# One Geology Cookbook 1

How to Serve A OneGeology Level 1 Conformant WMS Using MapServer

Version 1.1

Contents

1 INTRODUCTION

1.1 Background

The OneGeology project aims for a complete covering of the world with a target 1:1 000 000 Geological Map. Every country will display its own map series within the national or wider boundaries that it chooses. Further integration or international harmonisation of the content is not included in the project. The maps are displayed as Web Services, so the source keeper keeps full control of the national map, while it is still possible by calling all the web services to compose a full covering of the world.

This document is one of a series of "cookbooks" written to assist organisations contributing to OneGeology. This particular cookbook describes how to deliver images of geological maps over the Internet as an Open Geospatial Consortium (OGC) Web Mapping Service (WMS: see http://portal.opengeospatial.org/files/?artifact_id=1081&version=1&format=pdf from the web page http://www.opengeospatial.org/standards/wms for the WMS 1.1.1 standards definition that OneGeology aims to implement; we are currently using this version of the WMS standard because few if any clients understand how to use the newer 1.3/ISO standard WMS, in time OneGeology will evolve towards newer versions of standards as the software to support them becomes generally available on the WWW).

You will need to do this to conform to being a Level 1 participant in OneGeology. If you are already familiar with how to set up a WMS using software you already possess, you can read this guide just to find out the standard requirements for a OneGeology conformant WMS. If you are unfamiliar with how to set up a WMS, you can use the example in this guide which shows one way of doing it using the Open Source MapServer software. This cookbook consists of three parts: 1). this document 2). An exemplar WMS service from the British Geological Survey to be found at the web page http://ogc.bgs.ac.uk/BGS_Bedrock_and_Superficial_Geology/ (with the GetCapabilities request being: http://ogc.bgs.ac.uk/cgi-bin/BGS_Bedrock_and_Superficial_Geology/wms?service=WMS&version=1.1.1&request=GetCapabilities&) and 3). A fully configured MapServer template

application populated with, (i) an exemplar configuration using a shapefile with the BGS 625k data and, (ii) an exemplar configuration using an image file (such as might be created by scanning a paper map) with the BGS 625k bedrock age map, available for download over the Internet from a BGS FTP (file transfer protocol) server.

1.2   Who should be using this cookbook?

The minimum technical capability that a Geological Survey wishing to contribute a WMS to OneGeology has to have is an existing web server and the technical staff to maintain and support that. If a survey does not have this capability then OneGeology is setting up a system of volunteer neighbouring 'buddy' organisations who may be prepared to serve your data as a WMS for you.

The audience of this cookbook is therefore the survey's web applications installer and a geoscientist who is going to work with him to provide the digital data to be served.

A few OneGeology participants are already serving WMS' using MapServer or other similar technologies. If they are going to continue to use those technologies then they simply have to follow the naming and WMS configuration guidelines here to serve a OneGeology conformant WMS that can be registered with the OneGeology Portal and Client. The OneGeology conformant service naming conventions are described in detail in Chapter 4 along with the registration process once those draft services have been created.

Even if you are not going to use MapServer to serve your WMS please scan this document and read in full chapter 4 and see the appendix 5 for an example GetCapabilities response that includes examples of those naming conventions and see appendix 4 for the MapServer configuration file that shows how one particular piece of software implements the ICS 2008 colour scheme that it is requested OneGeology services try and implement for an age layer symbolisation.

Example technologies that are currently being used include open source software like GeoServer and commercial software such as ESRI's ArcIMS services with various WMS add-on capabilities and/or extra middleware such as Cocoon. Software like GeoServer is likely to be included in the future OneGeology Level 2

WFS cookbook, however it needs improvements before it can be packaged and recommended for use in a OneGeology cookbook and the OneGeology Technical Working Group are working on getting these improvements available. ESRI's ArcIMS software is not uncommon in the world's Geological survey's but it cannot publish a legend to go with the map symbolised polygon's and ESRI have stated that no future version of ArcIMS will have this capability. Current and future versions of ESRI Arc Server software (the wider capable new software from ESRI) do and will have such legend capability. Whilst having a legend is optional in the WMS 1.1.1 standard we as geoscientists do not believe that such a geological map should be published without a legend to aid interpretation and so it is part of a OneGeology conformance that each WMS much have some form of legend available as part of the service. Future versions of this cookbook — which will be improved over time in response to reader feedback — could include chapters on using other software to serve OneGeology Level 1 WMS as time and submitted texts allows.

1.3 What type of data should be served as a contribution to OneGeology Level 1?

The OneGeology initiative web site at http://www.onegeology.org/technical_progress/brief_overview.html explains that whilst "each contributor decides which maps to contribute. It is anticipated that the majority of contributed maps will be bedrock and/or superficial maps, lithological and/or lithostratigraphical and/or chronostratigraphical where possible, but again, each contributor decides". If chronostratigraphical symbolisation is being offered then if possible the target scheme to use would be the IUGS 2008 colour scheme which can be found at http://stratigraphy.org/cheu.pdf.

This definition of these target ideal data contents represented by the Level 1 participants was agreed at the Brighton meeting but it also forms a small part of the GeoSciML V2.0 logical model of geoscience concepts that OneGeology aspires in the long term to use to serve Level 2 Web Feature Service (WFS is the actual data in GML XML form being served over the web and not just a pictorial image of the map as in a WMS service) web services.

A relevant UML (Universal Modelling Language) fragment of that GeoSciML model is shown here for those who want to understand the long term context:
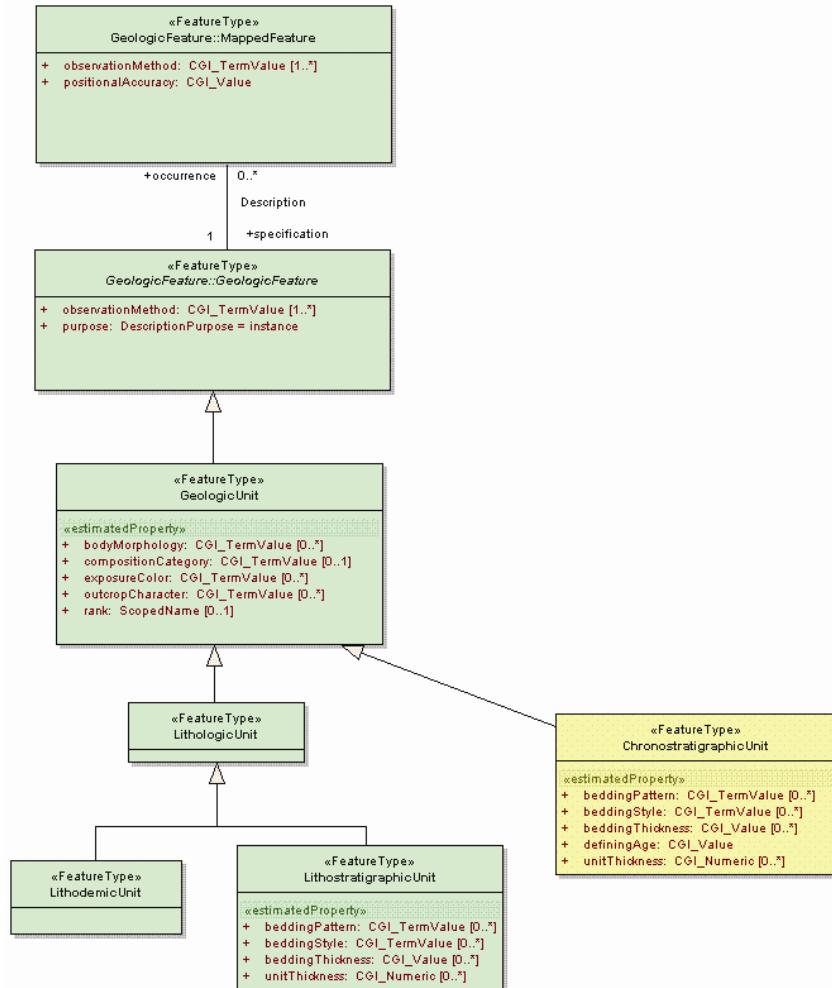
Any Level 1 participant that plans in the long term to serve a Level 2 OneGeology WFS web service will want to serve this type of category of data to make it straightforward to move from a Level 1 WMS to a Level 2 WFS (which is likely to be served using 'sister' software to MapServer called GeoServer — we plan to make available such software in the same packaged and pre-configured as far as possible form as here with this Level 1 cookbook).

We emphasise that these geoscientific categories or feature types are only the target aim for OneGeology and if you have other data that you wish to serve and contribute then you are very much encouraged to do so. Similarly, whilst the target scale of data to be published is 1:1000 000 OneGeology will happily accept data between the scales 1:500 000 and 1:5000 000 with some other useful baseline datasets being of even

larger scale. For example the British Geological Survey has decided to contribute it's 1:625 000 scale data — and as it would take time and money to change this to a 1:1 000 000 scale it is not worth the effort to make this change.

A WMS on the WWW is served from digital data and this comes in two forms; vector digital geological data in a GIS format such as ESRI's shapefile or a digitally scanned map in an image format such as GeoTIFF or JPEG. The latter is required if the map you wish to serve is only currently available in paper map form — perhaps from a historical library source.

If you wish to serve a WMS from a paper map source then follow chapter 2 on scanning a paper map and then proceed to chapter 3 on setting up a MapServer WMS. If you already have GIS digital data then proceed directly to chapter 3.

2 SCANNING A PAPER MAP

2.1 Scanning

Your chosen paper map may look something like this one from the Dutch Geological Survey of Dutch Guyana or Suriname:
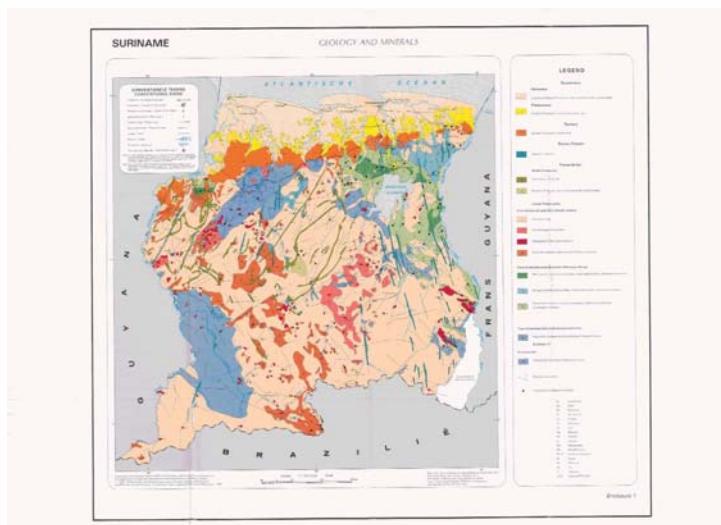
Step 1

It is important to find a large scanner in your city, which could cover a whole paper map. If this scanner is not available at your survey, you may try the Topographical Survey or a large bookshop or book printer.

Step 2A

If you could use a large scanner, you can scan the whole map at one time. But remember to scan the geological map portion into a separate file from that for the legend i.e. you will have two files one for the map and one for the legend. Alternatively, make a copy of an original digital image of the whole map face and cut out the map from the legend. Good software to do this is IrfanView or Photoshop. Tip: This cropped map is now ready for geo-referencing. If you have a slow Personal Computer, you could temporarily work with a JPEG copy. The file size is than much smaller and it can be accessed and geo-referenced faster.

The preferable output format should be .TIFF as this format keeps most information.

Step 2B

For larger maps, or if you have only a small scanner, the map should be scanned in parts and later stitched together.
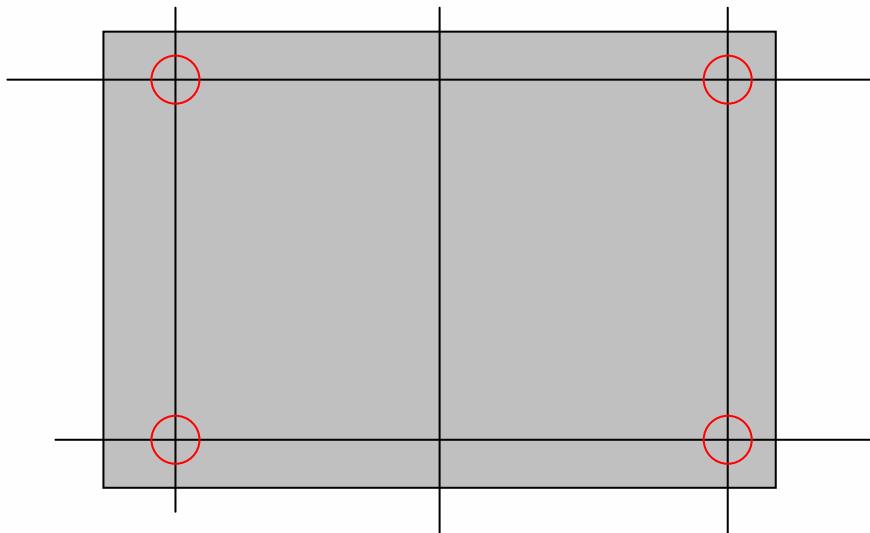
If you scan in parts always try to keep the crossings of the horizontal and vertical black lines in each of the four corners. The straight horizontal and vertical black lines on the map are the altitude and longitude. Then the stitching and geo-referencing will be much easier.

The output format should be .TIFF as this format keeps most pixel information available.

Step 2C

If scanners are not available, you could use a good digital camera. Unfold the map on a well lit place without glare or light reflections. Sometimes white sheets on the side will diffuse the light and prevent ugly reflections from the sun or from the light-bulb. Take a picture right above the centre of the map.

Make several pictures with different lighting and shutter speed. Choose the best colourful result. Usually the export format is .JPG.

Step 3

Stitching. For the stitching of map parts many applications or free software is available.

2.2 Geo-referencing a scanned map

You have now a .TIF file or maybe a .JPG-file, which is a representation of your paper map.

This digital file should now brought into relation with the surface of the earth. This is called geo-referencing.

For this action you need GIS- software.

Commercial GIS-software such as ESRI or MapInfo is widely available and 'no-cost' GIS-software, which also could perform this task, is: ILWIS, which can be found at the site of the International Institute for Geo-Information Science and Earth Observation. The URL of the site is: http://www.itc.nl/ilwis/

Note down the Coordinate system of the paper map, as this is necessary for the following process. Sometimes paper maps are found and we are not sure what coordinate system was being used as it has not been clearly stated on the paper copy. Some research may have to be done to estimate the original coordinate system used. For the Suriname map example it is thought probable that the coordinate system originally used was GCS North American 1927.

It is important to find four or more fixed points in the corner of the picture, from which you know exactly the position. Reliable points are church towers, railway and roads crossings, canals or bridges. Be careful with coastal features or rivers as these tend to change slowly in time. More points are desirable to prevent conical distortions, which often happen with digital cameras.
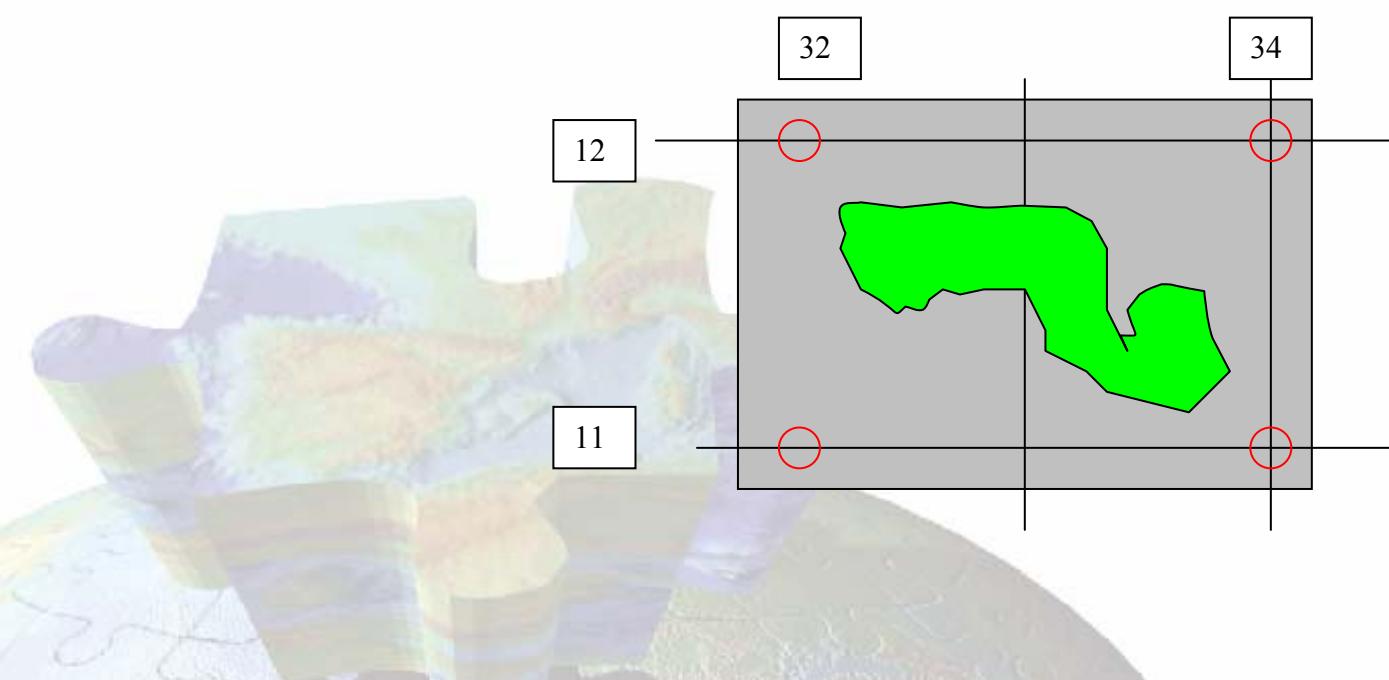
Usually these are crossing points of an altitude line and a longitude line.

The x- and y-coordinates of each crossing should be given to the program.

Be careful to use the relevant degree-minutes-seconds or decimal entries for degrees depending on the particular program's requirements. After confirming the picture will be warped by the program so it fits now on the world surface.

Please check the accuracy, preferable with a topographical map, as often even the cartographers have made mistakes. With slight alterations of the fixed points you can try to make a perfect overlap with a topographical map.

2.3   Image formats and transparency

Although your scanned image will be rectangular in shape, nearly all mapped geographic regions will have irregularly shaped boundaries. Thus it is preferable to make the background parts of your image transparent rather than a solid background colour which will obscure neighbouring regions. The variety of image formats that is usable with MapServer and their various advantages and disadvantages is a complex subject which we cannot be authoritative about. See at http://mapserver.gis.umn.edu/docs/howto/raster_data for more information. We have found 32-bit TIFF (RGB plus alpha layer) or 8-bit palette PNG with a transparent background colour work; you may wish to experiment.

2.4   The Legend for the scanned map

A WMS based on a scanned map will not have the ability to click on a symbolised polygon and see what attributes and therefore what classification it has according to the legend. A WMS based on GIS digital data polygons and attributes does have this capability and the legend is automatically created from such information by the MapServer software. However for this scanned map based WMS it is possible to associate

the scanned legend file for the map — which in the case of the Suriname example looked like this — with the WMS service by including the following lines in the Metadata section of the MapServer .map configuration file which is discussed later:

```
METADATA
...
    "wms_style" "default"
    "wms_style_default_legendurl_height" "353"
    "wms_style_default_legendurl_width" "253"
…
    "wms_style_default_legendurl_href"
"http://localhost/TNO_Suriname_Geology/surinameLegend.png"
    "wms_style_default_legendurl_format" "image/png"
```

It is a OneGeology target aim to provide any legends in English as well as the originating language, in this case you would have to create an image file with a relevant translation. Note that the image format should be one that can be directly displayed by a web browser, i.e. JPEG, PNG or GIF. To keep things simple we have decided that any alternative language WMS services should be completely separate language specific services e.g. the BRGM plans to serve an English service and a French one.

3 Setting up a MapServer WMS

3.1 Pre-requisites for setting up a WMS

This cookbook assumes you have an Internet connected machine on which the server software can be installed and kept running.

As far as source data goes, the examples will concentrate mainly on GeoTIFF format raster files and ESRI shapefiles for vector data. However, access to other formats of raster data is described at http://mapserver.gis.umn.edu/docs/howto/raster_data and many possible vector formats, including access to spatial databases are listed at http://mapserver.gis.umn.edu/docs/reference/vector_data. See also http://mapserver.gis.umn.edu/docs/howto/ogr_howto

3.2 Software installation

This cookbook will give you simple step-by-step instructions for setting up the MS4W "all-in-one" package of the Apache web server, MapServer web mapping application and various associated utility programs on a Microsoft Windows platform. It is actually possible to set up MapServer on a wide variety of different operating systems and web servers, it isn't possible to describe them all here but we will give pointers to the comprehensive documentation that is available on the MapServer website at http://mapserver.gis.umn.edu/.

Step-by-step instructions for installing MS4W

You may find the latest version of the MS4W package by visiting http://maptools.org/ms4w/. However, version 5 of MapServer which are included with MS4W v2.2.6 onwards have adopted a strict conformance to the OGC standard interface which gives some problems with certain clients commonly used on the WWW to look at WMS services. We therefore recommend downloading MS4W v2.2.5 which includes a more forgiving version of MapServer (4.10.3) which nonetheless has certain web security features that your web master would require in such software. (Note: At the time of writing it seems that MapServer will relax its strict OGC conformance requirements when v5.0.3 is released, precisely because of the problems with non-conformant clients. However, as this had not been released in ms4w packaged form in time for the authoring of this cookbook

we are sticking to a standard recommendation of using the older versions.) This can be downloaded from the URL http://maptools.org/dl/ms4w/ms4w_2.2.5.zip.

Please take the time to read the Copyright and Open Source license terms for the use of this no cost software at http://maptools.org/ms4w/index.phtml?page=license.html.

Unzip the downloaded file to the top level of one of your web server computer drives. (If you want to unzip it somewhere else you will have to edit a number of configuration files afterwards. We will not describe how to do this here.) We recommend that you practise installation and configuration on your personal desktop computer first.

Run the apache-install.bat script inside the newly created ms4w directory (e.g. by double-clicking it).

Open your Services control panel and check that you can see a service called something like "Apache MS4W Web Server" and that it is started.

Open http://localhost in a web browser and check that you get a MS4W - MapServer 4 Windows welcome page. Click the link to mapserv.exe under the Features heading and check you get an error message like "No query information to decode. QUERY_STRING is set, but empty".

You have successfully installed MapServer.

If you already have an Apache installation

If you already have an installation of Apache which you want to use it is possible to copy the necessary parts of the MS4W bundle to your installation. The details will depend on exactly how you have configured your installation but the main steps you will need to follow are as follows. They are in the context of using a pristine Apache (v2.2.4) installation so, if you have done a lot of customisation of your installation you may need to adapt them.

Instead of following all the above steps for installation simply unzip the ms4w_2.2.5.zip file to a convenient temporary location. You will then need to copy the following files over to your existing Apache installation. In the following we give directory paths from the ms4w root wherever you unzipped it.

Copy the contents of ms4w\Apache\cgi-bin to the cgi-bin directory of your Apache installation. (Strictly you may not need all these files but it is easier just to copy them all across.)

Add the following directives in an appropriate place in your httpd.conf file.

```
##
## Alias for MapServer tmp directory
##
Alias /ms_tmp/ /ms4w/tmp/ms_tmp/
<Directory "/ms4w/tmp/">
 AllowOverride None
 Options None
 Order allow,deny
 Allow from all
</Directory>
```

Replace "/ms4w/tmp/" with the path to somewhere on your machine suitable for storing the temporary image files which MapServer generates during its operation. You may also want to copy the contents of ms4w\tmp to this directory as it contains a script that can be used to delete old files from this directory and could be set as a scheduled task.

You will also want to copy the following directories from the MS4W bundle to somewhere convenient on your machine: ms4w\proj\nad, ms4w\gdaldata and ms4w\gdalplugins. Then add the following to your httpd.conf file, replacing the path /ms4w/ with the directory you have copied the above directories to.

```
# set environment vars necessary for MapServer
SetEnv PROJ_LIB /ms4w/proj/nad/
# Replace /Apache/cgi-bin/ below with your
# Apache cgi-bin directory path
SetEnv PATH /Apache/cgi-bin/
# set GDAL_DATA environment variable to location
# of supporting gdal files
SetEnv GDAL_DATA "/ms4w/gdaldata"
# set GDAL_DRIVER_PATH environment variable for gdal plugins
```

```
SetEnv GDAL_DRIVER_PATH "/ms4w/gdalplugins"
# uncomment the following line to log MapServer errors to a file
#SetEnv MS_ERRORFILE "/ms4w/tmp/ms_error.txt"
```

3.3 Configuring the WMS

The first query a WMS client will send to a server is a GetCapabilities request. In the response the server will supply information necessary for the client to know how many layers it is serving and how to retrieve them. It will also supply human readable information that could be useful for humans to understand what data is being served, what limitations it has, what restrictions on use etc. The way this information is viewable is dependent on the client, here we will just describe how you can make sure that it is included in the server response. MapServer will generate much of this information automatically for you from the configuration of data layers you include but there are some extra WMS specific parameters to include to fill in all the fields of a GetCapabilities response. MapServer uses text configuration files called "mapfiles" with a MapServer specific syntax to configure its web services. The first main section is inside the <Service> element which can contain a variety of metadata, such as keywords and contact information about your WMS. These are essentially all defined by corresponding fields in the MapServer mapfile. The next <Capability> section contains some essentially automatically generated <Request> specifications detailing what URLs to use for requesting maps, feature information etc. and a series of <Layer> elements inside one parent <Layer> which give some automatically generated and some WMS specifically configured data on each of your layers. The example layers show exactly what parameters should be supplied for each layer and Appendix 3 shows how these relate to the GetCapabilities response.

Step-by-step configuration for MS4W
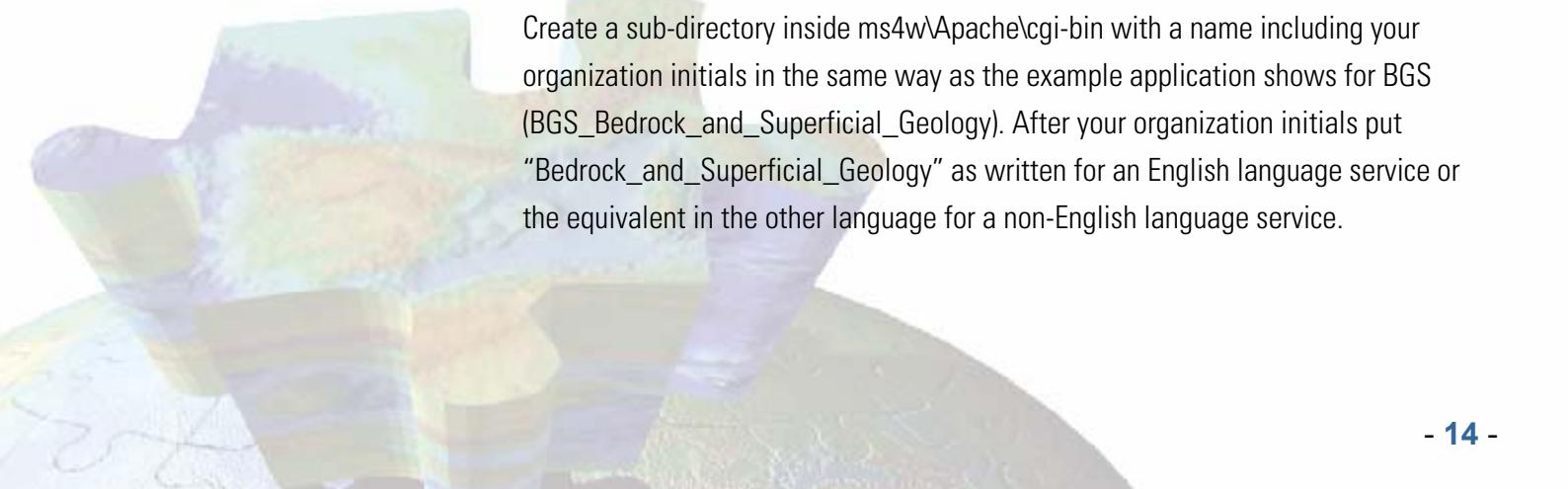
Create a sub-directory inside ms4w\Apache\cgi-bin with a name including your organization initials in the same way as the example application shows for BGS (BGS_Bedrock_and_Superficial_Geology). After your organization initials put "Bedrock_and_Superficial_Geology" as written for an English language service or the equivalent in the other language for a non-English language service.

It is not within the scope of OneGeology at this stage to address the problem of translating geological terms between different languages so the above service can be in the language you usually use for your data. However, if you already have your data in other languages, in particular English if that is not your default language, then we would like to encourage you to provide services in these other languages as well. These should be served from separate services with different URLs. In MapServer this means making another copy of the above directory and renaming it to use the appropriate language in the directory name.

You then need to copy the ms4w\Apache\cgi-bin\mapserv.exe file and all the libraries it depends on in the cgi-bin directory to the newly-created directory (or directories). Rather than attempt to list exactly which libraries are necessary it is probably easier simply to copy all the files from the top level of cgi-bin to the newly created directory. Rename the copy of mapserv.exe inside the new directory to wms. (N.B. Make sure there is no .exe extension, especially if you do not have file extensions visible in your Explorer windows. You may get a warning about changing the file suffix; this is OK.)

Obtain the OneGeology template application in the 20Mbytes approx. sized onegeology.zip file from the BGS ftp website at:
ftp://ftp.bgs.ac.uk/pubload/OneGeology/.

If you are using a web browser clicking on this URL may take you directly to it without requesting a password. If you prefer to use the older DOS prompt style FTP user interface then as normal with such anonymous ftp services enter anonymous if prompted for a userid and type your email address as the password to allow the FTP manager to monitor who is using the service.

Unzip the OneGeology template application to the same drive and directory level as the MS4W resulting from the MapServer installation e.g. if you installed MS4W on C:\MS4W then point the unzip extract to c\. It should create a number of files inside the ms4w directory. The main part of the two example applications are inside a BGS_Bedrock_and_Superficial_Geology directory (for the shapefile based example) and BGS_Bedrock_Raster_Map directory (for the image file based example) which will be created inside ms4w\apps. You should copy the appropriate one to a directory named appropriately for your service. We will assume you are basing your service on the BGS_Bedrock_and_Superficial_Geology example

below; substitute with BGS_Bedrock_Raster_Map if that is closer to your requirements. (Make more copies with appropriate names if you are also making multiple language services.) Inside this folder there is a wwwroot\index.html file. This has some example queries which will enable you to test your service when you have set it up. For these to work you will need to edit the file and change all occurrences of the string "BGS_Bedrock_and_Superficial_Geology" with the name of the new directory you have created for your service. In addition there will be a ms4w\httpd.d\httpd_ BGS_Bedrock_and_Superficial_Geology.conf file which should be copied and the copy renamed and edited so that all occurrences of the string "BGS_Bedrock_and_Superficial_Geology" are replaced with one appropriate for you. (Again make more copies if making multiple language services.) The same should be done for the file ms4w\Apache\htdocs\ BGS_Bedrock_and_Superficial_Geology.pkg.html

If you are using your own Apache installation as described above then, rather than just unzipping the onegeology.zip file into it you will need to unzip it to a temporary location first. Then copy the contents of the onegeology\httpd.d\httpd_ BGS_Bedrock_and_Superficial_Geology.conf file to your httpd.conf file and the contents of the onegeology\apps\ httpd_ BGS_Bedrock_and_Superficial_Geology folder to a convenient location on your machine. The ms4w/apps/ httpd_ BGS_Bedrock_and_Superficial_Geology/ paths in the httpd.conf file will need to be edited to reflect the latter location.

Re-start the Apache service using the Services control panel and then reload the http://localhost page in your browser.

A link to the template application and the copies you have made should have appeared below the Applications heading and if you follow them you should find a page with some test requests for some example layers we have included with the application.
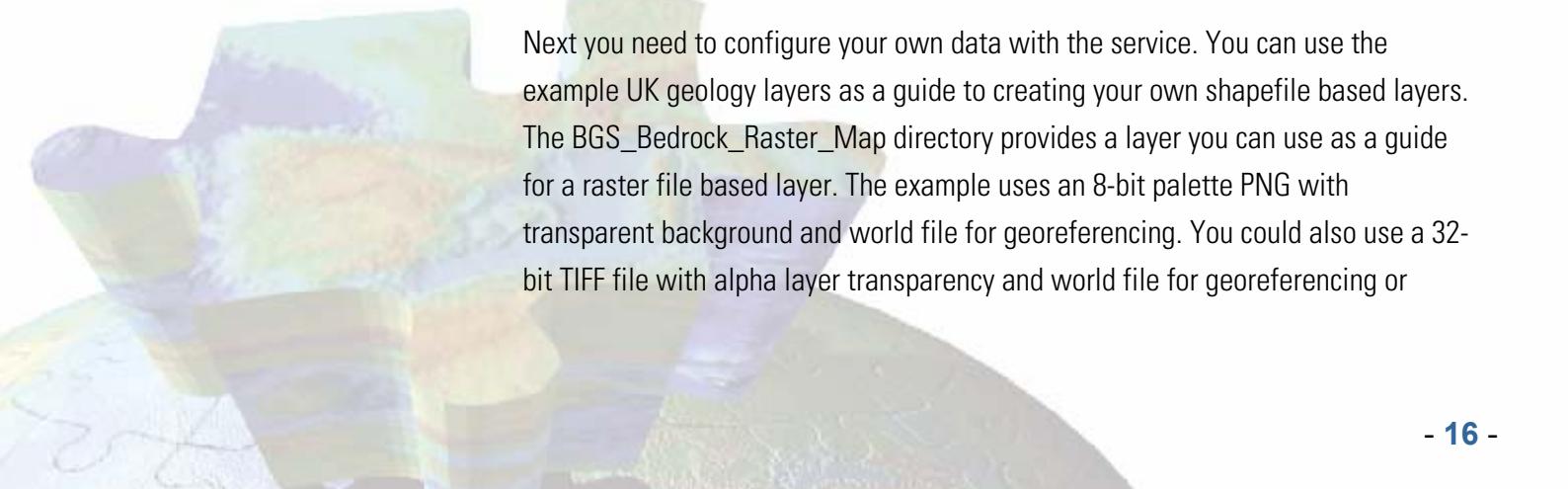
Next you need to configure your own data with the service. You can use the example UK geology layers as a guide to creating your own shapefile based layers. The BGS_Bedrock_Raster_Map directory provides a layer you can use as a guide for a raster file based layer. The example uses an 8-bit palette PNG with transparent background and world file for georeferencing. You could also use a 32-bit TIFF file with alpha layer transparency and world file for georeferencing or

GeoTIFF file with georeferencing information incorporated inside the file. Refer to the MapServer documentation for further details on raster formats or post a question to the OneGeology help forum if you have further questions. You should remove the examples in your own directories and all the BGS_Bedrock_and_Superficial_Geology files when you have finished i.e. make sure that you do not serve to the WWW the BGS dataset! We will soon see if more than one web server is serving it! The BGS 625k dataset and configuration is provided in the template application so that you can see everything that is required to set up a real OneGeology Level 1 WMS service including real metadata and example WMS service layer Names, Titles, Keywords etc.

First you should copy your source date (Shapefiles or rasters) to your renamed version of the apps\ BGS_Bedrock_and_Superficial_Geology\data directory.

Next you need to edit the onegeology mapfile appropriately for your server. There are comments included to indicate where you need to edit values. The important sections are reproduced below with comments.

