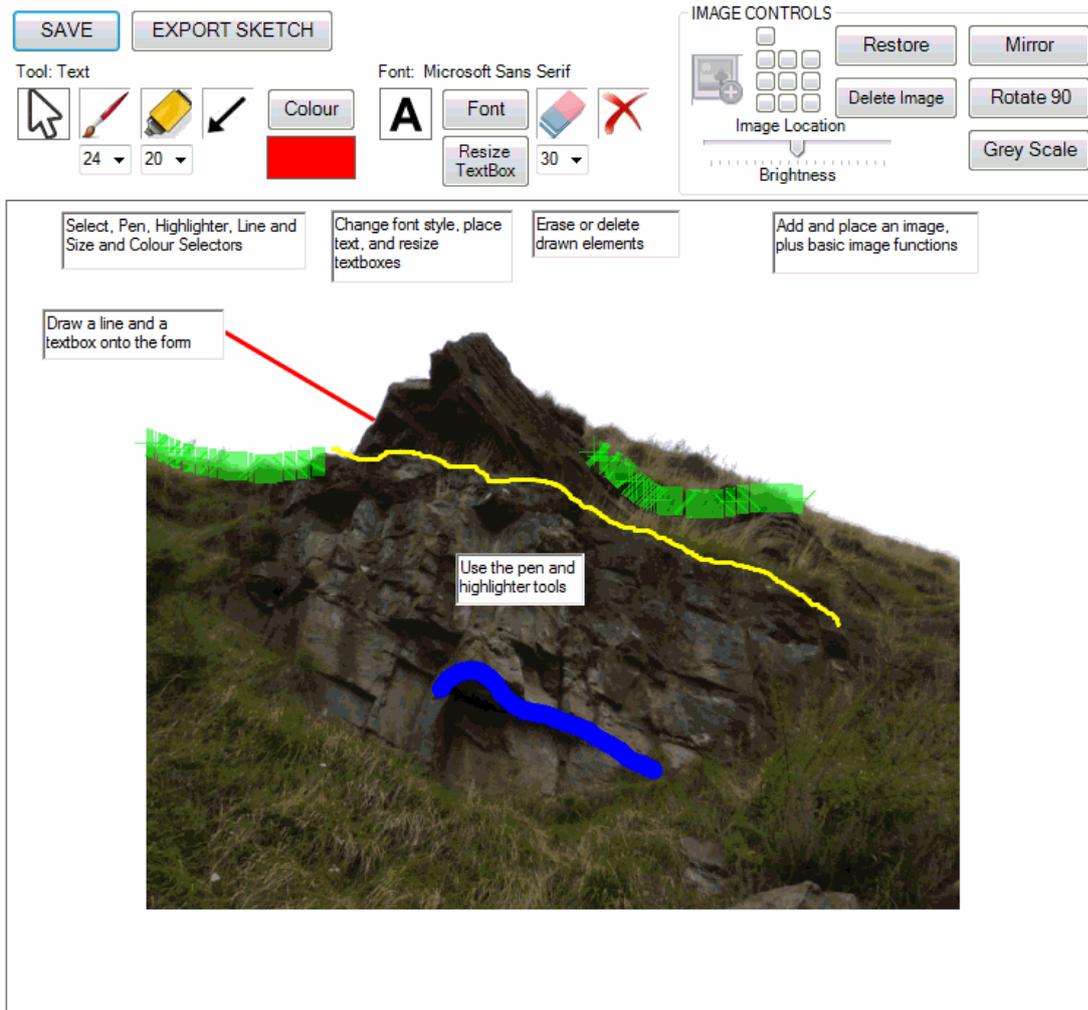


Image Controls

- Add an Image to the Sketch Pad by clicking the **Add Image Button** 
- Select the Image Location by using the small grey buttons to the right of the Add Image Button
 - The top lone button refers to Full Screen
 - Top left, top centre, top right
 - Centre left, centre centre, centre right
 - Bottom left, bottom centre, bottom right
- Options for Images:
 - **Mirror** – flips the image on the horizontal axis
 - **Rotate 90** – rotates the image by increments of 90 degrees
 - **Grey Scale** – converts the image from colour to grey scale
 - **Brightness** – slide the brightness scale from left to right for lighter or darker images
 - **Restore** – restores the image to its original format
 - **Delete Image** – deletes the image from the screen

Sketch Controls

- To **freehand draw**  onto the Sketch Pad:
 - Select a size for the pen/brush by choosing from the drop down menu below the button
 - Select a colour for the pen/brush by pressing the Colour Button and choosing the colour from the Dialog Box, press OK
 - Press the Paintbrush button and holding the left mouse button down draw on screen – release the mouse to finish drawing
- To **freehand highlight**  onto the Sketch Pad:
 - Select a size for the highlighter by choosing from the drop down menu below the button
 - Select a colour for the highlighter by pressing the Colour Button and choosing the colour from the Dialog Box, press OK
 - Press the Highlighter button and holding the left mouse button down draw on screen – release the mouse to finish drawing
- To **draw lines**  (arrows to come) onto the Sketch Pad:
 - Select a colour for the line/arrow by pressing the Colour Button and choosing the colour from the Dialog Box, press OK
 - Select the line/arrow button and holding the left mouse button down draw the line – release the mouse to end the line
- To **move**  **lines/arrows** within the Sketch Pad:
 - Select the Select Tool, click on the line to be moved (it will turn aqua), move the line to a new location and click on screen to drop it (original colour will return)
- To **draw a textbox**  onto the Sketch Pad:
 - Select a Font for the text by pressing the Font Button and choosing the Font from the Dialog Box, press OK
 - Select the Textbox button and holding the left mouse button down draw the text box – release the mouse to finish drawing
 - Add text by clicking within the text box and typing
 - To edit text click on the textbox icon and click within the textbox to be edited
- To **resize the textbox** within the Sketch Pad:
 - Select the Resize TextBox button, click within the textbox to be resized, and grab the handles along the outer edges to make the textbox bigger or smaller
- To **move**  **the textbox** within the Sketch Pad:
 - Select the Select Tool, click within the textbox to be moved (it will turn grey), move the textbox to a new location and click within the textbox again to drop it (original colour will return)
- To **erase**  drawn or highlighted lines:
 - Select an eraser size from the drop-down menu below the button
 - Select the eraser button and holding down the left mouse button erase any unwanted lines within the Sketch Pad
- To **delete**  lines/arrows and textboxes:

- Select the delete button (the cursor will change to cross-hairs) and within the Sketch Pad delete any unwanted elements by clicking on them

Main Controls

- **SAVE**
 - When the Save button is clicked an editable version and a JPEG are saved to the project folder
- **EXPORT SKETCH**
 - Saves a JPEG to the folder specified

Sketch Tool Caveats

- The Sketch Tool is very much under development and has certain limitations currently, these are:
 - Any adjustments to the image should be made before drawing any sketched lines onto it – adjusting the image later will cause any sketched lines to be deleted
 - Deleting the image will also delete any sketched lines already drawn
 - The Highlighter tool is not creating as smooth a line as desired

