The Use of 3D models to manage the groundwater resources of the Lower Greensand Group aquifer, Hertfordshire and North London, England

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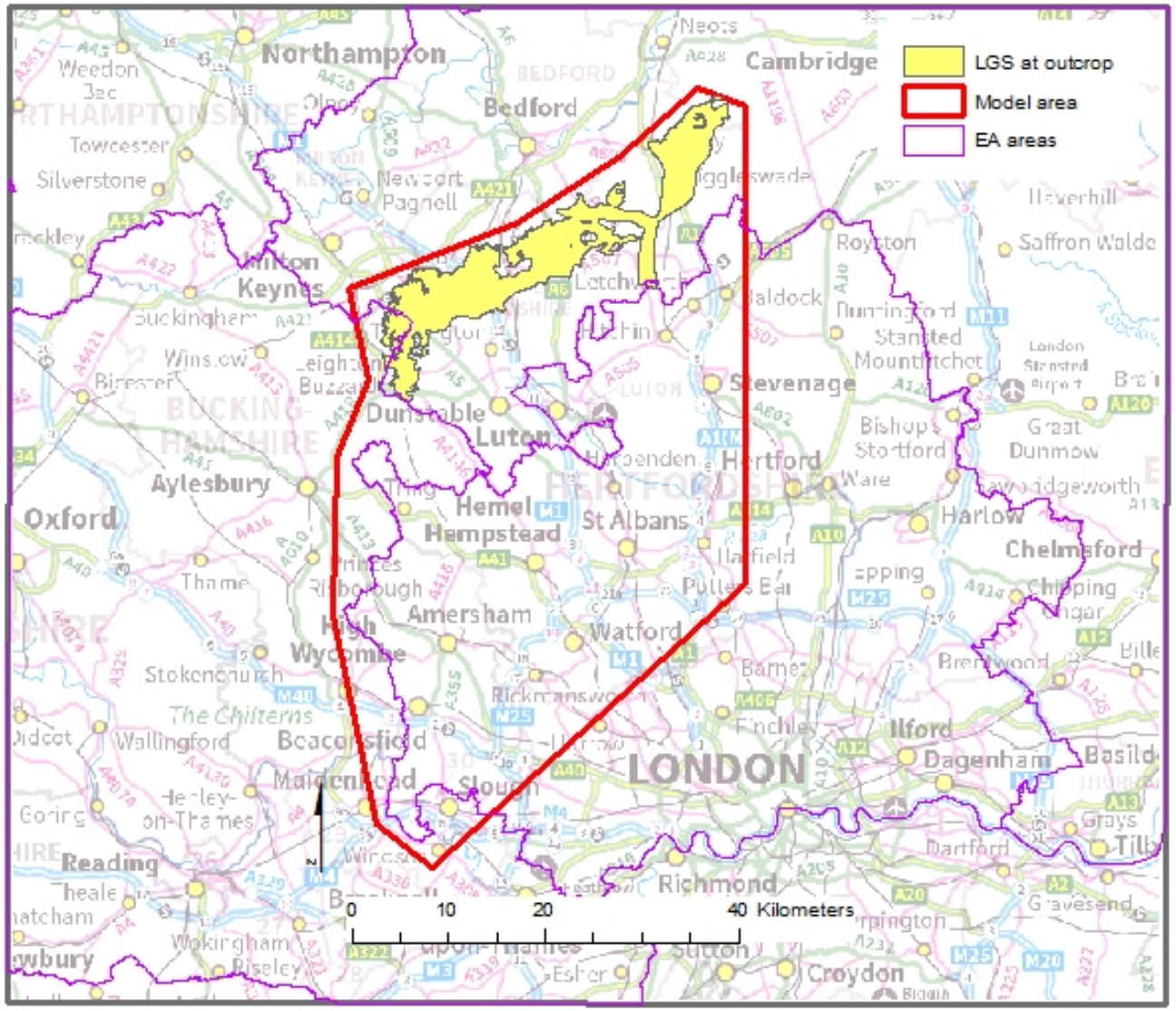

Environment Agency

Dr Michael Kehinde FGS,CGeol • 2nd

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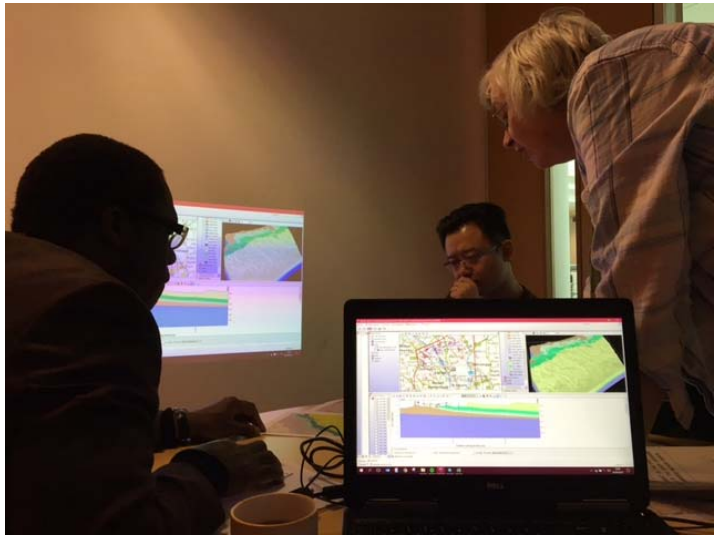