At the top of the mapfile you will need to edit the EXTENT and UNITS lines shown in the extract below. The shipped example specifies units of decimal degrees and an extent (minx miny maxx maxy) covering the whole Earth. You should change these according to the map units in your data files and their total extent.

```
NAME ONEGEOLOGY
STATUS ON
SIZE 600 600
EXTENT -8.6476 49.8639 1.76943 60.8622 # Change to appropriate
coordinates for your data
UNITS dd # UNITS [feet|inches|kilometers|meters|miles|dd] Units of the map
coordinates. Used for scalebar and scale computations.
SHAPEPATH "data"
IMAGECOLOR 255 255 255

OUTPUTFORMAT
  NAME png
  DRIVER "GDAL/PNG"
  MIMETYPE "image/png"
```

```
        IMAGEMODE RGBA      # All colours and alpha based transparency
        EXTENSION "png"
        TRANSPARENT ON
        FORMATOPTION "INTERLACE=ON,TRANSPARENT=ON" # Slow connections
will profit from this option
    END


# If you know you have fewer than 256 colours there may be a small decrease
# in image sizes if you use the below (default) OUTPUTFORMAT settings
rather
# than those above.
# OUTPUTFORMAT
#   NAME png
#   DRIVER "GD/PNG"
#   MIMETYPE "image/png"
#   IMAGEMODE PC256      # Only 256 colours, may be insufficient for
geological maps.
#   EXTENSION "png"
# END


    IMAGETYPE png

    PROJECTION
      "init=epsg:4326"
    END
```

The next (WEB) section of the mapfile (extract shown below) sets general information for your web service including a general description, contact information, default projection system etc. You can edit it according to the comments included in the example.

```
    #
    # Start of web interface definition (including WMS enabling metadata)
    #
    WEB
```

HEADER "templates/query_header.html"
FOOTER "templates/query_footer.html"
IMAGEPATH "/ms4w/tmp/ms_tmp/"
IMAGEURL "/ms_tmp/"
METADATA
WMS_TITLE "BGS Bedrock and Superficial geology"
WMS_ABSTRACT "The 1:625k DiGMap data covering the whole of the
United Kingdom is available in this OGC WMS service for your personal, non-
commercial use only and is being served as a contribution to the OneGeology
initiative(www.onegeology.org). Separate bedrock geology and superficial
deposits layers are available in this service.
Layers available for bedrock are lithostratigraphy, chronostratigraphy, and
lithology. The layer names are lithostratigraphy, chronostratigraphy and
lithology respectively.
Layers available for superficial deposits layer are lithostratigraphy and
lithology. The layer names are lithostratigraphy and lithology respectively.
For information about more of the British Geological Survey's maps that are
available digitally please visit
http://www.bgs.ac.uk/products/digitalmaps/digmapgb.html"
Put your organisation name and any other information you
want to include.
You must include "OneGeology" as one of the keywords.
WMS_KEYWORDLIST "OneGeology,Geology,Map,United
Kingdom,Bedrock,Superficial,Lithology,Lithostratigraphy,Age"
WMS_SERVICE_ONLINERESOURCE
"http://www.bgs.ac.uk/products/digitalmaps/digmapgb.html"
WMS_ONLINERESOURCE "http://ogc.bgs.ac.uk/cgi-bin/onegeology?"
WMS_CONTACTPERSON "Richard Hughes"
WMS_CONTACTORGANIZATION "British Geological Survey"
WMS_CONTACTPOSITION "Head of Information Delivery"
WMS_ADDRESSTYPE "postal"
WMS_ADDRESS "Kingsley Dunham Centre"
WMS_CITY "Keyworth"
WMS_STATEORPROVINCE "Nottinghamshire"
WMS_POSTCODE "NG12 5GG"
WMS_COUNTRY "UK"

```
WMS_CONTACTVOICETELEPHONE "+44 (0)115 936 3100"
WMS_CONTACTFACSIMILETELEPHONE "+44 (0)115 936 3200"
WMS_CONTACTELECTRONICMAILADDRESS enquiries@bgs.ac.uk
WMS_FEES "none"
WMS_ACCESSCONSTRAINTS "The 1:625k DiGMap data is available for free
download for your personal, teaching, research or non-commercial use as
described on the previous web-page. Your use of any information provided by
the British Geological Survey ("BGS") is at your own risk. Neither BGS nor the
Natural Environment Research Council ("NERC") gives any warranty, condition
or representation as to the quality, accuracy or completeness of the
information or its suitability for any use or purpose. All implied conditions
relating to the quality or suitability of the information, and all liabilities arising
from the supply of the information (including any liability arising in negligence)
are excluded to the fullest extent permitted by law."
WMS_FEATURE_INFO_MIME_TYPE "text/html"
WMS_SRS "EPSG:4326 EPSG:27700"
END
END
```

The items you should edit as appropriate for your organisation are:
WMS_ABSTRACT, WMS_CONTACTPERSON, WMS_CONTACTORGANIZATION,
WMS_CONTACTPOSITION, WMS_ADDRESS, WMS_CITY,
WMS_STATEORPROVINCE, WMS_POSTCODE and WMS_COUNTRY. You may
edit some of the others as appropriate. The SRS specifies the coordinate system
that the WMS can serve data in. These are commonly specified using EPSG codes
and must include EPSG:4326 so that all services have at least one coordinate
system in common. You may specify other systems that are appropriate for your
region if you wish.

You can find out more information about EPSG codes at http://www.epsg.org/. The
file ms4w\proj\nad\epsg in your MS4W distribution contains a list of EPSG codes
and their projection parameters in a form that the PROJ library used by MapServer
can understand. Hopefully, this should cover all cases. If you do not find your
system there you could try looking in some of the other files in the nad directory
and copying the appropriate line or following some of the links given in the
MapServer FAQ at http://mapserver.gis.umn.edu/docs/faq/epsg_codes/. You

might also try posting a question to the OneGeology self-help helpdesk forum to see if any projection system specialist can help you.

You must then create "LAYER" sections for each map (e.g. bedrock map, superficial geology map etc.) that you are going to serve. The contents of these LAYER sections will depend on whether your data is in shapefile format or a raster image. Examples are given below with comments where you will need to edit them according to your own data.

Raster image data layer

An example of adding a PNG layer is included in the BGS_Bedrock_Raster_Map application. The relevant section is reproduced below for reference. This data was simply created as a raster from the bedrock shapefile for the purposes of serving as an example. In this case we won't be setting up a response to GetFeatureInfo or GetLegendGraphic requests; we are just returning a coloured map. There is more detailed documentation at http://mapserver.gis.umn.edu/docs/howto/raster_data, in particular as regards efficient serving of large images, using 8-bit vs 24-bit images, tiling etc.

Example extract from mapfile below:

```
LAYER
  NAME BGS_625k_BAR
  TYPE RASTER
  STATUS ON
  DATA bedrock625ll.png
  PROJECTION
    "init=epsg:4326"
  END
  METADATA
    WMS_TITLE "GBR BGS 1:625k Bedrock Age"
    WMS_ABSTRACT "GBR BGS 1:625k Bedrock Age"
    WMS_SRS "EPSG:4326 EPSG:27700"
    "wms_metadataurl_href"
"http://www.bgs.ac.uk/discoverymetadata/13480426.html"
    "wms_metadataurl_format" "text/html"
    "wms_metadataurl_type" "TC211"
```

```
            "wms_dataurl_href"
      "http://www.bgs.ac.uk/products/digitalmaps/digmapgb_625.html"
          "wms_dataurl_format" "text/html"
          WMS_KEYWORDLIST "Bedrock,Age,Chronostratigraphy"
          "wms_style" "default"
          "wms_style_default_legendurl_height" "353"
          "wms_style_default_legendurl_width" "253"
          "wms_style_default_legendurl_href"
      "http://localhost/BGS_Bedrock_Raster_Map/bedrockAgeLegend.png"
          "wms_style_default_legendurl_format" "image/png"
        END
        TOLERANCE 10
        DUMP TRUE
      END Shapefile data layer
```

The example file includes the following shapefile based layers: UK bedrock geology classified by lithology, lithostratigraphy and age, and UK superficial geology classified by lithology and lithostratigraphy. These are typical of the sorts of layer expected for OneGeology but you may have slightly different theme layers and slightly different available classification schemes. Please consult on the OneGeology forum if you are uncertain about exactly what layers and classifications to serve.

The fields you will need to edit for each LAYER section are described below. The NAME must be unique for each layer. This is a short identifier used by WMS clients to select layers rather than being for human consumption. The OneGeology catalogue service requires that the NAMEs are unique within all the OneGeology layers we have decided some naming conventions as shown in the example. These are described explicitly in Section 4. (Note that MapServer does not allow more than 20 characters in a NAME.)

DATA should specify the name of your shapefile. The HEADER, TEMPLATE and FOOTER values refer to files with snippets of HTML template which format the results of GetFeatureInfo requests when requested in text/html format. The examples have been written for the data fields in the example shapefiles; it should be straightforward for you to edit them to match the fields in your shapefiles. The

PROJECTION section should specify the coordinate system that your data is actually in. This might not be EPSG:4326 if you have your data in some regional projected system. However, as most OneGeology clients will want to retrieve your data in the EPSG:4326 system we suggest it will be better for performance reasons to convert your data files to EPSG:4326 rather than have MapServer convert them on-the-fly in response to requests. See Appendix 1 for one way to do this with the tools bundled with MS4W.

```
LAYER
NAME GBR_BGS_625k _BLT # Bedrock lithology
TYPE POLYGON
STATUS ON
DATA bedrock625ll
TRANSPARENCY 100
TOLERANCE 0
TOLERANCEUNITS pixels
TRANSFORM TRUE
DUMP TRUE
HEADER "templates/bedrock_lithology_query_header.html"
TEMPLATE "templates/bedrock_lithology_query_body.html"
FOOTER "templates/bedrock_lithology_query_footer.html"
PROJECTION
"init=epsg:4326"
END
```

In the METADATA section you should edit the following values. WMS_TITLE is the human readable layer name and should specify the geographic area (using the ISO 3 letter country code if applicable – see http://en.wikipedia.org/wiki/ISO_3166-1_alpha-3), your organisation initials, the map scale and the type of map e.g. "GBR BGS 1:625k Bedrock Lithology". The WMS_ABSTRACT can expand on this with any extra information you feel would be useful. The WMS_SRS values specify which coordinate systems the WMS can supply the data in and must include at least EPSG:4326, others are up to you. The gml_include_items and wms_include items will depend on the data fields in your shapefile and which ones you wish to make available by a GetFeatureInfo request and should be a comma separated list of field names. These should be the same as the fields included in the HTML templates above. It is optional to include any information here but obviously if you

have fields with geological unit names or ages they would be useful to include. The wms_metadataurl_href and wms_dataurl_href are supposed to contain URLs for web pages which describe the dataset used for the layer in more detail. It is possible that you may already have suitable web pages on your organisation's website, or you may wish to create suitable pages to be served by this same server. These URL's give users of your WMS service quick and easy links back to your web pages that may describe your available data offerings in more detail. The only difference between the metadataurl and dataurl is that the metadataurl should contain information corresponding to the ISO TC211 recognised metadata standard.

(http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=26020&commid=54904) The UK geology layer examples point to some pre-existing web pages on the BGS website which were suitable so that you can get an idea of what you might use for your own data.

```
METADATA
WMS_TITLE "GBR BGS 1:625k Bedrock Lithology"
WMS_ABSTRACT "GBR BGS 1:625k Bedrock Lithology"
WMS_SRS "EPSG:4326 EPSG:27700"
GML_INCLUDE_ITEMS "RCS_D"
WMS_INCLUDE_ITEMS "RCS_D"
WMS_METADATAURL_HREF
"http://www.bgs.ac.uk/discoverymetadata/13480426.html"
WMS_METADATAURL_FORMAT "text/html"
WMS_METADATAURL_TYPE "TC211"
WMS_DATAURL_HREF
"http://www.bgs.ac.uk/products/digitalmaps/digmapgb_625.html"
WMS_DATAURL_FORMAT "text/html"
WMS_KEYWORDLIST "Bedrock,Lithology"
END
```
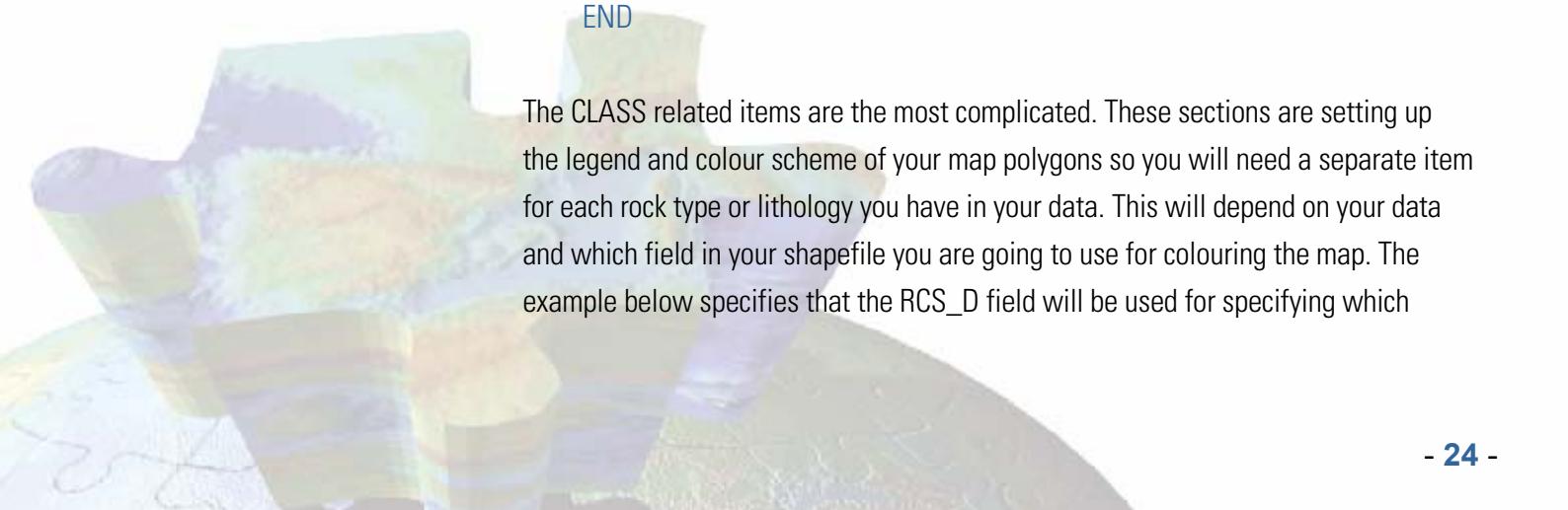
The CLASS related items are the most complicated. These sections are setting up the legend and colour scheme of your map polygons so you will need a separate item for each rock type or lithology you have in your data. This will depend on your data and which field in your shapefile you are going to use for colouring the map. The example below specifies that the RCS_D field will be used for specifying which

colour to use with the CLASSITEM VALUE. Then for each CLASS section the EXPRESSION specifies the value of RCS_D this colour will apply to and the COLOR and BACKGROUNDCOLOR give the respective RGB colour values. It is likely that creating a CLASS for all your values would be very time-consuming to do manually. If you already have ArcView and an ESRI .avl legend file you can automatically convert this to the MapServer format using the utility described in Appendix 2 or if you have ArcGIS and mxd or lyr files you can use the utility described in Appendix 3.

```
CLASSITEM 'RCS_D'

    CLASS
      NAME 'ANORTHOSITE'

      EXPRESSION 'ANORTHOSITE'
      #RASTERFILL_STYLE_SOLID
      STYLE
        COLOR 237 237 237
        BACKGROUNDCOLOR 255 255 255
      END  #STYLE
    END #CLASS


    #... more classes needed to assign colours
    # for each value of RCS_D
```

Colour codes for the lithostratigraphic and lithology layers are specific to the British Geological Survey, you should use the codes used by your geological survey. However, for OneGeology it has been agreed, where possible, to serve a chronostratigraphic age layer using the new IUGS 2008 colour scheme which can be found at http://stratigraphy.org/cheu.pdf. This will give some form of harmonisation between the different chronostratigraphic layers served by the contributing geological surveys and this is only possible where such an internationally agreed scheme exists. In this case the British Geological Survey had to refine, re-allocate and 'map' it's internal ages to fit this IUGS 2008 one. The file 'ICSClasses.txt' contains a full list of names and CLASS definitions for the appropriate colours for all the IUGS 2008 colours. In the mapfile we have

commented out the terms that are not actually used in the BGS map; please do the same for your map.

You may notice that in two of our example layers we have defined some "DUMMY" classes. This is a hack to work around a bug we found with Google Earth. It should only affect you if you have layers with fewer than 16 classes. If this is the case then read the comments in the mapfile for an explanation and add some dummy classes to your own layers so that there are at least 16.

Also note that the example CLASS definitions do not have any polygon borders (no OUTLINECOLOR directive). This is important as the different scales of viewing to be used within OneGeology mean that border lines would often obscure the polygons themselves.

You will also notice that we do not currently recommend enabling some capabilities in a WMS service such as setting Transparency (this can upset some WMS viewing clients and also other clients can allow the user to set the level of transparency interactively) and ScaleHint (this can upset several clients and make your service difficult to use in them).

4 REGISTERING YOUR WMS SERVICE WITH THE ONEGEOLOGY PORTAL REGISTRY

The prototype OneGeology Portal (http://portal.onegeology.org) and client hosted and implemented by the BRGM, will be made available at the same time as this WMS cookbook. Like this cookbook it will be continually developed and improved until its formal launch in August 2008 at IGC33 Oslo.

To fully participate in OneGeology you will need to register your WMS services in the Portal. Your organisation will have already registered its participation with the OneGeology secretariat. You will need to fill in the short 'buddy' form.

The Complete Registration Process

1. Complete the online 'buddy' form after reading the latest 'Cookbook' to understand the different technical options available to you as a Geological Survey, so that you can choose the appropriate choice for your organisation in the buddy form. The reader will ideally be the survey's web applications installer and a geoscientist who can provide the digital data to be served.

2. Once you have completed the 'buddy' form, you will be allocated a password; this will allow you to use the discussion forum to place queries about setting up WMS' and receive answers from the OneGeology technical community. This password will also be used in the future for editing your OneGeology registered services in the Portal. At this stage you will either use the cookbook and provided Mapserver software to set up a draft WMS service, or used your own WMS software to do this, or provided another perhaps neighbouring Geological Survey with your data if they have agreed to serve the WMS of your data for you - as a 'buddy'.

3. Email onegeology@bgs.ac.uk with your draft URL of your proposed WMS service. Include in this email the

   a. name of the geographical area e.g. United Kingdom or France (usually the Country name, but can be a specific geographical or geological area),

b. the name of the data provider,

c. the name of the service provider

4. The OneGeology secretariat will check that they have written confirmation that the server provider owns the right to serve the proposed data and/or has permission from the data provider to serve that data.

5. The secretariat will check the proposed WMS according to the OneGeology naming rules [see the latest 'Cookbook']

6. Once the naming rules are accepted the secretariat will contact BRGM (Portal) with the WMS URL.

7. BRGM will enter the service in the 'Catalogue of Registered Services' and will check any technical points with the service provider.

8. When the service is fit for registration BRGM will email the OneGeology secretariat and the service provider and enable the password for use within the Portal. Service providers will then be able to use the 'Edit your Registered Service' button on the Portal to make any final tunings or layer changes.

Your OneGeology WMS Service will now be officially registered and its layers are now visible in the Portal (e.g. in the "add layers" button). You can now add and remove other layers as you wish. As the reference information stored in the registry comes from your service directly it is highly recommended if you need to make major changes to your WMS service, to modify your WMS service first and then ask the BRGM registry (email: onegeologyportal@brgm.fr) to be updated. This 'Edit your Registered Service' option is currently offered only to simplify minor updates after you have already had your service registered by the BRGM portal managers.

If you have any queries please contact onegeologyhelp@bgs.ac.uk or use the discussion forum on the website.

The above text is expressed in diagram form here:
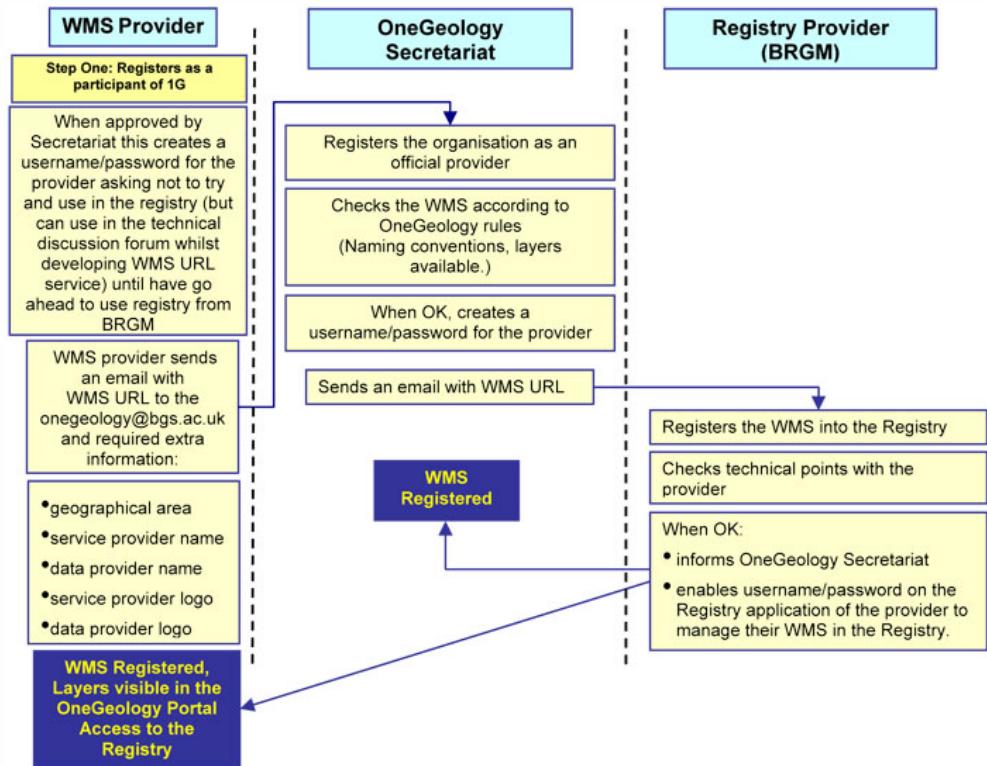
For your service(s) to be accepted in OneGeology the above protocol requires that you follow the WMS service naming conventions as agreed by the OneGeology Technical Working Group and they are described in detail with examples here:

Elements of the Capabilities response for a OneGeology WMS that are required to support the **OneGeology WMS service Registry naming conventions:**

1 For the WMS service URL:

example = http://ogc.bgs.ac.uk/cgi-bin/
BGS_Bedrock_and_Superficial_Geology/wms
structure = .../ organisation_theme/wms

Note that within this structure the URL elements to the left of /cgi-bin/ are likely to indicate the server of the data e.g. ogc.bgs.ac.uk shows it is BGS that owns this URL. The first part of the URL depends on the technical architecture and rules of the service providers. The second part, when possible (because it can depend on the WMS software capabilities), should have the same structure as the service title. The OneGeology Registry of services cannot be too strict about the left hand side of this rule as this naming could be partially out of the control of OneGeology service providers but the principle is one completely separate WMS service for

each 'country' being served and a completely separate service if the same 'country' is being served in one or more different languages e.g. English and French services from the BRGM.

A second same data but different language service from a OneGeology Participant follows the principle that you only need to label a service when it is having a specific non-default language e.g. if the BRGM served it's first default service in French i.e. the contents of the GetCapabilities response and legends were in French, and it decided to contribute to the OneGeology target aim of (everyone ultimately) providing an English service also then it would use the Optional ISO 2 letter language code (see http://en.wikipedia.org/wiki/List_of_ISO_639-1_codes, use 3 letter code only if 2 letter code does not exist) to differentiate between the default service and the second language service. Place this code AFTER the organisation code e.g. default BRGM service might be …/BRGM_ Formations Géologiques… and the second English language service would then be …/BRGM_EN_ Geological_Formations… We do not recommend that you include the language code for your default service – this will be obvious from the associated metadata and a great number of the OneGeology services will be in English anyway i.e. specify the language in the URL (and the service layer names and service layer titles below) only if it is different from your default.

2 For the WMS service itself:

The title should have the service provider name and the dataset's themes

No scale (because a same service can provide layers with various scales)

No geographic area (because a same service can provide layers for various areas)

Examples:

BGS Bedrock and Superficial geology

BRGM Formations Géologiques

If the service is setup for a specific area, we can accept this area information in the title.

- • Name: OGC:WMS

- Title: example = «BGS Bedrock and Superficial geology»

- Abstract

- Keywords – the Keyword "OneGeology" should be present to be able to search for services and layers with this keyword

- OnlineResource: a link to the provider web site

- Contact Information with at least: Contact, Organization, Country, Contact Electronic Mail Address

3 For each layer:

Layer Titles:

This title should show information (more or less a kind of metadata):

- geographic area

- data provider

- scale

- theme (we decided not to call this FeatureType that is too much linked with GeoSciML, but GeoSciML partners could/should use GeoSciML FeatureTypes)

Examples:

GBR BGS 1:625k Bedrock Lithostratigraphy

FRA BRGM 1:1M Formations géologiques - France Continentale

FRA BRGM 1:1M Formations géologiques - Guyanne

The geographic area should use the ISO code (GBR, FRA, ...) but it does not exist for "regional" maps (Europe, Africa, ...) so a word could be used instead of the ISO code (It is required to have the area in the title, but the format could be more flexible to get a good "readability" for the user of the layer list)

Layer Names:

To simplify the rules for the user and to avoid name duplication in the registry, this name must have the same structure as the title (we only delete the first part of the scale as the ":" cannot be used, and replace spaces by "_":

Examples:

FRA_BRGM_1M_GeologicUnits

GBR_BGS_625k_Lithostratigraphy

World_CGMW_25M_GeologicUnits

Europe_BGR_5M_Lithostratigraphy

The provider is responsible to guarantee that there is no layer name duplication in all the layers he provides (the same kind of requirement we have for urn administration in GeoSciML)

For GeoSciML (OneGeology level 2) partners, the theme should represent the GeoSciML FeatureType.

- Name: example = «GBR_BGS_625k_BA» *(see below)*

- Title: example = "GBR BGS 1:625k Bedrock Age" *(see below)*

- Abstract

- Keywords -— the Keyword "OneGeology" should be present to be able to search for services and layers with this keyword

- DataURL (with Format and OnlineResource) — optional

- LegendURL (with Format and OnlineResource)

- MetadataURL (with Format and OnlineResource) — optional
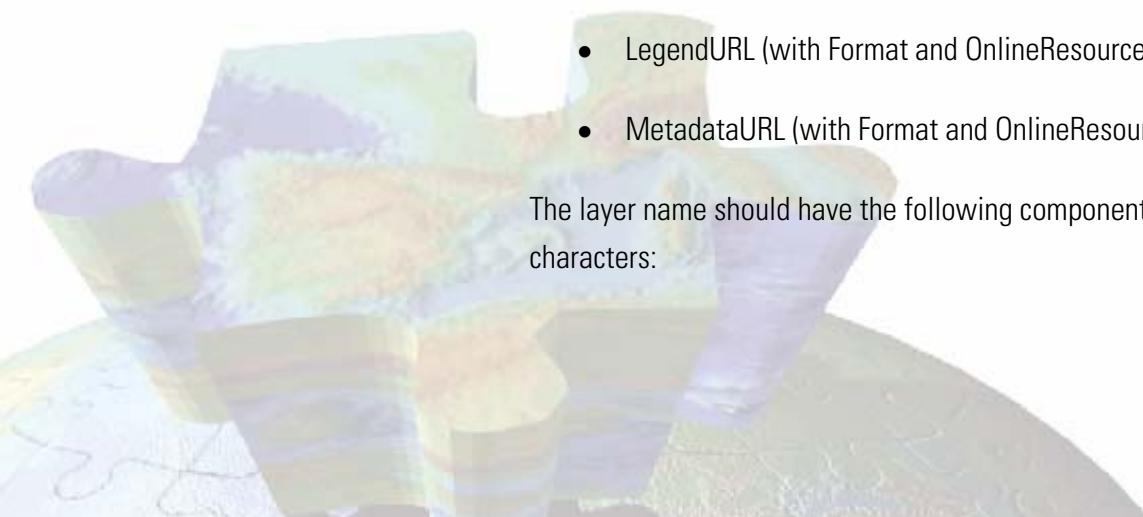
The layer name should have the following components separated by underscore characters:

- ISO 3 letter country code (see http://en.wikipedia.org/wiki/ISO_3166-1_alpha-3) or short geographic name such as "World" or "Europe" for areas not corresponding to a country. (You should still use a single country code even if your data coverage spills over somewhat into neighbouring countries.)

- Optional ISO 2 letter language code (see http://en.wikipedia.org/wiki/List_of_ISO_639-1_codes, use a 3 letter code only if a 2 letter code does not exist) for your non-default language service layers if you are providing more than one language service.

- Organization initials

- Scale in a form such as "500k" or "1M". Rather than using decimal points as in 1.5M use 1500k.

- Theme code. For the most common themes we have created standard codes below, if you have other types of data please create your own 2 or 3 letter code. If you think other participants might serve the same type of date you could post a message on the OneGeology forum for discussion of an agreed code. These codes rather than full textual strings are required because we have discovered that MapServer has a 20 character maximum limit on service names. We have also found that some non-Mapserver WMS services from ESRI , including the newer ArcGIS 9.2 Server WMS functions do not allow the specification of service layer names at all – the software auto-names layers 0,1,2… and we have discussed at a senior level in ESRI-USA if this can be worked around. It cannot for the time being apparently and this will be dealt with in the OneGeology Registry through the use of auto-generated unique id's for each registered service layer, this is necessary as in a Catalogue like that for OneGeology one cannot have two layers having the same name i.e. both being named layer name 0. This would occur with just two different geological surveys using ArcGIS 9.2 Server WMS to contribute to OneGeology :

    - BA – Bedrock Age

    - BLT – Bedrock Lithology

- o BLS – Bedrock Lithostratigraphy

- o SLT – Superficial Lithology

- o SLS – Superficial Lithostratigraphy

The layer Title has similar components expressed in a slightly more readable form and separated by spaces rather than underscore characters.

- ISO 3 letter country code, exactly same as layer name.

- Optional ISO 2 letter language code, exactly same as layer name.

- Organization initials, exactly same as layer name

- Scale in a form such as "1:500k" or "1:1M". Decimal points such as in 1:1.5M are acceptable here.

- Theme. Use descriptive phrase in the service language. For English services the layers will most commonly be "Bedrock Age", "Bedrock Lithology" etc. as above.

Depending on the data you have available for each layer and your WMS software you may be able to configure what is returned in response to GetFeatureInfo requests on each layer. Ideally the response should include a field for age/lithology/lithostratigraphy as appropriate for each layer. You may choose to include other information you consider useful but please try to exclude data fields that only have meaning internal to your organisation. Preferably it should be possible to retrieve the information in at least text/html and text/plain formats.

APPENDIX 1: CONVERTING COORDINATE SYSTEM IN DATA FILES

As mentioned in the documentation on setting up the WMS the OneGeology project requires that your WMS can serve data in lat-lon coordinates with the WGS84 ellipsoid and datum (epsg:4326). If your data files are stored in a different coordinate reference system, MapServer can convert the coordinates to epsg:4326 or other client requested coordinate reference systems on-the-fly. However, to reduce the load on your server, as we can expect that a substantial proportion of requests to OneGeology servers will be for epsg:4326 then we suggest that you convert your underlying data sets to this coordinate reference system so that the conversion won't have to be carried out on every request. The same tools that MapServer uses internally are available with command line programs bundled in the MS4W package and can be used to convert your underlying data sets as follows.

For shapefiles the main program you will want to use is ogr2ogr.exe which is located in ms4w\tools\gdal-ogr where ms4w is the top-level folder of your MS4W installation. The easiest way to use the programs is to run the batch file ms4w\setenv.bat from a DOS window which will set up your path. (You may need to edit the setenv.bat file to reflect the location where you have installed MS4W.) Next you need to find out whether your current data set has a coordinate reference system assigned to it. If you have, for example, a dataset in a shapefile called datafile.shp you would issue a command like:

```
ogrinfo -so datafile.shp datafile
```

(The first datafile.shp refers to the file name; the datafile afterwards is a layer name which is redundant in the case of shapefiles which only have one layer but is the way ogrinfo works.)

You should get some information including something like that below:

Layer SRS WKT:
PROJCS["British_National_Grid",

```
GEOGCS["GCS_OSGB_1936",
DATUM["OSGB_1936",
SPHEROID["Airy_1830",6377563.396,299.3249646]],
PRIMEM["Greenwich",0.0],
UNIT["Degree",0.0174532925199433]],
PROJECTION["Transverse_Mercator"],
PARAMETER["False_Easting",400000.0],
PARAMETER["False_Northing",-100000.0],
PARAMETER["Central_Meridian",-2.0],
PARAMETER["Scale_Factor",0.999601272],
PARAMETER["Latitude_Of_Origin",49.0],
UNIT["Meter",1.0]]
```

The details do not matter as long as you don't get the below:

```
Layer SRS WKT:
(unknown)
```

In the latter case you will need to find out what coordinate system your data is in. If the data has a coordinate system assigned you can issue a command like that below to convert the data (note that the destination file is specified before the source file): ogr2ogr -t_srs epsg:4326 new_datafile.shp datafile.shp

If your data set does not have a coordinate system assigned to it but you have found out what it is you can specify the source coordinate system on the command line with the parameter -s_srs, for example: ogr2ogr -s_srs epsg:27700 -t_srs epsg:4326 new_datafile.shp datafile.shp

For GeoTIFF files the utilities you will want to use are gdalinfo.exe and gdalwarp.exe. Issuing a command like: gdalinfo imagefile.tif will result in some information including projection information like that below:

```
Driver: GTiff/GeoTIFF
Size is 522, 252
Coordinate System is:
GEOGCS["WGS 84",
 DATUM["WGS_1984",
 SPHEROID["WGS 84",6378137,298.2572235630016,
```

```
AUTHORITY["EPSG","7030"]],
AUTHORITY["EPSG","6326"]],
PRIMEM["Greenwich",0],
UNIT["degree",0.0174532925199433],
AUTHORITY["EPSG","4326"]]
Origin = (-180.000000000000000,83.879999999999995)
Pixel Size = (0.690000000000000,-0.690000000000000)
Metadata:
```

You can transform an image in a similar way to the ogr2ogr utility for shapefiles but unlike ogr2ogr the source and destination files are specified in the more common source then destination file order so typical command lines would be:

```
gdalwarp –t_srs epsg:4326 imagefile.tif
new_imagefile.tif
```

or

```
gdalwarp -s_srs epsg:27700 -t_srs epsg:4326
imagefile.tif new_imagefile.tif
```

APPENDIX 2: CREATING MAPSERVER CLASS DEFINITIONS FROM ARCVIEW LEGENDS

The Gix Export Tool can help you create the CLASS sections of your MapFile from an ESRI ArcView 3.x .apr file. This tool converts ESRI ArcView 3.x (NOT ArcMap) projects to common open source alternatives including a MapServer MapFile. (Please note that this tool has only been used to convert simple symbology e.g. geology polygons symbolised by a solid colour according to its lithology value. Its ability to convert more complex symbology has not been tested.)

Download the Gix Export Tool from http://mapserver.gis.umn.edu/docs/link/Gix. Run the executable and follow the instructions to install the tool as an ArcView 3.x extension.

Having installed the Gix Export Tool, create or open an ArcView project containing your symbolised data.
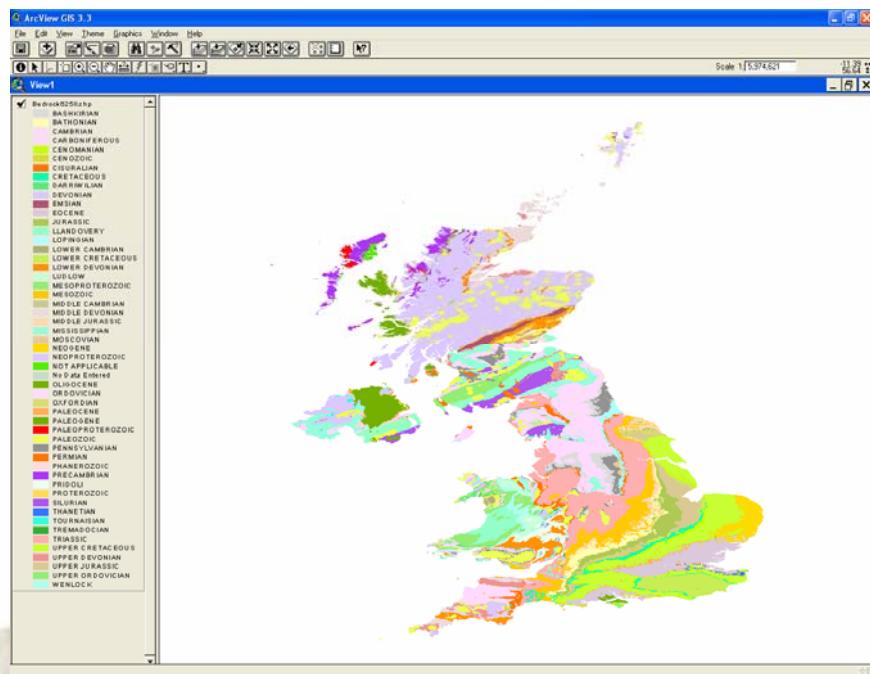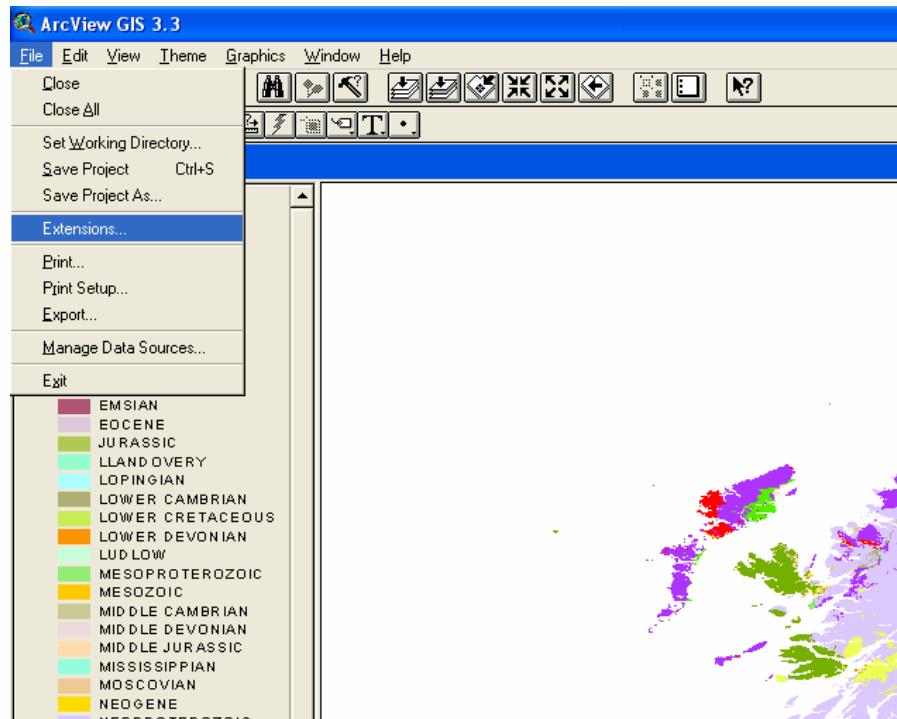
Load the Gix Export Tool Extension (File — Extensions, tick required extension, click OK).
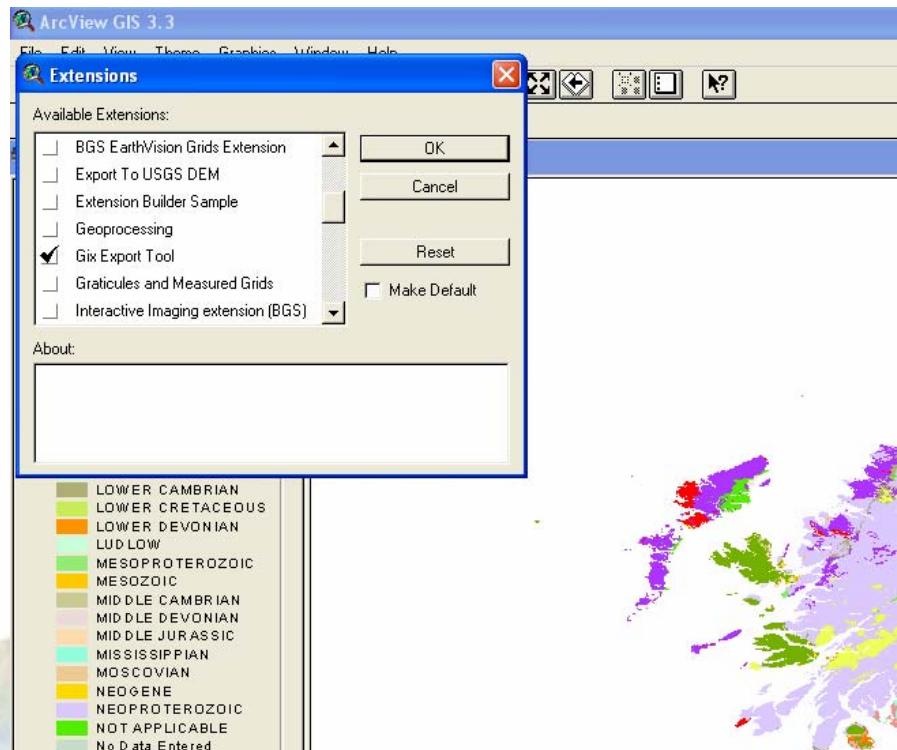
Complete the following steps to convert your project to a MapServer MapFile.