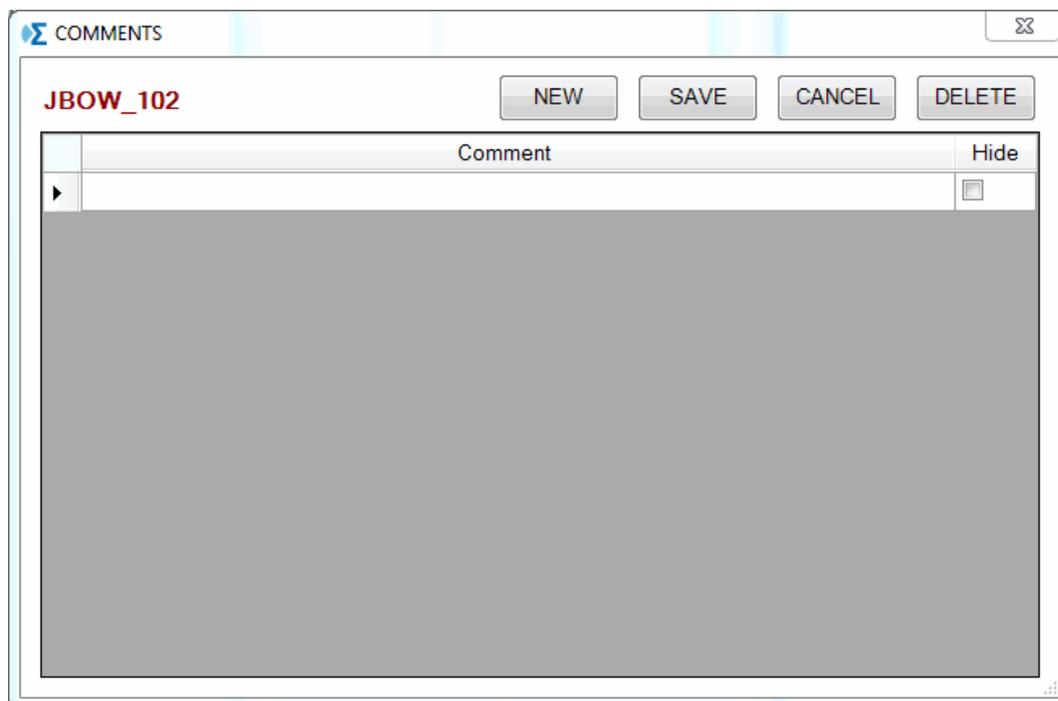
4.6 SAMPLE

The screenshot shows the 'SAMPLES' application window. At the top, there are buttons for 'NEW', 'COPY', 'SAVE', 'CANCEL', 'DELETE', and 'HIDE'. Below these is a form for adding a new sample. The 'Sample Number' field contains 'JBOW_102_2015429_01'. The 'Sample Type' dropdown menu is open, showing options: Bedrock Sample, Hand Specimen, Soil Sample, Stream Sediment Sample, Fossil Sample, Not Applicable, Not Available, Not Entered, and Superficial Deposit Sample. To the right is a 'Description' text area. Below the form is a table with columns 'Sample No.', 'Sample Description', and 'Hide'. The first row is highlighted in blue and contains 'JBOW_102' in the 'Sample No.' column and a checkbox in the 'Hide' column.

- Press the **NEW** button and a Sample entry is created in the database
 - A read-only snap-shot of the database (database view) is located at the bottom of the form
 - Highlight the database view rows for Copying, Saving, Deleting and etc. but you can only change the information within the database view using the form boxes
- Select the **Sample Type** from the drop down menu
- Enter in a detailed **Description** of the Sample
- **Save** – Any changes within the form will need to be saved (or cancelled) before you can move on to the next step (**SAVE** button)

- To **Edit** any record, first highlight the row in the database view , change the information within the form, and press the **SAVE** button
 - Multiple files can be edited at once by highlighting the rows in the database view
 - The Sample Type and Description will be updated
- **Copy** – To create a new Sample record with the same type and description: highlight the row to be copied in the database view and press the **COPY** button
 - The new record will be created at the bottom of the database view
- **Cancel** – To cancel any changes you have made to the form, before saving, use the **CANCEL** button
- **Delete** – To delete a record, highlight the row in the database view and press the **DELETE** button
 - Multiple files can be deleted at once by selecting them in the database view and pressing the **DELETE** button
- **Hide/Show** – If you do not wish to see the Sample location on the Map Face (ArcMap Window) then select the **HIDE** button or check the box in the database view
 - To show the record on the Map Face, highlight the row in the database view and press the **SHOW** button
 - (To view Hidden records generally on the MapFace, See [Section 3.11.5: Show hidden features, page 24](#))
- A spreadsheet of all of your Project Samples can be generated from the BGS SIGMA Mobile Toolbar – Database Tools – Samples Spreadsheet
 - See [Section 3.12.6: Samples Spreadsheet, page 26](#)

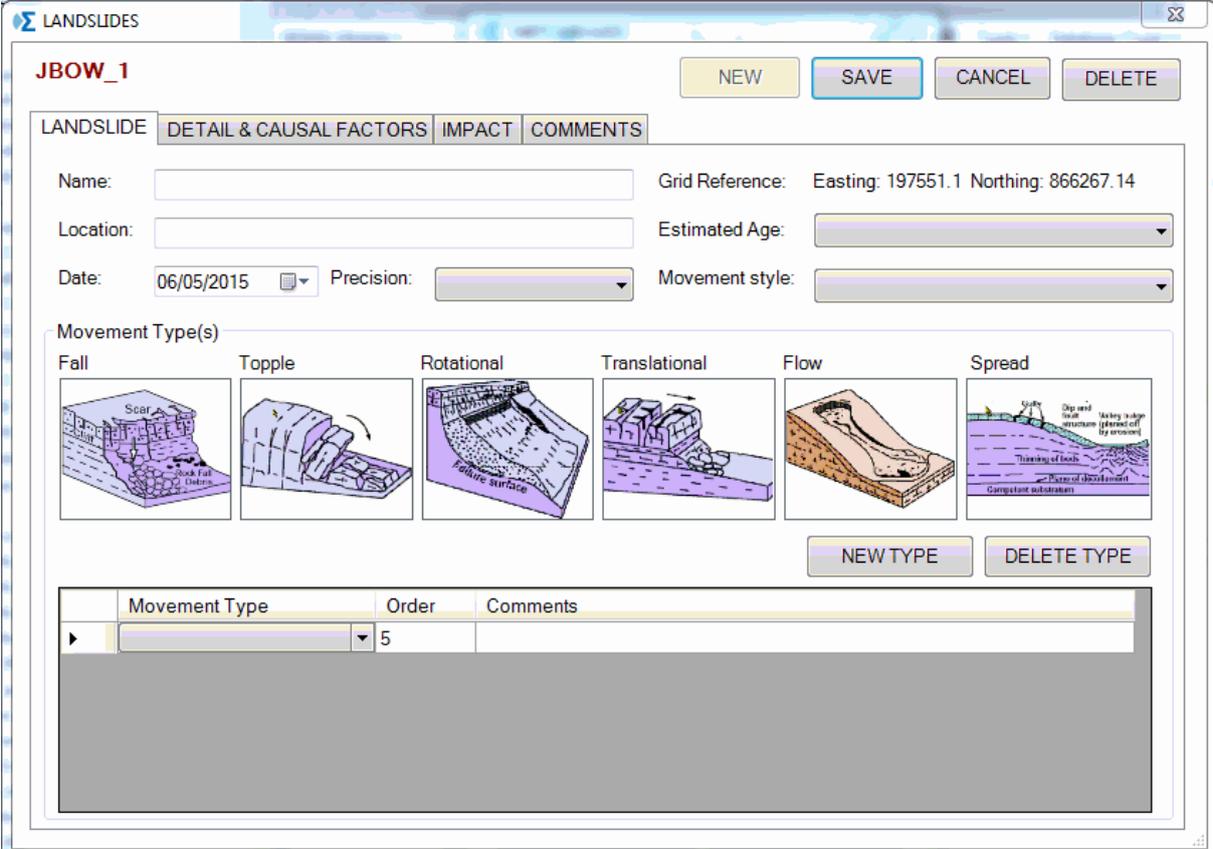
4.7 COMMENT



- Press the **NEW** button and a Comment entry is created in the database view
- Write your **Comment** in the database view
- If you do not wish to see the Comment location on the Map Face (ArcMap Window) then check the **Hide** box within the database view

- Edit the Hide/Show by checking the box on or off for any record
- (To view Hidden records generally on the MapFace, See [Section 3.11.5: Show hidden features, page 24](#))
- To **Edit** a comment click within the Comment box in the database view and make your edits
- **Save** – Save any changes within the form before closing by pressing the **SAVE** button
- **Cancel** – Press the **CANCEL** button to delete existing text
- **Delete** – To delete a record, highlight the row in the database view  and press the **DELETE** button
 - Multiple files can be deleted at once by selecting them in the database view and pressing the **DELETE** button

4.8 LANDSLIDES



LANDSLIDES NEW SAVE CANCEL DELETE

JBOW_1

LANDSLIDE **DETAIL & CAUSAL FACTORS** IMPACT COMMENTS

Name: Grid Reference: Easting: 197551.1 Northing: 866267.14

Location: Estimated Age:

Date: 06/05/2015 Precision: Movement style:

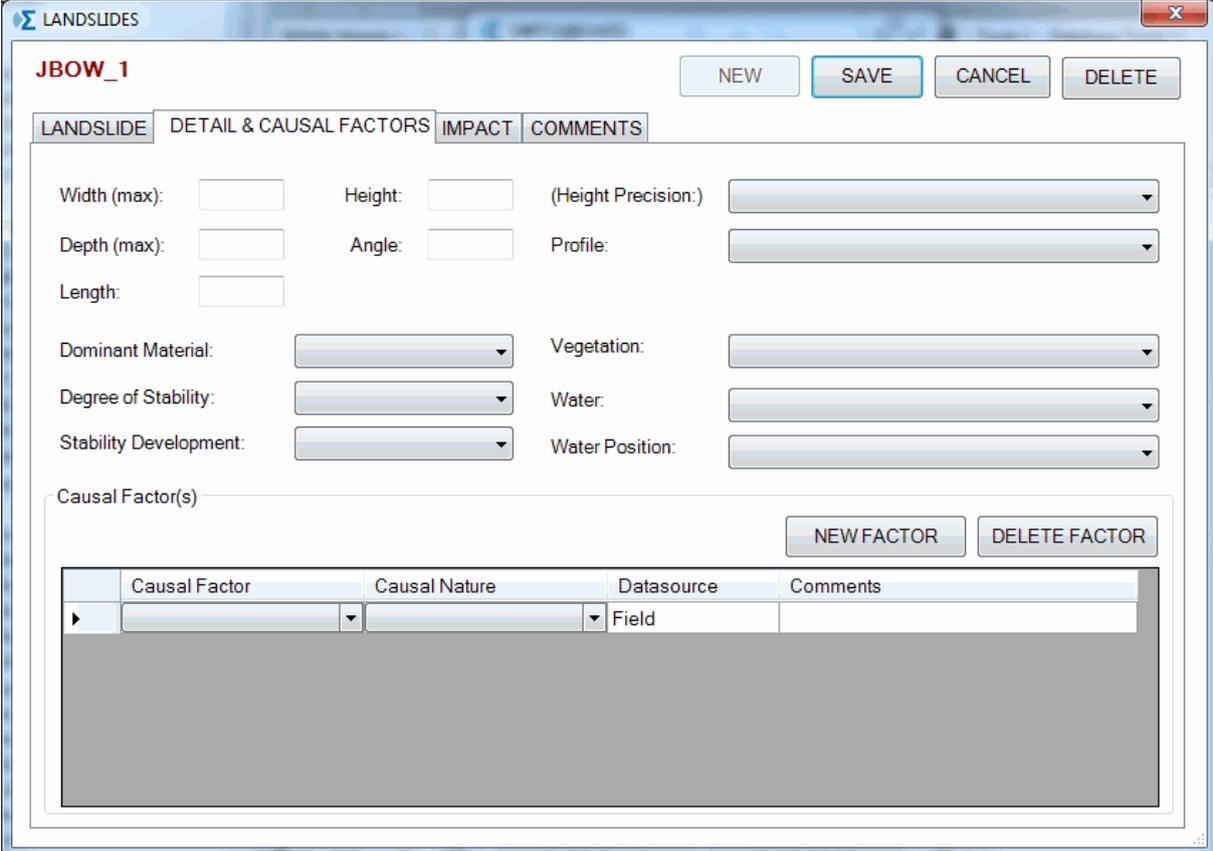
Movement Type(s)

Fall Topple Rotational Translational Flow Spread

Movement Type	Order	Comments
<input type="text"/>	5	

- Press the **NEW** button and a Landslide entry is created in the database
 - Only one Landslide can be entered per Field Observation Point
 - The Grid Reference will automatically be populated with Easting and Northing
- Enter data as required into: **Name, Location, Date, Precision, Estimated Age,** and **Movement style** using the text boxes or the drop down menus
- Press **NEW TYPE** to add a Movement Type into the Database view
 - A description of each Movement Type can be accessed by hovering the mouse/stylus over a Movement Type diagram
- Select the **Movement Type** from the drop-down menu and enter a **Comment** if required
 - More than one Movement Type can be added to the Database view and sorted by altering the **Order** numbers and pressing the Order Heading (or the next New Type added will also sort the record)

- To Delete a **Movement Type**, highlight the row in the database view  and press the **DELETE TYPE** button
- It is good practice to Save the form before going on to the next tab (or closing the form) by pressing the **SAVE** button
- The **CANCEL** button will erase all fields in all tabs
- The **DELETE** button will delete the entire database entry



The screenshot shows the 'LANDSLIDES' software window with the 'JBOW_1' form open. The 'DETAIL & CAUSAL FACTORS' tab is active. The form contains several input fields and dropdown menus for recording landslide details. Below these fields is a table for 'Causal Factor(s)' with columns for 'Causal Factor', 'Causal Nature', 'Datasource', and 'Comments'. A 'NEW FACTOR' button is positioned above the table, and a 'DELETE FACTOR' button is to its right. The table currently contains one row with 'Field' in the 'Datasource' column.

- On the **DETAIL & CAUSAL FACTORS** tab, continue to enter data as required using the text boxes and drop-down menus
- Press **NEW FACTOR** to add a new Causal Factor into the Database view
 - Enter the Causal Factor and Causal Nature using the drop-down menus and enter a Comment if required
 - More than one Causal Factor can be added to the Database view
- To Delete a Causal Factor, highlight the row in the database view  and press the **DELETE FACTOR** button
- It is good practice to Save the form before going on to the next tab (or closing the form) by pressing the **SAVE** button
- The **CANCEL** button will erase all fields in all tabs
- The **DELETE** button will delete the entire database entry

- On the **IMPACT** tab, continue to enter data as required using the text boxes and drop-down menus
- Press **NEW DAMAGE** to add Damage(s) into the Database view
 - Enter the Landuse, Level of Damage, and Position of Damage using the drop-down menus and enter a Comment if required
 - More than one Damage entry can be added to the Database view
- To Delete a Damage entry, highlight the row in the database view  and press the **DELETE DAMAGE** button
- It is good practice to Save the form before going on to the next tab (or closing the form) by pressing the **SAVE** button
- The **CANCEL** button will erase all fields in all tabs
- The **DELETE** button will delete the entire database entry

- On the **COMMENTS** tab, you have the option to add any extra information or detailed notes
- It is good practice to Save the form before going on to the next tab (or closing the form) by pressing the **SAVE** button
- The **CANCEL** button will erase all fields in all tabs

- The **DELETE** button will delete the entire database entry

4.9 LOG/SECTION

The screenshot shows a software interface titled "LOGS / SECTIONS" for a specific location "JBOW_102". At the top right, there are three buttons: "NEW", "SAVE", and "DELETE". Below the title bar, there are three tabs: "1_Auger", "2_Borehole", and "3_Quarry". The main form area is divided into several sections:

- Direction:** Two buttons, "Up" and "Down".
- Type:** A row of buttons: "Borehole", "Auger", "Other", "Quarry", "Section", and "Trench".
- Azimuth:** An empty input field.
- Inclination:** An empty input field.
- Total Thickness:** An empty input field.
- Units:** A section containing "NEW UNIT" and "DELETE UNIT" buttons.
- Table:** A table with the following columns: "Sort", "Description", "Lithology", "Bottom Limit", "Top Limit", and "Thick". The first row has a value of "5" in the "Sort" column. The rest of the table is currently empty.

- To begin, press the **NEW** button
- Select a Log/Section **Direction**
- Select a **Type** of Log/Section to record
- If required, enter in the Azimuth and Inclination
- The Total Thickness will automatically be updated as Units are recorded
- Select **NEW UNIT** and enter the required information directly into the database view by typing or using the drop-down menus
 - Keep adding **NEW UNITS** and entering the required information until the Log/Section is complete
 - If a unit has been missed, select **NEW UNIT** and change the value in the Sort column
 - For example, if a unit was missed between -5 and -10, then in the Sort column change the value to between -6 and -9
 - When the rest of the information has been entered into the row, press the Sort Column header and the unit will be slotted into place (or the next New Unit added will also sort the record)
 - The Lithology drop-down list can be customised by going to the BGS SIGMA Mobile Toolbar – Database Tools – Filter Dictionaries, See [Section 3.12.3: Filter Dictionaries, pages 25-26](#)
- To Delete a unit, select the row in the dataview  and press the **DELETE UNIT** button
- Save any changes within the form before closing by pressing the **SAVE** button
- Numerous Logs/Sections can be recorded at the same location by creating a **NEW** record