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Water resources

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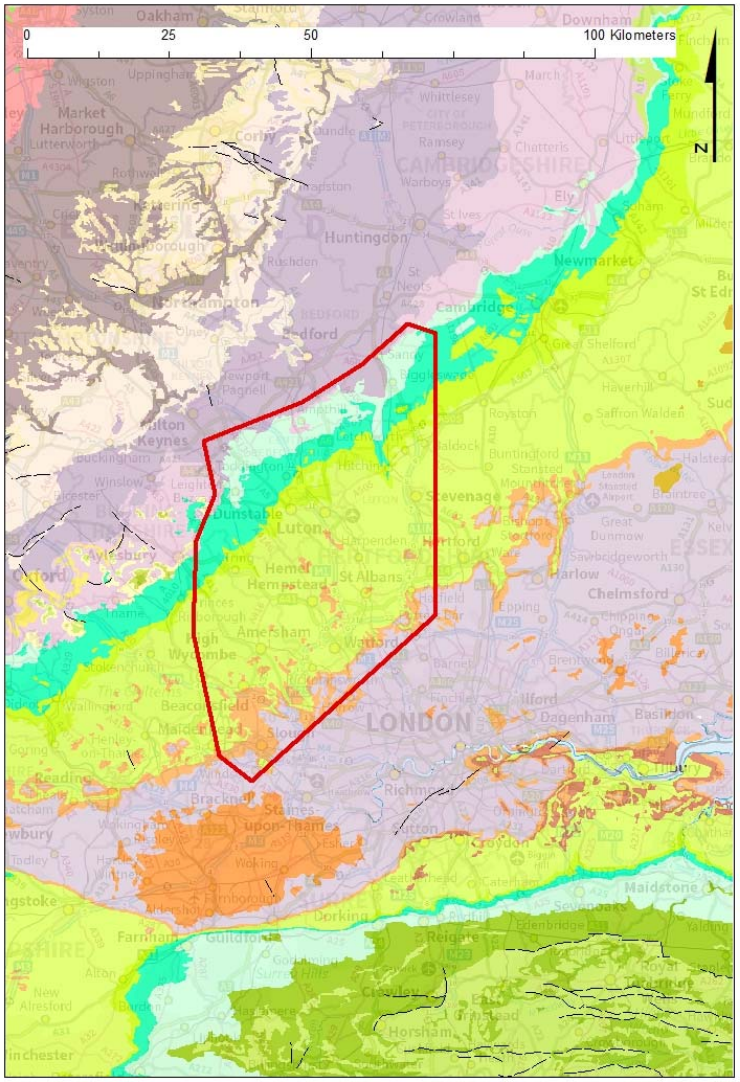
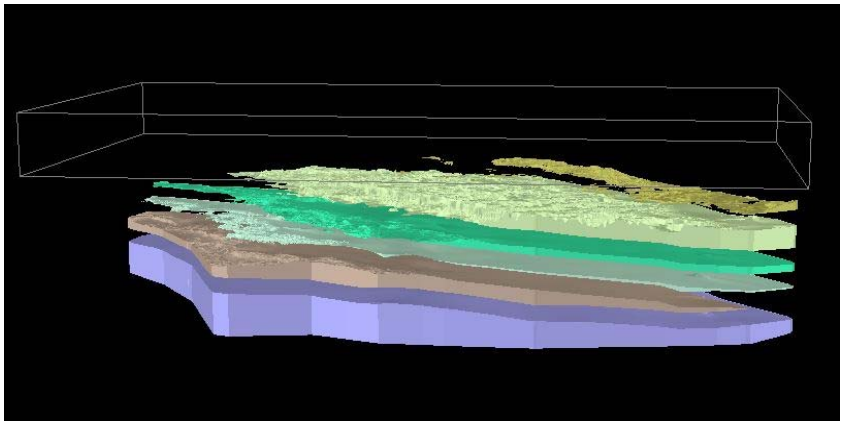
Lower Greensand Group