1 Select View — Export View.
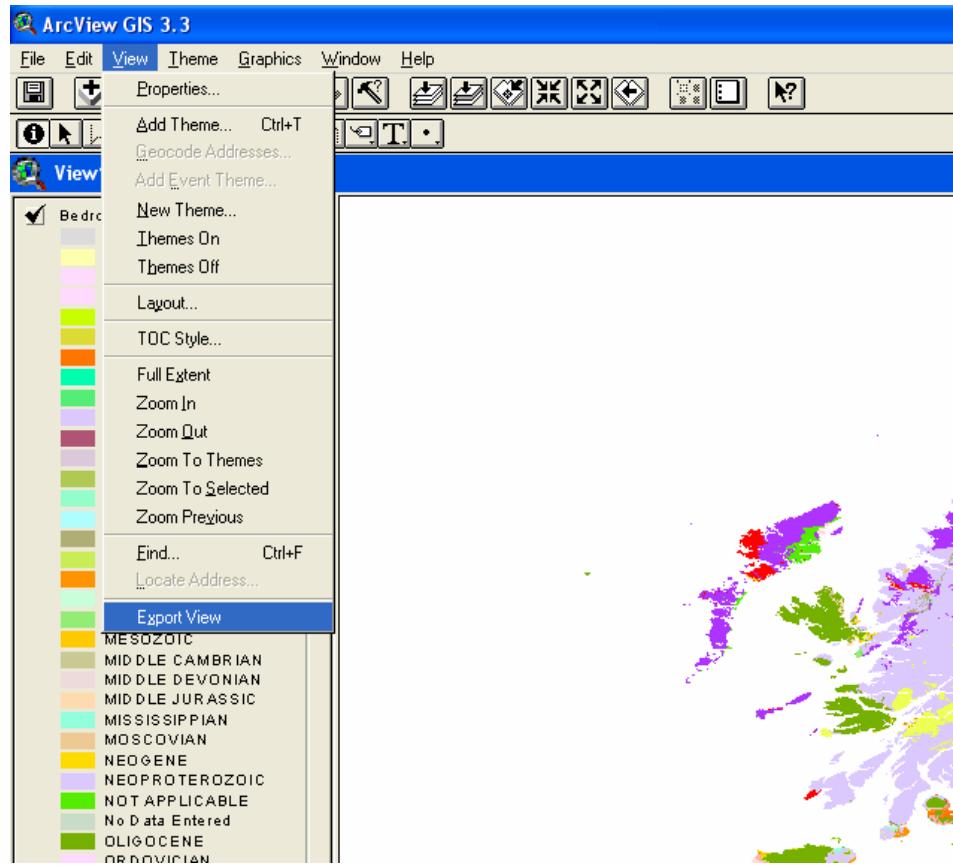
2 The first screen asks you to select your output file format — choose mapServer
MapFile (.map) and click next.
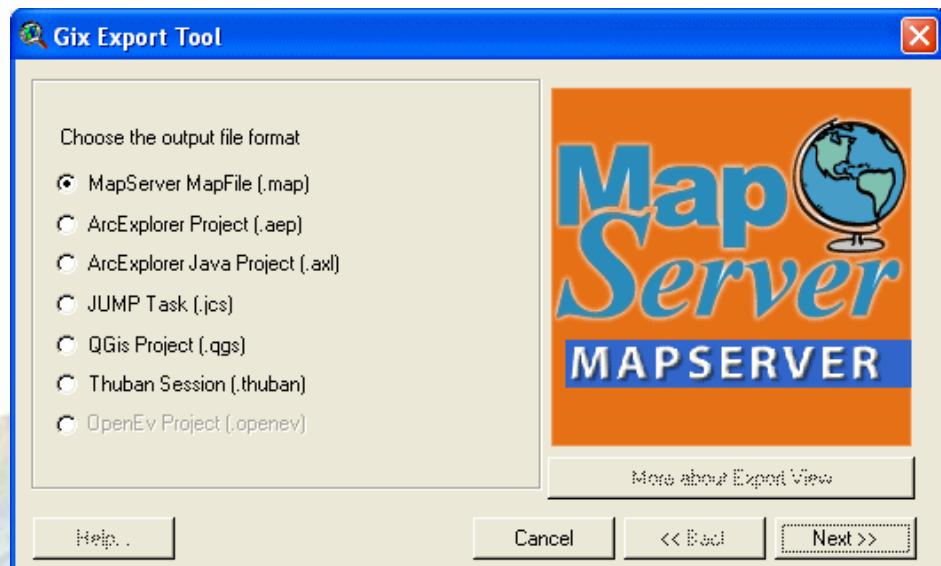
3 The next screen asks you to select a version (choose default) and output file. The output file generated will be a temporary file from which you will cut the CLASS components and paste them into the master MapFile you have been creating elsewhere. Select a location for your output file and click next.
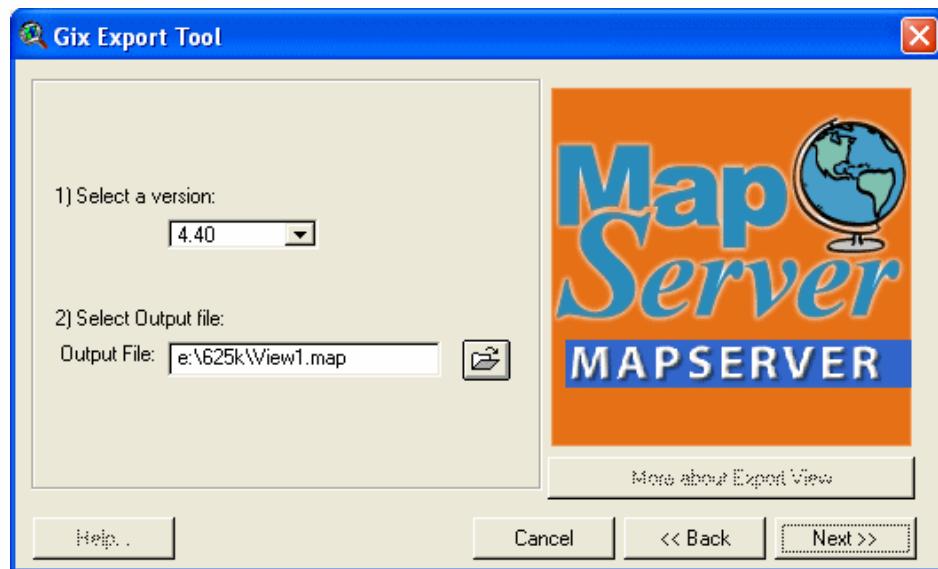
4 The next screen asks for details of the main and reference map. You won't use these sections so accept the defaults and click next.
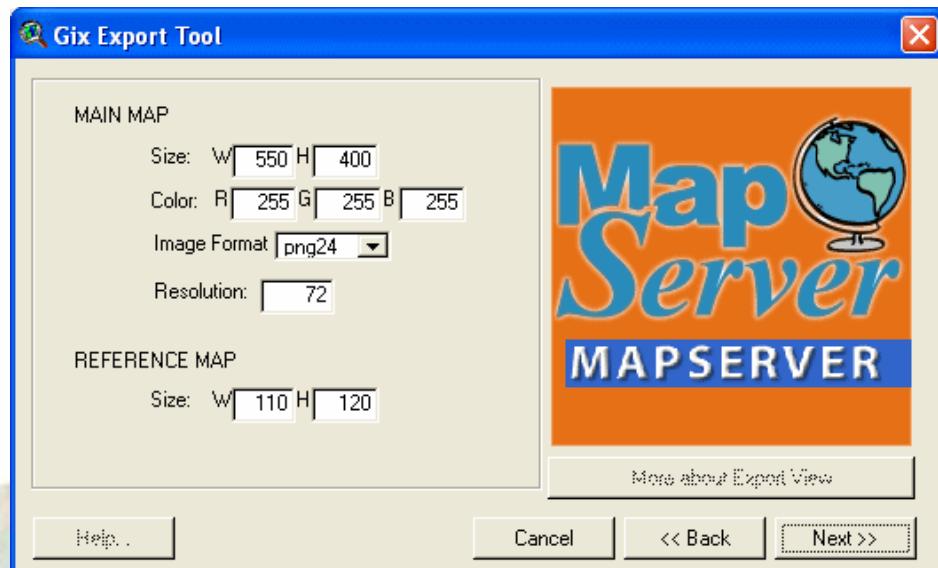
5 The next screen asks for details of the legend. Again, you won't use these sections so accept the defaults and click next.
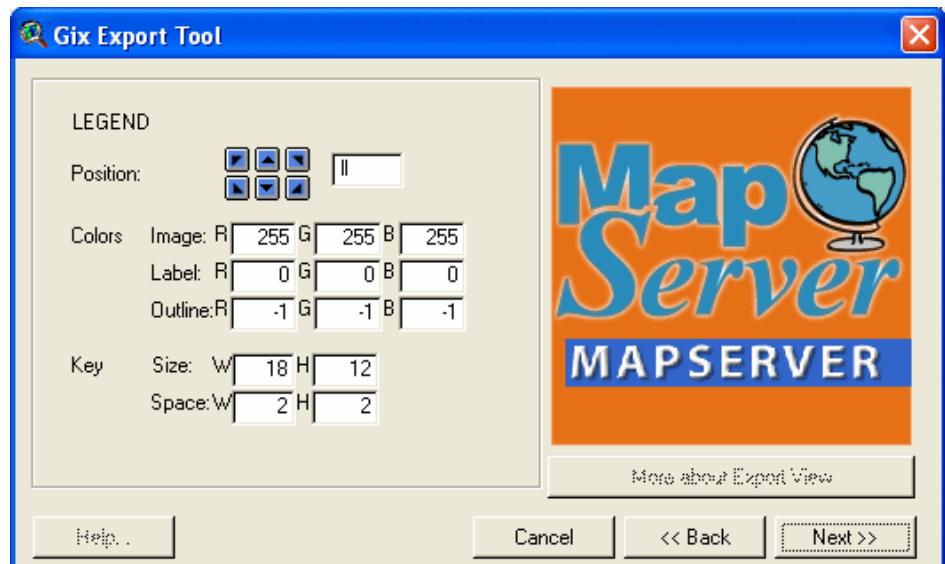
6 The next screen asks for details of the scalebar. Again, you won't use these sections so accept the defaults and click next.
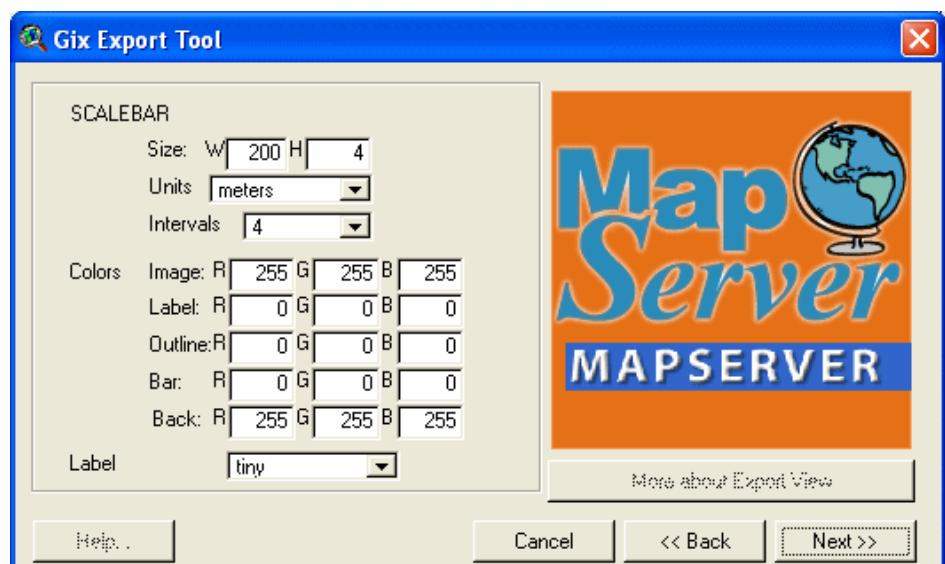
7 The next screen asks for details of the OGC metadata. Again, you won't use these sections so accept the defaults and click next.
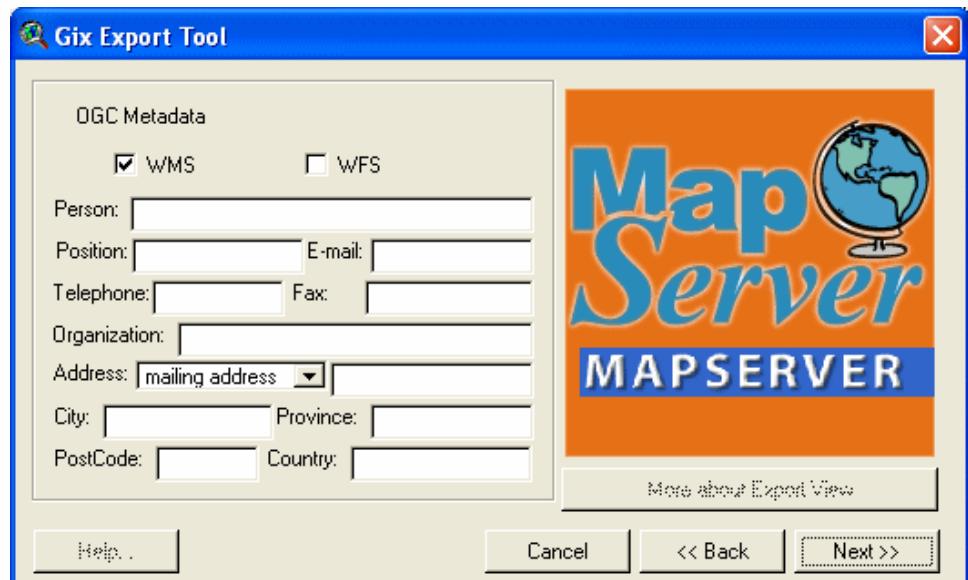
8 The next screen asks for details of final options. Again, you won't use these sections so accept the defaults.
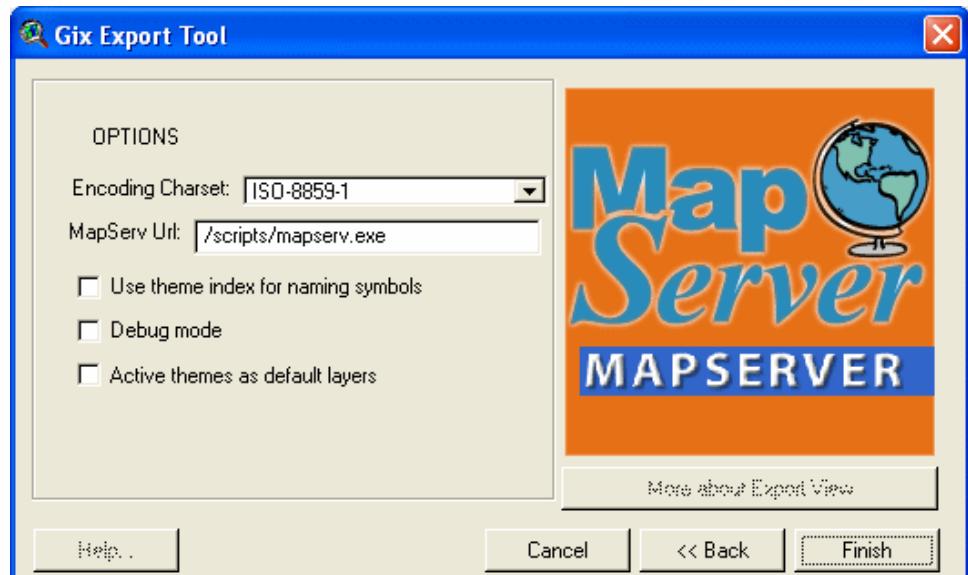
9 Click Finish to create your mapfile.

Open up the MapFile you created in a text editor and complete the following steps for each layer in your mapfile:

1   Navigate to the line beginning CLASSITEM

2   Highlight from here down to the END #CLASS line associated with that layer

3   Copy and paste the selected lines to an empty text file

4   Delete all TEMPLATE 'template.html' lines (one for each class)

5   Paste the remaining content into your master mapFile within the section for the layer you are dealing with. A good position is after the END line which closes the METADATA for that layer.

If your symbolisation in ArcView had polygon boundaries you will need to remove these from the MapServer symbolisation. This may be easier to do by deleting all the 'OUTLINECOLOR' lines from the generated mapfile than by altering your ArcView symbolisation.

APPENDIX 3: CREATING MAPSERVER CLASS DEFINITIONS FROM ARCGIS LEGENDS

The MXDtoWMS tool can help you create the complete MapServer mapfile including CLASS sections from an ESRI ArcMap .mxd file. There are versions for ArcGIS 8 and ArcGIS 9 supplied in the same download but only the version for ArcGIS 9 is described here.

The tool produces complete mapfiles and allows customisation of the produced mapfiles. However, we have not used this functionality and, for the purposes of this cookbook, we are only interested in the generation of the CLASS definitions, the other parts of the mapfile should be edited according to the instructions elsewhere in this document.

This tool is free and open source software released under the LGPL license. It can be obtained from http://arcscripts.esri.com/details.asp?dbid=12766, the author would like an email if you use it and like it.

Installation

The tool requires msxml3.dll to be pre-installed (usually located on Microsoft Windows systems in the system32 folder). First unzip the file somewhere on your system, (e.g C:\arcgis\customtools\MXD2WMS) Make sure the resources folder and its content are in the same directory as the MXD2WMS.dll file. You may want to check if the file regtool5.dll is already somewhere on your system. Register both of the dll files, MXD2WMS.dll and regtool5.dll, using the regsvr32.exe command line DOS utility. (eg 'regsvr32 regtool5.dll'). Go to the Customize window in ArcMap (right-click on the tool bar in ArcMap, or Tools-Customize in the menu). Select 'Add from file...' and point to the MXDtoWMS.dll file. This should add a tool 'MXD to Web Map Service configuration file' in the Commands-Tools category (second tab in the customize window).
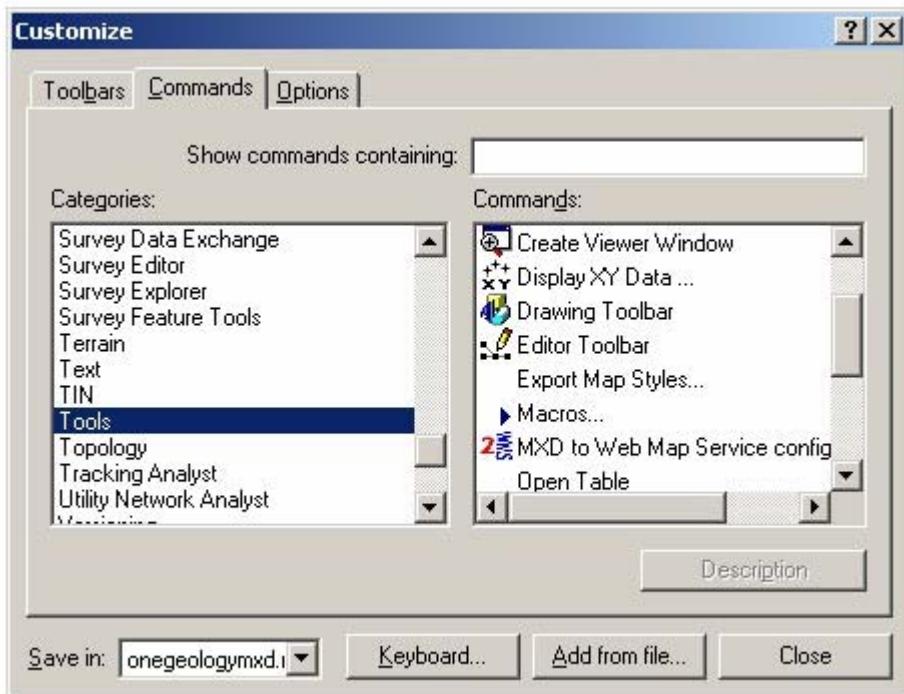
Use the left mouse button to drag the tool to a tool bar of your choice.

Creating mapfiles

Having installed the MXD2WMS tool, create or open an ArcMap file containing your symbolised data.
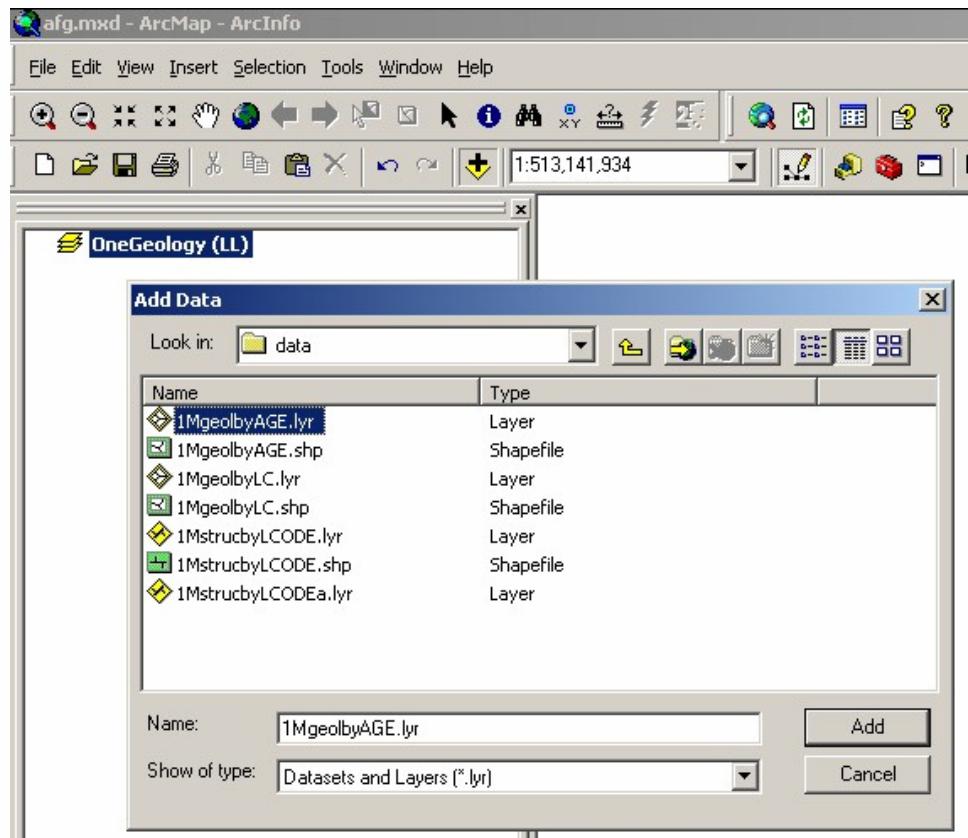
Click on the MXD2WMS tool icon and then close the popup window.
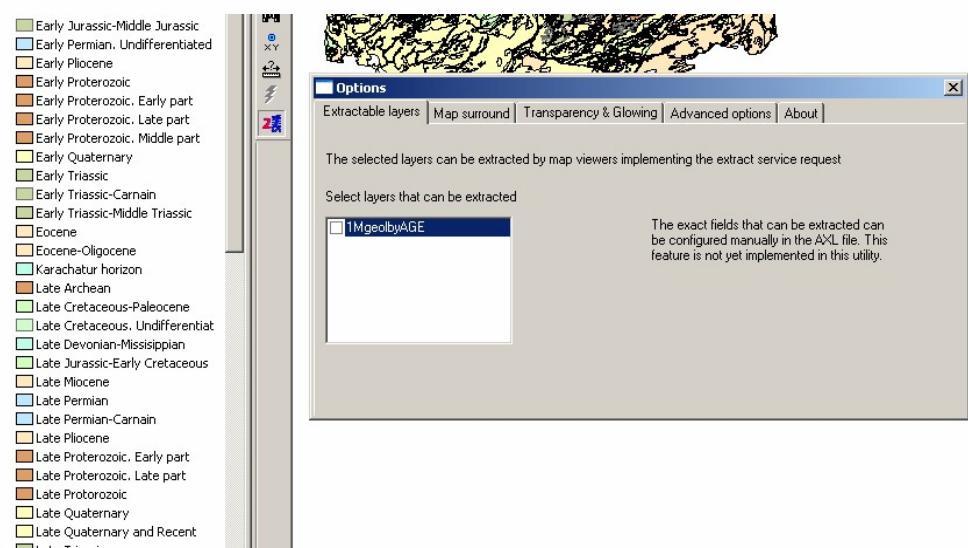
Closing the popup window opens a save as dialog window. The default data type to export to from this tool is AXL, so you will need select MapServer files (*.map) type from the drop down menu.
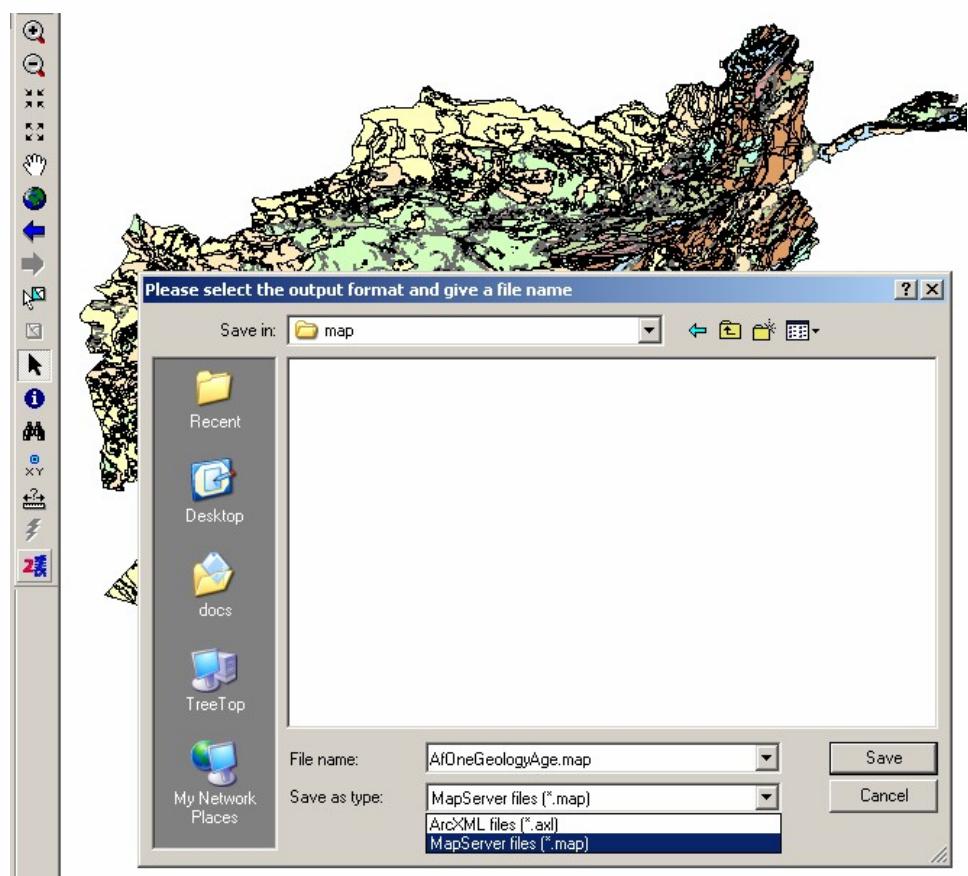
Please note, that though there are a number of tabbed options in the popup, they may not actually change the resultant mapfile. For example the tool will create a mapfile (and classify) any layer file or shape file in the ArcMap layer irrespectively of whether it is selected in the options dialog, or whether it is selected in the mapfile.

This will create a complete mapfile. However, you should simply copy the CLASS definitions from this mapfile to the appropriate LAYER section of the mapfile you have been creating according to the instructions in the body of this cookbook.

If your symbolisation in ArcMap had polygon boundaries you will need to remove these from the MapServer symbolisation. This may be easier to do by deleting all the 'OUTLINECOLOR' lines from the generated mapfile than by altering your ArcMap symbolisation.

APPENDIX 4: BGS EXAMPLE SERVICE MAPFILE

Below is the mapfile included in the example BGS shapefile based bedrock and superficial geology service.

```
#
# Start of map file
#
MAP
  NAME ONEGEOLOGY
  STATUS ON
  SIZE 600 600
  EXTENT -8.6476 49.8639 1.76943 60.8622 # Change to
appropriate coordinates for your data
  UNITS dd # UNITS [feet|inches|kilometers|meters|miles|dd]
Units of the map coordinates. Used for scalebar and scale
computations.
  SHAPEPATH "data"
  IMAGECOLOR 255 255 255

  OUTPUTFORMAT
    NAME png
    DRIVER "GD/PNG"
    MIMETYPE "image/png"
    IMAGEMODE RGBA         # All colours and alpha based
transparency
    EXTENSION "png"
    FORMATOPTION "INTERLACE=ON" # Slow connections will
profit from this option
  END

# If you know you have fewer than 256 colours there may be a
small decrease
# in image sizes if you use the below (default) OUTPUTFORMAT
settings rather
# than those above.
# OUTPUTFORMAT
#    NAME png
#    DRIVER "GD/PNG"
#    MIMETYPE "image/png"
#    IMAGEMODE PC256        # Only 256 colours, may be
insufficient for geological maps.
#    EXTENSION "png"
# END


  IMAGETYPE PNG

  PROJECTION
    "init=epsg:4326"
  END
```

```
    #
    # Start of web interface definition (including WMS
enabling metadata)
    #
    WEB
      HEADER "templates/query_header.html"
      FOOTER "templates/query_footer.html"
      IMAGEPATH "/ms4w/tmp/ms_tmp/"
      IMAGEURL "/ms_tmp/"
      METADATA
        WMS_TITLE "BGS Bedrock and Superficial geology"
        WMS_ABSTRACT "The 1:625k DiGMap data covering the
whole of the United Kingdom is available in this OGC WMS
service for your personal, non-commercial use only and is
being served as a contribution to the OneGeology
initiative(www.onegeology.org). Separate bedrock geology and
superficial deposits layers are available in this service.
Layers available for bedrock are lithostratigraphy,
chronostratigraphy, and lithology. The layer names are
lithostratigraphy, chronostratigraphy and lithology
respectively.
Layers available for superficial deposits layer are
lithostratigraphy and lithology. The layer names are
lithostratigraphy and lithology respectively.
For information about more of the British Geological
Survey's maps that are available digitally please visit
http://www.bgs.ac.uk/products/digitalmaps/digmapgb.html" #
Put your organisation name and any other information you
want to include.
        # You must include "OneGeology" as one of the
keywords.
        WMS_KEYWORDLIST "OneGeology,Geology,Map,United
Kingdom,Bedrock,Superficial,Lithology,Lithostratigraphy,Age"
        WMS_SERVICE_ONLINERESOURCE
"http://www.bgs.ac.uk/products/digitalmaps/digmapgb.html"
        #WMS_ONLINERESOURCE "http://ogc.bgs.ac.uk/cgi-
bin/onegeology?"
        WMS_CONTACTPERSON "Richard Hughes"
        WMS_CONTACTORGANIZATION "British Geological Survey"
        WMS_CONTACTPOSITION "Head of Information Delivery"
        WMS_ADDRESSTYPE "postal"
        WMS_ADDRESS "Kingsley Dunham Centre"
        WMS_CITY "Keyworth"
        WMS_STATEORPROVINCE "Nottinghamshire"
        WMS_POSTCODE "NG12 5GG"
        WMS_COUNTRY "UK"
        WMS_CONTACTVOICETELEPHONE "+44 (0)115 936 3100"
        WMS_CONTACTFACSIMILETELEPHONE "+44 (0)115 936 3200"
        WMS_CONTACTELECTRONICMAILADDRESS "enquiries@bgs.ac.uk"
        WMS_FEES "none"
        WMS_ACCESSCONSTRAINTS "The 1:625k DiGMap data is
available for free download for your personal, teaching,
research or non-commercial use as described on the previous
web-page. Your use of any information provided by the
British Geological Survey (BGS) is at your own risk. Neither
BGS nor the Natural Environment Research Council (NERC)
gives any warranty, condition or representation as to the
quality, accuracy or completeness of the information or its
```