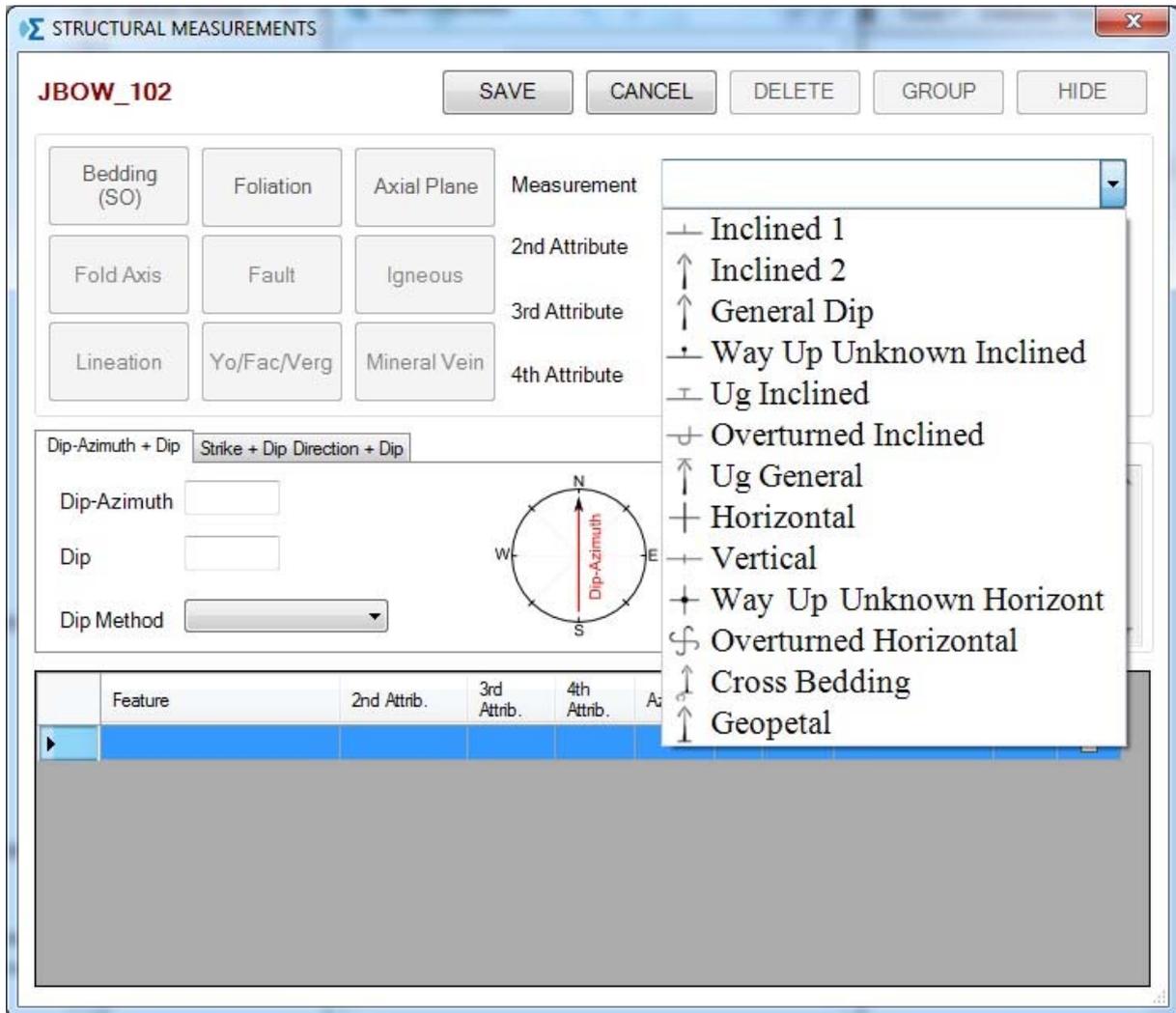
- Logs/Sections will be separated by tabs 1_Auger 2_Borehole 3_Quarry |
- To Delete the Log/Section choose the Log/Section tab and press the **DELETE** Button

4.10 MANMADE LANDFORMS

- To begin press on the Manmade Landform you wish to record, ie. Adit
 - A read-only snap-shot of the database (database view) is located at the bottom of the form
 - Highlight the database view rows for Copying, Saving, Deleting and etc. but you can only change the information within the database view using the form boxes
- Enter into the form the required information: **Azimuth, Inclination, Start Height, Length, Depth/Height, and Observation Comments** (unsuitable fields for the observation will be greyed-out/un-editable)
- **Save** – You will need to Save the record before you can add or modify another observation and/or before closing by pressing the **SAVE** button
- To **Edit** any record, first highlight the row in the database view , change the information within the form, and press the **SAVE** button
- **Copy** – To create a new Manmade Landform record with the same information: highlight the row to be copied in the database view and press the **COPY** button
 - The new record will be created at the bottom of the database view
- **Cancel** – To cancel any changes you have made to the form, before saving, use the **CANCEL** button
- **Delete** – To delete a record, highlight the row in the database view and press the **DELETE** button

- Multiple files can be deleted at once by selecting them in the database view and pressing the **DELETE** button
- **Hide/Show** – If you do not wish to see the Manmade Landform on the Map Face (ArcMap Window) then select the **HIDE** button or check to box on the database view
 - To show the record on the Map Face, highlight the row in the database view and press the **SHOW** button
 - (To view Hidden records generally on the MapFace, See [Section 3.11.5: Show hidden features, page 24](#))

4.11 STRUCTURAL MEASUREMENT



- To begin press on the Structural Measurement you wish to record, ie. Bedding
 - A drop-down menu will appear where you will select the **Measurement** you wish to record
 - A read-only snap-shot of the database (database view) is located at the bottom of the form
 - Highlight the database view rows for Copying, Saving, Deleting and etc. but you can only change the information within the database view using the form boxes

- Enter into the form the required information: **2nd, 3rd, and 4th Attributes, Dip/Azimuth/Strike, and General Structure Comments** (unsuitable fields for the observation will be greyed-out/un-editable)
- **Group** – You have the option of grouping records together by highlighting the rows in the database view  and pressing the **GROUP** button
- **Ungroup** – Ungroup records by highlighting the row in the database view  and pressing the un**GROUP** button (this can only be done one record at a time)
- **Save** – You will need to Save the record before you can add or modify another observation and/or before closing by pressing the **SAVE** button
- To **Edit** any record, first highlight the row in the database view , change the information within the form, and press the **SAVE** button
- **Cancel** – To cancel any changes you have made to the form, before saving, use the **CANCEL** button
- **Delete** – To delete a record, highlight the row in the database view  and press the **DELETE** button
 - Multiple files can be deleted at once by selecting them in the database view and pressing the **DELETE** button
- **Hide/Show** – If you do not wish to see the Structural Measurement on the Map Face (ArcMap Window) then select the **HIDE** button or check the box on the database view
 - To show the record on the Map Face, highlight the row in the database view  and press the **SHOW** button
 - (To view Hidden records generally on the MapFace, See [Section 3.11.5: Show hidden features, page 24](#))
- A spreadsheet of all of your Structural Measurements can be generated from the BGS SIGMA Mobile Toolbar – Database Tools – Structural Spreadsheet
 - See [Section 3.12.7: Structural Spreadsheet, page 27](#)

4.12 SUPERFICIAL LANDFORM

- To begin press on the Superficial Landform you wish to record, ie. Glacial
 - Other than Erratic, a drop-down menu will appear where you will select the **Feature** you wish to record
 - A read-only snap-shot of the database (database view) is located at the bottom of the form
 - Highlight the database view rows for Copying, Saving, Deleting and etc. but you can only change the information within the database view using the form boxes
- Enter into the form the required information: **Length, Width, Depth/Height, Azimuth, and Lithology** (unsuitable fields for the observation will be greyed-out/un-editable)
- **Save** – You will need to Save the record before you can add or modify another observation and/or before closing by pressing the **SAVE** button
- To **Edit** any record, first highlight the row in the database view , change the information within the form, and press the **SAVE** button
- **Cancel** – To cancel any changes you have made to the form, before saving, use the **CANCEL** button
- **Delete** – To delete a record, highlight the row in the database view  and press the **DELETE** button
 - Multiple files can be deleted at once by selecting them in the database view and pressing the **DELETE** button

- **Hide/Show** – If you do not wish to see the Superficial Landform on the Map Face (ArcMap Window) then select the **HIDE** button or check the box in the database view
 - To show the record on the Map Face, highlight the row in the database view  and press the **SHOW** button
 - (To view Hidden records generally on the MapFace, See [Section 3.11.5: Show hidden features, page 24](#))

4.13 BUILDING STONES

Currently under development.

5 BGS•SIGMA*desktop*

BGS•SIGMA*desktop* is used to compile all field data to create seeded geological linework and polygons.

5.1 SETTING UP BGS•SIGMA*DESKTOP*

If you are going to use your Field data, from BGS•SIGMA*mobile*, then it is recommended that you keep an ‘untouched’ copy of your fieldwork in a safe location. Take a copy of your DFDC and paste it into your BGS•SIGMA*desktop* Folder before starting BGS•SIGMA*desktop* and only link to this copied dataset. It is also recommended that you Archive your BGS•SIGMA*mobile* Project, as discussed in [Section 3.15 \(page 28\)](#).