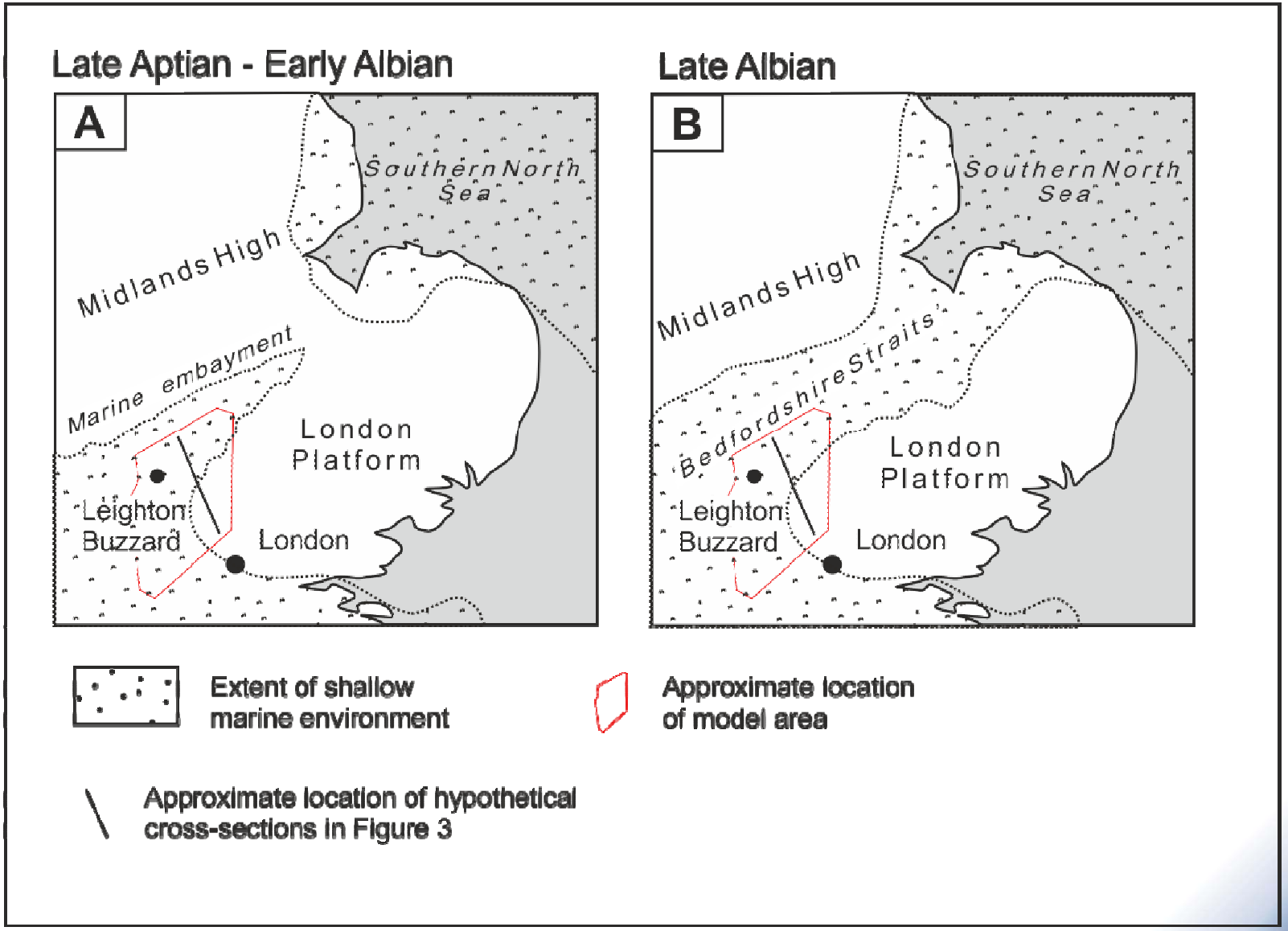


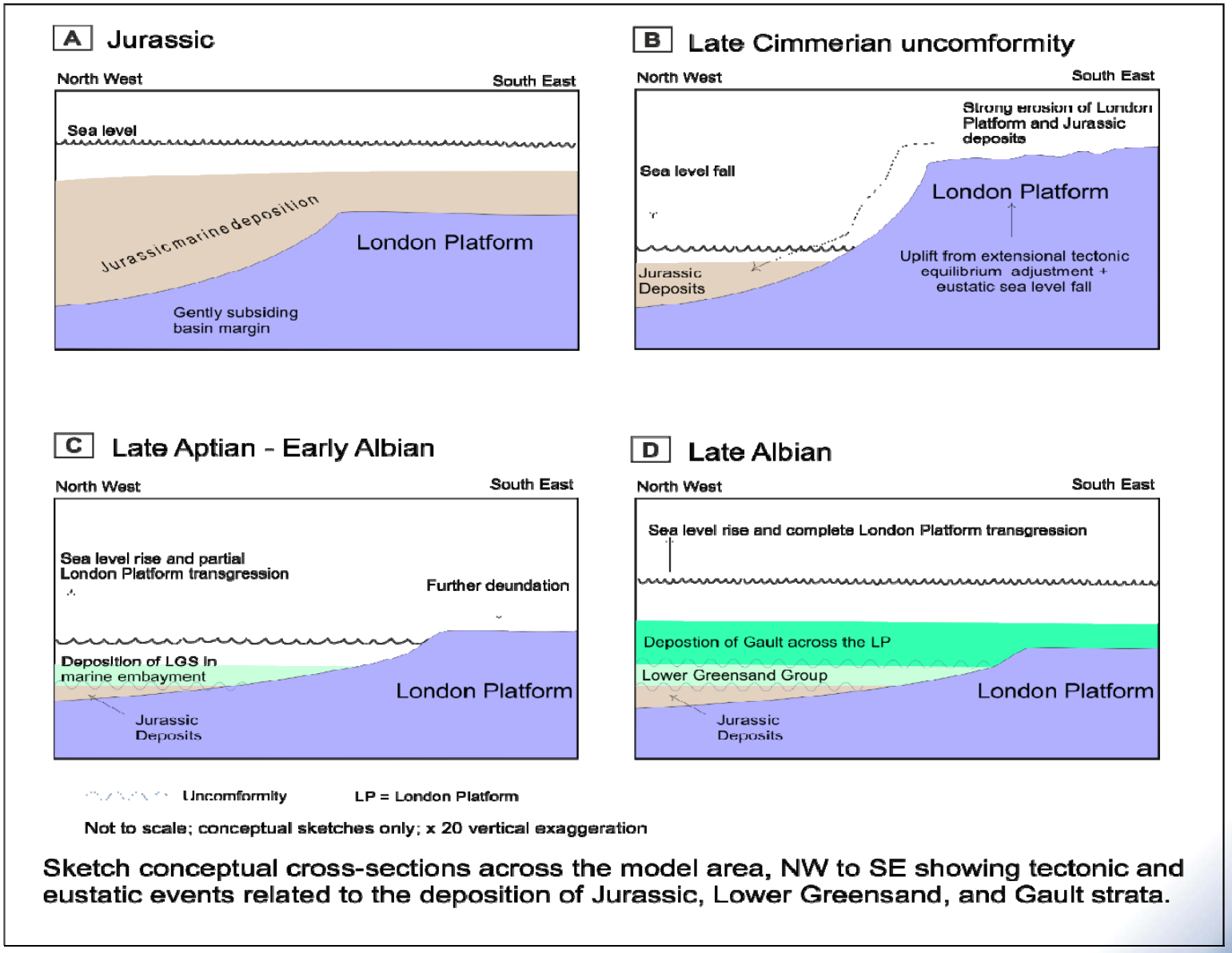
LGS_model_area

625k_V5_BEDROCK_Geology_Polygons

LEX_RCS_I

- BRACKLESHAM GROUP AND BARTON GROUP (UNDIFFERENTIATED) - SAND, SILT AND CLAY
- THAMES GROUP - CLAY, SILT, SAND AND GRAVEL
- THANET SAND FORMATION - SAND, SILT AND CLAY
- LAMBETH GROUP - CLAY, SILT, SAND AND GRAVEL
- GREY CHALK SUBGROUP - CHALK
- WHITE CHALK SUBGROUP - CHALK
- GAULT FORMATION AND UPPER GREENSAND FORMATION (UNDIFFERENTIATED) - MUDSTONE, SANDSTONE AND LIMESTONE
- LOWER GREENSAND GROUP - SANDSTONE AND MUDSTONE
- WEALDEN GROUP - MUDSTONE, SILTSTONE AND SANDSTONE
- WEALDEN GROUP - SANDSTONE AND SILTSTONE, INTERBEDDED
- PURBECK LIMESTONE GROUP - LIMESTONE AND MUDSTONE, INTERBEDDED
- PORTLAND GROUP - LIMESTONE AND CALCAREOUS SANDSTONE
- CORALLIAN GROUP - LIMESTONE, SANDSTONE, SILTSTONE AND MUDSTONE
- WEST WALTON FORMATION, AMPTHILL CLAY FORMATION AND KIMMERIDGE CLAY FORMATION (UNDIFFERENTIATED) - MU
- KELLAWAYS FORMATION AND OXFORD CLAY FORMATION (UNDIFFERENTIATED) - MUDSTONE, SILTSTONE AND SANDSTONE