suitability for any use or purpose. All implied conditions
relating to the quality or suitability of the information,
and all liabilities arising from the supply of the
information (including any liability arising in negligence)
are excluded to the fullest extent permitted by law."
```
      WMS_FEATURE_INFO_MIME_TYPE   "text/html"
      WMS_SRS "EPSG:4326 EPSG:27700"
    END
  END

  LEGEND
    OUTLINECOLOR 200 200 200
    KEYSPACING 10 10
    LABEL
      TYPE bitmap
      SIZE small
    END
  END

  LAYER
    NAME GBR_BGS_625K_BLT # Bedrock lithology
    TYPE POLYGON
    STATUS ON
    DATA bedrock625ll
    TRANSPARENCY 100
    TOLERANCE 0
    TOLERANCEUNITS pixels
    TRANSFORM TRUE
    DUMP TRUE

    HEADER "templates/bedrock_lithology_query_header.html"
    TEMPLATE "templates/bedrock_lithology_query_body.html"
    FOOTER "templates/bedrock_lithology_query_footer.html"

    PROJECTION
      "init=epsg:4326"
    END

    METADATA
      WMS_TITLE "GBR BGS 1:625k Bedrock Lithology"
      WMS_ABSTRACT "GBR BGS 1:625k Bedrock Lithology"
      WMS_SRS "EPSG:4326 EPSG:27700"
      GML_INCLUDE_ITEMS "RCS_D"
      WMS_INCLUDE_ITEMS "RCS_D"
      WMS_METADATAURL_HREF
"http://www.bgs.ac.uk/discoverymetadata/13480426.html"
      WMS_METADATAURL_FORMAT "text/html"
      WMS_METADATAURL_TYPE "TC211"
      WMS_DATAURL_HREF
"http://www.bgs.ac.uk/products/digitalmaps/digmapgb_625.html
"
      WMS_DATAURL_FORMAT "text/html"
      WMS_KEYWORDLIST "Bedrock,Lithology"
    END

    CLASSITEM 'RCS_D'
```

```
CLASS
  NAME 'ANORTHOSITE'

  EXPRESSION 'ANORTHOSITE'
  #RASTERFILL_STYLE_SOLID
  STYLE
    COLOR 237 237 237
    BACKGROUNDCOLOR 255 255 255
  END  #STYLE
END #CLASS
CLASS
  NAME 'BRECCIA AND METABRECCIA'

  EXPRESSION 'BRECCIA AND METABRECCIA'
  #RASTERFILL_STYLE_SOLID
  STYLE
    COLOR 219 117 117
    BACKGROUNDCOLOR 255 255 255
  END  #STYLE
END #CLASS
CLASS
  NAME 'BRECCIA, CONGLOMERATE AND SANDSTONE'

  EXPRESSION 'BRECCIA, CONGLOMERATE AND SANDSTONE'
  #RASTERFILL_STYLE_SOLID
  STYLE
    COLOR 201 84 51
    BACKGROUNDCOLOR 255 255 255
  END  #STYLE
END #CLASS
CLASS
  NAME 'CHALK'

  EXPRESSION 'CHALK'
  #RASTERFILL_STYLE_SOLID
  STYLE
    COLOR 201 255 175
    BACKGROUNDCOLOR 255 255 255
  END  #STYLE
END #CLASS
CLASS
  NAME 'CHALK AND SANDSTONE'

  EXPRESSION 'CHALK AND SANDSTONE'
  #RASTERFILL_STYLE_SOLID
  STYLE
    COLOR 175 255 117
    BACKGROUNDCOLOR 255 255 255
  END  #STYLE
END #CLASS
CLASS
  NAME 'CLAY AND LIGNITE'

  EXPRESSION 'CLAY AND LIGNITE'
  #RASTERFILL_STYLE_SOLID
  STYLE
    COLOR 201 201 117
    BACKGROUNDCOLOR 255 255 255
```

```
          END  #STYLE
        END #CLASS
        CLASS
          NAME 'CLAY, SILT AND SAND'

          EXPRESSION 'CLAY, SILT AND SAND'
          #RASTERFILL_STYLE_SOLID
          STYLE
            COLOR 255 201 175
            BACKGROUNDCOLOR 255 255 255
          END  #STYLE
        END #CLASS
        CLASS
          NAME 'CLAY, SILT, SAND AND GRAVEL'

          EXPRESSION 'CLAY, SILT, SAND AND GRAVEL'
          #RASTERFILL_STYLE_SOLID
          STYLE
            COLOR 219 147 117
            BACKGROUNDCOLOR 255 255 255
          END  #STYLE
        END #CLASS
        CLASS
          NAME 'CONGLOMERATE AND [SUBEQUAL/SUBORDINATE]
SANDSTONE, INTERBEDDED'

          EXPRESSION 'CONGLOMERATE AND [SUBEQUAL/SUBORDINATE]
SANDSTONE, INTERBEDDED'
          #RASTERFILL_STYLE_SOLID
          STYLE
            COLOR 175 147 84
            BACKGROUNDCOLOR 255 255 255
          END  #STYLE
        END #CLASS
        CLASS
          NAME 'CONGLOMERATE, SANDSTONE, SILTSTONE AND MUDSTONE'

          EXPRESSION 'CONGLOMERATE, SANDSTONE, SILTSTONE AND
MUDSTONE'
          #RASTERFILL_STYLE_SOLID
          STYLE
            COLOR 255 219 219
            BACKGROUNDCOLOR 255 255 255
          END  #STYLE
        END #CLASS
        CLASS
          NAME 'DIAMICTITE'

          EXPRESSION 'DIAMICTITE'
          #RASTERFILL_STYLE_SOLID
          STYLE
            COLOR 147 201 201
            BACKGROUNDCOLOR 255 255 255
          END  #STYLE
        END #CLASS
        CLASS
          NAME 'DOLERITE AND THOLEIITIC BASALT'
```

```
      EXPRESSION 'DOLERITE AND THOLEIITIC BASALT'
      #RASTERFILL_STYLE_SOLID
      STYLE
        COLOR 255 51 201
        BACKGROUNDCOLOR 255 255 255
      END  #STYLE
    END #CLASS
    CLASS
      NAME 'DOLOMITISED LIMESTONE AND DOLOMITE'

      EXPRESSION 'DOLOMITISED LIMESTONE AND DOLOMITE'
      #RASTERFILL_STYLE_SOLID
      STYLE
        COLOR 147 255 147
        BACKGROUNDCOLOR 255 255 255
      END  #STYLE
    END #CLASS
    CLASS
      NAME 'DOLOSTONE'

      EXPRESSION 'DOLOSTONE'
      #RASTERFILL_STYLE_SOLID
      STYLE
        COLOR 175 255 175
        BACKGROUNDCOLOR 255 255 255
      END  #STYLE
    END #CLASS
    CLASS
      NAME 'FELSIC LAVA'

      EXPRESSION 'FELSIC LAVA'
      #RASTERFILL_STYLE_SOLID
      STYLE
        COLOR 255 175 0
        BACKGROUNDCOLOR 255 255 255
      END  #STYLE
    END #CLASS
    CLASS
      NAME 'FELSIC LAVA AND FELSIC TUFF'

      EXPRESSION 'FELSIC LAVA AND FELSIC TUFF'
      #RASTERFILL_STYLE_SOLID
      STYLE
        COLOR 255 175 0
        BACKGROUNDCOLOR 255 255 255
      END  #STYLE
    END #CLASS
    CLASS
      NAME 'FELSIC TUFF'

      EXPRESSION 'FELSIC TUFF'
      #RASTERFILL_STYLE_SOLID
      STYLE
        COLOR 255 175 84
        BACKGROUNDCOLOR 255 255 255
      END  #STYLE
    END #CLASS
    CLASS
```

```
       NAME 'FELSIC-ROCK'

       EXPRESSION 'FELSIC-ROCK'
       #RASTERFILL_STYLE_SOLID
       STYLE
         COLOR 255 0 0
         BACKGROUNDCOLOR 255 255 255
       END  #STYLE
     END #CLASS
     CLASS
       NAME 'GNEISS'

       EXPRESSION 'GNEISS'
       #RASTERFILL_STYLE_SOLID
       STYLE
         COLOR 201 201 255
         BACKGROUNDCOLOR 255 255 255
       END  #STYLE
     END #CLASS
     CLASS
       NAME 'GNEISSOSE PSAMMITE AND GNEISSOSE SEMIPELITE'

       EXPRESSION 'GNEISSOSE PSAMMITE AND GNEISSOSE SEMIPELITE'
       #RASTERFILL_STYLE_SOLID
       STYLE
         COLOR 255 201 147
         BACKGROUNDCOLOR 255 255 255
       END  #STYLE
     END #CLASS
     CLASS
       NAME 'GNEISSOSE SEMIPELITE AND GNEISSOSE PSAMMITE'

       EXPRESSION 'GNEISSOSE SEMIPELITE AND GNEISSOSE PSAMMITE'
       #RASTERFILL_STYLE_SOLID
       STYLE
         COLOR 255 219 219
         BACKGROUNDCOLOR 255 255 255
       END  #STYLE
     END #CLASS
     CLASS
       NAME 'GRAPHITIC PELITE, CALCAREOUS PELITE, CALCSILICATE-
ROCK AND PSAMMITE'

       EXPRESSION 'GRAPHITIC PELITE, CALCAREOUS PELITE,
CALCSILICATE-ROCK AND PSAMMITE'
       #RASTERFILL_STYLE_SOLID
       STYLE
         COLOR 201 255 117
         BACKGROUNDCOLOR 255 255 255
       END  #STYLE
     END #CLASS
     CLASS
       NAME 'GRAVEL, SAND, SILT AND CLAY'

       EXPRESSION 'GRAVEL, SAND, SILT AND CLAY'
       #RASTERFILL_STYLE_SOLID
        STYLE
          COLOR 255 255 237
```

```
        BACKGROUNDCOLOR 255 255 255
      END  #STYLE
   END #CLASS
   CLASS
     NAME 'HORNBLENDE SCHIST'

     EXPRESSION 'HORNBLENDE SCHIST'
     #RASTERFILL_STYLE_SOLID
     STYLE
        COLOR 84 255 84
        BACKGROUNDCOLOR 255 255 255
      END  #STYLE
   END #CLASS
   CLASS
     NAME 'LAVA AND TUFF'

     EXPRESSION 'LAVA AND TUFF'
     #RASTERFILL_STYLE_SOLID
     STYLE
        COLOR 175 255 147
        BACKGROUNDCOLOR 255 255 255
      END  #STYLE
   END #CLASS
   CLASS
     NAME 'LAVA, TUFF, VOLCANICLASTIC ROCK AND SEDIMENTARY
ROCK'

     EXPRESSION 'LAVA, TUFF, VOLCANICLASTIC ROCK AND
SEDIMENTARY ROCK'
     #RASTERFILL_STYLE_SOLID
     STYLE
        COLOR 219 175 219
        BACKGROUNDCOLOR 255 255 255
      END  #STYLE
   END #CLASS
   CLASS
     NAME 'LIMESTONE'

     EXPRESSION 'LIMESTONE'
     #RASTERFILL_STYLE_SOLID
     STYLE
        COLOR 147 237 237
        BACKGROUNDCOLOR 255 255 255
      END  #STYLE
   END #CLASS
   CLASS
     NAME 'LIMESTONE AND CALCAREOUS SANDSTONE'

     EXPRESSION 'LIMESTONE AND CALCAREOUS SANDSTONE'
     #RASTERFILL_STYLE_SOLID
     STYLE
        COLOR 255 201 147
        BACKGROUNDCOLOR 255 255 255
      END  #STYLE
   END #CLASS
   CLASS
     NAME 'LIMESTONE AND MUDSTONE, INTERBEDDED'
```

```
          EXPRESSION 'LIMESTONE AND MUDSTONE, INTERBEDDED'
          #RASTERFILL_STYLE_SOLID
          STYLE
            COLOR 175 201 201
            BACKGROUNDCOLOR 255 255 255
          END  #STYLE
     END #CLASS
     CLASS
        NAME 'LIMESTONE WITH SUBORDINATE SANDSTONE AND
ARGILLACEOUS ROCKS'

          EXPRESSION 'LIMESTONE WITH SUBORDINATE SANDSTONE AND
ARGILLACEOUS ROCKS'
          #RASTERFILL_STYLE_SOLID
          STYLE
            COLOR 147 255 237
            BACKGROUNDCOLOR 255 255 255
          END  #STYLE
     END #CLASS
     CLASS
        NAME 'LIMESTONE, ARGILLACEOUS ROCKS AND SUBORDINATE
SANDSTONE, INTERBEDDED'

          EXPRESSION 'LIMESTONE, ARGILLACEOUS ROCKS AND
SUBORDINATE SANDSTONE, INTERBEDDED'
          #RASTERFILL_STYLE_SOLID
          STYLE
            COLOR 84 219 219
            BACKGROUNDCOLOR 255 255 255
          END  #STYLE
     END #CLASS
     CLASS
        NAME 'LIMESTONE, MUDSTONE AND CALCAREOUS MUDSTONE'

          EXPRESSION 'LIMESTONE, MUDSTONE AND CALCAREOUS MUDSTONE'
          #RASTERFILL_STYLE_SOLID
          STYLE
            COLOR 117 255 255
            BACKGROUNDCOLOR 255 255 255
          END  #STYLE
     END #CLASS
     CLASS
        NAME 'LIMESTONE, MUDSTONE, SANDSTONE AND SILTSTONE, WITH
SUBORDINATE CHERT, COAL AND CONGLOMERATE'

          EXPRESSION 'LIMESTONE, MUDSTONE, SANDSTONE AND
SILTSTONE, WITH SUBORDINATE CHERT, COAL AND CONGLOMERATE'
          #RASTERFILL_STYLE_SOLID
          STYLE
            COLOR 175 175 117
            BACKGROUNDCOLOR 255 255 255
          END  #STYLE
     END #CLASS
     CLASS
        NAME 'LIMESTONE, SANDSTONE, SILTSTONE AND MUDSTONE'

          EXPRESSION 'LIMESTONE, SANDSTONE, SILTSTONE AND
   MUDSTONE'
```
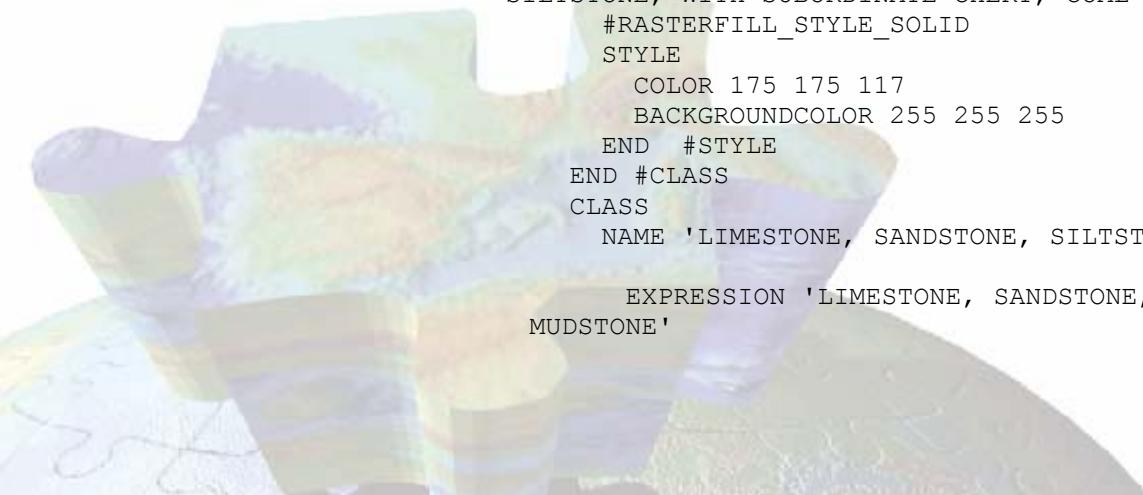
```
                   #RASTERFILL_STYLE_SOLID
                   STYLE
                     COLOR 255 219 147
                     BACKGROUNDCOLOR 255 255 255
                   END  #STYLE
                 END #CLASS
                 CLASS
                   NAME 'MAFIC GNEISS'

                   EXPRESSION 'MAFIC GNEISS'
                   #RASTERFILL_STYLE_SOLID
                   STYLE
                     COLOR 175 51 255
                     BACKGROUNDCOLOR 255 255 255
                   END  #STYLE
                 END #CLASS
                 CLASS
                   NAME 'MAFIC IGNEOUS-ROCK'

                   EXPRESSION 'MAFIC IGNEOUS-ROCK'
                   #RASTERFILL_STYLE_SOLID
                   STYLE
                     COLOR 84 201 84
                     BACKGROUNDCOLOR 255 255 255
                   END  #STYLE
                 END #CLASS
                 CLASS
                   NAME 'MAFIC LAVA'

                   EXPRESSION 'MAFIC LAVA'
                   #RASTERFILL_STYLE_SOLID
                   STYLE
                     COLOR 255 219 255
                     BACKGROUNDCOLOR 255 255 255
                   END  #STYLE
                 END #CLASS
                 CLASS
                   NAME 'MAFIC LAVA AND MAFIC TUFF'

                   EXPRESSION 'MAFIC LAVA AND MAFIC TUFF'
                   #RASTERFILL_STYLE_SOLID
                   STYLE
                     COLOR 255 219 255
                     BACKGROUNDCOLOR 255 255 255
                   END  #STYLE
                 END #CLASS
                 CLASS
                   NAME 'MAFIC TUFF'

                   EXPRESSION 'MAFIC TUFF'
                   #RASTERFILL_STYLE_SOLID
                   STYLE
                     COLOR 255 219 255
                     BACKGROUNDCOLOR 255 255 255
                   END  #STYLE
                 END #CLASS
                 CLASS
                   NAME 'MAFITE'
```

```
      EXPRESSION 'MAFITE'
      #RASTERFILL_STYLE_SOLID
      STYLE
        COLOR 117 255 0
        BACKGROUNDCOLOR 255 255 255
      END  #STYLE
    END #CLASS
    CLASS
      NAME 'METALIMESTONE'

      EXPRESSION 'METALIMESTONE'
      #RASTERFILL_STYLE_SOLID
      STYLE
        COLOR 84 255 255
        BACKGROUNDCOLOR 255 255 255
      END  #STYLE
    END #CLASS
    CLASS
      NAME 'METASEDIMENTARY ROCK'

      EXPRESSION 'METASEDIMENTARY ROCK'
      #RASTERFILL_STYLE_SOLID
      STYLE
        COLOR 175 201 84
        BACKGROUNDCOLOR 255 255 255
      END  #STYLE
    END #CLASS
    CLASS
      NAME 'METAVOLCANICLASTIC IGNEOUS-ROCK AND
METAVOLCANICLASTIC SEDIMENTARY-ROCK'

      EXPRESSION 'METAVOLCANICLASTIC IGNEOUS-ROCK AND
METAVOLCANICLASTIC SEDIMENTARY-ROCK'
      #RASTERFILL_STYLE_SOLID
      STYLE
        COLOR 117 255 147
        BACKGROUNDCOLOR 255 255 255
      END  #STYLE
    END #CLASS
    CLASS
      NAME 'MICA SCHIST'

      EXPRESSION 'MICA SCHIST'
      #RASTERFILL_STYLE_SOLID
      STYLE
        COLOR 175 237 175
        BACKGROUNDCOLOR 255 255 255
      END  #STYLE
    END #CLASS
    CLASS
      NAME 'MIGMATITIC ROCK'

      EXPRESSION 'MIGMATITIC ROCK'
      #RASTERFILL_STYLE_SOLID
      STYLE
        COLOR 201 175 201
        BACKGROUNDCOLOR 255 255 255
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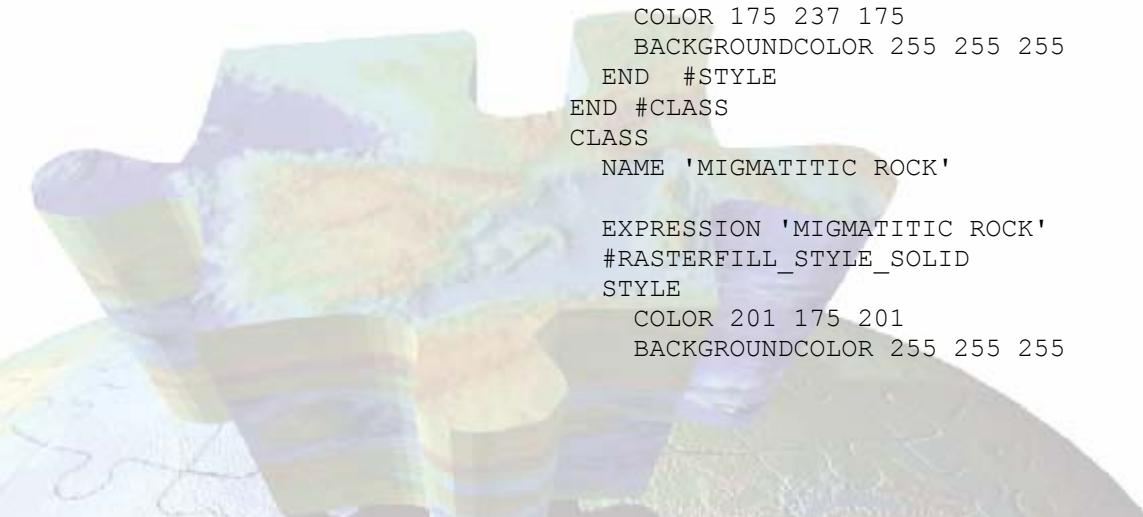
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              END  #STYLE
          END #CLASS
          CLASS
            NAME 'MUDSTONE, CHERT AND SMECTITE-CLAYSTONE'

            EXPRESSION 'MUDSTONE, CHERT AND SMECTITE-CLAYSTONE'
            #RASTERFILL_STYLE_SOLID
            STYLE
              COLOR 117 175 219
              BACKGROUNDCOLOR 255 255 255
            END  #STYLE
          END #CLASS
          CLASS
            NAME 'MUDSTONE, SANDSTONE AND CONGLOMERATE'

            EXPRESSION 'MUDSTONE, SANDSTONE AND CONGLOMERATE'
            #RASTERFILL_STYLE_SOLID
            STYLE
              COLOR 147 255 255
              BACKGROUNDCOLOR 255 255 255
            END  #STYLE
          END #CLASS
          CLASS
            NAME 'MUDSTONE, SANDSTONE AND LIMESTONE'

            EXPRESSION 'MUDSTONE, SANDSTONE AND LIMESTONE'
            #RASTERFILL_STYLE_SOLID
            STYLE
              COLOR 255 201 51
              BACKGROUNDCOLOR 255 255 255
            END  #STYLE
          END #CLASS
          CLASS
            NAME 'MUDSTONE, SILTSTONE AND SANDSTONE'

            EXPRESSION 'MUDSTONE, SILTSTONE AND SANDSTONE'
            #RASTERFILL_STYLE_SOLID
            STYLE
              COLOR 201 201 117
              BACKGROUNDCOLOR 255 255 255
            END  #STYLE
          END #CLASS
          CLASS
            NAME 'MUDSTONE, SILTSTONE, LIMESTONE AND SANDSTONE'

            EXPRESSION 'MUDSTONE, SILTSTONE, LIMESTONE AND
SANDSTONE'
            #RASTERFILL_STYLE_SOLID
            STYLE
              COLOR 84 117 201
              BACKGROUNDCOLOR 255 255 255
            END  #STYLE
          END #CLASS
          CLASS
            NAME 'MUDSTONE, SILTSTONE, SANDSTONE, COAL, IRONSTONE
AND FERRICRETE'
```

```
                EXPRESSION 'MUDSTONE, SILTSTONE, SANDSTONE, COAL,
IRONSTONE AND FERRICRETE'
          #RASTERFILL_STYLE_SOLID
          STYLE
            COLOR 237 201 84
            BACKGROUNDCOLOR 255 255 255
          END  #STYLE
      END #CLASS
      CLASS
        NAME 'MYLONITIC-ROCK AND FAULT-BRECCIA'

        EXPRESSION 'MYLONITIC-ROCK AND FAULT-BRECCIA'
        #RASTERFILL_STYLE_SOLID
        STYLE
          COLOR 147 175 0
          BACKGROUNDCOLOR 255 255 255
        END  #STYLE
      END #CLASS
      CLASS
        NAME 'PELITE'

        EXPRESSION 'PELITE'
        #RASTERFILL_STYLE_SOLID
        STYLE
          COLOR 175 237 255
          BACKGROUNDCOLOR 255 255 255
        END  #STYLE
      END #CLASS
      CLASS
        NAME 'PSAMMITE'

        EXPRESSION 'PSAMMITE'
        #RASTERFILL_STYLE_SOLID
        STYLE
          COLOR 255 237 117
          BACKGROUNDCOLOR 255 255 255
        END  #STYLE
      END #CLASS
      CLASS
        NAME 'PSAMMITE AND PELITE'

        EXPRESSION 'PSAMMITE AND PELITE'
        #RASTERFILL_STYLE_SOLID
        STYLE
          COLOR 237 237 0
          BACKGROUNDCOLOR 255 255 255
        END  #STYLE
      END #CLASS
      CLASS
        NAME 'PSAMMITE AND SEMIPELITE'

        EXPRESSION 'PSAMMITE AND SEMIPELITE'
        #RASTERFILL_STYLE_SOLID
        STYLE
          COLOR 201 175 255
          BACKGROUNDCOLOR 255 255 255
        END  #STYLE
      END #CLASS
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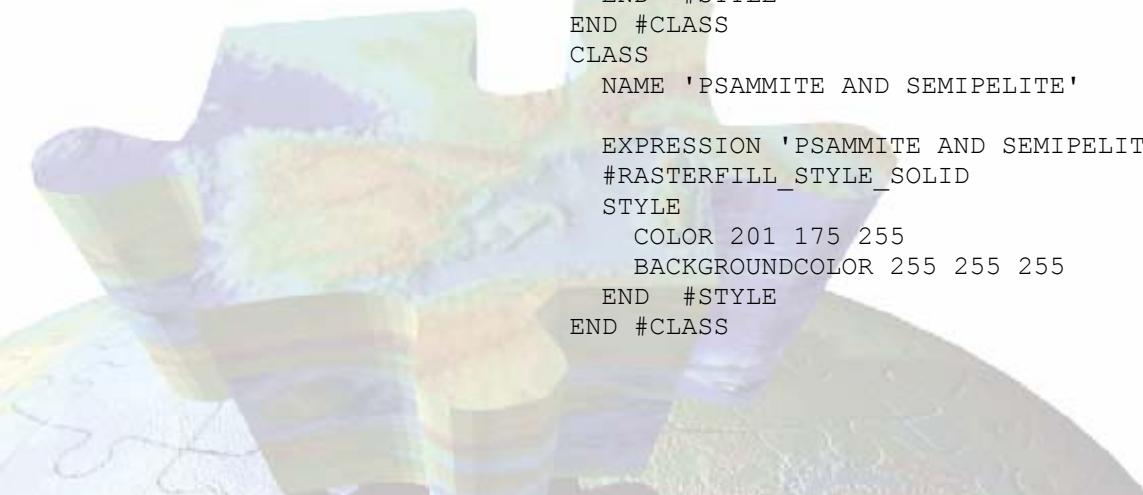
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CLASS
  NAME 'PSAMMITE, PELITE, SEMIPELITE AND CALCSILICATE-ROCK'

  EXPRESSION 'PSAMMITE, PELITE, SEMIPELITE AND CALCSILICATE-
ROCK'
  #RASTERFILL_STYLE_SOLID
  STYLE
    COLOR 255 237 219
    BACKGROUNDCOLOR 255 255 255
  END  #STYLE
END #CLASS
CLASS
  NAME 'PSAMMITE, SEMIPELITE AND PELITE'

  EXPRESSION 'PSAMMITE, SEMIPELITE AND PELITE'
  #RASTERFILL_STYLE_SOLID
  STYLE
    COLOR 255 147 175
    BACKGROUNDCOLOR 255 255 255
  END  #STYLE
END #CLASS
CLASS
  NAME 'PYROCLASTIC-ROCK'

  EXPRESSION 'PYROCLASTIC-ROCK'
  #RASTERFILL_STYLE_SOLID
  STYLE
    COLOR 255 255 84
    BACKGROUNDCOLOR 255 255 255
  END  #STYLE
END #CLASS
CLASS
  NAME 'QUARTZ-ARENITE'

  EXPRESSION 'QUARTZ-ARENITE'
  #RASTERFILL_STYLE_SOLID
  STYLE
    COLOR 147 237 255
    BACKGROUNDCOLOR 255 255 255
  END  #STYLE
END #CLASS
CLASS
  NAME 'QUARTZITE'

  EXPRESSION 'QUARTZITE'
  #RASTERFILL_STYLE_SOLID
  STYLE
    COLOR 237 219 51
    BACKGROUNDCOLOR 255 255 255
  END  #STYLE
END #CLASS
CLASS
  NAME 'SAND, SILT AND CLAY'

  EXPRESSION 'SAND, SILT AND CLAY'
  #RASTERFILL_STYLE_SOLID
  STYLE
    COLOR 51 117 255
```

```
          BACKGROUNDCOLOR 255 255 255
        END  #STYLE
      END #CLASS
      CLASS
        NAME 'SANDSTONE AND CONGLOMERATE, INTERBEDDED'

        EXPRESSION 'SANDSTONE AND CONGLOMERATE, INTERBEDDED'
        #RASTERFILL_STYLE_SOLID
        STYLE
          COLOR 201 255 175
          BACKGROUNDCOLOR 255 255 255
        END  #STYLE
      END #CLASS
      CLASS
        NAME 'SANDSTONE AND MUDSTONE'

        EXPRESSION 'SANDSTONE AND MUDSTONE'
        #RASTERFILL_STYLE_SOLID
        STYLE
          COLOR 201 219 147
          BACKGROUNDCOLOR 255 255 255
        END  #STYLE
      END #CLASS
      CLASS
        NAME 'SANDSTONE AND SILTSTONE, INTERBEDDED'

        EXPRESSION 'SANDSTONE AND SILTSTONE, INTERBEDDED'
        #RASTERFILL_STYLE_SOLID
        STYLE
          COLOR 201 237 84
          BACKGROUNDCOLOR 255 255 255
        END  #STYLE
      END #CLASS
      CLASS
        NAME 'SANDSTONE AND SUBORDINATE BRECCIA'

        EXPRESSION 'SANDSTONE AND SUBORDINATE BRECCIA'
        #RASTERFILL_STYLE_SOLID
        STYLE
          COLOR 255 147 84
          BACKGROUNDCOLOR 255 255 255
        END  #STYLE
      END #CLASS
      CLASS
        NAME 'SANDSTONE AND [SUBEQUAL/SUBORDINATE] ARGILLACEOUS
ROCKS, INTERBEDDED'

        EXPRESSION 'SANDSTONE AND [SUBEQUAL/SUBORDINATE]
ARGILLACEOUS ROCKS, INTERBEDDED'
        #RASTERFILL_STYLE_SOLID
        STYLE
          COLOR 237 175 147
          BACKGROUNDCOLOR 255 255 255
        END  #STYLE
      END #CLASS
      CLASS
        NAME 'SANDSTONE AND [SUBEQUAL/SUBORDINATE] LIMESTONE,
INTERBEDDED'
```

```
        EXPRESSION 'SANDSTONE AND [SUBEQUAL/SUBORDINATE]
LIMESTONE, INTERBEDDED'
      #RASTERFILL_STYLE_SOLID
      STYLE
        COLOR 255 175 0
        BACKGROUNDCOLOR 255 255 255
      END  #STYLE
    END #CLASS
    CLASS
      NAME 'SANDSTONE WITH SUBORDINATE ARGILLACEOUS ROCKS AND
LIMESTONE'

        EXPRESSION 'SANDSTONE WITH SUBORDINATE ARGILLACEOUS
ROCKS AND LIMESTONE'
      #RASTERFILL_STYLE_SOLID
      STYLE
        COLOR 255 147 147
        BACKGROUNDCOLOR 255 255 255
      END  #STYLE
    END #CLASS
    CLASS
      NAME 'SANDSTONE WITH SUBORDINATE CONGLOMERATE AND
SILTSTONE'

        EXPRESSION 'SANDSTONE WITH SUBORDINATE CONGLOMERATE AND
SILTSTONE'
      #RASTERFILL_STYLE_SOLID
      STYLE
        COLOR 237 147 51
        BACKGROUNDCOLOR 255 255 255
      END  #STYLE
    END #CLASS
    CLASS
      NAME 'SANDSTONE WITH SUBORDINATE CONGLOMERATE, SILTSTONE
AND MUDSTONE'

        EXPRESSION 'SANDSTONE WITH SUBORDINATE CONGLOMERATE,
SILTSTONE AND MUDSTONE'
      #RASTERFILL_STYLE_SOLID
      STYLE
        COLOR 237 147 175
        BACKGROUNDCOLOR 255 255 255
      END  #STYLE
    END #CLASS
    CLASS
      NAME 'SANDSTONE, BRECCIA AND CONGLOMERATE'

        EXPRESSION 'SANDSTONE, BRECCIA AND CONGLOMERATE'
      #RASTERFILL_STYLE_SOLID
      STYLE
        COLOR 237 117 84
        BACKGROUNDCOLOR 255 255 255
      END  #STYLE
    END #CLASS
    CLASS
      NAME 'SANDSTONE, CONGLOMERATE AND [SUBORDINATE]
ARGILLACEOUS ROCKS'
```

```
          EXPRESSION 'SANDSTONE, CONGLOMERATE AND [SUBORDINATE]
ARGILLACEOUS ROCKS'
          #RASTERFILL_STYLE_SOLID
          STYLE
            COLOR 201 175 117
            BACKGROUNDCOLOR 255 255 255
          END  #STYLE
       END #CLASS
       CLASS
          NAME 'SANDSTONE, LIMESTONE AND ARGILLACEOUS ROCKS'

          EXPRESSION 'SANDSTONE, LIMESTONE AND ARGILLACEOUS ROCKS'
          #RASTERFILL_STYLE_SOLID
          STYLE
            COLOR 175 51 255
            BACKGROUNDCOLOR 255 255 255
          END  #STYLE
       END #CLASS
       CLASS
          NAME 'SANDSTONE, MUDSTONE, SILTSTONE AND CONGLOMERATE'

          EXPRESSION 'SANDSTONE, MUDSTONE, SILTSTONE AND
CONGLOMERATE'
          #RASTERFILL_STYLE_SOLID
          STYLE
            COLOR 219 255 117
            BACKGROUNDCOLOR 255 255 255
          END  #STYLE
       END #CLASS
       CLASS
          NAME 'SANDSTONE, SILTSTONE AND MUDSTONE'

          EXPRESSION 'SANDSTONE, SILTSTONE AND MUDSTONE'
          #RASTERFILL_STYLE_SOLID
          STYLE
            COLOR 237 175 175
            BACKGROUNDCOLOR 255 255 255
          END  #STYLE
       END #CLASS
       CLASS
          NAME 'SCHIST'

          EXPRESSION 'SCHIST'
          #RASTERFILL_STYLE_SOLID
          STYLE
            COLOR 237 237 219
            BACKGROUNDCOLOR 255 255 255
          END  #STYLE
       END #CLASS
       CLASS
          NAME 'SEDIMENTARY ROCK CYCLES, CLACKMANNAN GROUP TYPE'

          EXPRESSION 'SEDIMENTARY ROCK CYCLES, CLACKMANNAN GROUP
TYPE'
          #RASTERFILL_STYLE_SOLID
           STYLE
             COLOR 175 175 117
```

```
                BACKGROUNDCOLOR 255 255 255
            END  #STYLE
        END #CLASS
        CLASS
          NAME 'SEDIMENTARY ROCK CYCLES, STRATHCLYDE GROUP TYPE'

          EXPRESSION 'SEDIMENTARY ROCK CYCLES, STRATHCLYDE GROUP
TYPE'
            #RASTERFILL_STYLE_SOLID
            STYLE
              COLOR 175 175 117
              BACKGROUNDCOLOR 255 255 255
            END  #STYLE
        END #CLASS
        CLASS
          NAME 'SEMIPELITE'

          EXPRESSION 'SEMIPELITE'
            #RASTERFILL_STYLE_SOLID
            STYLE
              COLOR 219 219 255
              BACKGROUNDCOLOR 255 255 255
            END  #STYLE
        END #CLASS
        CLASS
          NAME 'SEMIPELITE AND PELITE'

          EXPRESSION 'SEMIPELITE AND PELITE'
            #RASTERFILL_STYLE_SOLID
            STYLE
              COLOR 219 219 255
              BACKGROUNDCOLOR 255 255 255
            END  #STYLE
        END #CLASS
        CLASS
          NAME 'SERPENTINITE, METABASALT, METALIMESTONE AND
PSAMMITE'

          EXPRESSION 'SERPENTINITE, METABASALT, METALIMESTONE AND
PSAMMITE'
            #RASTERFILL_STYLE_SOLID
            STYLE
              COLOR 51 117 201
              BACKGROUNDCOLOR 255 255 255
            END  #STYLE
        END #CLASS
        CLASS
          NAME 'SILTSTONE AND SANDSTONE WITH SUBORDINATE
MUDSTONE'

          EXPRESSION 'SILTSTONE AND SANDSTONE WITH SUBORDINATE
MUDSTONE'
            #RASTERFILL_STYLE_SOLID
            STYLE
              COLOR 201 175 0
              BACKGROUNDCOLOR 255 255 255
            END  #STYLE
        END #CLASS
```

```
          CLASS
            NAME 'SYENITIC-ROCK'

            EXPRESSION 'SYENITIC-ROCK'
            #RASTERFILL_STYLE_SOLID
            STYLE
               COLOR 237 117 84
               BACKGROUNDCOLOR 255 255 255
            END  #STYLE
          END #CLASS
          CLASS
            NAME 'ULTRAMAFITITE'

            EXPRESSION 'ULTRAMAFITITE'
            #RASTERFILL_STYLE_SOLID
            STYLE
               COLOR 147 51 255
               BACKGROUNDCOLOR 255 255 255
            END  #STYLE
          END #CLASS
          CLASS
            NAME 'WACKE'

            EXPRESSION 'WACKE'
            #RASTERFILL_STYLE_SOLID
            STYLE
               COLOR 201 237 255
               BACKGROUNDCOLOR 255 255 255
            END  #STYLE
          END #CLASS

      END #LAYER

      LAYER
        NAME GBR_BGS_625k_BLS
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        TOLERANCE 0
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        DUMP TRUE

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        FOOTER
"templates/bedrock_lithostratigraphy_query_footer.html"

        PROJECTION
           "init=epsg:4326"
        END

        METADATA
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        WMS_ABSTRACT "GBR BGS 1:625k Bedrock Lithostratigraphy
(including Lithogenic units)"
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        WMS_METADATAURL_TYPE "TC211"
        WMS_DATAURL_HREF
"http://www.bgs.ac.uk/products/digitalmaps/digmapgb_625.html"
        WMS_DATAURL_FORMAT "text/html"
        WMS_KEYWORDLIST "Bedrock,Lithostratigraphy"
    END

    CLASSITEM 'LEX_D'

    CLASS
      NAME 'APPIN GROUP'
      EXPRESSION 'APPIN GROUP'
      #RASTERFILL_STYLE_SOLID
      STYLE
        COLOR 147 175 117
        BACKGROUNDCOLOR 255 255 255
      END  #STYLE
    END #CLASS
    CLASS
      NAME 'APPIN GROUP AND ARGYLL GROUP (UNDIFFERENTIATED)'
      EXPRESSION 'APPIN GROUP AND ARGYLL GROUP
(UNDIFFERENTIATED)'
      #RASTERFILL_STYLE_SOLID
      STYLE
        COLOR 0 255 255
        BACKGROUNDCOLOR 255 255 255
      END  #STYLE
    END #CLASS
    CLASS
      NAME 'APPLEBY GROUP'
      EXPRESSION 'APPLEBY GROUP'
      #RASTERFILL_STYLE_SOLID
      STYLE
        COLOR 255 117 0
        BACKGROUNDCOLOR 255 255 255
      END  #STYLE
    END #CLASS
    CLASS
      NAME 'ARBUTHNOTT-GARVOCK GROUP'
      EXPRESSION 'ARBUTHNOTT-GARVOCK GROUP'
      #RASTERFILL_STYLE_SOLID
      STYLE
        COLOR 147 84 84
        BACKGROUNDCOLOR 255 255 255
      END  #STYLE
    END #CLASS
    CLASS
      NAME 'ARDVRECK GROUP'
      EXPRESSION 'ARDVRECK GROUP'
      #RASTERFILL_STYLE_SOLID
```

```
          STYLE
            COLOR 201 255 147
            BACKGROUNDCOLOR 255 255 255
          END  #STYLE
        END #CLASS
        CLASS
          NAME 'ARENIG ROCKS (UNDIFFERENTIATED)'
          EXPRESSION 'ARENIG ROCKS (UNDIFFERENTIATED)'
          #RASTERFILL_STYLE_SOLID
          STYLE
            COLOR 175 117 255
            BACKGROUNDCOLOR 255 255 255
          END  #STYLE
        END #CLASS
        CLASS
          NAME 'ARGYLL GROUP'
          EXPRESSION 'ARGYLL GROUP'
          #RASTERFILL_STYLE_SOLID
          STYLE
            COLOR 237 219 51
            BACKGROUNDCOLOR 255 255 255
          END  #STYLE
        END #CLASS
        CLASS
          NAME 'ARMAGH GROUP'
          EXPRESSION 'ARMAGH GROUP'
          #RASTERFILL_STYLE_SOLID
          STYLE
            COLOR 147 255 219
            BACKGROUNDCOLOR 255 255 255
          END  #STYLE
        END #CLASS
        CLASS
          NAME 'ASHGILL ROCKS (UNDIFFERENTIATED)'
          EXPRESSION 'ASHGILL ROCKS (UNDIFFERENTIATED)'
          #RASTERFILL_STYLE_SOLID
          STYLE
            COLOR 147 147 237
            BACKGROUNDCOLOR 255 255 255
          END  #STYLE
        END #CLASS
        CLASS
          NAME 'BELFAST GROUP'
          EXPRESSION 'BELFAST GROUP'
          #RASTERFILL_STYLE_SOLID
          STYLE
            COLOR 237 201 0
            BACKGROUNDCOLOR 255 255 255
          END  #STYLE
        END #CLASS
        CLASS
          NAME 'BLACKCRAIG FORMATION AND GALDENOCH FORMATION
(UNDIFFERENTIATED)'
          EXPRESSION 'BLACKCRAIG FORMATION AND GALDENOCH
FORMATION (UNDIFFERENTIATED)'
          #RASTERFILL_STYLE_SOLID
            STYLE
              COLOR 201 237 237
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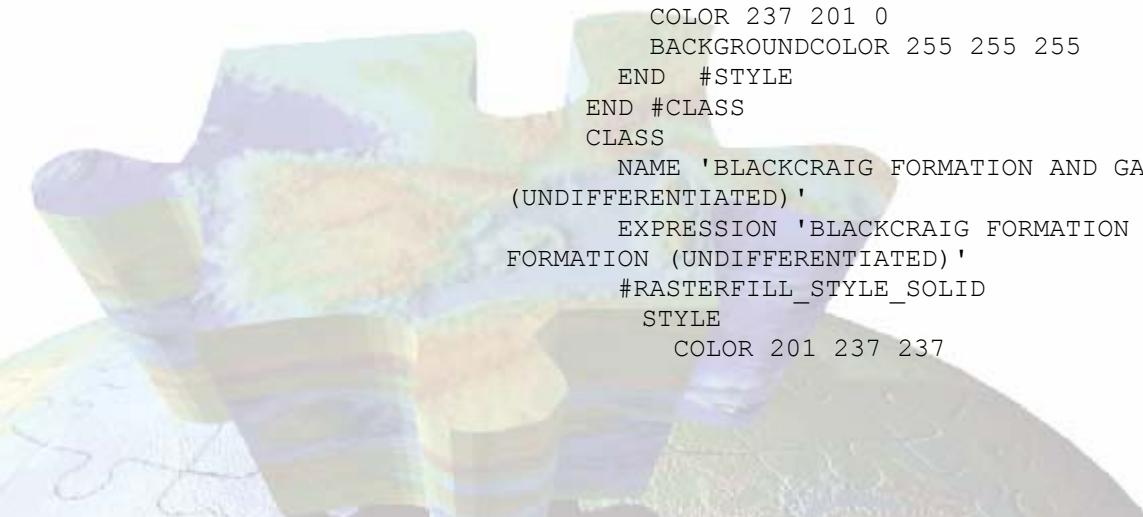
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                    BACKGROUNDCOLOR 255 255 255
              END  #STYLE
          END #CLASS
          CLASS
            NAME 'BORDER GROUP'
            EXPRESSION 'BORDER GROUP'
            #RASTERFILL_STYLE_SOLID
            STYLE
              COLOR 51 255 219
              BACKGROUNDCOLOR 255 255 255
            END  #STYLE
          END #CLASS
          CLASS
            NAME 'BOUNDARY ZONE COMPLEX'
            EXPRESSION 'BOUNDARY ZONE COMPLEX'
            #RASTERFILL_STYLE_SOLID
            STYLE
              COLOR 255 0 0
              BACKGROUNDCOLOR 255 255 255
            END  #STYLE
          END #CLASS
          CLASS
            NAME 'BOWLAND HIGH GROUP AND CRAVEN GROUP
(UNDIFFERENTIATED)'
            EXPRESSION 'BOWLAND HIGH GROUP AND CRAVEN GROUP
(UNDIFFERENTIATED)'
            #RASTERFILL_STYLE_SOLID
            STYLE
              COLOR 237 255 84
              BACKGROUNDCOLOR 255 255 255
            END  #STYLE
          END #CLASS
          CLASS
            NAME 'BRACKLESHAM GROUP AND BARTON GROUP
(UNDIFFERENTIATED)'
            EXPRESSION 'BRACKLESHAM GROUP AND BARTON GROUP
(UNDIFFERENTIATED)'
            #RASTERFILL_STYLE_SOLID
            STYLE
              COLOR 255 147 51
              BACKGROUNDCOLOR 255 255 255
            END  #STYLE
          END #CLASS
          CLASS
            NAME 'CAMBRIAN AND ORDOVICIAN ROCKS (UNDIFFERENTIATED)'
            EXPRESSION 'CAMBRIAN AND ORDOVICIAN ROCKS
(UNDIFFERENTIATED)'
            #RASTERFILL_STYLE_SOLID
            STYLE
              COLOR 255 219 255
              BACKGROUNDCOLOR 255 255 255
            END  #STYLE
          END #CLASS
          CLASS
            NAME 'CARADOC ROCKS (UNDIFFERENTIATED)'
            EXPRESSION 'CARADOC ROCKS (UNDIFFERENTIATED)'
            #RASTERFILL_STYLE_SOLID
            STYLE
```

```
                    COLOR 117 175 255
                    BACKGROUNDCOLOR 255 255 255
                  END  #STYLE
                END #CLASS
                CLASS
                  NAME 'CLACKMANNAN GROUP'
                  EXPRESSION 'CLACKMANNAN GROUP'
                  #RASTERFILL_STYLE_SOLID
                  STYLE
                    COLOR 255 51 201
                    BACKGROUNDCOLOR 255 255 255
                  END  #STYLE
                END #CLASS
                CLASS
                  NAME 'COAL MEASURES GROUP [OBSOLETE  EXCEPT IN NORTHERN
         IRELAND: USE PCM, SWCM, CMSC]'
                  EXPRESSION 'COAL MEASURES GROUP [OBSOLETE  EXCEPT IN
         NORTHERN IRELAND: USE PCM, SWCM, CMSC]'
                  #RASTERFILL_STYLE_SOLID
                  STYLE
                    COLOR 147 147 147
                    BACKGROUNDCOLOR 255 255 255
                  END  #STYLE
                END #CLASS
                CLASS
                  NAME 'CORALLIAN GROUP'
                  EXPRESSION 'CORALLIAN GROUP'
                  #RASTERFILL_STYLE_SOLID
                  STYLE
                    COLOR 255 147 0
                    BACKGROUNDCOLOR 255 255 255
                  END  #STYLE
                END #CLASS
                CLASS
                  NAME 'CRAWFORD GROUP AND MOFFAT SHALE GROUP
         (UNDIFFERENTIATED)'
                  EXPRESSION 'CRAWFORD GROUP AND MOFFAT SHALE GROUP
         (UNDIFFERENTIATED)'
                  #RASTERFILL_STYLE_SOLID
                  STYLE
                    COLOR 117 175 219
                    BACKGROUNDCOLOR 255 255 255
                  END  #STYLE
                END #CLASS
                CLASS
                  NAME 'CROSS SLIEVE GROUP'
                  EXPRESSION 'CROSS SLIEVE GROUP'
                  #RASTERFILL_STYLE_SOLID
                  STYLE
                    COLOR 147 84 51
                    BACKGROUNDCOLOR 255 255 255
                  END  #STYLE
                END #CLASS
                CLASS
                  NAME 'DEVONIAN ROCKS (UNDIFFERENTIATED)'
                  EXPRESSION 'DEVONIAN ROCKS (UNDIFFERENTIATED)'
                  #RASTERFILL_STYLE_SOLID
                    STYLE
```

```
          COLOR 237 117 147
          BACKGROUNDCOLOR 255 255 255
        END  #STYLE
      END #CLASS
      CLASS
        NAME 'DINANTIAN ROCKS (UNDIFFERENTIATED)'
        EXPRESSION 'DINANTIAN ROCKS (UNDIFFERENTIATED)'
        #RASTERFILL_STYLE_SOLID
        STYLE
          COLOR 175 255 255
          BACKGROUNDCOLOR 255 255 255
        END  #STYLE
      END #CLASS
      CLASS
        NAME 'DUNNOTTAR-CRAWTON GROUP'
        EXPRESSION 'DUNNOTTAR-CRAWTON GROUP'
        #RASTERFILL_STYLE_SOLID
        STYLE
          COLOR 255 219 0
          BACKGROUNDCOLOR 255 255 255
        END  #STYLE
      END #CLASS
      CLASS
        NAME 'DURNESS GROUP'
        EXPRESSION 'DURNESS GROUP'
        #RASTERFILL_STYLE_SOLID
        STYLE
          COLOR 147 237 255
          BACKGROUNDCOLOR 255 255 255
        END  #STYLE
      END #CLASS
      CLASS
        NAME 'ENLER GROUP'
        EXPRESSION 'ENLER GROUP'
        #RASTERFILL_STYLE_SOLID
        STYLE
          COLOR 255 84 0
          BACKGROUNDCOLOR 255 255 255
        END  #STYLE
      END #CLASS
      CLASS
        NAME 'EOCENE TO MIOCENE ROCKS (UNDIFFERENTIATED)'
        EXPRESSION 'EOCENE TO MIOCENE ROCKS
(UNDIFFERENTIATED)'
        #RASTERFILL_STYLE_SOLID
        STYLE
          COLOR 219 219 51
          BACKGROUNDCOLOR 255 255 255
        END  #STYLE
      END #CLASS
      CLASS
        NAME 'FAULT ZONE ROCKS, UNASSIGNED'
        EXPRESSION 'FAULT ZONE ROCKS, UNASSIGNED'
        #RASTERFILL_STYLE_SOLID
        STYLE
          COLOR 84 255 84
          BACKGROUNDCOLOR 255 255 255
        END  #STYLE
```

```
                  END #CLASS
                  CLASS
                    NAME 'FINTONA GROUP'
                    EXPRESSION 'FINTONA GROUP'
                    #RASTERFILL_STYLE_SOLID
                    STYLE
                      COLOR 237 117 147
                      BACKGROUNDCOLOR 255 255 255
                    END  #STYLE
                  END #CLASS
                  CLASS
                    NAME 'GALA GROUP'
                    EXPRESSION 'GALA GROUP'
                    #RASTERFILL_STYLE_SOLID
                    STYLE
                      COLOR 175 237 219
                      BACKGROUNDCOLOR 255 255 255
                    END  #STYLE
                  END #CLASS
                  CLASS
                    NAME 'GAULT FORMATION AND UPPER GREENSAND FORMATION
(UNDIFFERENTIATED)'
                    EXPRESSION 'GAULT FORMATION AND UPPER GREENSAND
FORMATION (UNDIFFERENTIATED)'
                    #RASTERFILL_STYLE_SOLID
                    STYLE
                      COLOR 51 255 175
                      BACKGROUNDCOLOR 255 255 255
                    END  #STYLE
                  END #CLASS
                  CLASS
                    NAME 'GLENFINNAN GROUP'
                    EXPRESSION 'GLENFINNAN GROUP'
                    #RASTERFILL_STYLE_SOLID
                    STYLE
                      COLOR 201 175 219
                      BACKGROUNDCOLOR 255 255 255
                    END  #STYLE
                  END #CLASS
                  CLASS
                    NAME 'GRAMPIAN GROUP'
                    EXPRESSION 'GRAMPIAN GROUP'
                    #RASTERFILL_STYLE_SOLID
                    STYLE
                      COLOR 255 175 117
                      BACKGROUNDCOLOR 255 255 255
                    END  #STYLE
                  END #CLASS
                  CLASS
                    NAME 'GREAT OOLITE GROUP'
                    EXPRESSION 'GREAT OOLITE GROUP'
                    #RASTERFILL_STYLE_SOLID
                    STYLE
                      COLOR 175 201 84
                      BACKGROUNDCOLOR 255 255 255
                    END  #STYLE
                  END #CLASS
                  CLASS
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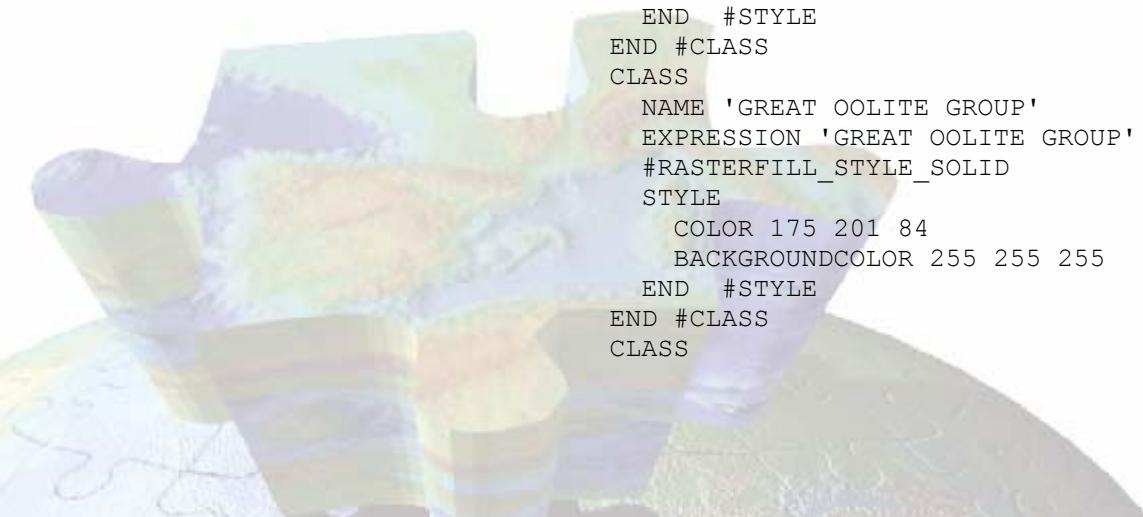
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            NAME 'GREY CHALK SUBGROUP'
            EXPRESSION 'GREY CHALK SUBGROUP'
            #RASTERFILL_STYLE_SOLID
            STYLE
              COLOR 201 255 51
              BACKGROUNDCOLOR 255 255 255
            END  #STYLE
          END #CLASS
          CLASS
            NAME 'HAWICK GROUP'
            EXPRESSION 'HAWICK GROUP'
            #RASTERFILL_STYLE_SOLID
            STYLE
              COLOR 147 84 255
              BACKGROUNDCOLOR 255 255 255
            END  #STYLE
          END #CLASS
          CLASS
            NAME 'HIBERNIAN GREENSANDS FORMATION AND ULSTER WHITE
     LIMESTONE FORMATION (UNDIFFERENTIATED)'
            EXPRESSION 'HIBERNIAN GREENSANDS FORMATION AND ULSTER
     WHITE LIMESTONE FORMATION (UNDIFFERENTIATED)'
            #RASTERFILL_STYLE_SOLID
            STYLE
              COLOR 175 255 147
              BACKGROUNDCOLOR 255 255 255
            END  #STYLE
          END #CLASS
          CLASS
            NAME 'HIGHLAND BORDER COMPLEX [UNDER REVIEW; POSSIBLY
     OBSOLETE]'
            EXPRESSION 'HIGHLAND BORDER COMPLEX [UNDER REVIEW;
     POSSIBLY OBSOLETE]'
            #RASTERFILL_STYLE_SOLID
            STYLE
              COLOR 0 255 117
              BACKGROUNDCOLOR 255 255 255
            END  #STYLE
          END #CLASS
          CLASS
            NAME 'HOLSWORTHY GROUP'
            EXPRESSION 'HOLSWORTHY GROUP'
            #RASTERFILL_STYLE_SOLID
            STYLE
              COLOR 219 219 175
              BACKGROUNDCOLOR 255 255 255
            END  #STYLE
          END #CLASS
          CLASS
            NAME 'HOLYWOOD GROUP'
            EXPRESSION 'HOLYWOOD GROUP'
            #RASTERFILL_STYLE_SOLID
            STYLE
              COLOR 201 237 201
              BACKGROUNDCOLOR 255 255 255
            END  #STYLE
          END #CLASS
          CLASS
```
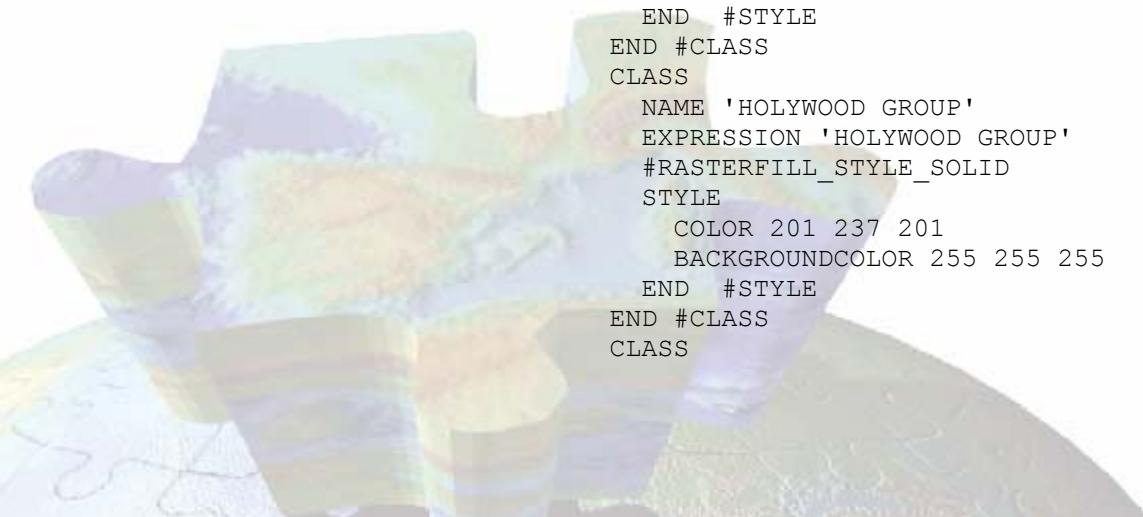
```
          NAME 'INFERIOR OOLITE GROUP'
          EXPRESSION 'INFERIOR OOLITE GROUP'
          #RASTERFILL_STYLE_SOLID
          STYLE
            COLOR 255 147 0
            BACKGROUNDCOLOR 255 255 255
          END  #STYLE
        END #CLASS
        CLASS
          NAME 'INVERCLYDE GROUP'
          EXPRESSION 'INVERCLYDE GROUP'
          #RASTERFILL_STYLE_SOLID
          STYLE
            COLOR 175 255 117
            BACKGROUNDCOLOR 255 255 255
          END  #STYLE
        END #CLASS
        CLASS
          NAME 'KELLAWAYS FORMATION AND OXFORD CLAY FORMATION
  (UNDIFFERENTIATED)'
          EXPRESSION 'KELLAWAYS FORMATION AND OXFORD CLAY
  FORMATION (UNDIFFERENTIATED)'
          #RASTERFILL_STYLE_SOLID
          STYLE
            COLOR 117 147 0
            BACKGROUNDCOLOR 255 255 255
          END  #STYLE
        END #CLASS
        CLASS
          NAME 'KILSKEERY GROUP'
          EXPRESSION 'KILSKEERY GROUP'
          #RASTERFILL_STYLE_SOLID
          STYLE
            COLOR 219 219 175
            BACKGROUNDCOLOR 255 255 255
          END  #STYLE
        END #CLASS
        CLASS
          NAME 'KIRKCOLM FORMATION'
          EXPRESSION 'KIRKCOLM FORMATION'
          #RASTERFILL_STYLE_SOLID
          STYLE
            COLOR 175 219 255
            BACKGROUNDCOLOR 255 255 255
          END  #STYLE
        END #CLASS
        CLASS
          NAME 'LAMBETH GROUP'
          EXPRESSION 'LAMBETH GROUP'
          #RASTERFILL_STYLE_SOLID
          STYLE
            COLOR 219 147 0
            BACKGROUNDCOLOR 255 255 255
          END  #STYLE
        END #CLASS
        CLASS
          NAME 'LANARK GROUP'
          EXPRESSION 'LANARK GROUP'
```

```
                      #RASTERFILL_STYLE_SOLID
                      STYLE
                        COLOR 237 117 117
                        BACKGROUNDCOLOR 255 255 255
                      END  #STYLE
                  END #CLASS
                  CLASS
                    NAME 'LEADHILLS SUPERGROUP'
                    EXPRESSION 'LEADHILLS SUPERGROUP'
                    #RASTERFILL_STYLE_SOLID
                    STYLE
                        COLOR 117 117 147
                        BACKGROUNDCOLOR 255 255 255
                    END  #STYLE
                  END #CLASS
                  CLASS
                    NAME 'LEITRIM GROUP'
                    EXPRESSION 'LEITRIM GROUP'
                    #RASTERFILL_STYLE_SOLID
                    STYLE
                        COLOR 219 255 117
                        BACKGROUNDCOLOR 255 255 255
                    END  #STYLE
                  END #CLASS
                  CLASS
                    NAME 'LEWISIAN COMPLEX'
                    EXPRESSION 'LEWISIAN COMPLEX'
                    #RASTERFILL_STYLE_SOLID
                    STYLE
                        COLOR 237 147 237
                        BACKGROUNDCOLOR 255 255 255
                    END  #STYLE
                  END #CLASS
                  CLASS
                    NAME 'LIAS GROUP'
                    EXPRESSION 'LIAS GROUP'
                    #RASTERFILL_STYLE_SOLID
                    STYLE
                        COLOR 0 84 201
                        BACKGROUNDCOLOR 255 255 255
                    END  #STYLE
                  END #CLASS
                  CLASS
                    NAME 'LLANDOVERY ROCKS (UNDIFFERENTIATED)'
                    EXPRESSION 'LLANDOVERY ROCKS (UNDIFFERENTIATED)'
                    #RASTERFILL_STYLE_SOLID
                    STYLE
                        COLOR 147 51 219
                        BACKGROUNDCOLOR 255 255 255
                    END  #STYLE
                  END #CLASS
                  CLASS
                    NAME 'LLANVIRN ROCKS (UNDIFFERENTIATED)'
                    EXPRESSION 'LLANVIRN ROCKS (UNDIFFERENTIATED)'
                    #RASTERFILL_STYLE_SOLID
                    STYLE
                        COLOR 117 175 219
                        BACKGROUNDCOLOR 255 255 255
```

```
        END  #STYLE
    END #CLASS
    CLASS
      NAME 'LOCH EIL GROUP'
      EXPRESSION 'LOCH EIL GROUP'
      #RASTERFILL_STYLE_SOLID
      STYLE
        COLOR 237 219 51
        BACKGROUNDCOLOR 255 255 255
      END  #STYLE
    END #CLASS
    CLASS
      NAME 'LOCH MAREE GROUP'
      EXPRESSION 'LOCH MAREE GROUP'
      #RASTERFILL_STYLE_SOLID
      STYLE
        COLOR 255 219 84
        BACKGROUNDCOLOR 255 255 255
      END  #STYLE
    END #CLASS
    CLASS
      NAME 'LOUGH NEAGH CLAYS GROUP'
      EXPRESSION 'LOUGH NEAGH CLAYS GROUP'
      #RASTERFILL_STYLE_SOLID
      STYLE
        COLOR 219 219 117
        BACKGROUNDCOLOR 255 255 255
      END  #STYLE
    END #CLASS
    CLASS
      NAME 'LOWER CAMBRIAN ROCKS (UNDIFFERENTIATED)'
      EXPRESSION 'LOWER CAMBRIAN ROCKS (UNDIFFERENTIATED)'
      #RASTERFILL_STYLE_SOLID
      STYLE
        COLOR 201 175 175
        BACKGROUNDCOLOR 255 255 255
      END  #STYLE
    END #CLASS
    CLASS
      NAME 'LOWER DEVONIAN ROCKS (UNDIFFERENTIATED)'
      EXPRESSION 'LOWER DEVONIAN ROCKS (UNDIFFERENTIATED)'
      #RASTERFILL_STYLE_SOLID
      STYLE
        COLOR 175 84 147
        BACKGROUNDCOLOR 255 255 255
      END  #STYLE
    END #CLASS
    CLASS
      NAME 'LOWER GREENSAND GROUP'
      EXPRESSION 'LOWER GREENSAND GROUP'
      #RASTERFILL_STYLE_SOLID
      STYLE
        COLOR 201 255 219
        BACKGROUNDCOLOR 255 255 255
      END  #STYLE
    END #CLASS
    CLASS
      NAME 'LOWER OLD RED SANDSTONE'
```

```
                            EXPRESSION 'LOWER OLD RED SANDSTONE'
                            #RASTERFILL_STYLE_SOLID
                            STYLE
                              COLOR 219 175 175
                              BACKGROUNDCOLOR 255 255 255
                            END  #STYLE
                          END #CLASS
                          CLASS
                            NAME 'LUDLOW ROCKS (UNDIFFERENTIATED)'
                            EXPRESSION 'LUDLOW ROCKS (UNDIFFERENTIATED)'
                            #RASTERFILL_STYLE_SOLID
                            STYLE
                              COLOR 201 201 237
                              BACKGROUNDCOLOR 255 255 255
                            END  #STYLE
                          END #CLASS
                          CLASS
                            NAME 'MERCIA MUDSTONE GROUP'
                            EXPRESSION 'MERCIA MUDSTONE GROUP'
                            #RASTERFILL_STYLE_SOLID
                            STYLE
                              COLOR 255 175 175
                              BACKGROUNDCOLOR 255 255 255
                            END  #STYLE
                          END #CLASS
                          CLASS
                            NAME 'MESOPROTEROZOIC ROCKS (UNDIFFERENTIATED)'
                            EXPRESSION 'MESOPROTEROZOIC ROCKS (UNDIFFERENTIATED)'
                            #RASTERFILL_STYLE_SOLID
                            STYLE
                              COLOR 255 147 175
                              BACKGROUNDCOLOR 255 255 255
                            END  #STYLE
                          END #CLASS
                          CLASS
                            NAME 'MIDDLE CAMBRIAN'
                            EXPRESSION 'MIDDLE CAMBRIAN'
                            #RASTERFILL_STYLE_SOLID
                            STYLE
                              COLOR 219 201 255
                              BACKGROUNDCOLOR 255 255 255
                            END  #STYLE
                          END #CLASS
                          CLASS
                            NAME 'MIDDLE DEVONIAN (UNDIFFERENTIATED)'
                            EXPRESSION 'MIDDLE DEVONIAN (UNDIFFERENTIATED)'
                            #RASTERFILL_STYLE_SOLID
                            STYLE
                              COLOR 255 201 84
                              BACKGROUNDCOLOR 255 255 255
                            END  #STYLE
                          END #CLASS
                          CLASS
                            NAME 'MIDDLE JURASSIC ROCKS (UNDIFFERENTIATED)'
                            EXPRESSION 'MIDDLE JURASSIC ROCKS (UNDIFFERENTIATED)'
                            #RASTERFILL_STYLE_SOLID
                            STYLE
                              COLOR 237 219 117
```

```
                        BACKGROUNDCOLOR 255 255 255
                      END  #STYLE
                  END #CLASS
                  CLASS
                    NAME 'MIDDLE OLD RED SANDSTONE (UNDIFFERENTIATED)'
                    EXPRESSION 'MIDDLE OLD RED SANDSTONE
(UNDIFFERENTIATED)'
                      #RASTERFILL_STYLE_SOLID
                      STYLE
                        COLOR 147 51 0
                        BACKGROUNDCOLOR 255 255 255
                      END  #STYLE
                  END #CLASS
                  CLASS
                    NAME 'MILLSTONE GRIT GROUP [SEE ALSO MIGR]'
                    EXPRESSION 'MILLSTONE GRIT GROUP [SEE ALSO MIGR]'
                      #RASTERFILL_STYLE_SOLID
                      STYLE
                        COLOR 237 175 0
                        BACKGROUNDCOLOR 255 255 255
                      END  #STYLE
                  END #CLASS
                  CLASS
                    NAME 'MOINE SUPERGROUP'
                    EXPRESSION 'MOINE SUPERGROUP'
                      #RASTERFILL_STYLE_SOLID
                      STYLE
                        COLOR 0 255 219
                        BACKGROUNDCOLOR 255 255 255
                      END  #STYLE
                  END #CLASS
                  CLASS
                    NAME 'MORAR GROUP'
                    EXPRESSION 'MORAR GROUP'
                      #RASTERFILL_STYLE_SOLID
                      STYLE
                        COLOR 237 219 219
                        BACKGROUNDCOLOR 255 255 255
                      END  #STYLE
                  END #CLASS
                  CLASS
                    NAME 'NEOGENE ROCKS (UNDIFFERENTIATED)'
                    EXPRESSION 'NEOGENE ROCKS (UNDIFFERENTIATED)'
                      #RASTERFILL_STYLE_SOLID
                      STYLE
                        COLOR 255 219 0
                        BACKGROUNDCOLOR 255 255 255
                      END  #STYLE
                  END #CLASS
                  CLASS
                    NAME 'NEOGENE TO QUATERNARY ROCKS (UNDIFFERENTIATED)'
                    EXPRESSION 'NEOGENE TO QUATERNARY ROCKS
(UNDIFFERENTIATED)'
                      #RASTERFILL_STYLE_SOLID
                      STYLE
                        COLOR 219 175 0
                        BACKGROUNDCOLOR 255 255 255
                      END  #STYLE
```

```
        END #CLASS
        CLASS
          NAME 'NEW RED SANDSTONE SUPERGROUP'
          EXPRESSION 'NEW RED SANDSTONE SUPERGROUP'
          #RASTERFILL_STYLE_SOLID
          STYLE
            COLOR 255 201 175
            BACKGROUNDCOLOR 255 255 255
          END  #STYLE
        END #CLASS
        CLASS
          NAME 'OLD RED SANDSTONE SUPERGROUP'
          EXPRESSION 'OLD RED SANDSTONE SUPERGROUP'
          #RASTERFILL_STYLE_SOLID
          STYLE
            COLOR 201 117 51
            BACKGROUNDCOLOR 255 255 255
          END  #STYLE
        END #CLASS
        CLASS
          NAME 'OMAGH SANDSTONE GROUP'
          EXPRESSION 'OMAGH SANDSTONE GROUP'
          #RASTERFILL_STYLE_SOLID
          STYLE
            COLOR 117 219 219
            BACKGROUNDCOLOR 255 255 255
          END  #STYLE
        END #CLASS
        CLASS
          NAME 'ORDOVICIAN ROCKS (UNDIFFERENTIATED)'
          EXPRESSION 'ORDOVICIAN ROCKS (UNDIFFERENTIATED)'
          #RASTERFILL_STYLE_SOLID
          STYLE
            COLOR 117 175 237
            BACKGROUNDCOLOR 255 255 255
          END  #STYLE
        END #CLASS
        CLASS
          NAME 'OWENKILLEW SANDSTONE GROUP'
          EXPRESSION 'OWENKILLEW SANDSTONE GROUP'
          #RASTERFILL_STYLE_SOLID
          STYLE
            COLOR 117 219 219
            BACKGROUNDCOLOR 255 255 255
          END  #STYLE
        END #CLASS
        CLASS
          NAME 'PENNINE COAL MEASURES GROUP'
          EXPRESSION 'PENNINE COAL MEASURES GROUP'
          #RASTERFILL_STYLE_SOLID
          STYLE
            COLOR 175 219 51
            BACKGROUNDCOLOR 255 255 255
          END  #STYLE
        END #CLASS
        CLASS
          NAME 'PENNINE LOWER COAL MEASURES FORMATION AND SOUTH
WALES LOWER COAL MEASURES FORMATION (UNDIFFERENTIATED)'
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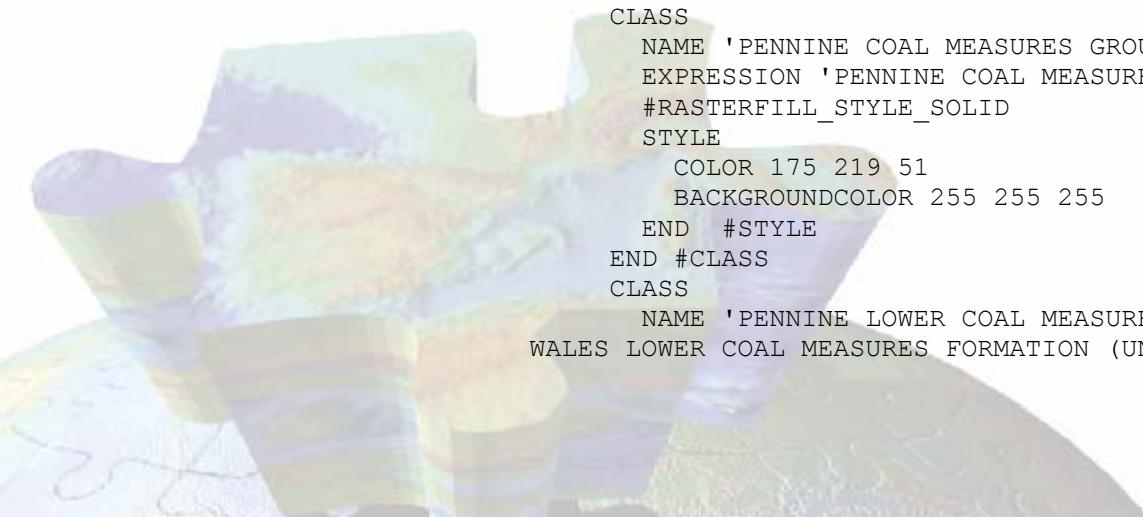
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        EXPRESSION 'PENNINE LOWER COAL MEASURES FORMATION AND
SOUTH WALES LOWER COAL MEASURES FORMATION
(UNDIFFERENTIATED)'
        #RASTERFILL_STYLE_SOLID
        STYLE
          COLOR 147 147 147
          BACKGROUNDCOLOR 255 255 255
        END  #STYLE
      END #CLASS
      CLASS
        NAME 'PENNINE MIDDLE COAL MEASURES FORMATION AND
SOUTH WALES MIDDLE COAL MEASURES FORMATION
(UNDIFFERENTIATED)'
        EXPRESSION 'PENNINE MIDDLE COAL MEASURES FORMATION
AND SOUTH WALES MIDDLE COAL MEASURES FORMATION
(UNDIFFERENTIATED)'
        #RASTERFILL_STYLE_SOLID
        STYLE
          COLOR 201 201 201
          BACKGROUNDCOLOR 255 255 255
        END  #STYLE
      END #CLASS
      CLASS
        NAME 'PENNINE UPPER COAL MEASURES FORMATION'
        EXPRESSION 'PENNINE UPPER COAL MEASURES FORMATION'
        #RASTERFILL_STYLE_SOLID
        STYLE
          COLOR 237 201 147
          BACKGROUNDCOLOR 255 255 255
        END  #STYLE
      END #CLASS
      CLASS
        NAME 'PERMIAN ROCKS (UNDIFFERENTIATED)'
        EXPRESSION 'PERMIAN ROCKS (UNDIFFERENTIATED)'
        #RASTERFILL_STYLE_SOLID
        STYLE
          COLOR 255 175 0
          BACKGROUNDCOLOR 255 255 255
        END  #STYLE
      END #CLASS
      CLASS
        NAME 'PORTLAND GROUP'
        EXPRESSION 'PORTLAND GROUP'
        #RASTERFILL_STYLE_SOLID
        STYLE
          COLOR 255 175 0
          BACKGROUNDCOLOR 255 255 255
        END  #STYLE
      END #CLASS
      CLASS
        NAME 'PORTPATRICK FORMATION AND GLENWHARGEN FORMATION
(UNDIFFERENTIATED)'
        EXPRESSION 'PORTPATRICK FORMATION AND GLENWHARGEN
FORMATION (UNDIFFERENTIATED)'
        #RASTERFILL_STYLE_SOLID
        STYLE
          COLOR 201 237 255
          BACKGROUNDCOLOR 255 255 255
```

```
          END  #STYLE
END #CLASS
CLASS
  NAME 'PRIDOLI ROCKS (UNDIFFERENTIATED)'
  EXPRESSION 'PRIDOLI ROCKS (UNDIFFERENTIATED)'
  #RASTERFILL_STYLE_SOLID
  STYLE
    COLOR 237 117 255
    BACKGROUNDCOLOR 255 255 255
  END  #STYLE
END #CLASS
CLASS
  NAME 'PURBECK LIMESTONE GROUP'
  EXPRESSION 'PURBECK LIMESTONE GROUP'
  #RASTERFILL_STYLE_SOLID
  STYLE
    COLOR 219 255 0
    BACKGROUNDCOLOR 255 255 255
  END  #STYLE
END #CLASS
CLASS
  NAME 'QUEYFIRTH GROUP'
  EXPRESSION 'QUEYFIRTH GROUP'
  #RASTERFILL_STYLE_SOLID
  STYLE
    COLOR 175 175 255
    BACKGROUNDCOLOR 255 255 255
  END  #STYLE
END #CLASS
CLASS
  NAME 'RAVENSCAR GROUP'
  EXPRESSION 'RAVENSCAR GROUP'
  #RASTERFILL_STYLE_SOLID
  STYLE
    COLOR 219 175 84
    BACKGROUNDCOLOR 255 255 255
  END  #STYLE
END #CLASS
CLASS
  NAME 'RED BAY FORMATION'
  EXPRESSION 'RED BAY FORMATION'
  #RASTERFILL_STYLE_SOLID
  STYLE
    COLOR 219 117 0
    BACKGROUNDCOLOR 255 255 255
  END  #STYLE
END #CLASS
CLASS
  NAME 'RESTON GROUP'
  EXPRESSION 'RESTON GROUP'
  #RASTERFILL_STYLE_SOLID
  STYLE
    COLOR 219 117 175
    BACKGROUNDCOLOR 255 255 255
  END  #STYLE
END #CLASS
CLASS
  NAME 'RICCARTON GROUP'
```

```
EXPRESSION 'RICCARTON GROUP'
#RASTERFILL_STYLE_SOLID
STYLE
  COLOR 117 175 201
  BACKGROUNDCOLOR 255 255 255
END  #STYLE
END #CLASS
CLASS
NAME 'ROE VALLEY GROUP'
EXPRESSION 'ROE VALLEY GROUP'
#RASTERFILL_STYLE_SOLID
STYLE
  COLOR 147 175 117
  BACKGROUNDCOLOR 255 255 255
END  #STYLE
END #CLASS
CLASS
NAME 'SCOTTISH COAL MEASURES GROUP'
EXPRESSION 'SCOTTISH COAL MEASURES GROUP'
#RASTERFILL_STYLE_SOLID
STYLE
  COLOR 255 219 219
  BACKGROUNDCOLOR 255 255 255
END  #STYLE
END #CLASS
CLASS
NAME 'SHANMULLAGH FORMATION'
EXPRESSION 'SHANMULLAGH FORMATION'
#RASTERFILL_STYLE_SOLID
STYLE
  COLOR 201 175 0
  BACKGROUNDCOLOR 255 255 255
END  #STYLE
END #CLASS
CLASS
NAME 'SHERWOOD SANDSTONE GROUP'
EXPRESSION 'SHERWOOD SANDSTONE GROUP'
#RASTERFILL_STYLE_SOLID
STYLE
  COLOR 255 175 201
  BACKGROUNDCOLOR 255 255 255
END  #STYLE
END #CLASS
CLASS
NAME 'SHINNEL FORMATION AND GLENLEE FORMATION
(UNDIFFERENTIATED)'
EXPRESSION 'SHINNEL FORMATION AND GLENLEE FORMATION
(UNDIFFERENTIATED)'
#RASTERFILL_STYLE_SOLID
STYLE
  COLOR 237 219 255
  BACKGROUNDCOLOR 255 255 255
END  #STYLE
END #CLASS
CLASS
NAME 'SILURIAN ROCKS (UNDIFFERENTIATED)'
EXPRESSION 'SILURIAN ROCKS (UNDIFFERENTIATED)'
#RASTERFILL_STYLE_SOLID
```

```
              STYLE
                COLOR 175 147 255
                BACKGROUNDCOLOR 255 255 255
              END  #STYLE
            END #CLASS
            CLASS
              NAME 'SLEAT GROUP'
              EXPRESSION 'SLEAT GROUP'
              #RASTERFILL_STYLE_SOLID
              STYLE
                COLOR 201 147 147
                BACKGROUNDCOLOR 255 255 255
              END  #STYLE
            END #CLASS
            CLASS
              NAME 'SLIEVEBANE GROUP'
              EXPRESSION 'SLIEVEBANE GROUP'
              #RASTERFILL_STYLE_SOLID
              STYLE
                COLOR 237 201 147
                BACKGROUNDCOLOR 255 255 255
              END  #STYLE
            END #CLASS
            CLASS
              NAME 'SOLENT GROUP'
              EXPRESSION 'SOLENT GROUP'
              #RASTERFILL_STYLE_SOLID
              STYLE
                COLOR 255 175 175
                BACKGROUNDCOLOR 255 255 255
              END  #STYLE
            END #CLASS
            CLASS
              NAME 'SOUTH WALES UPPER COAL MEASURES FORMATION'
              EXPRESSION 'SOUTH WALES UPPER COAL MEASURES
FORMATION'
              #RASTERFILL_STYLE_SOLID
              STYLE
                COLOR 84 84 84
                BACKGROUNDCOLOR 255 255 255
              END  #STYLE
            END #CLASS
            CLASS
              NAME 'SOUTHERN HIGHLAND GROUP'
              EXPRESSION 'SOUTHERN HIGHLAND GROUP'
              #RASTERFILL_STYLE_SOLID
              STYLE
                COLOR 147 255 117
                BACKGROUNDCOLOR 255 255 255
              END  #STYLE
            END #CLASS
            CLASS
              NAME 'STEWARTRY GROUP'
              EXPRESSION 'STEWARTRY GROUP'
              #RASTERFILL_STYLE_SOLID
              STYLE
                COLOR 201 84 0
                BACKGROUNDCOLOR 255 255 255
```

```
        END  #STYLE
    END #CLASS
    CLASS
      NAME 'STOER GROUP'
      EXPRESSION 'STOER GROUP'
      #RASTERFILL_STYLE_SOLID
      STYLE
        COLOR 175 117 117
        BACKGROUNDCOLOR 255 255 255
      END  #STYLE
    END #CLASS
    CLASS
      NAME 'STONEHAVEN GROUP'
      EXPRESSION 'STONEHAVEN GROUP'
      #RASTERFILL_STYLE_SOLID
      STYLE
        COLOR 201 84 175
        BACKGROUNDCOLOR 255 255 255
      END  #STYLE
    END #CLASS
    CLASS
      NAME 'STRATHCLYDE GROUP'
      EXPRESSION 'STRATHCLYDE GROUP'
      #RASTERFILL_STYLE_SOLID
      STYLE
        COLOR 84 84 84
        BACKGROUNDCOLOR 255 255 255
      END  #STYLE
    END #CLASS
    CLASS
      NAME 'STRATHEDEN GROUP'
      EXPRESSION 'STRATHEDEN GROUP'
      #RASTERFILL_STYLE_SOLID
      STYLE
        COLOR 51 84 175
        BACKGROUNDCOLOR 255 255 255
      END  #STYLE
    END #CLASS
    CLASS
      NAME 'STRATHMORE GROUP'
      EXPRESSION 'STRATHMORE GROUP'
      #RASTERFILL_STYLE_SOLID
      STYLE
        COLOR 237 147 84
        BACKGROUNDCOLOR 255 255 255
      END  #STYLE
    END #CLASS
    CLASS
      NAME 'STRATHY COMPLEX'
      EXPRESSION 'STRATHY COMPLEX'
      #RASTERFILL_STYLE_SOLID
      STYLE
        COLOR 84 255 255
        BACKGROUNDCOLOR 255 255 255
      END  #STYLE
    END #CLASS
    CLASS
      NAME 'TAPPINS GROUP'
```

```
      EXPRESSION 'TAPPINS GROUP'
      #RASTERFILL_STYLE_SOLID
      STYLE
        COLOR 175 175 255
        BACKGROUNDCOLOR 255 255 255
      END  #STYLE
    END #CLASS
    CLASS
      NAME 'TEIGN VALLEY GROUP'
      EXPRESSION 'TEIGN VALLEY GROUP'
      #RASTERFILL_STYLE_SOLID
      STYLE
        COLOR 147 117 147
        BACKGROUNDCOLOR 255 255 255
      END  #STYLE
    END #CLASS
    CLASS
      NAME 'THAMES GROUP'
      EXPRESSION 'THAMES GROUP'
      #RASTERFILL_STYLE_SOLID
      STYLE
        COLOR 175 147 175
        BACKGROUNDCOLOR 255 255 255
      END  #STYLE
    END #CLASS
    CLASS
      NAME 'THANET SAND FORMATION'
      EXPRESSION 'THANET SAND FORMATION'
      #RASTERFILL_STYLE_SOLID
      STYLE
        COLOR 51 117 255
        BACKGROUNDCOLOR 255 255 255
      END  #STYLE
    END #CLASS
    CLASS
      NAME 'TORRIDON GROUP'
      EXPRESSION 'TORRIDON GROUP'
      #RASTERFILL_STYLE_SOLID
      STYLE
        COLOR 219 175 175
        BACKGROUNDCOLOR 255 255 255
      END  #STYLE
    END #CLASS
    CLASS
      NAME 'TREMADOC ROCKS (UNDIFFERENTIATED)'
      EXPRESSION 'TREMADOC ROCKS (UNDIFFERENTIATED)'
      #RASTERFILL_STYLE_SOLID
      STYLE
        COLOR 117 201 201
        BACKGROUNDCOLOR 255 255 255
      END  #STYLE
    END #CLASS
    CLASS
      NAME 'TRIASSIC ROCKS (UNDIFFERENTIATED)'
      EXPRESSION 'TRIASSIC ROCKS (UNDIFFERENTIATED)'
      #RASTERFILL_STYLE_SOLID
      STYLE
        COLOR 255 175 175
```