5.1.1 Start Collecting

- Select this option to set-up a new BGS•SIGMA*desktop* project or to continue with an existing project
- Details of how to do this are outlined in the [Section 1.3: ArcMap 10 - BGS•SIGMA Set-up \(page 2\)](#)

5.1.2 Modify Collection Layers

- After you have set-up a project you can use this function to modify the layers you chose in the ‘Select Datasets’ dialog box and within your project

5.1.3 Import Database

- A function to allow you to import previous fieldwork databases or colleagues’ databases for collating
- Pre-2015 databases are currently viewable by the précis tool
- See [Section 3.14: Working with BGS•SIGMA 2012 Databases \(page 28\)](#)

5.1.4 Help

- A link to the BGS•SIGMA 2015 manual

5.2 CREATING BOUNDARIES

5.2.1 Create a Map Boundary Line

You will need to create a Map Boundary Line for your project. This boundary will be used for snapping lines at the edge of your project and thus for the creation of polygons.

- For square/rectangular shaped project areas:
 - On the BGS SIGMA Desktop Toolbar select Tools and Create Map Boundary Line
 - Enter in a map sheet, such as NT26NE or Grid References in the format xmin, ymin, xmax, ymax and press OK
- For irregular shaped project areas:
 - Make sure the Boundary Line Layer is visible in the ArcMap Table of Contents
 - Select the Boundary Line from the Create Features Window and draw your Boundary
 - Edit by using the Edit Tools, if necessary

5.2.2 Create a Map Boundary Polygon

A Map Boundary Polygon is necessary for downloading Baseline Data and useful for clipping layers to the Project Area.

- For square/rectangular shaped project areas:
 - On the BGS SIGMA Desktop Toolbar select Tools and Create Map Boundary
 - Enter in a map sheet, such as NT26NE or Grid References in the format xmin, ymin, xmax, ymax and press OK
- For irregular shaped project areas:
 - Make sure the Boundary Layer is visible in the ArcMap Table of Contents
 - Select Boundary from the Create Features Window and draw your Boundary
 - Edit by using the Edit Tools, if necessary, found on the BGS SIGMA Mobile and Desktop Toolbars and on the ArcMap Editor Toolbar

5.3 DOWNLOAD BASELINE DATA

Useful baseline data should be added to your project to help you make decisions about Geological Linework. Some examples might be: Topology, Contours, Hillshaded images, Historic Maps and Fieldslips, Aerial Photography, and Terrain Models.

It should be noted that Baseline data should be downloaded to the project folder for transportability in the field but can be linked to your home drives for use in the office.

5.4 DOWNLOAD DOMAINS FROM ORACLE

BGS Specific.

5.5 SUBSET LEX-RCS DOMAINS

BGS Specific.

5.6 DIGITIZING AND EDITING GEOLOGICAL BOUNDARIES, SETTING SNAPPING, LAYER SELECTABILITY, AND CREATING TAGS

Digitize Geological Boundaries by firstly making sure the Layer is selected in the Table of Contents, choosing the line style from the Create Features Window, and digitizing your line. Edit your lines using the Edit and Edit Vertices Tools located on the BGS SIGMA Desktop/Mobile or Editor Toolbars. This and other important information are discussed in detail in [Section 2: Digitizing and Editing in BGS•SIGMA 2015 \(page 9\)](#).

5.7 SAVING AND SAVING EDITS

As always, it is good practice to frequently Save  your Project and to Save any Edits that you have made. To Save Edits, Open the Editor Toolbar (Customize – Toolbars - Editor) and Edit – Save Edits.

5.8 BGS SIGMA DESKTOP TOOLBAR – PARTIAL

A portion of the BGS• SIGMA *desktop* Tools are explained in brief in this section. You will find the Topology Tools explained in the Checking for Errors Section ([5.9](#)), the Seed Tools explained in the Creating Seeds Section ([5.10](#)), and the Build Polygons Tool explained in the Building Polygons Section ([5.11](#)).



5.8.

1 2 3 4 5 6 7 8

9 10 11

5.8.1 AutoPan

When this tool is ON, the screen will automatically pan in the direction you are digitizing when you near an edge.

- Check mark – ON, Red X – OFF

5.8.2 BGS Smooth

This tool will smooth jagged lines.

- Select the tool and smooth any required lines (if a line is selected when the tool is pressed, this line will also be smoothed)
 - Please note that this tool has the potential to move your original line nodes and will then affect other lines that are snapped to it so it is best practice to draw your line, smooth it, and then snap other lines on to it (smoothing a group of lines could cause all the snapping to be lost)

5.8.3 Flip Line Tool

This tool is useful for directional lines such as: faults, meltwater channels, drumlins and eskers.

- Select the tool and change the direction of any required lines (if a line is selected when the tool is pressed, this line will also change direction)

5.8.4 Edit Tool

This tool allows you to select, move, duplicate, and delete features.

- Also available from the ArcMap Editing Tools Toolbar and BGS SIGMA Mobile Toolbar

5.8.5 Edit Vertices Tool

This tool allows you to move, insert, delete, and change vertices of a point, line or polygon.

- Also available from the ArcMap Editing Tools Toolbar and BGS SIGMA Mobile Toolbar

5.8.6 Rotate Marker Tool

This tool allows you to rotate a symbol on screen (primarily for cartographic use)

5.8.7 Pan Zoom to Mouse

This button pans or zooms to the area you have clicked on screen and is set to an appropriate scale for digitizing

5.8.8 Précis Tool

The Précis Tool gives an overview screen shot of a Field Observation point including, Comments, Sketches, Photos, Samples, and Observations within the DFDC

- Press the Précis button  from the BGS SIGMA Desktop Toolbar and select the desired Field Observation Point (FOP)

5.8.9 Define Renderer using BGSRef

This tool colours up DiGMap as well as the Polygons Layer within your Project's DFDC.

- Select the Layer you wish to colour in the ArcMap Table of Contents and press the Define Renderer using BGSRef Button  on the BGS SIGMA Desktop Toolbar
- Select Classification Field: either LEX_ROCK or LEX_RCS depending on your preference
- Select Label Field: LEX_ROCK or LEX_RCS
- Select Colouring Field: BGSREF
- Select Description Field: LEX_ROCK or LEX_RCS
- OK, OK

5.8.10 Hide Features Tool

This tool is used to hide features. Use this tool with caution, as you can only hide but not unhide easily. To unhide any currently hidden features you will need to temporarily delete the Definition Query from the Table Properties and change any items in the Hide Field in the Attribute Table from 1 to 0. See also, the [Show Hidden Features](#) tool located on the BGS SIGMA Mobile Tools Drop Down list ([page 24](#)).

5.8.11 Tools – Change Default Editor Tool

This tool allows you to change from Standard to Sketch Editing.

Standard Editing

- Is the default editor where you click/tap on screen to add nodes/vertices for your line

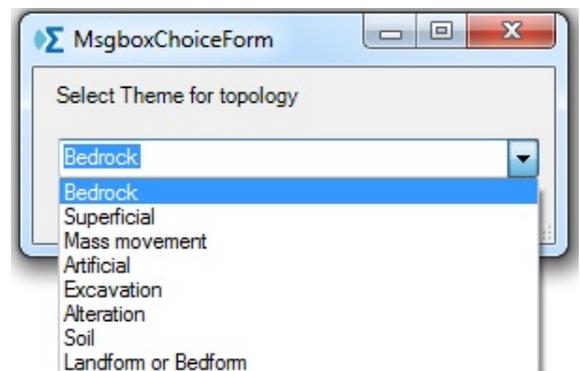
Sketch Editing

- Allows you to draw a continuous line and nodes/vertices are added automatically
 - In this version of the Sketch Editor nodes/vertices are added at reasonably spaced intervals to allow for easy editing of the line

5.9 CHECKING FOR ERRORS

It is a good idea to check for line connectivity errors before building polygons. Lines that have not been snapped together properly will not create polygons. Where the line hasn't snapped together or overhangs the line is called a dangle.

- To check for dangle errors select the Set Map Topology button  from the BGS SIGMA Desktop Toolbar
 - From the dialog box select the Theme you wish to check and Ok
- You can now use the Zoom to First Dangle  button to find and edit your errors
 - Continue to press this button until no more errors are found



- It should be noted that this button will not go to the next error until the current error is fixed
- If you are finding quite a lot of errors, then double check that snapping is set - see [Section 2.1 \(page 10\)](#)
- If you would just like an overall view of probable errors then select the Display nodes within visible extents button 
 - Red nodes are errors
 - As soon as you zoom or pan the node errors will disappear – press the button again to show errors if necessary.
- The Display edges with visible extent button  can be useful for finding obscure errors in the data by highlighting the number of lines connecting to one another

5.10 CREATING SEED TEMPLATES

Seeds are point features with LEX-RCS attributes. You use seeds to attribute and colour the layer's polygons.