- GREAT OOLITE GROUP - SANDSTONE, LIMESTONE AND ARGILLACEOUS ROCKS
- INFERIOR OOLITE GROUP - LIMESTONE, SANDSTONE, SILTSTONE AND MUDSTONE
- LIAS GROUP - MUDSTONE, SILTSTONE, LIMESTONE AND SANDSTONE





Sketch conceptual cross-sections across the model area, NW to SE showing tectonic and eustatic events related to the deposition of Jurassic, Lower Greensand, and Gault strata.

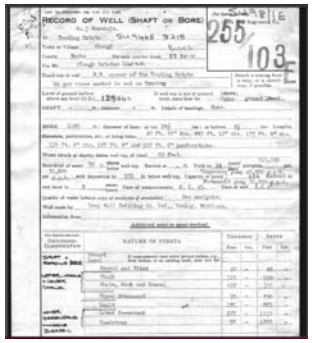
Modelled units

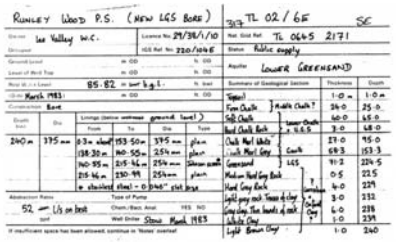
Name in model	Description
PEAT-P	Peat
ALV-XCZSV	Alluvium
HEAD-XCZSV	Head
FELM-XSV	Felmersham Member
RTD1-XSV	River Terrace Deposits, 1
RTD2-XSV	River Terrace Deposits, 2
T1T2-XSV	River Terrace Deposits, 1 to 2
RTDU-XSV	River Terrace Deposits, Undifferentiated
GFDMP-XSV	Glaciofluvial Deposits, Mid-Pleistocene
LOFT-DMTN	Lowestoft Formation
ODT-DMTN	Oadby Member
GFDMP2-XSV	Glaciofluvial Deposits, Mid-Pleistocene 2
TILL1-DMTN	Unnamed Till 1
GFDMP3-XSV	Glaciofluvial Deposits, Mid-Pleistocene 3
GLDMP-XSC	Glaciolacustrine Deposits, Mid-Pleistocene
TILL2-DMTN	Unnamed Till 2
QUU-UKWN	Quaternary Deposits, undifferentiated