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          BACKGROUNDCOLOR 255 255 255
    END  #STYLE
END #CLASS
CLASS
  NAME 'TYRONE GROUP'
  EXPRESSION 'TYRONE GROUP'
  #RASTERFILL_STYLE_SOLID
  STYLE
    COLOR 117 255 201
    BACKGROUNDCOLOR 255 255 255
  END  #STYLE
END #CLASS
CLASS
  NAME 'UNNAMED EXTRUSIVE ROCKS, CAMBRIAN'
  EXPRESSION 'UNNAMED EXTRUSIVE ROCKS, CAMBRIAN'
  #RASTERFILL_STYLE_SOLID
  STYLE
    COLOR 255 219 255
    BACKGROUNDCOLOR 255 255 255
  END  #STYLE
END #CLASS
CLASS
  NAME 'UNNAMED EXTRUSIVE ROCKS, CARBONIFEROUS'
  EXPRESSION 'UNNAMED EXTRUSIVE ROCKS, CARBONIFEROUS'
  #RASTERFILL_STYLE_SOLID
  STYLE
    COLOR 255 201 255
    BACKGROUNDCOLOR 255 255 255
  END  #STYLE
END #CLASS
CLASS
  NAME 'UNNAMED EXTRUSIVE ROCKS, DEVONIAN'
  EXPRESSION 'UNNAMED EXTRUSIVE ROCKS, DEVONIAN'
  #RASTERFILL_STYLE_SOLID
  STYLE
    COLOR 255 219 255
    BACKGROUNDCOLOR 255 255 255
  END  #STYLE
END #CLASS
CLASS
  NAME 'UNNAMED EXTRUSIVE ROCKS, DINANTIAN'
  EXPRESSION 'UNNAMED EXTRUSIVE ROCKS, DINANTIAN'
  #RASTERFILL_STYLE_SOLID
  STYLE
    COLOR 255 175 0
    BACKGROUNDCOLOR 255 255 255
  END  #STYLE
END #CLASS
CLASS
  NAME 'UNNAMED EXTRUSIVE ROCKS, NEOPROTEROZOIC'
  EXPRESSION 'UNNAMED EXTRUSIVE ROCKS, NEOPROTEROZOIC'
  #RASTERFILL_STYLE_SOLID
  STYLE
    COLOR 219 117 237
    BACKGROUNDCOLOR 255 255 255
  END  #STYLE
END #CLASS
CLASS
```
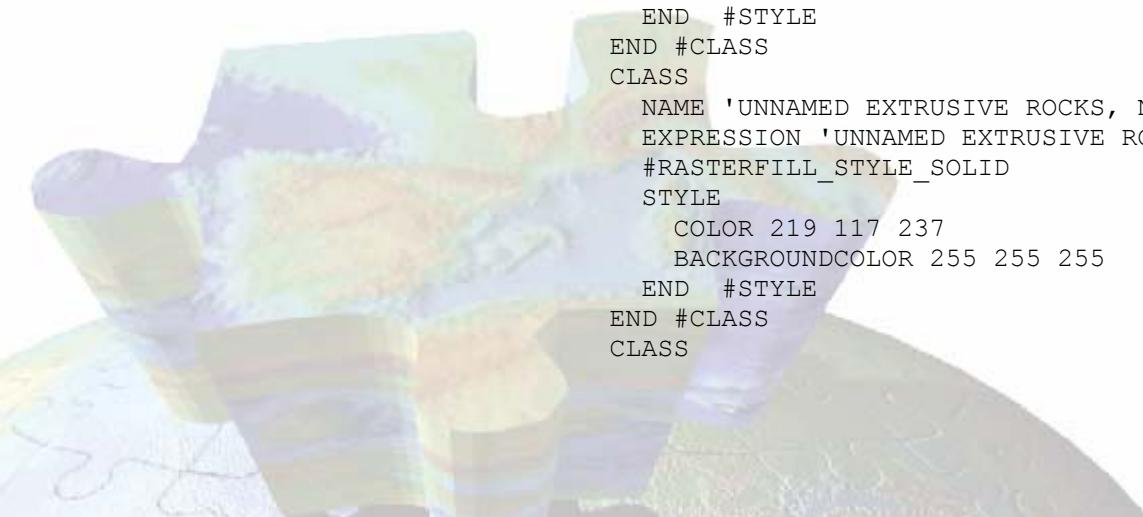
```
         NAME 'UNNAMED EXTRUSIVE ROCKS, ORDOVICIAN'
         EXPRESSION 'UNNAMED EXTRUSIVE ROCKS, ORDOVICIAN'
         #RASTERFILL_STYLE_SOLID
         STYLE
           COLOR 255 175 0
           BACKGROUNDCOLOR 255 255 255
         END  #STYLE
      END #CLASS
      CLASS
         NAME 'UNNAMED EXTRUSIVE ROCKS, PALAEOGENE'
         EXPRESSION 'UNNAMED EXTRUSIVE ROCKS, PALAEOGENE'
         #RASTERFILL_STYLE_SOLID
         STYLE
           COLOR 255 219 255
           BACKGROUNDCOLOR 255 255 255
         END  #STYLE
      END #CLASS
      CLASS
         NAME 'UNNAMED EXTRUSIVE ROCKS, PALAEOPROTEROZOIC'
         EXPRESSION 'UNNAMED EXTRUSIVE ROCKS,
PALAEOPROTEROZOIC'
         #RASTERFILL_STYLE_SOLID
         STYLE
           COLOR 255 219 255
           BACKGROUNDCOLOR 255 255 255
         END  #STYLE
      END #CLASS
      CLASS
         NAME 'UNNAMED EXTRUSIVE ROCKS, PERMIAN'
         EXPRESSION 'UNNAMED EXTRUSIVE ROCKS, PERMIAN'
         #RASTERFILL_STYLE_SOLID
         STYLE
           COLOR 255 219 255
           BACKGROUNDCOLOR 255 255 255
         END  #STYLE
      END #CLASS
      CLASS
         NAME 'UNNAMED EXTRUSIVE ROCKS, SILESIAN'
         EXPRESSION 'UNNAMED EXTRUSIVE ROCKS, SILESIAN'
         #RASTERFILL_STYLE_SOLID
         STYLE
           COLOR 255 219 255
           BACKGROUNDCOLOR 255 255 255
         END  #STYLE
      END #CLASS
      CLASS
         NAME 'UNNAMED EXTRUSIVE ROCKS, SILURIAN'
         EXPRESSION 'UNNAMED EXTRUSIVE ROCKS, SILURIAN'
         #RASTERFILL_STYLE_SOLID
         STYLE
           COLOR 255 175 0
           BACKGROUNDCOLOR 255 255 255
         END  #STYLE
      END #CLASS
      CLASS
         NAME 'UNNAMED EXTRUSIVE ROCKS, SILURIAN TO DEVONIAN'
         EXPRESSION 'UNNAMED EXTRUSIVE ROCKS, SILURIAN TO
DEVONIAN'
```