The SIGMA Desktop Toolbar provides three ways to create Seed Templates to enable you to seed your polygons. The template commands are found on the BGS SIGMA Desktop – Tools drop-down list.

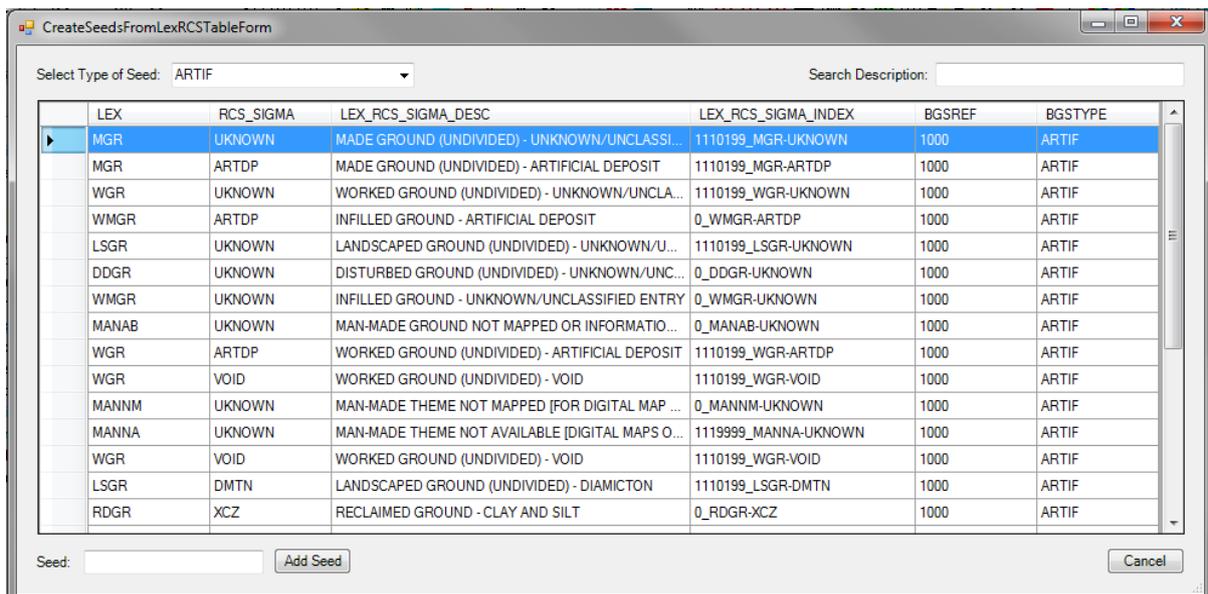
The template commands are as follows:

- Create Seeds
- Seed Templates From Visible Layers
- Create Seed Templates from DigMap

The first step in any of the template creation commands is to turn on the Seed Layer you wish to create the template for in the ArcMap Table of Contents. For example if you wish to capture Bedrock Seeds the “BEDROCK_SEED” layer needs to be checked on.

5.10.1 Create Seeds Command

The “Create Seeds” command uses an on-screen dialog box to interactively create seed templates using LEX-RCS.



- Select the Seed Type you wish to make the template for from the ‘Select Type of Seed’ drop-down list on the top left of the dialog box (Artificial, Bedrock, Fossil Horizon, Mass Movement, or Superficial)
 - The appropriate seeds for that seed type will be displayed in the table
- The table can be sorted, filtered, and adjusted
 - The seeds and seed details can be ordered by clicking on any of the field headings
 - Rows can be filtered by entering a search term into the ‘Search Description’ box
 - Column widths can be adjusted to be larger or smaller
- Click to the left of a row (in the column beginning with the blue box and arrow)
 - This will select your record and add it to the Seed box
 - Press the ‘Add Seed’ button to add the Seed to the Create Features dialog box and automatically be returned to the main form
- Repeat these steps for as many LEX-RCS codes as required
- When you have finished creating your template press the cancel button or exit from the form
- SAVE your ArcMap Project as this will save your template!

You can also:

- Enter the LEX-RCS code directly into the ‘Seed:’ box on the bottom left of the form
 - (If you type in just the LEX, then all items starting with that LEX will be filtered and the seed can be selected as above)
 - LEX-RCS codes should be entered with the hyphen in between them
 - If you wish to use a temporary code or combinations of LEX-RCS codes that are not valid you can still add them to your Create Features dialog box
- If a valid LEX-RCS code is entered into the Seed box it will turn green, invalid entries or combinations will turn the box red
- Press the ‘Add Seed’ button to add the Seed to the Create Features dialog box and automatically be returned to the main form

5.10.2 Seed Templates From Visible Layers

The create Seed Templates From Visible Layers command is a more specialised way of creating templates. It is essentially used to create Seed templates from LEX-RCS codes present in an existing GIS layer.

- The command checks the ArcMap Table of Contents for suitable layers containing LEX-RCS codes
 - Your GIS Layer must contain a field called LEX_RCS and their layer name must contain one of the following keywords (bedrock, superficial, artificial, and mass)
- A template is then created in your Create Features dialog box based on this layer

5.10.3 Create Seed Templates from DigMap

- BGS Specific.

5.10.4 Sharing Templates

Templates are stored as part of the layer so if members of a team wish to share templates it is possible to create a layer file (.lyr) and use it as a mechanism to move templates between different instances of SIGMA.

5.10.5 Seeding Polygons

Once created, the Seed templates are standard ArcMap Edit Templates and are used in the standard way. Select a seed from the Create Features dialog and click on the map where you want to place it. Click as many times as required, to place multiple seeds of the same type. Select a different seed from the Create Features dialog as required.

5.11 BUILDING POLYGONS

Once you have checked for errors and seeded your polygons you can then build them. Select Build Polygons from the BGS SIGMA Desktop Tools drop down list, select the type of polygon you wish to build, and press ok. You can build polygons as many times as required. **It should be noted that this currently cannot be done in the Field using an ArcEditor Licence.**

5.12 PLOTTING ORIENTATION DATA ON A STEREOGRAM

Orientation data collected in SIGMA can be exported and displayed on a stereogram using the freely available, free Open Source “Open Stereo” application <http://www.igc.usp.br/index.php?id=openstereo>.

5.12.1 Installing Open Stereo on your PC or Windows Laptop

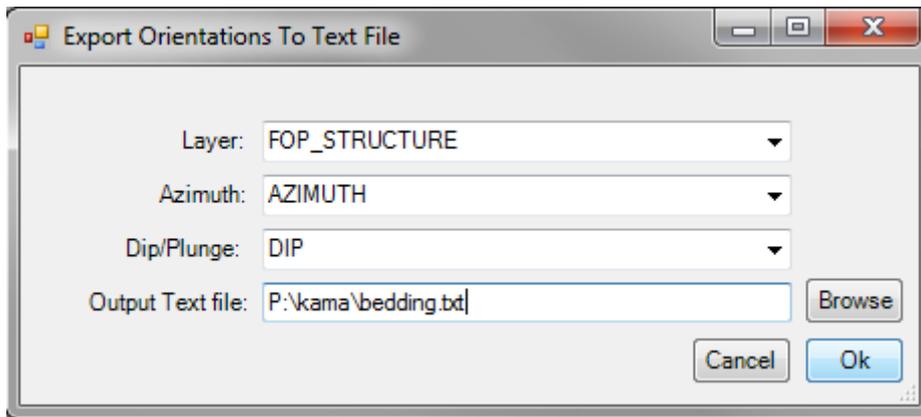
To install Open Stereo, copy the folder S:\SIGMAToolkit\openstereo_0.1.2f_win32 to the local hard drive on your computer. Then create a shortcut to OpenStereo.exe located in the folder you have copied to your hard drive. For use in the office you do not even need to copy the folder you can just create a shortcut to OpenStereo.exe from the S: drive.

5.12.2 Exporting Orientation data to a Text File suitable for use in Open Stereo

The Export Orientations To Text File command under the SIGMA Desktop Tools menu allows the Export of orientation data from a layer such as FOP_STRUCTURE to a simple text format suitable for loading into Open Stereo. The export command will honour any selections that have been applied to the layer and will only export the orientations of selected features. Selection may be spatial or by any attribute.