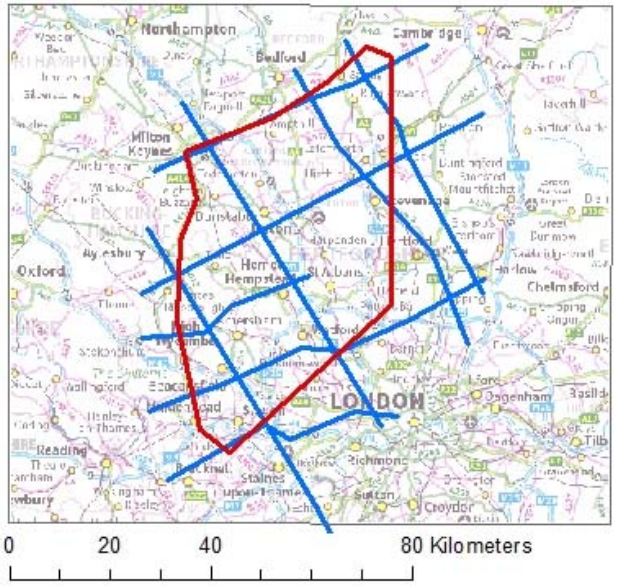
Name	Description
PGU-MDSD	Palaeogene Deposits, undifferentiated
CK-CHLK	Chalk Group
GLT-MDST	Gault Formation
LGS-SDST	Lower Greensand Group
JURA-MDLM	Jurassic rocks, undifferentiated
RZRU-MDSL	Palaeozoic rocks, undifferentiated

Data Sources:

1. DigMap50k v8
2. Boreholes
3. UK3D sections







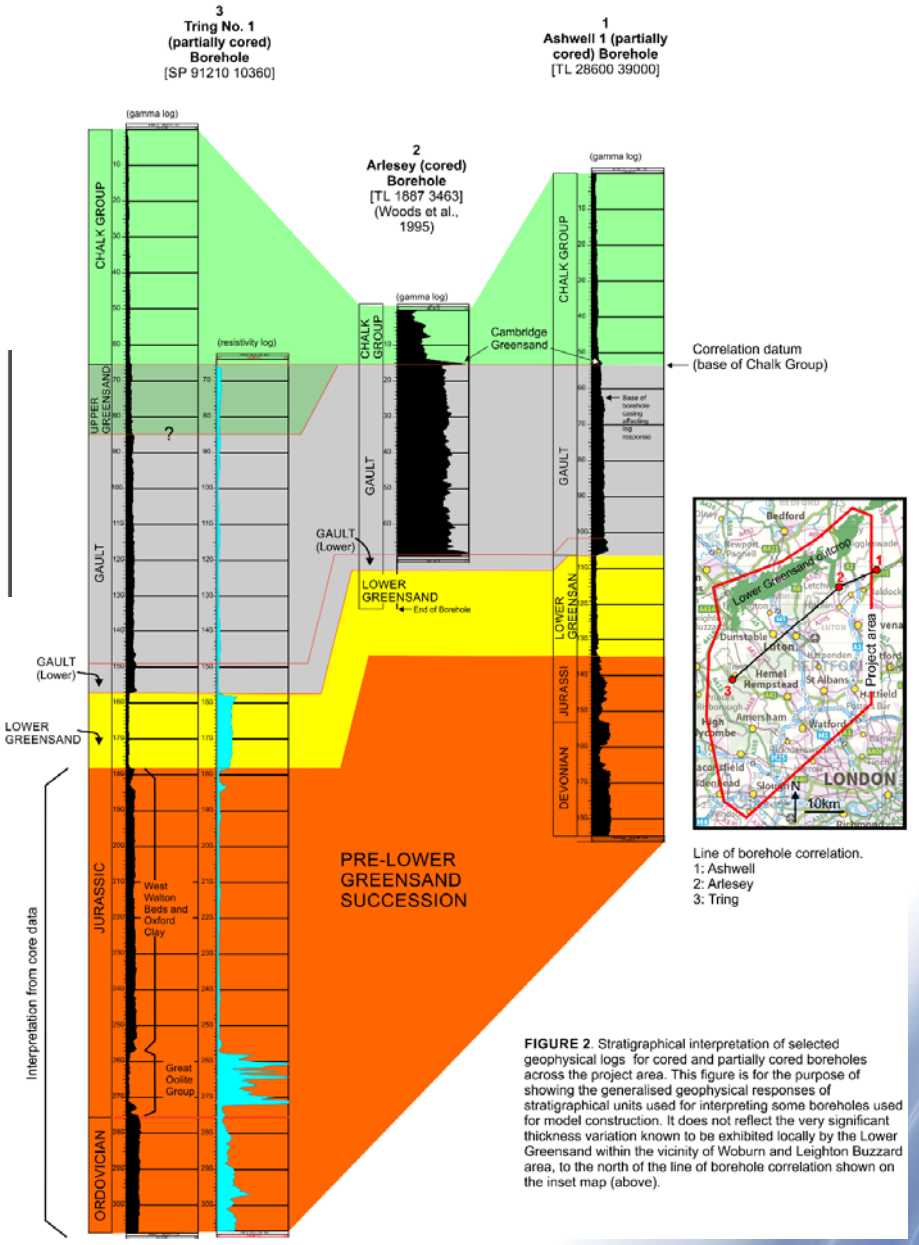