```
#RASTERFILL_STYLE_SOLID
     STYLE
       COLOR 255 175 0
       BACKGROUNDCOLOR 255 255 255
     END  #STYLE
  END #CLASS
  CLASS
     NAME 'UNNAMED IGNEOUS INTRUSION, CAMBRIAN TO
ORDOVICIAN'
     EXPRESSION 'UNNAMED IGNEOUS INTRUSION, CAMBRIAN TO
ORDOVICIAN'
     #RASTERFILL_STYLE_SOLID
     STYLE
       COLOR 255 0 0
       BACKGROUNDCOLOR 255 255 255
     END  #STYLE
  END #CLASS
  CLASS
     NAME 'UNNAMED IGNEOUS INTRUSION, CARBONIFEROUS TO
PERMIAN'
     EXPRESSION 'UNNAMED IGNEOUS INTRUSION, CARBONIFEROUS
TO PERMIAN'
     #RASTERFILL_STYLE_SOLID
     STYLE
       COLOR 117 117 0
       BACKGROUNDCOLOR 255 255 255
     END  #STYLE
  END #CLASS
  CLASS
     NAME 'UNNAMED IGNEOUS INTRUSION, DEVONIAN'
     EXPRESSION 'UNNAMED IGNEOUS INTRUSION, DEVONIAN'
     #RASTERFILL_STYLE_SOLID
     STYLE
       COLOR 175 0 237
       BACKGROUNDCOLOR 255 255 255
     END  #STYLE
  END #CLASS
  CLASS
     NAME 'UNNAMED IGNEOUS INTRUSION, LATE SILURIAN TO
EARLY DEVONIAN'
     EXPRESSION 'UNNAMED IGNEOUS INTRUSION, LATE SILURIAN
TO EARLY DEVONIAN'
     #RASTERFILL_STYLE_SOLID
     STYLE
       COLOR 84 201 84
       BACKGROUNDCOLOR 255 255 255
     END  #STYLE
  END #CLASS
  CLASS
     NAME 'UNNAMED IGNEOUS INTRUSION, NEOPROTEROZOIC'
     EXPRESSION 'UNNAMED IGNEOUS INTRUSION,
NEOPROTEROZOIC'
     #RASTERFILL_STYLE_SOLID
     STYLE
       COLOR 147 237 84
       BACKGROUNDCOLOR 255 255 255
     END  #STYLE
  END #CLASS
```
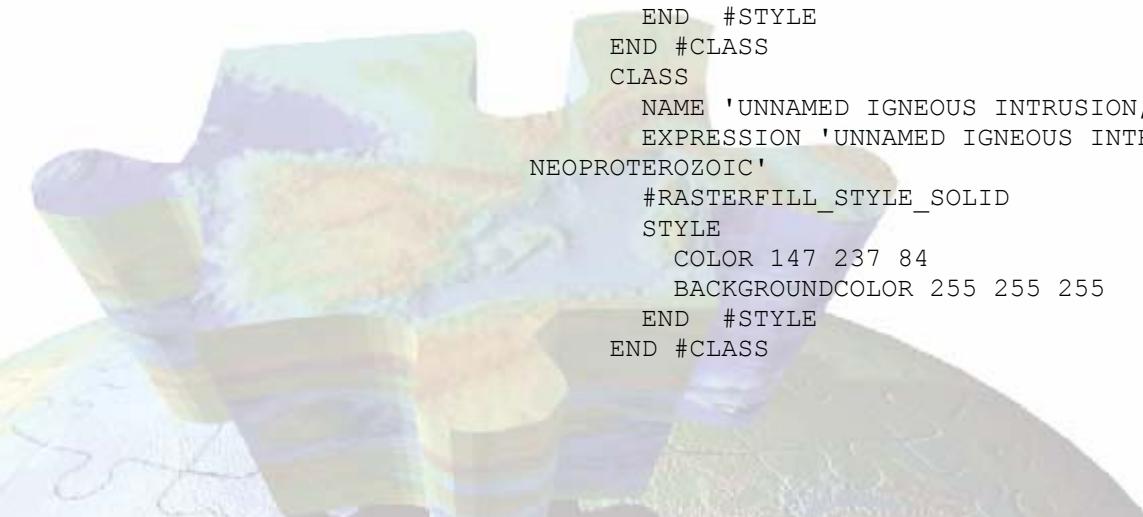
```
      CLASS
        NAME 'UNNAMED IGNEOUS INTRUSION, ORDOVICIAN TO
SILURIAN'
        EXPRESSION 'UNNAMED IGNEOUS INTRUSION, ORDOVICIAN TO
SILURIAN'
        #RASTERFILL_STYLE_SOLID
        STYLE
          COLOR 255 0 175
          BACKGROUNDCOLOR 255 255 255
        END  #STYLE
      END #CLASS
      CLASS
        NAME 'UNNAMED IGNEOUS INTRUSION, PALAEOGENE'
        EXPRESSION 'UNNAMED IGNEOUS INTRUSION, PALAEOGENE'
        #RASTERFILL_STYLE_SOLID
        STYLE
          COLOR 255 0 255
          BACKGROUNDCOLOR 255 255 255
        END  #STYLE
      END #CLASS
      CLASS
        NAME 'UNNAMED IGNEOUS INTRUSION, PALAEOPROTEROZOIC'
        EXPRESSION 'UNNAMED IGNEOUS INTRUSION,
PALAEOPROTEROZOIC'
        #RASTERFILL_STYLE_SOLID
        STYLE
          COLOR 0 237 147
          BACKGROUNDCOLOR 255 255 255
        END  #STYLE
      END #CLASS
      CLASS
        NAME 'UNNAMED METAMORPHIC ROCKS, NEOPROTEROZOIC'
        EXPRESSION 'UNNAMED METAMORPHIC ROCKS,
NEOPROTEROZOIC'
        #RASTERFILL_STYLE_SOLID
        STYLE
          COLOR 0 255 147
          BACKGROUNDCOLOR 255 255 255
        END  #STYLE
      END #CLASS
      CLASS
        NAME 'UNNAMED METAMORPHIC ROCKS, PRE-CALEDONIAN TO
CALEDONIAN'
        EXPRESSION 'UNNAMED METAMORPHIC ROCKS, PRE-CALEDONIAN
TO CALEDONIAN'
        #RASTERFILL_STYLE_SOLID
        STYLE
          COLOR 84 255 84
          BACKGROUNDCOLOR 255 255 255
        END  #STYLE
      END #CLASS
      CLASS
        NAME 'UNNAMED METASEDIMENTARY ROCKS, NEOPROTEROZOIC'
        EXPRESSION 'UNNAMED METASEDIMENTARY ROCKS,
NEOPROTEROZOIC'
        #RASTERFILL_STYLE_SOLID
        STYLE
          COLOR 147 255 219
```

```
            BACKGROUNDCOLOR 255 255 255
          END  #STYLE
        END #CLASS
        CLASS
          NAME 'UNST PHYLLITE GROUP'
          EXPRESSION 'UNST PHYLLITE GROUP'
          #RASTERFILL_STYLE_SOLID
          STYLE
            COLOR 175 219 219
            BACKGROUNDCOLOR 255 255 255
          END  #STYLE
        END #CLASS
        CLASS
          NAME 'UPPER CAMBRIAN, INCLUDING TREMADOC'
          EXPRESSION 'UPPER CAMBRIAN, INCLUDING TREMADOC'
          #RASTERFILL_STYLE_SOLID
          STYLE
            COLOR 255 255 175
            BACKGROUNDCOLOR 255 255 255
          END  #STYLE
        END #CLASS
        CLASS
          NAME 'UPPER CRETACEOUS TO PALAEOGENE ROCKS
(UNDIFFERENTIATED)'
          EXPRESSION 'UPPER CRETACEOUS TO PALAEOGENE ROCKS
(UNDIFFERENTIATED)'
          #RASTERFILL_STYLE_SOLID
          STYLE
            COLOR 219 255 201
            BACKGROUNDCOLOR 255 255 255
          END  #STYLE
        END #CLASS
        CLASS
          NAME 'UPPER DEVONIAN ROCKS (UNDIFFERENTIATED)'
          EXPRESSION 'UPPER DEVONIAN ROCKS (UNDIFFERENTIATED)'
          #RASTERFILL_STYLE_SOLID
          STYLE
            COLOR 237 147 175
            BACKGROUNDCOLOR 255 255 255
          END  #STYLE
        END #CLASS
        CLASS
          NAME 'UPPER JURASSIC ROCKS (UNDIFFERENTIATED)'
          EXPRESSION 'UPPER JURASSIC ROCKS (UNDIFFERENTIATED)'
          #RASTERFILL_STYLE_SOLID
          STYLE
            COLOR 219 201 147
            BACKGROUNDCOLOR 255 255 255
          END  #STYLE
        END #CLASS
        CLASS
          NAME 'UPPER OLD RED SANDSTONE'
          EXPRESSION 'UPPER OLD RED SANDSTONE'
          #RASTERFILL_STYLE_SOLID
          STYLE
            COLOR 237 201 219
            BACKGROUNDCOLOR 255 255 255
          END  #STYLE
```

```
          END #CLASS
          CLASS
            NAME 'WARWICKSHIRE GROUP'
            EXPRESSION 'WARWICKSHIRE GROUP'
            #RASTERFILL_STYLE_SOLID
            STYLE
              COLOR 147 201 147
              BACKGROUNDCOLOR 255 255 255
            END  #STYLE
          END #CLASS
          CLASS
            NAME 'WEALDEN GROUP'
            EXPRESSION 'WEALDEN GROUP'
            #RASTERFILL_STYLE_SOLID
            STYLE
              COLOR 201 219 175
              BACKGROUNDCOLOR 255 255 255
            END  #STYLE
          END #CLASS
          CLASS
            NAME 'WENLOCK ROCKS (UNDIFFERENTIATED)'
            EXPRESSION 'WENLOCK ROCKS (UNDIFFERENTIATED)'
            #RASTERFILL_STYLE_SOLID
            STYLE
              COLOR 175 51 255
              BACKGROUNDCOLOR 255 255 255
            END  #STYLE
          END #CLASS
          CLASS
            NAME 'WEST WALTON FORMATION, AMPTHILL CLAY FORMATION
AND KIMMERIDGE CLAY FORMATION (UNDIFFERENTIATED)'
            EXPRESSION 'WEST WALTON FORMATION, AMPTHILL CLAY
FORMATION AND KIMMERIDGE CLAY FORMATION (UNDIFFERENTIATED)'
            #RASTERFILL_STYLE_SOLID
            STYLE
              COLOR 237 201 219
              BACKGROUNDCOLOR 255 255 255
            END  #STYLE
          END #CLASS
          CLASS
            NAME 'WHITE CHALK SUBGROUP'
            EXPRESSION 'WHITE CHALK SUBGROUP'
            #RASTERFILL_STYLE_SOLID
            STYLE
              COLOR 219 255 84
              BACKGROUNDCOLOR 255 255 255
            END  #STYLE
          END #CLASS
          CLASS
            NAME 'YOREDALE GROUP'
            EXPRESSION 'YOREDALE GROUP'
            #RASTERFILL_STYLE_SOLID
            STYLE
              COLOR 147 255 219
              BACKGROUNDCOLOR 255 255 255
            END  #STYLE
          END #CLASS
          CLASS
```
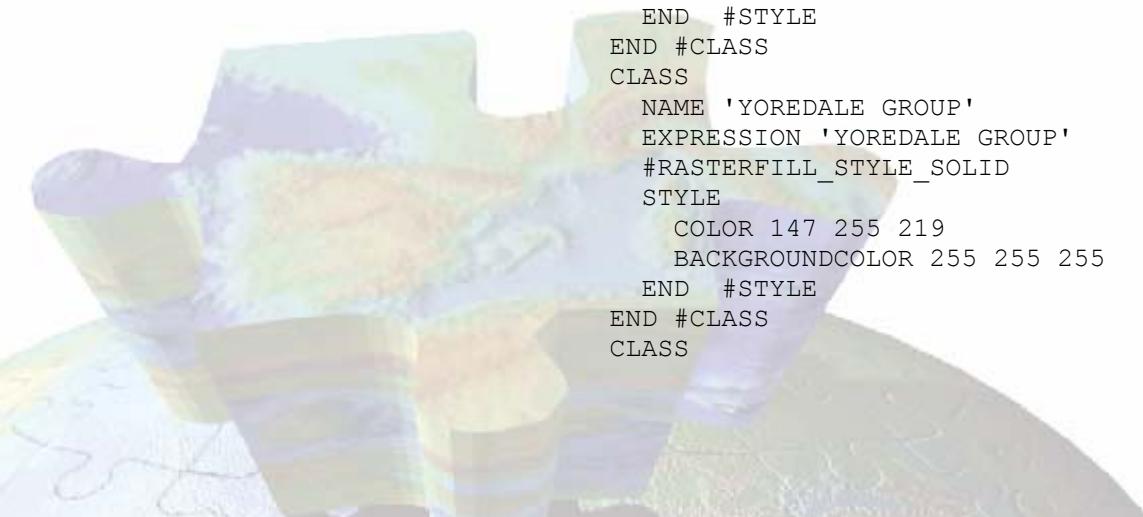
```
            NAME 'ZECHSTEIN GROUP'
            EXPRESSION 'ZECHSTEIN GROUP'
            #RASTERFILL_STYLE_SOLID
            STYLE
               COLOR 255 147 84
               BACKGROUNDCOLOR 255 255 255
            END  #STYLE
          END #CLASS

     END #LAYER

     LAYER
        NAME GBR_BGS_625k_BA
        TYPE POLYGON
        STATUS ON
        DATA bedrock625ll
        TRANSPARENCY 100
        TOLERANCE 0
        TOLERANCEUNITS pixels
        TRANSFORM TRUE
        DUMP TRUE

        HEADER "templates/bedrock_age_query_header.html"
        TEMPLATE "templates/bedrock_age_query_body.html"
        FOOTER "templates/bedrock_age_query_footer.html"

        PROJECTION
           "init=epsg:4326"
        END

        METADATA
           WMS_TITLE "GBR BGS 1:625k Bedrock Age"
           WMS_ABSTRACT "GBR BGS 1:625k Bedrock Age"
           WMS_SRS "EPSG:4326 EPSG:27700"
           GML_INCLUDE_ITEMS "AGE_ONEGL"
           WMS_INCLUDE_ITEMS "AGE_ONEGL"
           WMS_METADATAURL_HREF
"http://www.bgs.ac.uk/discoverymetadata/13480426.html"
           WMS_METADATAURL_FORMAT "text/html"
           WMS_METADATAURL_TYPE "TC211"
           WMS_DATAURL_HREF
"http://www.bgs.ac.uk/products/digitalmaps/digmapgb_625.html
"
           WMS_DATAURL_FORMAT "text/html"
           WMS_KEYWORDLIST "Bedrock,Age,Chronostratigraphy"
        END

                #CLASSITEM 'AGE_ONEGL'
                CLASS
                    #NAME 'AELENIAN'
                    EXPRESSION ('[AGE_ONEGL]' eq 'AELENIAN')
                    STYLE
                          ANTIALIAS false
                          COLOR 152 254 241
                          BACKGROUNDCOLOR 152 254 241

                    END #style
                END #class
```

```
CLASS
      #NAME 'AERONIAN'
      EXPRESSION ('[AGE_ONEGL]' eq 'AERONIAN')
      STYLE
            ANTIALIAS false
            COLOR 178 254 203
            BACKGROUNDCOLOR 178 254 203

      END #style
END #class
CLASS
      #NAME 'ALBIAN'
      EXPRESSION ('[AGE_ONEGL]' eq 'ALBIAN')
      STYLE
            ANTIALIAS false
            COLOR 203 254 152
            BACKGROUNDCOLOR 203 254 152

      END #style
END #class
CLASS
      #NAME 'ANISIAN'
      EXPRESSION ('[AGE_ONEGL]' eq 'ANISIAN')
      STYLE
            ANTIALIAS false
            COLOR 190 127 254
            BACKGROUNDCOLOR 190 127 254

      END #style
END #class
CLASS
      #NAME 'APTIAN'
      EXPRESSION ('[AGE_ONEGL]' eq 'APTIAN')
      STYLE
            ANTIALIAS false
            COLOR 190 254 139
            BACKGROUNDCOLOR 190 254 139

      END #style
END #class
CLASS
      #NAME 'AQUITANIAN'
      EXPRESSION ('[AGE_ONEGL]' eq 'AQUITANIAN')
      STYLE
            ANTIALIAS false
            COLOR 254 254 50
            BACKGROUNDCOLOR 254 254 50

      END #style
END #class
CLASS
      #NAME 'ARCHEAN'
      EXPRESSION ('[AGE_ONEGL]' eq 'ARCHEAN')
      STYLE
            ANTIALIAS false
            COLOR 254 0 254
            BACKGROUNDCOLOR 254 0 254
```

```
                              END #style
               END #class
               CLASS
                      #NAME 'ARTINSKIAN'
                      EXPRESSION ('[AGE_ONEGL]' eq 'ARTINSKIAN')
                      STYLE
                              ANTIALIAS false
                              COLOR 229 127 139
                              BACKGROUNDCOLOR 229 127 139

                      END #style
               END #class
               CLASS
                      #NAME 'ASSELIAN'
                      EXPRESSION ('[AGE_ONEGL]' eq 'ASSELIAN')
                      STYLE
                              ANTIALIAS false
                              COLOR 229 101 114
                              BACKGROUNDCOLOR 229 101 114

                      END #style
               END #class
               CLASS
                      #NAME 'BAJOCIAN'
                      EXPRESSION ('[AGE_ONEGL]' eq 'BAJOCIAN')
                      STYLE
                              ANTIALIAS false
                              COLOR 165 254 241
                              BACKGROUNDCOLOR 165 254 241

                      END #style
               END #class
               CLASS
                      #NAME 'BARREMIAN'
                      EXPRESSION ('[AGE_ONEGL]' eq 'BARREMIAN')
                      STYLE
                              ANTIALIAS false
                              COLOR 178 254 127
                              BACKGROUNDCOLOR 178 254 127

                      END #style
               END #class
               CLASS
                      #NAME 'BARTONIAN'
                      EXPRESSION ('[AGE_ONEGL]' eq 'BARTONIAN')
                      STYLE
                              ANTIALIAS false
                              COLOR 254 190 165
                              BACKGROUNDCOLOR 254 190 165

                      END #style
               END #class
               CLASS
                      NAME 'BASHKIRIAN'
                      EXPRESSION ('[AGE_ONEGL]' eq 'BASHKIRIAN')
                      STYLE
                              ANTIALIAS false
                              COLOR 152 229 203
```

```
                          BACKGROUNDCOLOR 152 229 203

                  END #style
          END #class
          CLASS
                  NAME 'BATHONIAN'
                  EXPRESSION ('[AGE_ONEGL]' eq 'BATHONIAN')
                  STYLE
                          ANTIALIAS false
                          COLOR 178 254 241
                          BACKGROUNDCOLOR 178 254 241

                  END #style
          END #class
          CLASS
                  #NAME 'BERRIASIAN'
                  EXPRESSION ('[AGE_ONEGL]' eq 'BERRIASIAN')
                  STYLE
                          ANTIALIAS false
                          COLOR 139 254 88
                          BACKGROUNDCOLOR 139 254 88

                  END #style
          END #class
          CLASS
                  #NAME 'BURDIGALIAN'
                  EXPRESSION ('[AGE_ONEGL]' eq 'BURDIGALIAN')
                  STYLE
                          ANTIALIAS false
                          COLOR 254 254 63
                          BACKGROUNDCOLOR 254 254 63

                  END #style
          END #class
          CLASS
                  #NAME 'CALLOVIAN'
                  EXPRESSION ('[AGE_ONEGL]' eq 'CALLOVIAN')
                  STYLE
                          ANTIALIAS false
                          COLOR 190 254 241
                          BACKGROUNDCOLOR 190 254 241

                  END #style
          END #class
          CLASS
                  #NAME 'CALYMMIAN'
                  EXPRESSION ('[AGE_ONEGL]' eq 'CALYMMIAN')
                  STYLE
                          ANTIALIAS false
                          COLOR 254 190 139
                  BACKGROUNDCOLOR 254 190 139

          END #style
      END #class
      CLASS
      NAME 'CAMBRIAN'
      EXPRESSION ('[AGE_ONEGL]' eq 'CAMBRIAN')
      STYLE
```

```
                          ANTIALIAS false
                          COLOR 127 203 88
                          BACKGROUNDCOLOR 127 203 88


                   END #style
            END #class
            CLASS
                   #NAME 'CAMBRIAN SERIES 2'
                   EXPRESSION ('[AGE_ONEGL]' eq 'CAMBRIAN SERIES 2')
                   STYLE
                          ANTIALIAS false
                          COLOR 152 229 127
                          BACKGROUNDCOLOR 152 229 127


                   END #style
            END #class
            CLASS
                   #NAME 'CAMBRIAN SERIES 3'
                   EXPRESSION ('[AGE_ONEGL]' eq 'CAMBRIAN SERIES 3')
                   STYLE
                          ANTIALIAS false
                          COLOR 165 241 139
                          BACKGROUNDCOLOR 165 241 139


                   END #style
            END #class
            CLASS
                   #NAME 'CAMBRIAN STAGE 10'
                   EXPRESSION ('[AGE_ONEGL]' eq 'CAMBRIAN STAGE 10')
                   STYLE
                          ANTIALIAS false
                          COLOR 229 254 203
                          BACKGROUNDCOLOR 229 254 203


                   END #style
            END #class
            CLASS
                   #NAME 'CAMBRIAN STAGE 2'
                   EXPRESSION ('[AGE_ONEGL]' eq 'CAMBRIAN STAGE 2')
                   STYLE
                          ANTIALIAS false
                          COLOR 165 216 139
                          BACKGROUNDCOLOR 165 216 139


                   END #style
            END #class
            CLASS
                   #NAME 'CAMBRIAN STAGE 3'
                   EXPRESSION ('[AGE_ONEGL]' eq 'CAMBRIAN STAGE 3')
                          STYLE
                          ANTIALIAS false
                          COLOR 165 229 139
                          BACKGROUNDCOLOR 165 229 139


                   END #style
            END #class
            CLASS
                   #NAME 'CAMBRIAN STAGE 4'
```
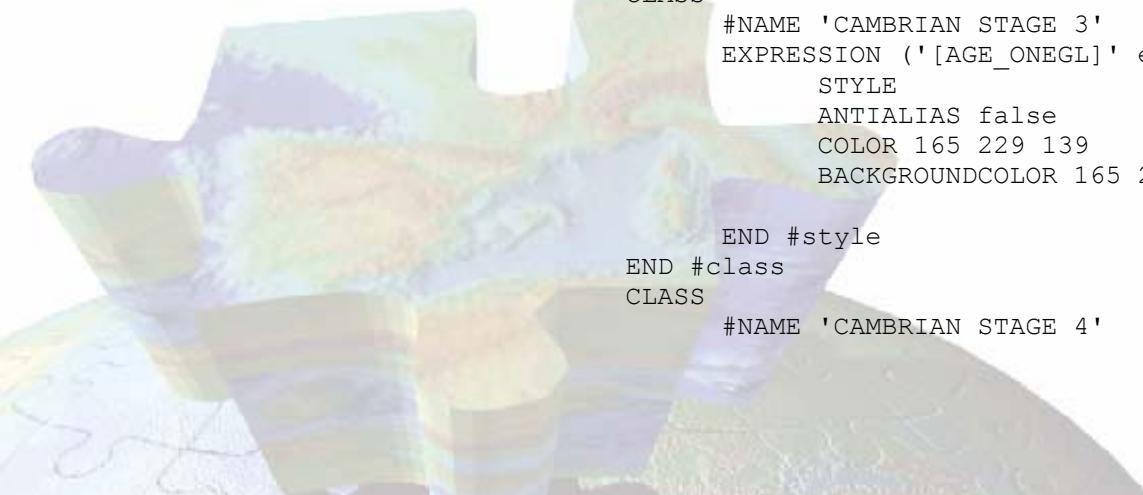
```
                    EXPRESSION ('[AGE_ONEGL]' eq 'CAMBRIAN STAGE 4')
                    STYLE
                            ANTIALIAS false
                            COLOR 178 229 152
                            BACKGROUNDCOLOR 178 229 152