The Process is as follows:

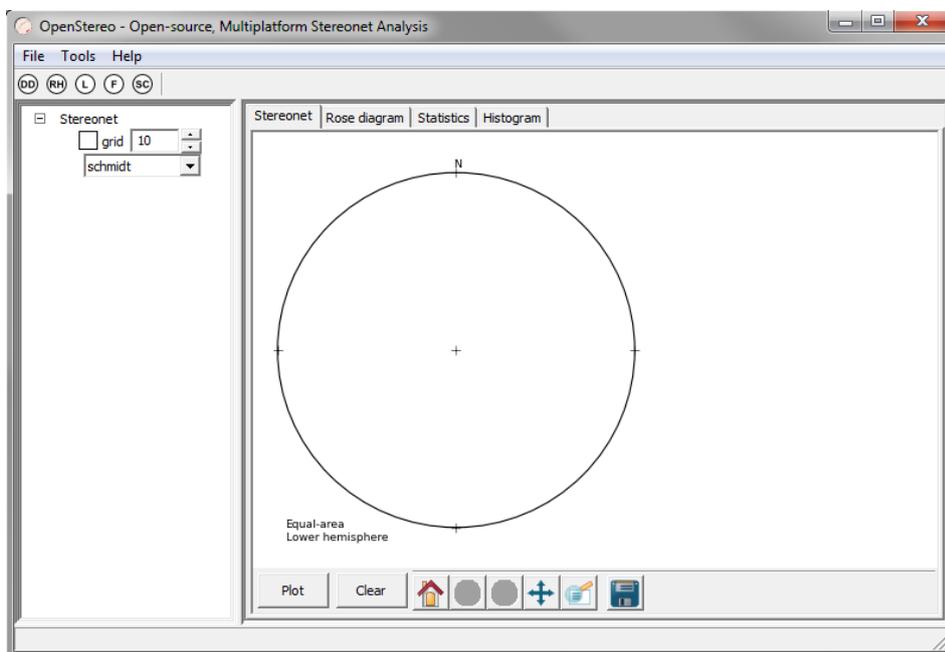
- Select the orientations required using standard ArcMap selection tools
- Click the command and select the layer and fields to be exported
 - The layer will normally be FOP_STRUCTURE (the tool has been written to be generic so that it can potentially be used with other GIS layers containing orientation data)
 - Azimuth field and dip field will normally be called AZIMUTH and DIP respectively
- Then select the output location of the export file (.txt extension)



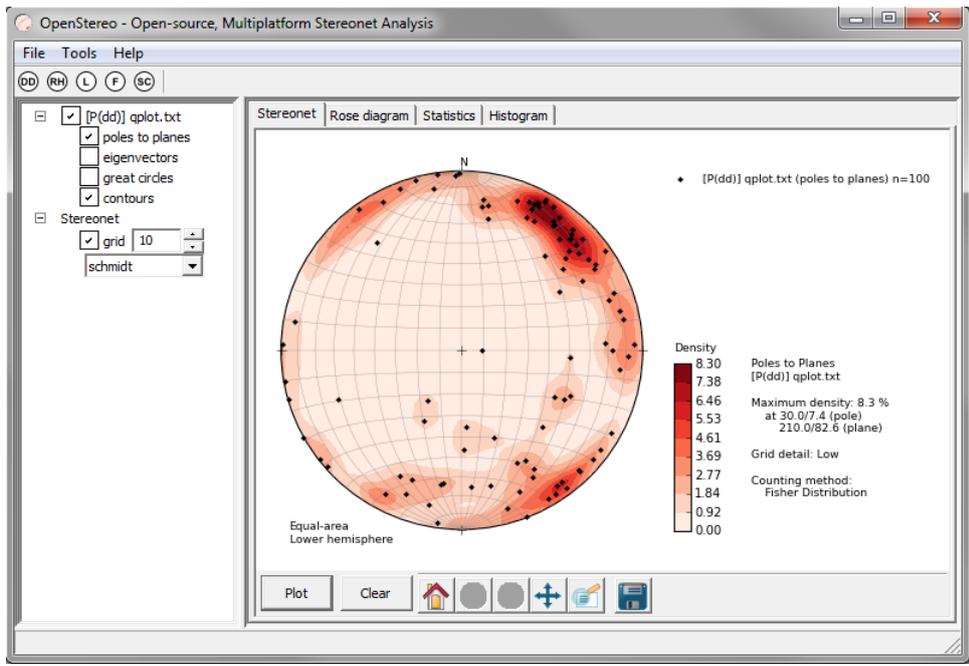
- Click ok to export the orientation data

5.12.3 Plotting your exported orientations in Open Stereo

- Start Open Stereo



- Click File and choose the type of data you want to load
 - For example if you want to load bedding measurements select: Open Planar Data (Dipdir/Dip)
- Navigate to the location of your orientations data file (.txt)
- Click Plot - for a simple plot
- Select options in Open Stereo as required and click plot again to refresh the display



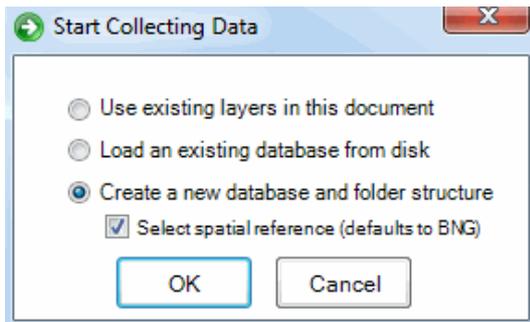
There are many options in Open Stereo for displaying and analysing orientation data such as Stereonets, Rose Diagrams, Statistics and Histograms. Description of the functions available in Open Stereo is beyond the scope of this document. However the options should be fairly intuitive.

6 Setting up Projects Overseas

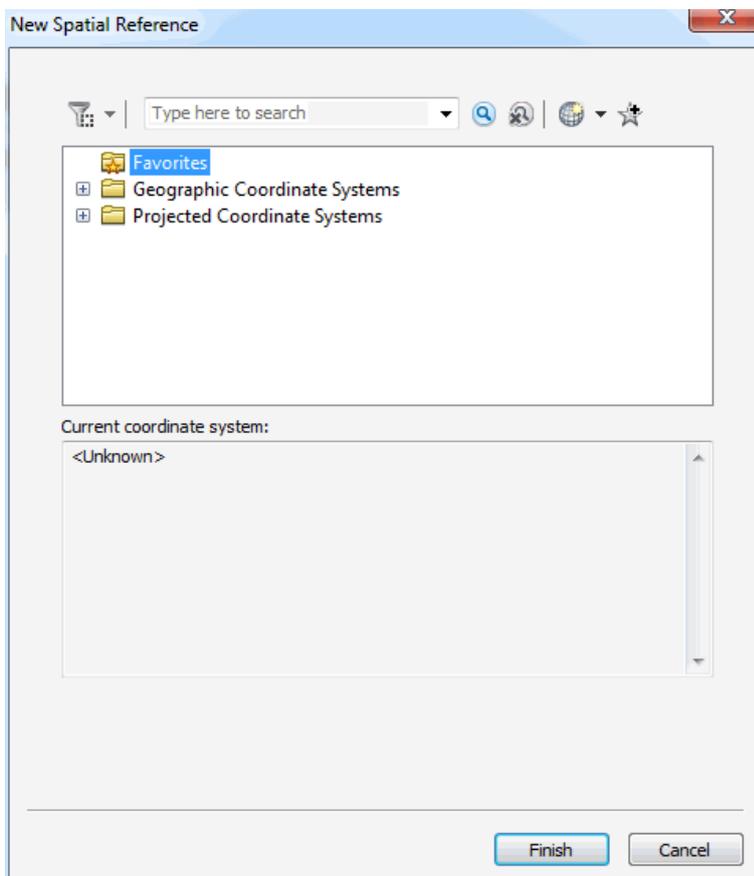
If your Projection/Transformation is standard within ESRI ArcGIS, then you only need to do this process once during Project Set-up. If your Projection/Transformation is non-standard then this process will need to be done at start-up every time you run your Project.