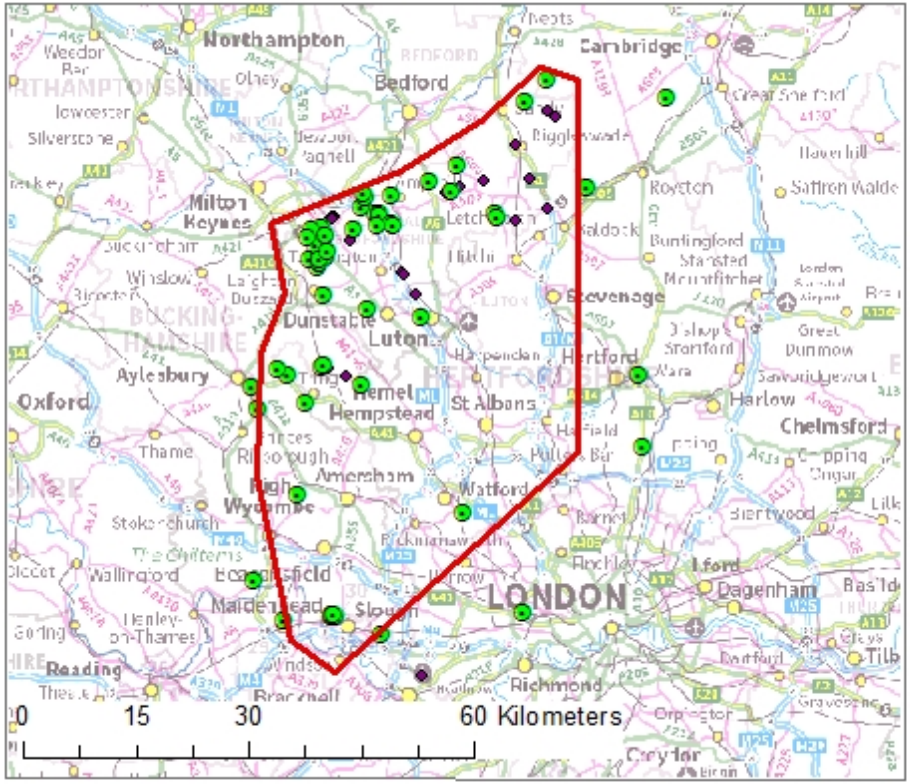
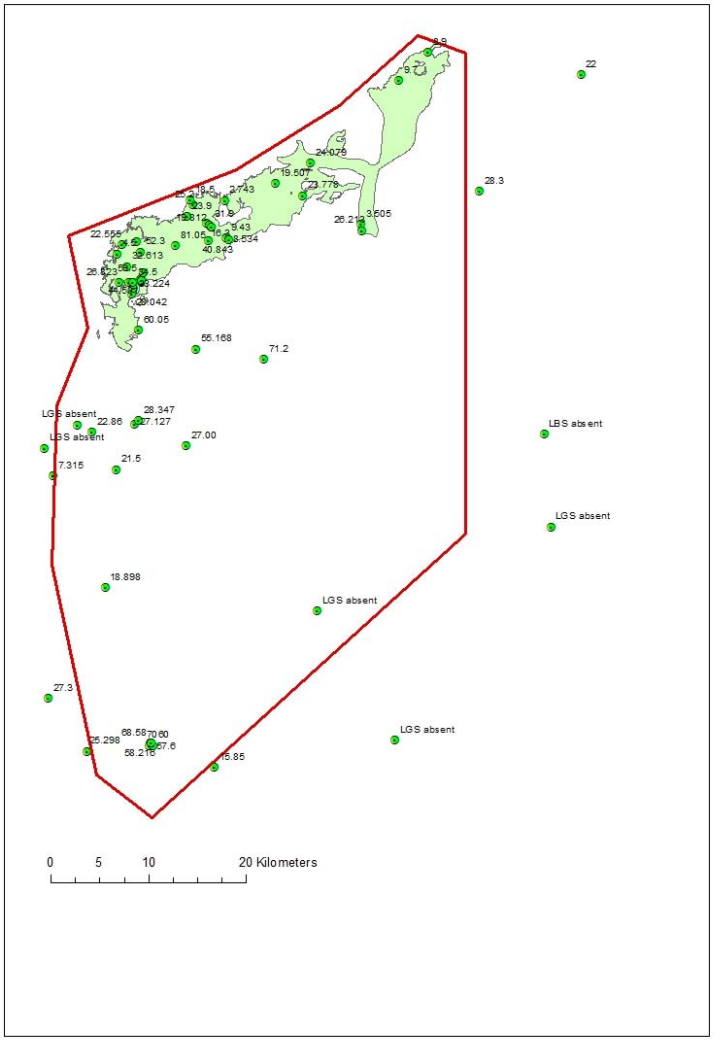
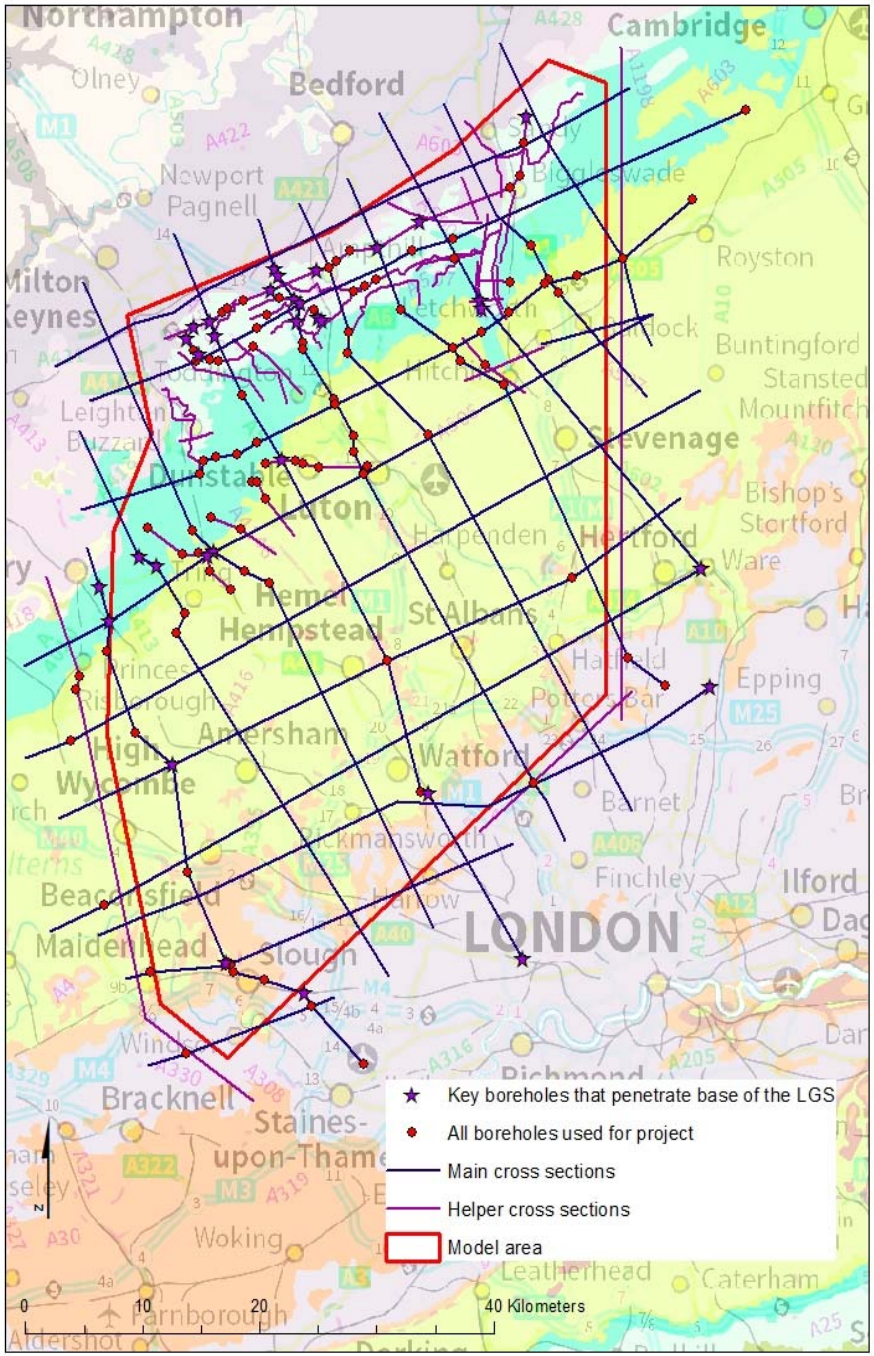