                    END #style
            END #class
            CLASS
                    #NAME 'CAMBRIAN STAGE 5'
                    EXPRESSION ('[AGE_ONEGL]' eq 'CAMBRIAN STAGE 5')
                    STYLE
                            ANTIALIAS false
                            COLOR 178 241 152
                            BACKGROUNDCOLOR 178 241 152

                    END #style
            END #class
            CLASS
                    #NAME 'CAMBRIAN STAGE 9'
                    EXPRESSION ('[AGE_ONEGL]' eq 'CAMBRIAN STAGE 9')
                    STYLE
                            ANTIALIAS false
                            COLOR 216 254 190
                            BACKGROUNDCOLOR 216 254 190

                    END #style
            END #class
            CLASS
                    #NAME 'CAMPANIAN'
                    EXPRESSION ('[AGE_ONEGL]' eq 'CAMPANIAN')
                    STYLE
                            ANTIALIAS false
                            COLOR 229 254 127
                            BACKGROUNDCOLOR 229 254 127

                    END #style
            END #class
            CLASS
                    #NAME 'CAPITANIAN'
                    EXPRESSION ('[AGE_ONEGL]' eq 'CAPITANIAN')
                    STYLE
                            ANTIALIAS false
                            COLOR 254 152 165
                            BACKGROUNDCOLOR 254 152 165

                    END #style
            END #class
            CLASS
                    NAME 'CARBONIFEROUS'
                    EXPRESSION ('[AGE_ONEGL]' eq
'CARBONIFEROUS')
                        STYLE
                            ANTIALIAS false
                            COLOR 101 216 178
                            BACKGROUNDCOLOR 101 216 178

                        END #style
```
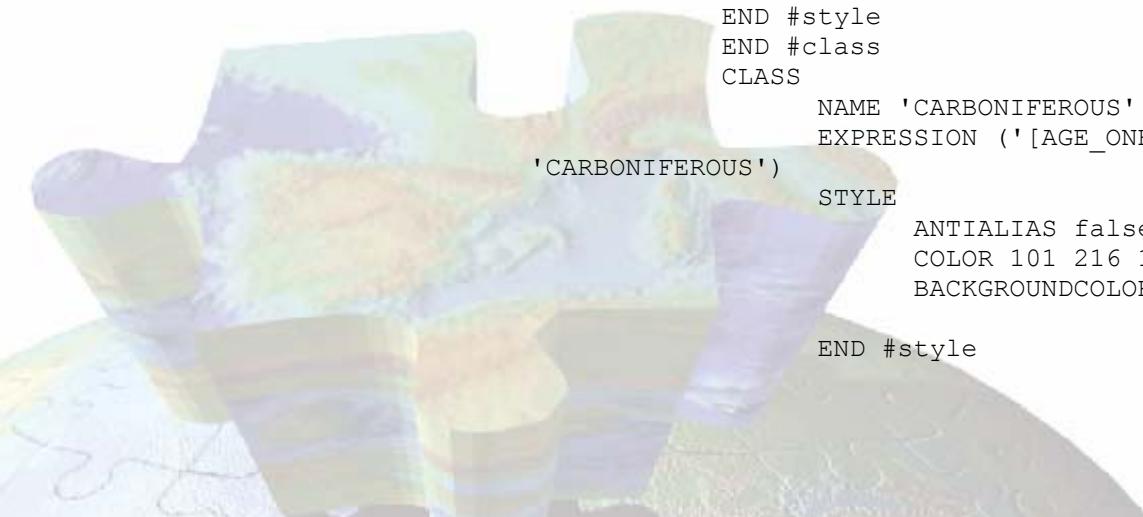
```
                                END #class
                                CLASS
                                        #NAME 'CARNIAN'
                                        EXPRESSION ('[AGE_ONEGL]' eq 'CARNIAN')
                                        STYLE
                                                ANTIALIAS false
                                                COLOR 203 165 254
                                                BACKGROUNDCOLOR 203 165 254

                                        END #style
                                END #class
                                CLASS
                                        NAME 'CENOMANIAN'
                                        EXPRESSION ('[AGE_ONEGL]' eq 'CENOMANIAN')
                                        STYLE
                                                ANTIALIAS false
                                                COLOR 178 254 76
                                                BACKGROUNDCOLOR 178 254 76

                                        END #style
                                END #class
                                CLASS
                                        NAME 'CENOZOIC'
                                        EXPRESSION ('[AGE_ONEGL]' eq 'CENOZOIC')
                                        STYLE
                                                ANTIALIAS false
                                                COLOR 241 254 0
                                                BACKGROUNDCOLOR 241 254 0

                                        END #style
                                END #class
                                CLASS
                                        #NAME 'CHANGHSINGIAN'
                                        EXPRESSION ('[AGE_ONEGL]' eq
'CHANGHSINGIAN')
                                        STYLE
                                                ANTIALIAS false
                                                COLOR 254 190 203
                                                BACKGROUNDCOLOR 254 190 203

                                        END #style
                                END #class
                                CLASS
                                        #NAME 'CHATTIAN'
                                        EXPRESSION ('[AGE_ONEGL]' eq 'CHATTIAN')
                                        STYLE
                                                ANTIALIAS false
                                                COLOR 254 229 178
                                                BACKGROUNDCOLOR 254 229 178

                                        END #style
                                END #class
                                CLASS
                                        NAME 'CISURALIAN'
                                        EXPRESSION ('[AGE_ONEGL]' eq 'CISURALIAN')
                                        STYLE
                                                ANTIALIAS false
                                                COLOR 241 88 101
```

```
                                BACKGROUNDCOLOR 241 88 101


                        END #style
                END #class
                CLASS
                        #NAME 'CONIACIAN'
                        EXPRESSION ('[AGE_ONEGL]' eq 'CONIACIAN')
                        STYLE
                                ANTIALIAS false
                                COLOR 203 254 101
                                BACKGROUNDCOLOR 203 254 101


                        END #style
                END #class
                CLASS
                        NAME 'CRETACEOUS'
                        EXPRESSION ('[AGE_ONEGL]' eq 'CRETACEOUS')
                        STYLE
                                ANTIALIAS false
                                COLOR 127 254 63
                                BACKGROUNDCOLOR 127 254 63


                        END #style
                END #class
                CLASS
                        #NAME 'CRYOGENIAN'
                        EXPRESSION ('[AGE_ONEGL]' eq 'CRYOGENIAN')
                        STYLE
                                ANTIALIAS false
                                COLOR 254 203 101
                                BACKGROUNDCOLOR 254 203 101


                        END #style
                END #class
                CLASS
                        #NAME 'DANIAN'
                        EXPRESSION ('[AGE_ONEGL]' eq 'DANIAN')
                        STYLE
                                ANTIALIAS false
                                COLOR 254 178 114
                                BACKGROUNDCOLOR 254 178 114


                        END #style
                END #class
                CLASS
                        #NAME 'DARPINGIAN'
                        EXPRESSION ('[AGE_ONEGL]' eq 'DARPINGIAN')
                        STYLE
                                ANTIALIAS false
                                COLOR 101 254 152
                                BACKGROUNDCOLOR 101 254 152


                        END #style
                END #class
                CLASS
                        NAME 'DARRIWILIAN'
                        EXPRESSION ('[AGE_ONEGL]' eq 'DARRIWILIAN')
                        STYLE
```

```
                              ANTIALIAS false
                              COLOR 114 254 165
                              BACKGROUNDCOLOR 114 254 165


                      END #style
              END #class
              CLASS
                      NAME 'DEVONIAN'
                      EXPRESSION ('[AGE_ONEGL]' eq 'DEVONIAN')
                      STYLE
                              ANTIALIAS false
                              COLOR 203 152 63
                              BACKGROUNDCOLOR 203 152 63


                      END #style
              END #class
              CLASS
                      #NAME 'DRUMIAN'
                      EXPRESSION ('[AGE_ONEGL]' eq 'DRUMIAN')
                      STYLE
                              ANTIALIAS false
                              COLOR 190 241 165
                              BACKGROUNDCOLOR 190 241 165


                      END #style
              END #class
              CLASS
                      #NAME 'EAOARCHEAN'
                      EXPRESSION ('[AGE_ONEGL]' eq 'EAOARCHEAN')
                      STYLE
                              ANTIALIAS false
                              COLOR 229 0 254
                              BACKGROUNDCOLOR 229 0 254


                      END #style
              END #class
              CLASS
                      #NAME 'ECTASIAN'
                      EXPRESSION ('[AGE_ONEGL]' eq 'ECTASIAN')
                      STYLE
                              ANTIALIAS false
                              COLOR 254 203 152
                              BACKGROUNDCOLOR 254 203 152


                      END #style
              END #class
              CLASS
                      #NAME 'EDICARIAN'
                      EXPRESSION ('[AGE_ONEGL]' eq 'EDICARIAN')
                      STYLE
                              ANTIALIAS false
                              COLOR 254 216 114
                              BACKGROUNDCOLOR 254 216 114


                      END #style
              END #class
              CLASS
                      #NAME 'EIFELIAN'
```

```
                    EXPRESSION ('[AGE_ONEGL]' eq 'EIFELIAN')
                    STYLE
                            ANTIALIAS false
                            COLOR 241 216 127
                            BACKGROUNDCOLOR 241 216 127

                    END #style
            END #class
            CLASS
                    NAME 'EMSIAN'
                    EXPRESSION ('[AGE_ONEGL]' eq 'EMSIAN')
                    STYLE
                            ANTIALIAS false
                            COLOR 229 216 127
                            BACKGROUNDCOLOR 229 216 127

                    END #style
            END #class
            CLASS
                    NAME 'EOCENE'
                    EXPRESSION ('[AGE_ONEGL]' eq 'EOCENE')
                    STYLE
                            ANTIALIAS false
                            COLOR 254 178 127
                            BACKGROUNDCOLOR 254 178 127

                    END #style
            END #class
            CLASS
                    NAME 'FAMENNIAN'
                    EXPRESSION ('[AGE_ONEGL]' eq 'FAMENNIAN')
                    STYLE
                            ANTIALIAS false
                            COLOR 241 241 203
                            BACKGROUNDCOLOR 241 241 203

                    END #style
            END #class
            CLASS
                    #NAME 'FLOIAN'
                    EXPRESSION ('[AGE_ONEGL]' eq 'FLOIAN')
                    STYLE
                            ANTIALIAS false
                            COLOR 63 254 139
                            BACKGROUNDCOLOR 63 254 139

                    END #style
            END #class
            CLASS
                    #NAME 'FORTUNIAN'
                    EXPRESSION ('[AGE_ONEGL]' eq 'FORTUNIAN')
                    STYLE
                            ANTIALIAS false
                            COLOR 152 216 127
                            BACKGROUNDCOLOR 152 216 127

                    END #style
            END #class
```

```
CLASS
      #NAME 'FRASNIAN'
      EXPRESSION ('[AGE_ONEGL]' eq 'FRASNIAN')
      STYLE
            ANTIALIAS false
            COLOR 241 241 178
            BACKGROUNDCOLOR 241 241 178

      END #style
END #class
CLASS
      #NAME 'FURONGIAN'
      EXPRESSION ('[AGE_ONEGL]' eq 'FURONGIAN')
      STYLE
            ANTIALIAS false
            COLOR 178 254 152
            BACKGROUNDCOLOR 178 254 152

      END #style
END #class
CLASS
      #NAME 'GELASIAN'
      EXPRESSION ('[AGE_ONEGL]' eq 'GELASIAN')
      STYLE
            ANTIALIAS false
            COLOR 254 254 203
            BACKGROUNDCOLOR 254 254 203

      END #style
END #class
CLASS
      #NAME 'GHZELIAN'
      EXPRESSION ('[AGE_ONEGL]' eq 'GHZELIAN')
      STYLE
            ANTIALIAS false
            COLOR 203 229 216
            BACKGROUNDCOLOR 203 229 216

      END #style
END #class
CLASS
      #NAME 'GIVETIAN'
      EXPRESSION ('[AGE_ONEGL]' eq 'GIVETIAN')
      STYLE
            ANTIALIAS false
            COLOR 241 229 139
            BACKGROUNDCOLOR 241 229 139

      END #style
END #class
CLASS
      #NAME 'GORSTIAN'
      EXPRESSION ('[AGE_ONEGL]' eq 'GORSTIAN')
      STYLE
            ANTIALIAS false
            COLOR 203 254 229
            BACKGROUNDCOLOR 203 254 229
```

```
                                        END #style
                        END #class
                        CLASS
                                #NAME 'GUADALUPIAN'
                                EXPRESSION ('[AGE_ONEGL]' eq 'GUADALUPIAN')
                                STYLE
                                        ANTIALIAS false
                                        COLOR 254 114 127
                                        BACKGROUNDCOLOR 254 114 127

                                        END #style
                        END #class
                        CLASS
                                #NAME 'GUZHANGIAN'
                                EXPRESSION ('[AGE_ONEGL]' eq 'GUZHANGIAN')
                                STYLE
                                        ANTIALIAS false
                                        COLOR 203 241 178
                                        BACKGROUNDCOLOR 203 241 178

                                        END #style
                        END #class
                        CLASS
                                #NAME 'HADEAN (INFORMAL)'
                                EXPRESSION ('[AGE_ONEGL]' eq 'HADEAN
(INFORMAL)')
                                STYLE
                                        ANTIALIAS false
                                        COLOR 254 76 190
                                        BACKGROUNDCOLOR 254 76 190

                                        END #style
                        END #class
                        CLASS
                                #NAME 'HAUTERIVIAN'
                                EXPRESSION ('[AGE_ONEGL]' eq 'HAUTERIVIAN')
                                STYLE
                                        ANTIALIAS false
                                        COLOR 165 254 114
                                        BACKGROUNDCOLOR 165 254 114

                                        END #style
                        END #class
                        CLASS
                                #NAME 'HETTANGIAN'
                                EXPRESSION ('[AGE_ONEGL]' eq 'HETTANGIAN')
                                STYLE
                                        ANTIALIAS false
                                        COLOR 76 241 254
                                        BACKGROUNDCOLOR 76 241 254

                                        END #style
                        END #class
                        CLASS
                                #NAME 'HIRNANTIAN'
                                EXPRESSION ('[AGE_ONEGL]' eq 'HIRNANTIAN')
                                STYLE
                                        ANTIALIAS false
```

```
                    COLOR 165 254 178
                    BACKGROUNDCOLOR 165 254 178


            END #style
    END #class
    CLASS
            #NAME 'HOLOCENE'
            EXPRESSION ('[AGE_ONEGL]' eq 'HOLOCENE')
            STYLE
                    ANTIALIAS false
                    COLOR 254 241 241
                    BACKGROUNDCOLOR 254 241 241


            END #style
    END #class
    CLASS
            #NAME 'HOMERIAN'
            EXPRESSION ('[AGE_ONEGL]' eq 'HOMERIAN')
            STYLE
                    ANTIALIAS false
                    COLOR 203 254 216
                    BACKGROUNDCOLOR 203 254 216


            END #style
    END #class
    CLASS
            #NAME 'INDUAN'
            EXPRESSION ('[AGE_ONEGL]' eq 'INDUAN')
            STYLE
                    ANTIALIAS false
                    COLOR 165 76 254
                    BACKGROUNDCOLOR 165 76 254


            END #style
    END #class
    CLASS
            NAME 'JURASSIC'
            EXPRESSION ('[AGE_ONEGL]' eq 'JURASSIC')
            STYLE
                    ANTIALIAS false
                    COLOR 50 241 254
                    BACKGROUNDCOLOR 50 241 254


            END #style
    END #class
    CLASS
            #NAME 'KASIMOVIAN'
            EXPRESSION ('[AGE_ONEGL]' eq 'KASIMOVIAN')
            STYLE
                    ANTIALIAS false
                    COLOR 190 229 216
                    BACKGROUNDCOLOR 190 229 216


            END #style
    END #class
    CLASS
            #NAME 'KATIAN'
            EXPRESSION ('[AGE_ONEGL]' eq 'KATIAN')
```

```
                          STYLE
                                  ANTIALIAS false
                                  COLOR 152 254 165
                                  BACKGROUNDCOLOR 152 254 165

                          END #style
                  END #class
                  CLASS
                          #NAME 'KIMMERIDGIAN'
                          EXPRESSION ('[AGE_ONEGL]' eq 'KIMMERIDGIAN')
                          STYLE
                                  ANTIALIAS false
                                  COLOR 203 254 254
                                  BACKGROUNDCOLOR 203 254 254

                          END #style
                  END #class
                  CLASS
                          #NAME 'KUNGURIAN'
                          EXPRESSION ('[AGE_ONEGL]' eq 'KUNGURIAN')
                          STYLE
                                  ANTIALIAS false
                                  COLOR 229 139 152
                                  BACKGROUNDCOLOR 229 139 152

                          END #style
                  END #class
                  CLASS
                          #NAME 'LADINIAN'
                          EXPRESSION ('[AGE_ONEGL]' eq 'LADINIAN')
                          STYLE
                                  ANTIALIAS false
                                  COLOR 203 139 254
                                  BACKGROUNDCOLOR 203 139 254

                          END #style
                  END #class
                  CLASS
                          #NAME 'LANGHIAN'
                          EXPRESSION ('[AGE_ONEGL]' eq 'LANGHIAN')
                          STYLE
                                  ANTIALIAS false
                                  COLOR 254 254 76
                                  BACKGROUNDCOLOR 254 254 76

                          END #style
                  END #class
                  CLASS
                          NAME 'LLANDOVERY'
                          EXPRESSION ('[AGE_ONEGL]' eq 'LLANDOVERY')
                          STYLE
                                  ANTIALIAS false
                                  COLOR 152 254 190
                                  BACKGROUNDCOLOR 152 254 190

                          END #style
                  END #class
                  CLASS
```

```
                                        #NAME 'LOCHKOVIAN'
                                        EXPRESSION ('[AGE_ONEGL]' eq 'LOCHKOVIAN')
                                        STYLE
                                                ANTIALIAS false
                                                COLOR 229 190 101
                                                BACKGROUNDCOLOR 229 190 101

                                        END #style
                                END #class
                                CLASS
                                        NAME 'LOPINGIAN'
                                        EXPRESSION ('[AGE_ONEGL]' eq 'LOPINGIAN')
                                        STYLE
                                                ANTIALIAS false
                                                COLOR 254 165 178
                                                BACKGROUNDCOLOR 254 165 178

                                        END #style
                                END #class
                                CLASS
                                        NAME 'LOWER CAMBRIAN'
                                        EXPRESSION ('[AGE_ONEGL]' eq 'LOWER
                        CAMBRIAN')
                                        STYLE
                                                ANTIALIAS false
                                                COLOR 139 216 114
                                                BACKGROUNDCOLOR 139 216 114

                                        END #style
                                END #class
                                CLASS
                                        NAME 'LOWER CRETACEOUS'
                                        EXPRESSION ('[AGE_ONEGL]' eq 'LOWER
                        CRETACEOUS')
                                        STYLE
                                                ANTIALIAS false
                                                COLOR 139 254 76
                                                BACKGROUNDCOLOR 139 254 76

                                        END #style
                                END #class
                                CLASS
                                        NAME 'LOWER DEVONIAN'
                                        EXPRESSION ('[AGE_ONEGL]' eq 'LOWER
                        DEVONIAN')
                                        STYLE
                                                ANTIALIAS false
                                                COLOR 229 178 88
                                                BACKGROUNDCOLOR 229 178 88

                                        END #style
                                END #class
                                CLASS
                                        #NAME 'LOWER JURASSIC'
                                        EXPRESSION ('[AGE_ONEGL]' eq 'LOWER
                        JURASSIC')
                                        STYLE
                                                ANTIALIAS false
```

```
                              COLOR 63 241 254
                              BACKGROUNDCOLOR 63 241 254

                    END #style
              END #class
              CLASS
                    #NAME 'LOWER MISSISSIPPIAN'
                    EXPRESSION ('[AGE_ONEGL]' eq 'LOWER
MISSISSIPPIAN')
                    STYLE
                              ANTIALIAS false
                              COLOR 127 216 114
                              BACKGROUNDCOLOR 127 216 114

                    END #style
              END #class
              CLASS
                    #NAME 'LOWER ORDOVICIAN'
                    EXPRESSION ('[AGE_ONEGL]' eq 'LOWER
ORDOVICIAN')
                    STYLE
                              ANTIALIAS false
                              COLOR 25 254 101
                              BACKGROUNDCOLOR 25 254 101

                    END #style
              END #class
              CLASS
                    #NAME 'LOWER PENNSYLVANIAN'
                    EXPRESSION ('[AGE_ONEGL]' eq 'LOWER
PENNSYLVANIAN')
                    STYLE
                              ANTIALIAS false
                              COLOR 139 229 203
                              BACKGROUNDCOLOR 139 229 203

                    END #style
              END #class
              CLASS
                    #NAME 'LOWER PLEISTOCENE'
                    EXPRESSION ('[AGE_ONEGL]' eq 'LOWER
PLEISTOCENE')
                    STYLE
                              ANTIALIAS false
                              COLOR 254 241 190
                              BACKGROUNDCOLOR 254 241 190

                    END #style
              END #class
              CLASS
                    #NAME 'LOWER TRIASSIC'
                    EXPRESSION ('[AGE_ONEGL]' eq 'LOWER
TRIASSIC')
                    STYLE
                              ANTIALIAS false
                              COLOR 152 63 254
                              BACKGROUNDCOLOR 152 63 254
```

```
                                END #style
                        END #class
                        CLASS
                                #NAME 'LUDFORDIAN'
                                EXPRESSION ('[AGE_ONEGL]' eq 'LUDFORDIAN')
                                STYLE
                                        ANTIALIAS false
                                        COLOR 216 254 229
                                        BACKGROUNDCOLOR 216 254 229

                                END #style
                        END #class
                        CLASS
                                NAME 'LUDLOW'
                                EXPRESSION ('[AGE_ONEGL]' eq 'LUDLOW')
                                STYLE
                                        ANTIALIAS false
                                        COLOR 190 254 216
                                        BACKGROUNDCOLOR 190 254 216

                                END #style
                        END #class
                        CLASS
                                #NAME 'LUTETIAN'
                                EXPRESSION ('[AGE_ONEGL]' eq 'LUTETIAN')
                                STYLE
                                        ANTIALIAS false
                                        COLOR 254 178 152
                                        BACKGROUNDCOLOR 254 178 152

                                END #style
                        END #class
                        CLASS
                                #NAME 'MAASTRICHTIAN'
                                EXPRESSION ('[AGE_ONEGL]' eq
'MAASTRICHTIAN')
                                STYLE
                                        ANTIALIAS false
                                        COLOR 241 254 139
                                        BACKGROUNDCOLOR 241 254 139

                                END #style
                        END #class
                        CLASS
                                #NAME 'MESOARCHEAN'
                                EXPRESSION ('[AGE_ONEGL]' eq 'MESOARCHEAN')
                                STYLE
                                        ANTIALIAS false
                                        COLOR 254 101 241
                                        BACKGROUNDCOLOR 254 101 241

                                END #style
                        END #class
                        CLASS
                                NAME 'MESOPROTEROZOIC'
                                EXPRESSION ('[AGE_ONEGL]' eq
'MESOPROTEROZOIC')
                                STYLE
```

```
                                   ANTIALIAS false
                                   COLOR 254 178 114
                                   BACKGROUNDCOLOR 254 178 114

                           END #style
                    END #class
                    CLASS
                           NAME 'MESOZOIC'
                           EXPRESSION ('[AGE_ONEGL]' eq 'MESOZOIC')
                           STYLE
                                   ANTIALIAS false
                                   COLOR 101 254 229
                                   BACKGROUNDCOLOR 101 254 229

                           END #style
                    END #class
                    CLASS
                           #NAME 'MESSINIAN'
                           EXPRESSION ('[AGE_ONEGL]' eq 'MESSINIAN')
                           STYLE
                                   ANTIALIAS false
                                   COLOR 254 254 114
                                   BACKGROUNDCOLOR 254 254 114

                           END #style
                    END #class
                    CLASS
                           NAME 'MIDDLE CAMBRIAN'
                           EXPRESSION ('[AGE_ONEGL]' eq 'MIDDLE
        CAMBRIAN')
                           STYLE
                                   ANTIALIAS false
                                   COLOR 165 241 139
                                   BACKGROUNDCOLOR 165 241 139

                           END #style
                    END #class
                    CLASS
                           NAME 'MIDDLE DEVONIAN'
                           EXPRESSION ('[AGE_ONEGL]' eq 'MIDDLE
        DEVONIAN')
                           STYLE
                                   ANTIALIAS false
                                   COLOR 241 203 114
                                   BACKGROUNDCOLOR 241 203 114

                           END #style
                    END #class
                    CLASS
                           NAME 'MIDDLE JURASSIC'
                           EXPRESSION ('[AGE_ONEGL]' eq 'MIDDLE
        JURASSIC')
                           STYLE
                                   ANTIALIAS false
                                   COLOR 127 254 241
                                   BACKGROUNDCOLOR 127 254 241

                           END #style
```

```
                        END #class
                        CLASS
                                #NAME 'MIDDLE MISSISSIPPIAN'
                                EXPRESSION ('[AGE_ONEGL]' eq 'MIDDLE
MISSISSIPPIAN')
                                STYLE
                                        ANTIALIAS false
                                        COLOR 152 216 114
                                        BACKGROUNDCOLOR 152 216 114

                                END #style
                        END #class
                        CLASS
                                #NAME 'MIDDLE ORDOVICIAN'
                                EXPRESSION ('[AGE_ONEGL]' eq 'MIDDLE
ORDOVICIAN')
                                STYLE
                                        ANTIALIAS false
                                        COLOR 76 254 127
                                        BACKGROUNDCOLOR 76 254 127

                                END #style
                        END #class
                        CLASS
                                #NAME 'MIDDLE PENNSYLVANIAN'
                                EXPRESSION ('[AGE_ONEGL]' eq 'MIDDLE
PENNSYLVANIAN')
                                STYLE
                                        ANTIALIAS false
                                        COLOR 165 229 203
                                        BACKGROUNDCOLOR 165 229 203

                                END #style
                        END #class
                        CLASS
                                #NAME 'MIDDLE PLEISTOCENE'
                                EXPRESSION ('[AGE_ONEGL]' eq 'MIDDLE
PLEISTOCENE')
                                STYLE
                                        ANTIALIAS false
                                        COLOR 254 241 203
                                        BACKGROUNDCOLOR 254 241 203

                                END #style
                        END #class
                        CLASS
                                #NAME 'MIDDLE TRIASSIC'
                                EXPRESSION ('[AGE_ONEGL]' eq 'MIDDLE
TRIASSIC')
                                STYLE
                                        ANTIALIAS false
                                        COLOR 178 114 254
                                        BACKGROUNDCOLOR 178 114 254

                                END #style
                        END #class
                        CLASS
                                #NAME 'MIOCENE'
```

```
                        EXPRESSION ('[AGE_ONEGL]' eq 'MIOCENE')
                        STYLE
                                ANTIALIAS false
                                COLOR 254 254 0
                                BACKGROUNDCOLOR 254 254 0

                        END #style
                END #class
                CLASS
                        NAME 'MISSISSIPPIAN'
                        EXPRESSION ('[AGE_ONEGL]' eq
'MISSISSIPPIAN')
                        STYLE
                                ANTIALIAS false
                                COLOR 101 190 114
                                BACKGROUNDCOLOR 101 190 114

                        END #style
                END #class
                CLASS
                        NAME 'MOSCOVIAN'
                        EXPRESSION ('[AGE_ONEGL]' eq 'MOSCOVIAN')
                        STYLE
                                ANTIALIAS false
                                COLOR 178 229 203
                                BACKGROUNDCOLOR 178 229 203

                        END #style
                END #class
                CLASS
                        #NAME 'NEOARCHEAN'
                        EXPRESSION ('[AGE_ONEGL]' eq 'NEOARCHEAN')
                        STYLE
                                ANTIALIAS false
                                COLOR 254 152 241
                                BACKGROUNDCOLOR 254 152 241

                        END #style
                END #class
                CLASS
                        NAME 'NEOGENE'
                        EXPRESSION ('[AGE_ONEGL]' eq 'NEOGENE')
                        STYLE
                                ANTIALIAS false
                                COLOR 254 229 0
                                BACKGROUNDCOLOR 254 229 0

                        END #style
                END #class
                CLASS
                        NAME 'NEOPROTEROZOIC'
                        EXPRESSION ('[AGE_ONEGL]' eq
'NEOPROTEROZOIC')
                        STYLE
                                ANTIALIAS false
                                COLOR 254 178 76
                                BACKGROUNDCOLOR 254 178 76
```

```
                                     END #style
                          END #class
                          CLASS
                                 #NAME 'NORIAN'
                                 EXPRESSION ('[AGE_ONEGL]' eq 'NORIAN')
                                 STYLE
                                        ANTIALIAS false
                                        COLOR 216 178 254
                                        BACKGROUNDCOLOR 216 178 254

                                 END #style
                          END #class
                          CLASS
                                 NAME 'NOT APPLICABLE'
                                 EXPRESSION ('[AGE_ONEGL]' eq 'NOT
APPLICABLE')
                                 STYLE
                                        ANTIALIAS false
                                        COLOR 178 178 178
                                        BACKGROUNDCOLOR 178 178 178

                                 END #style
                          END #class
                          CLASS
                                 NAME 'No Data Entered'
                                 EXPRESSION ('[AGE_ONEGL]' eq 'No Data
Entered')
                                 STYLE
                                        ANTIALIAS false
                                        COLOR 178 178 178
                                        BACKGROUNDCOLOR 178 178 178

                                 END #style
                          END #class
                          CLASS
                                 #NAME 'OLENEKIAN'
                                 EXPRESSION ('[AGE_ONEGL]' eq 'OLENEKIAN')
                                 STYLE
                                        ANTIALIAS false
                                        COLOR 178 88 254
                                        BACKGROUNDCOLOR 178 88 254

                                 END #style
                          END #class
                          CLASS
                                 NAME 'OLIGOCENE'
                                 EXPRESSION ('[AGE_ONEGL]' eq 'OLIGOCENE')
                                 STYLE
                                        ANTIALIAS false
                                        COLOR 254 190 139
                                        BACKGROUNDCOLOR 254 190 139

                                 END #style
                          END #class
                          CLASS
                                 NAME 'ORDOVICIAN'
                                 EXPRESSION ('[AGE_ONEGL]' eq 'ORDOVICIAN')
                                 STYLE
```

```
                              ANTIALIAS false
                              COLOR 0 254 101
                              BACKGROUNDCOLOR 0 254 101


                      END #style
              END #class
              CLASS
                      #NAME 'OROSIRIAN'
                      EXPRESSION ('[AGE_ONEGL]' eq 'OROSIRIAN')
                      STYLE
                              ANTIALIAS false
                              COLOR 254 101 216
                              BACKGROUNDCOLOR 254 101 216


                      END #style
              END #class
              CLASS
                      NAME 'OXFORDIAN'
                      EXPRESSION ('[AGE_ONEGL]' eq 'OXFORDIAN')
                      STYLE
                              ANTIALIAS false
                              COLOR 190 254 254
                              BACKGROUNDCOLOR 190 254 254


                      END #style
              END #class
              CLASS
                      #NAME 'PAIBIAN'
                      EXPRESSION ('[AGE_ONEGL]' eq 'PAIBIAN')
                      STYLE
                              ANTIALIAS false
                              COLOR 203 254 178
                              BACKGROUNDCOLOR 203 254 178


                      END #style
              END #class
              CLASS
                      #NAME 'PALEOARCHEAN'
                      EXPRESSION ('[AGE_ONEGL]' eq 'PALEOARCHEAN')
                      STYLE
                              ANTIALIAS false
                              COLOR 254 63 254
                              BACKGROUNDCOLOR 254 63 254


                      END #style
              END #class
              CLASS
                      NAME 'PALEOCENE'
                      EXPRESSION ('[AGE_ONEGL]' eq 'PALEOCENE')
                      STYLE
                              ANTIALIAS false
                              COLOR 254 165 114
                              BACKGROUNDCOLOR 254 165 114


                      END #style
              END #class
              CLASS
                      NAME 'PALEOGENE'
```

```
                EXPRESSION ('[AGE_ONEGL]' eq 'PALEOGENE')
                STYLE
                        ANTIALIAS false
                        COLOR 254 152 101
                        BACKGROUNDCOLOR 254 152 101

                END #style
        END #class
        CLASS
                NAME 'PALEOPROTEROZOIC'
                EXPRESSION ('[AGE_ONEGL]' eq
'PALEOPROTEROZOIC')
                STYLE
                        ANTIALIAS false
                        COLOR 254 63 178
                        BACKGROUNDCOLOR 254 63 178

                END #style
        END #class
        CLASS
                NAME 'PALEOZOIC'
                EXPRESSION ('[AGE_ONEGL]' eq 'PALEOZOIC')
                STYLE
                        ANTIALIAS false
                        COLOR 152 229 152
                        BACKGROUNDCOLOR 152 229 152

                END #style
        END #class
        CLASS
                NAME 'PENNSYLVANIAN'
                EXPRESSION ('[AGE_ONEGL]' eq
'PENNSYLVANIAN')
                STYLE
                        ANTIALIAS false
                        COLOR 152 229 203
                        BACKGROUNDCOLOR 152 229 203

                END #style
        END #class
        CLASS
                NAME 'PERMIAN'
                EXPRESSION ('[AGE_ONEGL]' eq 'PERMIAN')
                STYLE
                        ANTIALIAS false
                        COLOR 241 63 63
                        BACKGROUNDCOLOR 241 63 63

                END #style
        END #class
        CLASS
                NAME 'PHANEROZOIC'
                EXPRESSION ('[AGE_ONEGL]' eq 'PHANEROZOIC')
                STYLE
                        ANTIALIAS false
                        COLOR 152 254 241
                        BACKGROUNDCOLOR 152 254 241
```

```
                                END #style
                        END #class
                        CLASS
                                #NAME 'PIACENZIAN'
                                EXPRESSION ('[AGE_ONEGL]' eq 'PIACENZIAN')
                                STYLE
                                        ANTIALIAS false
                                        COLOR 254 254 190
                                        BACKGROUNDCOLOR 254 254 190

                                END #style
                        END #class
                        CLASS
                                #NAME 'PLEISTOCENE'
                                EXPRESSION ('[AGE_ONEGL]' eq 'PLEISTOCENE')
                                STYLE
                                        ANTIALIAS false
                                        COLOR 254 241 178
                                        BACKGROUNDCOLOR 254 241 178

                                END #style
                        END #class
                        CLASS
                                #NAME 'PLIENSBACHIAN'
                                EXPRESSION ('[AGE_ONEGL]' eq
'PLIENSBACHIAN')
                                STYLE
                                        ANTIALIAS false
                                        COLOR 127 241 254
                                        BACKGROUNDCOLOR 127 241 254

                                END #style
                        END #class
                        CLASS
                                #NAME 'PLIOCENE'
                                EXPRESSION ('[AGE_ONEGL]' eq 'PLIOCENE')
                                STYLE
                                        ANTIALIAS false
                                        COLOR 254 254 152
                                        BACKGROUNDCOLOR 254 254 152

                                END #style
                        END #class
                        CLASS
                                #NAME 'PRAGIAN'
                                EXPRESSION ('[AGE_ONEGL]' eq 'PRAGIAN')
                                STYLE
                                        ANTIALIAS false
                                        COLOR 229 203 114
                                        BACKGROUNDCOLOR 229 203 114

                                END #style
                        END #class
                        CLASS
                                NAME 'PRECAMBRIAN'
                                EXPRESSION ('[AGE_ONEGL]' eq 'PRECAMBRIAN')
                                STYLE
                                        ANTIALIAS false
```

```
                                    COLOR 254 63 178
                                    BACKGROUNDCOLOR 254 63 178


                        END #style
                END #class
                CLASS
                        #NAME 'PRIABONIAN'
                        EXPRESSION ('[AGE_ONEGL]' eq 'PRIABONIAN')
                        STYLE
                                ANTIALIAS false
                                COLOR 254 203 178
                                BACKGROUNDCOLOR 254 203 178


                        END #style
                END #class
                CLASS
                        NAME 'PRIDOLI'
                        EXPRESSION ('[AGE_ONEGL]' eq 'PRIDOLI')
                        STYLE
                                ANTIALIAS false
                                COLOR 229 254 229
                                BACKGROUNDCOLOR 229 254 229


                        END #style
                END #class
                CLASS
                        NAME 'PROTEROZOIC'
                        EXPRESSION ('[AGE_ONEGL]' eq 'PROTEROZOIC')
                        STYLE
                                ANTIALIAS false
                                COLOR 254 50 165
                                BACKGROUNDCOLOR 254 50 165


                        END #style
                END #class
                CLASS
                        #NAME 'QUATERNARY'
                        EXPRESSION ('[AGE_ONEGL]' eq 'QUATERNARY')
                        STYLE
                                ANTIALIAS false
                                COLOR 254 254 127
                                BACKGROUNDCOLOR 254 254 127


                        END #style
                END #class
                CLASS
                        #NAME 'RHAETIAN'
                        EXPRESSION ('[AGE_ONEGL]' eq 'RHAETIAN')
                        STYLE
                                ANTIALIAS false
                                COLOR 229 190 254
                                BACKGROUNDCOLOR 229 190 254


                        END #style
                END #class
                CLASS
                        #NAME 'RHUDDANIAN'
                        EXPRESSION ('[AGE_ONEGL]' eq 'RHUDDANIAN')
```

```
                STYLE
                        ANTIALIAS false
                        COLOR 190 254 190
                        BACKGROUNDCOLOR 190 254 190