6.1 STEPS TO SETTING UP PROJECTS OVERSEAS

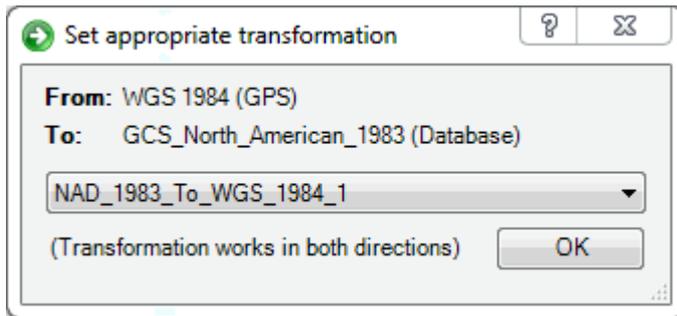
- From the Start Collecting Data dialog box, select Create a new database and folder structure and check Select spatial reference



- Browse to your Project Folder and press OK
- You will then be asked to select the Projection you wish to use from either the list contained within the Geographic or Projected Coordinate Systems Folders



- Set the appropriate transformation from the drop-down list, Press OK



- Continue on setting up your Project from [Section 1.3: Select Datasets \(page 2\)](#)

6.2 HOW TO CHOOSE THE APPROPRIATE TRANSFORMATION

Please see the following documents:

http://webhelp.esri.com/arcgisdesktop/9.3/index.cfm?TopicName=Geographic_transformation_methods

<http://blogs.esri.com/esri/arcgis/2009/05/06/about-geographic-transformations-and-how-to-choose-the-right-one/>

<http://support.esri.com/en/knowledgebase/techarticles/detail/21327>

7 Appendix A – Using the BGS GPS Tools within SIGMA

The Global Positioning System (GPS) uses a satellite based system to determine your position anywhere in the world. The BGS GPS Tools takes the location information and offers various tools to help navigate within your BGS•SIGMA Project.

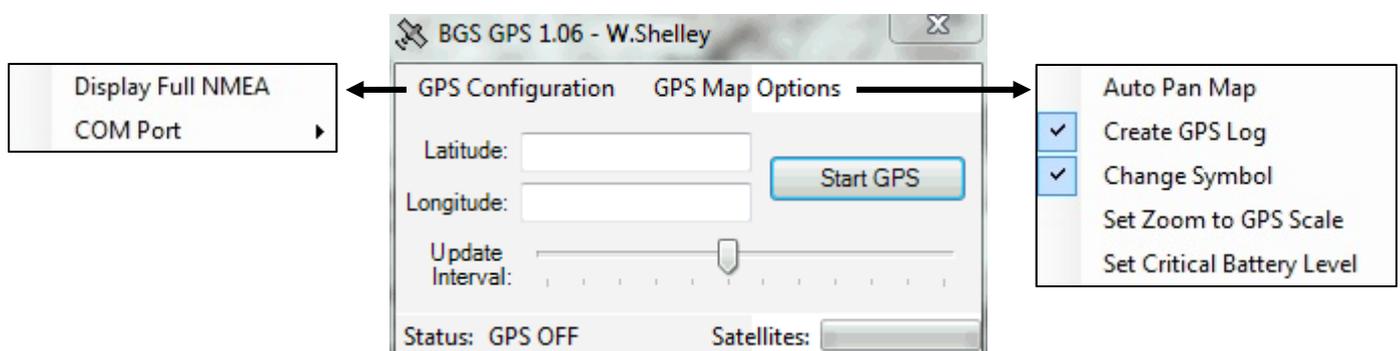
The Basics

- Press the Start GPS Button  on the BGS SIGMA Mobile Toolbar and the BGS GPS 1.06 Form will appear
- Press Start GPS
 - The Satellites bar will fill as available satellites work together to determine your position
 - The Status bar will advise you of: GPS Fix, No Fix, or GPS OFF
 - When a fix has been determined the Latitude and Longitude boxes will be updated
- Two shapefiles will appear at the top of your Project Table of Contents
 - GPS – Your current GPS Location
 - The colour of the GPS symbol will change depending on satellite strength: Red = No Signal, Yellow = Low Signal, and Green = Good Signal
 - GPS_YYMMDD_HHMMSS – GPS Log for the current session
 - These files can be found in your Project Folder under GPS
 - **You can delete previous GPS Logs from the Project Table of Contents but errors may occur if the GPS Location and current GPS Log are deleted**
- Adjust the Update Interval slider for your preferred refresh/update interval, in seconds, of your GPS location
- Close the BGS GPS 1.06 Form by using the X in the corner
 - The GPS will continue to run in the background
- Use the Pan to GPS  and  Zoom to GPS buttons on the BGS SIGMA Mobile Toolbar to Pan and Zoom to your current position
- To Stop using the GPS, press the Start GPS Button  on the BGS SIGMA Mobile Toolbar to see the BGS GPS 1.06 Form again and press Stop GPS

A Bit More Detail

The tablet PC's GPS System collects location information using WGS 1984. SIGMA projects this information into British National Grid, OSGB 1936 using the layer TestPointProjection.

For information on how to use BGS•SIGMA outside of the UK, See [Section 6: Setting up Projects Overseas](#) (page 56-57)



- **BGS GPS 1.06 Form**
 - **Start/Stop GPS** – Starts and Stops the acquisition of your GPS location
 - **Latitude** – When a satellite fix is found, your current latitude
 - **Longitude** – When a satellite fix is found, your current longitude
 - **Update Interval** – Slider to control the Map Panning, GPS Log, and GPS Symbolizing frequency in seconds
 - **Status** – A status indicator specifying one of: GPS OFF, No Fix, or GPS Fix
 - **Satellites** – Satellite acquisition progress
- **GPS Configuration Drop Down List**
 - **Display Full NMEA** – Displays the Tablet PC's Satellite Acquisition Screen and Settings
 - **COM Port** – COM Port 2 will automatically be selected, if a different COM Port is required you can select it from the drop down list
- **GPS Map Options Drop Down List**
 - **Auto Pan Map** – A setting to automatically pan to the current GPS location
 - **Create GPS Log** – A GPS log will be created within your Project Folder based on the interval specified on the Update Interval Slider (on by default)
 - **Change Symbol** – When this function is ticked on the symbol changes with satellite strength: Red = No Signal, Yellow = Low Signal, and Green = Good Signal (on by default)
 - **Set Zoom to GPS Scale** – Allows the user to set the amount of zoom required for the Zoom to GPS button on the BGS SIGMA Mobile toolbar
 - **Set Critical Battery Level** – This should be automatically set above the Tablet PC's critical battery level to avoid a GPS error

ARC GPS Tools

Some platforms work better with one GPS Tool than another. For instance, our Getac V100 tablets work better with the BGS GPS Tools but our Panasonic CF-19 Toughbooks only work with the ArcGPS Tools. See the section on using the [ArcGPS tools](#) in Chapter 4.

Appendix B – Trouble Shooting

1. Bringing in older SIGMA data causes an error regarding the BGS Object Class Extension
 - a. The BGS Object Class Extension has been replaced by the Audit Extension code within SIGMA 2015. For older databases it is best to remove the extension reference from the database rather than install the old BGS Object Class Extension.
 - i. Open the .mdb file using Microsoft Access
 - ii. F11 to show the Objects panel if it is hidden
 - iii. Open the Table GDB_ObjectClasses
 - iv. Locate the field EXTCLSID
 - v. Search and Replace all instances of the ID: {F4390CCD-4520-4B55-803D-8A889A1AAE33} in the EXTCLSID with blank
 - vi. Save the changes to the .mdb and exit Access
 - b. The .mdb will no longer need the BGSOBJECTCLASSEXTENSION and you can bring in data as normal
2. An older database comes up with this error: Your Microsoft Office Access database or project contains a missing or broken reference to the file 'BGSPrecisTool.tlb' version 1.0. To ensure that your database or project works properly, you must fix this reference
 - a. Close out of SIGMA and/or Access
 - b. Open Access from the Start menu and create a new database
 - c. Go to the Database Tools tab and press the Visual Basic button
 - d. Go to Tools, References, and press the Browse button
 - e. Browse to where your Précis Tool is installed –
.../BGS/BGSPrecisTool/BGSPrecisTool.tlb
 - f. OK and Close Access
 - g. Your older databases should now work
3. Can't see the Create Features Dialog Box? Try one of these:
 - a. Have you pressed the Start Collecting button on the either the Mobile or Desktop Toolbars?
 - b. Go to: BGS SIGMA Mobile Toolbar – Tools – Open Create Features or press the last icon on the Editor Toolbar
 - c. Right-click on the layer you wish to edit in the Table of Contents and select Edit Features – Start Editing
4. Can't find the line style in the Create Features Dialog Box?
 - a. Make sure the layer is selected in the Table of Contents
 - b. Search for line styles in the Filter Templates Box <Search>
5. Want to Hide the Create Features Dialog Box?
 - a. Press the push pin in the corner of the Create Features Dialog Box and it will tack to the far right margin
6. Want to set-up Sleep mode on the Panasonic Toughbooks?
 - a. Go to Control Panel, Power Options, System Settings, and toggle the Don't Require a Password

References

British Geological Survey holds most of the references listed below, and copies may be obtained via the library service subject to copyright legislation (contact libuser@bgs.ac.uk for details). The library catalogue is available at: <http://geolib.bgs.ac.uk>.

ADLAM, KAM. 2005. SIGMA Desktop V3.5 User Guide and Training Manual V1.5. *British Geological Survey Internal Report*, 30pp.

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