                END #style
        END #class
        CLASS
                #NAME 'RHYACIAN'
                EXPRESSION ('[AGE_ONEGL]' eq 'RHYACIAN')
                STYLE
                        ANTIALIAS false
                        COLOR 254 88 203
                        BACKGROUNDCOLOR 254 88 203

                END #style
        END #class
        CLASS
                #NAME 'ROADIAN'
                EXPRESSION ('[AGE_ONEGL]' eq 'ROADIAN')
                STYLE
                        ANTIALIAS false
                        COLOR 254 127 139
                        BACKGROUNDCOLOR 254 127 139

                END #style
        END #class
        CLASS
                #NAME 'RUPELIAN'
                EXPRESSION ('[AGE_ONEGL]' eq 'RUPELIAN')
                STYLE
                        ANTIALIAS false
                        COLOR 254 216 165
                        BACKGROUNDCOLOR 254 216 165

                END #style
        END #class
        CLASS
                #NAME 'SAKMARIAN'
                EXPRESSION ('[AGE_ONEGL]' eq 'SAKMARIAN')
                STYLE
                        ANTIALIAS false
                        COLOR 229 114 127
                        BACKGROUNDCOLOR 229 114 127

                END #style
        END #class
        CLASS
                #NAME 'SANDBIAN'
                EXPRESSION ('[AGE_ONEGL]' eq 'SANDBIAN')
                STYLE
                        ANTIALIAS false
                        COLOR 139 254 152
                        BACKGROUNDCOLOR 139 254 152

                END #style
        END #class
        CLASS
```

```
                        #NAME 'SANTONIAN'
                        EXPRESSION ('[AGE_ONEGL]' eq 'SANTONIAN')
                        STYLE
                                ANTIALIAS false
                                COLOR 216 254 114
                                BACKGROUNDCOLOR 216 254 114

                        END #style
                END #class
                CLASS
                        #NAME 'SELANDIAN'
                        EXPRESSION ('[AGE_ONEGL]' eq 'SELANDIAN')
                        STYLE
                                ANTIALIAS false
                                COLOR 254 190 114
                                BACKGROUNDCOLOR 254 190 114

                        END #style
                END #class
                CLASS
                        #NAME 'SERPUKHOVIAN'
                        EXPRESSION ('[AGE_ONEGL]' eq 'SERPUKHOVIAN')
                        STYLE
                                ANTIALIAS false
                                COLOR 190 216 114
                                BACKGROUNDCOLOR 190 216 114

                        END #style
                END #class
                CLASS
                        #NAME 'SERRAVALIAN'
                        EXPRESSION ('[AGE_ONEGL]' eq 'SERRAVALIAN')
                        STYLE
                                ANTIALIAS false
                                COLOR 254 254 88
                                BACKGROUNDCOLOR 254 254 88

                        END #style
                END #class
                CLASS
                        #NAME 'SHEINWOODIAN'
                        EXPRESSION ('[AGE_ONEGL]' eq 'SHEINWOODIAN')
                        STYLE
                                ANTIALIAS false
                                COLOR 190 254 203
                                BACKGROUNDCOLOR 190 254 203

                        END #style
                END #class
                CLASS
                        #NAME 'SIDERIAN'
                        EXPRESSION ('[AGE_ONEGL]' eq 'SIDERIAN')
                        STYLE
                                ANTIALIAS false
                                COLOR 254 76 190
                                BACKGROUNDCOLOR 254 76 190

                        END #style
```

```
                        END #class
                        CLASS
                              NAME 'SILURIAN'
                              EXPRESSION ('[AGE_ONEGL]' eq 'SILURIAN')
                              STYLE
                                    ANTIALIAS false
                                    COLOR 178 254 190
                                    BACKGROUNDCOLOR 178 254 190

                              END #style
                        END #class
                        CLASS
                              #NAME 'SINEMURIAN'
                              EXPRESSION ('[AGE_ONEGL]' eq 'SINEMURIAN')
                              STYLE
                                    ANTIALIAS false
                                    COLOR 101 241 254
                                    BACKGROUNDCOLOR 101 241 254

                              END #style
                        END #class
                        CLASS
                              #NAME 'STATHERIAN'
                              EXPRESSION ('[AGE_ONEGL]' eq 'STATHERIAN')
                              STYLE
                                    ANTIALIAS false
                                    COLOR 254 114 229
                                    BACKGROUNDCOLOR 254 114 229

                              END #style
                        END #class
                        CLASS
                              #NAME 'STENIAN'
                              EXPRESSION ('[AGE_ONEGL]' eq 'STENIAN')
                              STYLE
                                    ANTIALIAS false
                                    COLOR 254 216 165
                                    BACKGROUNDCOLOR 254 216 165

                              END #style
                        END #class
                        CLASS
                              #NAME 'TELYCHIAN'
                              EXPRESSION ('[AGE_ONEGL]' eq 'TELYCHIAN')
                              STYLE
                                    ANTIALIAS false
                                    COLOR 190 254 216
                                    BACKGROUNDCOLOR 190 254 216

                              END #style
                        END #class
                        CLASS
                              #NAME 'TERRENEUVIAN'
                              EXPRESSION ('[AGE_ONEGL]' eq 'TERRENEUVIAN')
                              STYLE
                                    ANTIALIAS false
                                    COLOR 139 216 114
                                    BACKGROUNDCOLOR 139 216 114
```

```
            END #style
    END #class
    CLASS
        NAME 'THANETIAN'
        EXPRESSION ('[AGE_ONEGL]' eq 'THANETIAN')
        STYLE
            ANTIALIAS false
            COLOR 254 190 127
            BACKGROUNDCOLOR 254 190 127

        END #style
    END #class
    CLASS
        #NAME 'TITHONIAN'
        EXPRESSION ('[AGE_ONEGL]' eq 'TITHONIAN')
        STYLE
            ANTIALIAS false
            COLOR 216 254 254
            BACKGROUNDCOLOR 216 254 254

        END #style
    END #class
    CLASS
        #NAME 'TOARCIAN'
        EXPRESSION ('[AGE_ONEGL]' eq 'TOARCIAN')
        STYLE
            ANTIALIAS false
            COLOR 152 241 254
            BACKGROUNDCOLOR 152 241 254

        END #style
    END #class
    CLASS
        #NAME 'TONIAN'
        EXPRESSION ('[AGE_ONEGL]' eq 'TONIAN')
        STYLE
            ANTIALIAS false
            COLOR 254 190 88
            BACKGROUNDCOLOR 254 190 88

        END #style
    END #class
    CLASS
        #NAME 'TORTONIAN'
        EXPRESSION ('[AGE_ONEGL]' eq 'TORTONIAN')
        STYLE
            ANTIALIAS false
            COLOR 254 254 101
            BACKGROUNDCOLOR 254 254 101

        END #style
    END #class
    CLASS
        NAME 'TOURNAISIAN'
        EXPRESSION ('[AGE_ONEGL]' eq 'TOURNAISIAN')
        STYLE
            ANTIALIAS false
```

```
                                         COLOR 139 216 114
                                         BACKGROUNDCOLOR 139 216 114


                                  END #style
                           END #class
                           CLASS
                                  NAME 'TREMADOCIAN'
                                  EXPRESSION ('[AGE_ONEGL]' eq 'TREMADOCIAN')
                                  STYLE
                                         ANTIALIAS false
                                         COLOR 50 254 127
                                         BACKGROUNDCOLOR 50 254 127


                                  END #style
                           END #class
                           CLASS
                                  NAME 'TRIASSIC'
                                  EXPRESSION ('[AGE_ONEGL]' eq 'TRIASSIC')
                                  STYLE
                                         ANTIALIAS false
                                         COLOR 127 50 254
                                         BACKGROUNDCOLOR 127 50 254


                                  END #style
                           END #class
                           CLASS
                                  #NAME 'TURONIAN'
                                  EXPRESSION ('[AGE_ONEGL]' eq 'TURONIAN')
                                  STYLE
                                         ANTIALIAS false
                                         COLOR 190 254 88
                                         BACKGROUNDCOLOR 190 254 88


                                  END #style
                           END #class
                           CLASS
                                  #NAME 'UNKNOWN'
                                  EXPRESSION ('[AGE_ONEGL]' eq 'UNKNOWN')
                                  STYLE
                                         ANTIALIAS false
                                         COLOR 254 254 254
                                         BACKGROUNDCOLOR 254 254 254


                                  END #style
                           END #class
                           CLASS
                                  NAME 'UPPER CRETACEOUS'
                                  EXPRESSION ('[AGE_ONEGL]' eq 'UPPER
CRETACEOUS')
                                  STYLE
                                         ANTIALIAS false
                                         COLOR 165 254 63
                                         BACKGROUNDCOLOR 165 254 63

                                  END #style
                           END #class
                           CLASS
                                  NAME 'UPPER DEVONIAN'
```
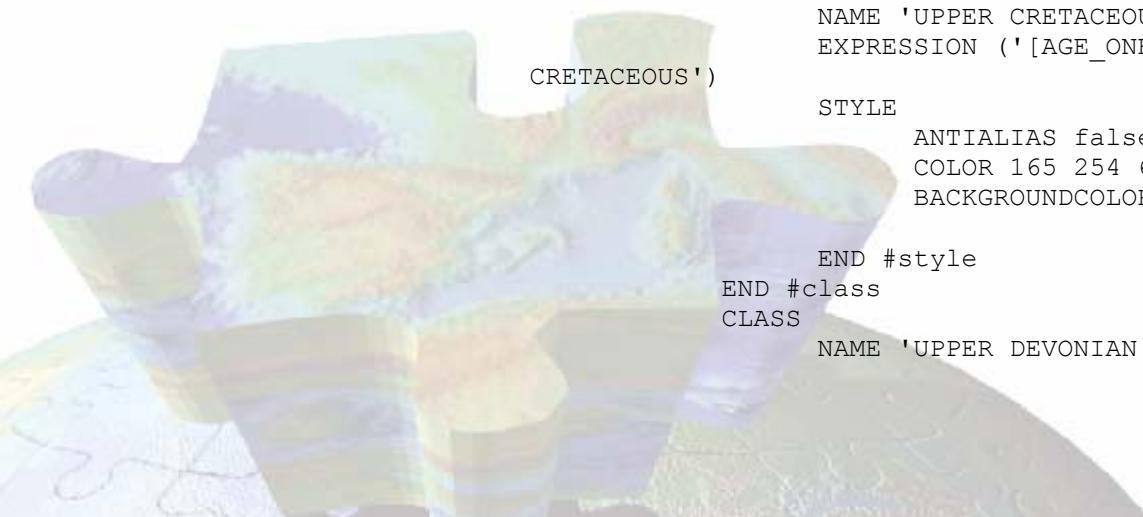
```
                        EXPRESSION ('[AGE_ONEGL]' eq 'UPPER
DEVONIAN')
                        STYLE
                              ANTIALIAS false
                              COLOR 241 229 165
                              BACKGROUNDCOLOR 241 229 165

                        END #style
                  END #class
                  CLASS
                        NAME 'UPPER JURASSIC'
                        EXPRESSION ('[AGE_ONEGL]' eq 'UPPER
JURASSIC')
                        STYLE
                              ANTIALIAS false
                              COLOR 178 254 254
                              BACKGROUNDCOLOR 178 254 254

                        END #style
                  END #class
                  CLASS
                        #NAME 'UPPER MISSISSIPPIAN'
                        EXPRESSION ('[AGE_ONEGL]' eq 'UPPER
MISSISSIPPIAN')
                        STYLE
                              ANTIALIAS false
                              COLOR 178 216 114
                              BACKGROUNDCOLOR 178 216 114

                        END #style
                  END #class
                  CLASS
                        NAME 'UPPER ORDOVICIAN'
                        EXPRESSION ('[AGE_ONEGL]' eq 'UPPER
ORDOVICIAN')
                        STYLE
                              ANTIALIAS false
                              COLOR 127 254 152
                              BACKGROUNDCOLOR 127 254 152

                        END #style
                  END #class
                  CLASS
                        #NAME 'UPPER PENNSYLVANIAN'
                        EXPRESSION ('[AGE_ONEGL]' eq 'UPPER
PENNSYLVANIAN')
                        STYLE
                              ANTIALIAS false
                              COLOR 190 229 203
                              BACKGROUNDCOLOR 190 229 203

                        END #style
                  END #class
                  CLASS
                        #NAME 'UPPER PLEISTOCENE'
                        EXPRESSION ('[AGE_ONEGL]' eq 'UPPER
PLEISTOCENE')
                        STYLE
```

```
                              ANTIALIAS false
                              COLOR 254 241 216
                              BACKGROUNDCOLOR 254 241 216

                         END #style
                    END #class
                    CLASS
                         #NAME 'UPPER TRIASSIC'
                         EXPRESSION ('[AGE_ONEGL]' eq 'UPPER
TRIASSIC')

                         STYLE
                              ANTIALIAS false
                              COLOR 190 152 254
                              BACKGROUNDCOLOR 190 152 254

                         END #style
                    END #class
                    CLASS
                         #NAME 'VALANGINIAN'
                         EXPRESSION ('[AGE_ONEGL]' eq 'VALANGINIAN')
                         STYLE
                              ANTIALIAS false
                              COLOR 152 254 101
                              BACKGROUNDCOLOR 152 254 101

                         END #style
                    END #class
                    CLASS
                         #NAME 'VISEAN'
                         EXPRESSION ('[AGE_ONEGL]' eq 'VISEAN')
                         STYLE
                              ANTIALIAS false
                              COLOR 165 216 114
                              BACKGROUNDCOLOR 165 216 114

                         END #style
                    END #class
                    CLASS
                         NAME 'WENLOCK'
                         EXPRESSION ('[AGE_ONEGL]' eq 'WENLOCK')
                         STYLE
                              ANTIALIAS false
                              COLOR 178 254 203
                              BACKGROUNDCOLOR 178 254 203

                         END #style
                    END #class
                    CLASS
                         #NAME 'WORDIAN'
                         EXPRESSION ('[AGE_ONEGL]' eq 'WORDIAN')
                         STYLE
                              ANTIALIAS false
                              COLOR 254 139 152
                              BACKGROUNDCOLOR 254 139 152

                         END #style
                    END #class
                    CLASS
```

```
                        #NAME 'WUCHIAPINGIAN'
                        EXPRESSION ('[AGE_ONEGL]' eq
'WUCHIAPINGIAN')
                        STYLE
                              ANTIALIAS false
                              COLOR 254 178 190
                              BACKGROUNDCOLOR 254 178 190

                        END #style
                  END #class
                  CLASS
                        #NAME 'YPRESIAN'
                        EXPRESSION ('[AGE_ONEGL]' eq 'YPRESIAN')
                        STYLE
                              ANTIALIAS false
                              COLOR 254 165 139
                              BACKGROUNDCOLOR 254 165 139

                        END #style
                  END #class
                  CLASS
                        #NAME 'ZANCLEAN'
                        EXPRESSION ('[AGE_ONEGL]' eq 'ZANCLEAN')
                        STYLE
                              ANTIALIAS false
                              COLOR 254 254 178
                              BACKGROUNDCOLOR 254 254 178

                        END #style
                  END #class


      END #LAYER

      LAYER
        NAME GBR_BGS_625k_SLT
        TYPE POLYGON
        STATUS ON
        DATA superficial625ll
        TRANSPARENCY 100
        TOLERANCE 0
        TOLERANCEUNITS pixels
        TRANSFORM TRUE
        DUMP TRUE

        HEADER "templates/superficial_lithology_query_header.html"
        TEMPLATE "templates/superficial_lithology_query_body.html"
        FOOTER "templates/superficial_lithology_query_footer.html"

        PROJECTION
          "init=epsg:4326"
        END

        METADATA
          WMS_TITLE "GBR BGS 1:625k Superficial Lithology"
          WMS_ABSTRACT "GBR BGS 1:625k Superficial Deposits
Lithology"
          WMS_SRS "EPSG:4326 EPSG:27700"
```

```
                    GML_INCLUDE_ITEMS "ROCK_D"
                    WMS_INCLUDE_ITEMS "ROCK_D"
                    WMS_METADATAURL_HREF
"http://www.bgs.ac.uk/discoverymetadata/13480426.html"
                    WMS_METADATAURL_FORMAT "text/html"
                    WMS_METADATAURL_TYPE "TC211"
                    WMS_DATAURL_HREF
"http://www.bgs.ac.uk/products/digitalmaps/digmapgb_625.html"
                    WMS_DATAURL_FORMAT "text/html"
                    WMS_KEYWORDLIST "Superficial,Lithology"
              END

          CLASSITEM 'ROCK_D'

          CLASS
            NAME 'CLAY'
            EXPRESSION 'CLAY'
            #RASTERFILL_STYLE_SOLID
            STYLE
              COLOR 219 237 201
              BACKGROUNDCOLOR 255 255 255
            END  #STYLE
          END #CLASS
          CLASS
            NAME 'CLAY, SILT AND SAND'
            EXPRESSION 'CLAY, SILT AND SAND'
            #RASTERFILL_STYLE_SOLID
            STYLE
              COLOR 255 201 147
              BACKGROUNDCOLOR 255 255 255
            END  #STYLE
          END #CLASS
          CLASS
            NAME 'DIAMICTON'
            EXPRESSION 'DIAMICTON'
            #RASTERFILL_STYLE_SOLID
            STYLE
              COLOR 219 175 175
              BACKGROUNDCOLOR 255 255 255
            END  #STYLE
          END #CLASS
          CLASS
            NAME 'PEAT'
            EXPRESSION 'PEAT'
            #RASTERFILL_STYLE_SOLID
            STYLE
              COLOR 219 175 117
              BACKGROUNDCOLOR 255 255 255
            END  #STYLE
          END #CLASS
          CLASS
            NAME 'SAND'
            EXPRESSION 'SAND'
            #RASTERFILL_STYLE_SOLID
            STYLE
              COLOR 255 201 147
              BACKGROUNDCOLOR 255 255 255
            END  #STYLE
```

```
          END #CLASS
          CLASS
            NAME 'SAND AND GRAVEL'
            EXPRESSION 'SAND AND GRAVEL'
            #RASTERFILL_STYLE_SOLID
            STYLE
              COLOR 255 201 255
              BACKGROUNDCOLOR 255 255 255
            END  #STYLE
          END #CLASS
          CLASS
            NAME 'SILT'
            EXPRESSION 'SILT'
            #RASTERFILL_STYLE_SOLID
            STYLE
              COLOR 255 255 175
              BACKGROUNDCOLOR 255 255 255
            END  #STYLE
          END #CLASS
          CLASS
            NAME 'UNKNOWN LITHOLOGY'
            EXPRESSION 'UNKNOWN LITHOLOGY'
            #RASTERFILL_STYLE_SOLID
            STYLE
              COLOR 175 201 237
              BACKGROUNDCOLOR 255 255 255
            END  #STYLE
          END #CLASS
      #
      # Note: The following DUMMY CLASSes have been added as a
      # quick hack to get around a bug we found in Google Earth
      # WMS visualization. It should not affect you unless you
      # have 16 or fewer classes in one of your layers.
      #
      # If you have fewer than 16 classes Mapserver may send the
      # image as a 4-bit PNG file. It seems that Google Earth
      # doesn't (as of Jan 2008) handle transparent areas properly
      # with 4-bit images so we have added the extra classes to
      # force sending an 8-bit image. (Not necessarily the best
      # way of achieving this.)
      #
          CLASS
             EXPRESSION 'DUMMY CLASS 1'
            #RASTERFILL_STYLE_SOLID
            STYLE
              COLOR 1 1 1
              BACKGROUNDCOLOR 255 255 255
            END  #STYLE
          END #CLASS
          CLASS
            EXPRESSION 'DUMMY CLASS 2'
            #RASTERFILL_STYLE_SOLID
            STYLE
              COLOR 2 2 2
              BACKGROUNDCOLOR 255 255 255
            END  #STYLE
          END #CLASS
          CLASS
```

```
            EXPRESSION 'DUMMY CLASS 3'
            #RASTERFILL_STYLE_SOLID
            STYLE
               COLOR 3 3 3
               BACKGROUNDCOLOR 255 255 255
            END  #STYLE
         END #CLASS
         CLASS
            EXPRESSION 'DUMMY CLASS 4'
            #RASTERFILL_STYLE_SOLID
            STYLE
               COLOR 4 4 4
               BACKGROUNDCOLOR 255 255 255
            END  #STYLE
         END #CLASS
         CLASS
            EXPRESSION 'DUMMY CLASS 5'
            #RASTERFILL_STYLE_SOLID
            STYLE
               COLOR 5 5 5
               BACKGROUNDCOLOR 255 255 255
            END  #STYLE
         END #CLASS
         CLASS
            EXPRESSION 'DUMMY CLASS 6'
            #RASTERFILL_STYLE_SOLID
            STYLE
               COLOR 6 6 6
               BACKGROUNDCOLOR 255 255 255
            END  #STYLE
         END #CLASS
         CLASS
            EXPRESSION 'DUMMY CLASS 7'
            #RASTERFILL_STYLE_SOLID
            STYLE
               COLOR 7 7 7
               BACKGROUNDCOLOR 255 255 255
            END  #STYLE
         END #CLASS
         CLASS
            EXPRESSION 'DUMMY CLASS 8'
            #RASTERFILL_STYLE_SOLID
            STYLE
               COLOR 8 8 8
               BACKGROUNDCOLOR 255 255 255
            END  #STYLE
         END #CLASS
         CLASS
            EXPRESSION 'DUMMY CLASS 9'
            #RASTERFILL_STYLE_SOLID
            STYLE
               COLOR 9 9 9
               BACKGROUNDCOLOR 255 255 255
            END  #STYLE
         END #CLASS
         CLASS
            EXPRESSION 'DUMMY CLASS 10'
            #RASTERFILL_STYLE_SOLID
```

```
        STYLE
          COLOR 10 10 10
          BACKGROUNDCOLOR 255 255 255
        END   #STYLE
      END #CLASS

    END #LAYER

     LAYER
        NAME GBR_BGS_625k_SLS
        TYPE POLYGON
        STATUS ON
        DATA superficial625ll
        TRANSPARENCY 100
        TOLERANCE 0
        TOLERANCEUNITS pixels
        TRANSFORM TRUE
        DUMP TRUE

        HEADER
"templates/superficial_lithostratigraphy_query_header.html"
        TEMPLATE
"templates/superficial_lithostratigraphy_query_body.html"
        FOOTER
"templates/superficial_lithostratigraphy_query_footer.html"

        PROJECTION
          "init=epsg:4326"
        END

        METADATA
          WMS_TITLE "GBR BGS 1:625k Superficial
Lithostratigraphy"
          WMS_ABSTRACT "GBR BGS 1:625k Superficial Deposits
Lithostratigraphy (including Lithomorphogenetic units)"
          WMS_SRS "EPSG:4326 EPSG:27700"
          GML_INCLUDE_ITEMS "LEX_ROCK_D"
          WMS_INCLUDE_ITEMS "LEX_ROCK_D"
          WMS_METADATAURL_HREF
"http://www.bgs.ac.uk/discoverymetadata/13480426.html"
          WMS_METADATAURL_FORMAT "text/html"
          WMS_METADATAURL_TYPE "TC211"
          WMS_DATAURL_HREF
"http://www.bgs.ac.uk/products/digitalmaps/digmapgb_625.html"
          WMS_DATAURL_FORMAT "text/html"
          WMS_KEYWORDLIST "Superficial,Lithostratigraphy"
        END

        CLASSITEM 'LEX_ROCK_D'

        CLASS
          NAME 'ALLUVIUM (CLAY, SILT AND SAND)'
          EXPRESSION 'ALLUVIUM (CLAY, SILT AND SAND)'
          #RASTERFILL_STYLE_SOLID
          STYLE
            COLOR 255 255 175
            BACKGROUNDCOLOR 255 255 255
          END   #STYLE
```
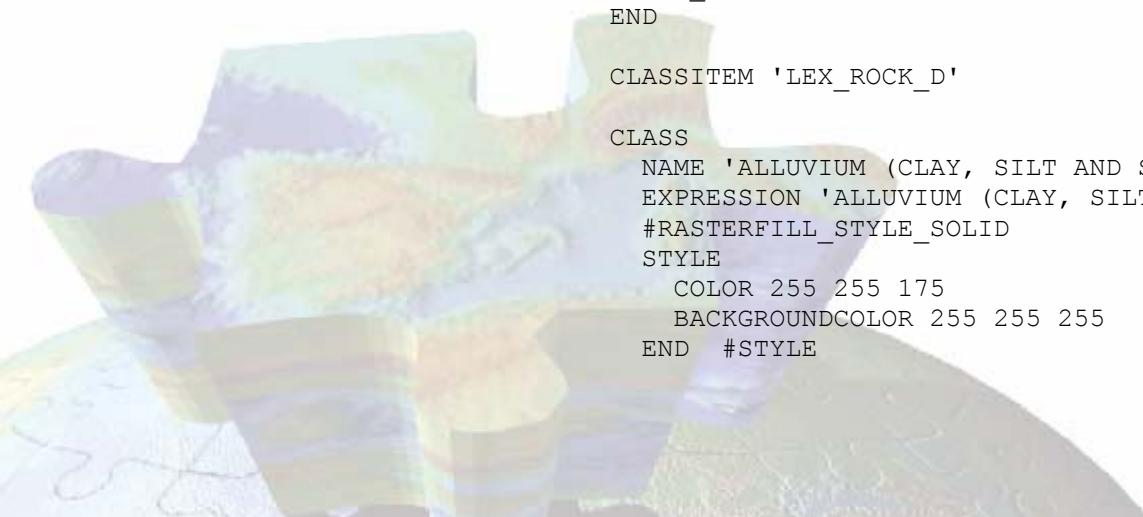
```
            END #CLASS
            CLASS
              NAME 'BLOWN SAND'
              EXPRESSION 'BLOWN SAND'
              #RASTERFILL_STYLE_SOLID
              STYLE
                COLOR 255 255 237
                BACKGROUNDCOLOR 255 255 255
              END  #STYLE
            END #CLASS
            CLASS
              NAME 'BRICKEARTH (SILT)'
              EXPRESSION 'BRICKEARTH (SILT)'
              #RASTERFILL_STYLE_SOLID
              STYLE
                COLOR 255 147 0
                BACKGROUNDCOLOR 255 255 255
              END  #STYLE
            END #CLASS
            CLASS
              NAME 'CLAY-WITH-FLINTS (DIAMICTON)'
              EXPRESSION 'CLAY-WITH-FLINTS (DIAMICTON)'
              #RASTERFILL_STYLE_SOLID
              STYLE
                COLOR 201 147 84
                BACKGROUNDCOLOR 255 255 255
              END  #STYLE
            END #CLASS
            CLASS
              NAME 'CRAG GROUP (SAND AND GRAVEL)'
              EXPRESSION 'CRAG GROUP (SAND AND GRAVEL)'
              #RASTERFILL_STYLE_SOLID
              STYLE
                COLOR 255 84 175
                BACKGROUNDCOLOR 255 255 255
              END  #STYLE
            END #CLASS
            CLASS
              NAME 'GLACIAL SAND AND GRAVEL'
              EXPRESSION 'GLACIAL SAND AND GRAVEL'
              #RASTERFILL_STYLE_SOLID
              STYLE
                COLOR 255 175 255
                BACKGROUNDCOLOR 255 255 255
              END  #STYLE
            END #CLASS
            CLASS
              NAME 'LACUSTRINE DEPOSITS - UNDIFFERENTIATED (CLAY)'
               EXPRESSION 'LACUSTRINE DEPOSITS - UNDIFFERENTIATED
(CLAY)'
              #RASTERFILL_STYLE_SOLID
              STYLE
                COLOR 237 201 147
                BACKGROUNDCOLOR 255 255 255
              END  #STYLE
            END #CLASS
            CLASS
              NAME 'LANDSLIP'
```

```
          EXPRESSION 'LANDSLIP'
          #RASTERFILL_STYLE_SOLID
          STYLE
            COLOR 255 255 237
            BACKGROUNDCOLOR 255 255 255
          END  #STYLE
        END #CLASS
        CLASS
          NAME 'PEAT'
           EXPRESSION 'PEAT'
          #RASTERFILL_STYLE_SOLID
          STYLE
            COLOR 219 175 117
            BACKGROUNDCOLOR 255 255 255
          END  #STYLE
        END #CLASS
        CLASS
          NAME 'RAISED MARINE DEPOSITS - UNDIFFERENTIATED (SAND
AND GRAVEL)'
          EXPRESSION 'RAISED MARINE DEPOSITS - UNDIFFERENTIATED
(SAND AND GRAVEL)'
          #RASTERFILL_STYLE_SOLID
          STYLE
            COLOR 255 201 175
            BACKGROUNDCOLOR 255 255 255
          END  #STYLE
        END #CLASS
        CLASS
          NAME 'RIVER TERRACE DEPOSITS - UNDIFFERENTIATED (SAND
AND GRAVEL)'
          EXPRESSION 'RIVER TERRACE DEPOSITS - UNDIFFERENTIATED
(SAND AND GRAVEL)'
          #RASTERFILL_STYLE_SOLID
          STYLE
            COLOR 255 201 147
            BACKGROUNDCOLOR 255 255 255
          END  #STYLE
        END #CLASS
        CLASS
          NAME 'SAND AND GRAVEL OF UNCERTAIN AGE AND ORIGIN'
          EXPRESSION 'SAND AND GRAVEL OF UNCERTAIN AGE AND
ORIGIN'
          #RASTERFILL_STYLE_SOLID
          STYLE
            COLOR 255 201 255
            BACKGROUNDCOLOR 255 255 255
          END  #STYLE
        END #CLASS
        CLASS
          NAME 'SUPERFICIAL DEPOSITS NOT MAPPED'
          EXPRESSION 'SUPERFICIAL DEPOSITS NOT MAPPED'
          #RASTERFILL_STYLE_SOLID
          STYLE
            COLOR 255 255 237
            BACKGROUNDCOLOR 255 255 255
          END  #STYLE
        END #CLASS
        CLASS
```
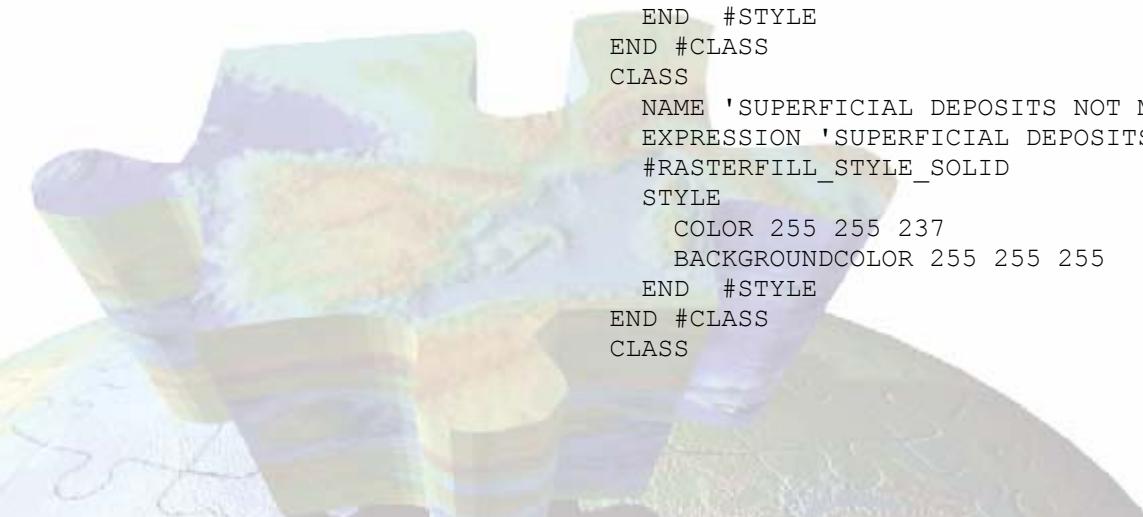
```
          NAME 'TILL (DIAMICTON)'
          EXPRESSION 'TILL (DIAMICTON)'
          #RASTERFILL_STYLE_SOLID
          STYLE
            COLOR 219 255 255
            BACKGROUNDCOLOR 255 255 255
          END  #STYLE
        END #CLASS
   #
   # Note: The following DUMMY CLASSes have been added as a
   # quick hack to get around a bug we found in Google Earth
   # WMS visualization. It should not affect you unless you
   # have 16 or fewer classes in one of your layers.
   #
   # If you have fewer than 16 classes Mapserver may send the
   # image as a 4-bit PNG file. It seems that Google Earth
   # doesn't (as of Jan 2008) handle transparent areas properly
   # with 4-bit images so we have added the extra classes to
   # force sending an 8-bit image. (Not necessarily the best
   # way of achieving this.)
   #
      CLASS
         EXPRESSION 'DUMMY CLASS 1'
        #RASTERFILL_STYLE_SOLID
        STYLE
          COLOR 1 1 1
          BACKGROUNDCOLOR 255 255 255
        END  #STYLE
      END #CLASS
      CLASS
        EXPRESSION 'DUMMY CLASS 2'
        #RASTERFILL_STYLE_SOLID
        STYLE
          COLOR 2 2 2
          BACKGROUNDCOLOR 255 255 255
        END  #STYLE
      END #CLASS
      CLASS
        EXPRESSION 'DUMMY CLASS 3'
        #RASTERFILL_STYLE_SOLID
        STYLE
          COLOR 3 3 3
          BACKGROUNDCOLOR 255 255 255
        END  #STYLE
      END #CLASS
      CLASS
         EXPRESSION 'DUMMY CLASS 4'
        #RASTERFILL_STYLE_SOLID
        STYLE
          COLOR 4 4 4
          BACKGROUNDCOLOR 255 255 255
        END  #STYLE
      END #CLASS
      CLASS
        EXPRESSION 'DUMMY CLASS 5'
        #RASTERFILL_STYLE_SOLID
        STYLE
          COLOR 5 5 5
```

```
         BACKGROUNDCOLOR 255 255 255
      END  #STYLE
    END #CLASS

    END #LAYER

END # Map File
```

APPENDIX 5: GETCAPABILITIES RESPONSE FROM BGS ONEGEOLOGY SERVICE

Below is the GetCapabilities response returned by the BGS OneGeology service as configured by the MapServer mapfile in the previous appendix.

```
<?xml version='1.0' encoding="ISO-8859-1" standalone="no" ?>
<!DOCTYPE WMT_MS_Capabilities SYSTEM
"http://schemas.opengis.net/wms/1.1.1/WMS_MS_Capabilities.dtd"
 [
 <!ELEMENT VendorSpecificCapabilities EMPTY>
 ]>  <!-- end of DOCTYPE declaration -->

<WMT_MS_Capabilities version="1.1.1">

<!-- MapServer version 4.10.3 OUTPUT=GIF OUTPUT=PNG
OUTPUT=JPEG OUTPUT=WBMP OUTPUT=PDF OUTPUT=SWF
OUTPUT=SVG SUPPORTS=PROJ SUPPORTS=FREETYPE
SUPPORTS=WMS_SERVER SUPPORTS=WMS_CLIENT
SUPPORTS=WFS_SERVER SUPPORTS=WFS_CLIENT
SUPPORTS=WCS_SERVER SUPPORTS=SOS_SERVER
SUPPORTS=FASTCGI SUPPORTS=THREADS SUPPORTS=GEOS
INPUT=JPEG INPUT=POSTGIS INPUT=OGR INPUT=GDAL
INPUT=SHAPEFILE DEBUG=MSDEBUG -->

<Service>
  <Name>OGC:WMS</Name>
  <Title>BGS Bedrock and Superficial geology</Title>
  <Abstract>The 1:625k DiGMap data covering the whole of the United
Kingdom is available in this OGC WMS service for your personal, non-
commercial use only and is being served as a contribution to the
OneGeology initiative(www.onegeology.org). Separate bedrock geology
and superficial deposits layers are available in this service.
Layers available for bedrock are lithostratigraphy, age, and lithology.
Layers available for superficial deposits layer are lithostratigraphy and
lithology.
For information about more of the British Geological Survey&#39;s maps
that are available digitally please visit
http://www.bgs.ac.uk/products/digitalmaps/digmapgb.html</Abstract>
        <KeywordList>
        <Keyword>OneGeology</Keyword>
        <Keyword>Geology</Keyword>
```

```xml
            <Keyword>Map</Keyword>
            <Keyword>United Kingdom</Keyword>
            <Keyword>Bedrock</Keyword>
            <Keyword>Superficial</Keyword>
            <Keyword>Lithology</Keyword>
            <Keyword>Lithostratigraphy</Keyword>
            <Keyword>Age</Keyword>
          </KeywordList>
    <OnlineResource xmlns:xlink="http://www.w3.org/1999/xlink"
xlink:href="http://www.bgs.ac.uk/products/digitalmaps/digmapgb.html"/>
    <ContactInformation>
      <ContactPersonPrimary>
        <ContactPerson>Richard Hughes</ContactPerson>
        <ContactOrganization>British Geological
Survey</ContactOrganization>
      </ContactPersonPrimary>
        <ContactPosition>Head of Information Delivery</ContactPosition>
      <ContactAddress>
        <AddressType>postal</AddressType>
        <Address>Kingsley Dunham Centre</Address>
        <City>Keyworth</City>
        <StateOrProvince>Nottinghamshire</StateOrProvince>
        <PostCode>NG12 5GG</PostCode>
        <Country>UK</Country>
      </ContactAddress>
        <ContactVoiceTelephone>+44 (0)115 936
3100</ContactVoiceTelephone>
        <ContactFacsimileTelephone>+44 (0)115 936
3200</ContactFacsimileTelephone>

<ContactElectronicMailAddress>enquiries@bgs.ac.uk</ContactElectronic
MailAddress>
      </ContactInformation>
      <Fees>none</Fees>
      <AccessConstraints>The 1:625k DiGMap data is available for free
download for your personal, teaching, research or non-commercial use as
described on the previous web-page. Your use of any information provided
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completeness of the information or its suitability for any use or purpose.
All implied conditions relating to the quality or suitability of the
information, and all liabilities arising from the supply of the information
(including any liability arising in negligence) are excluded to the fullest
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  </Layer>
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