FIGURE 2. Stratigraphical interpretation of selected geophysical logs for cored and partially cored boreholes across the project area. This figure is for the purpose of showing the generalised geophysical responses of stratigraphical units used for interpreting some boreholes used for model construction. It does not reflect the very significant thickness variation known to be exhibited locally by the Lower Greensand within the vicinity of Woburn and Leighton Buzzard area, to the north of the line of borehole correlation shown on the inset map (above).

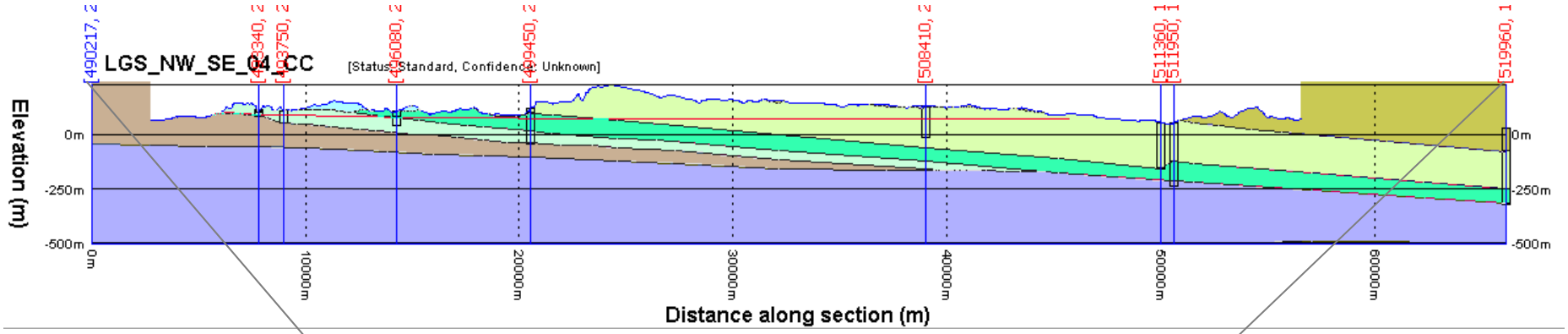
Key borehole distribution:



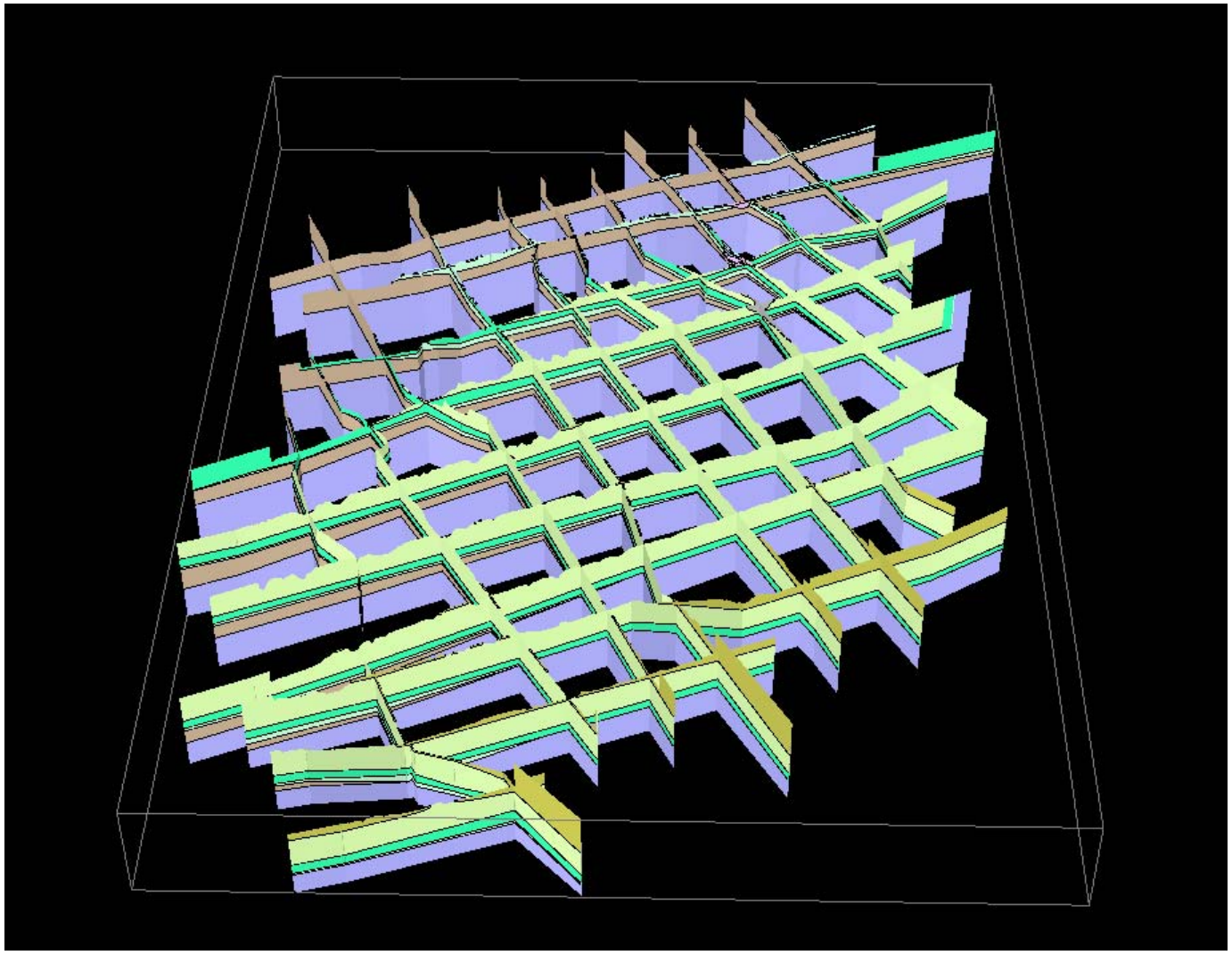


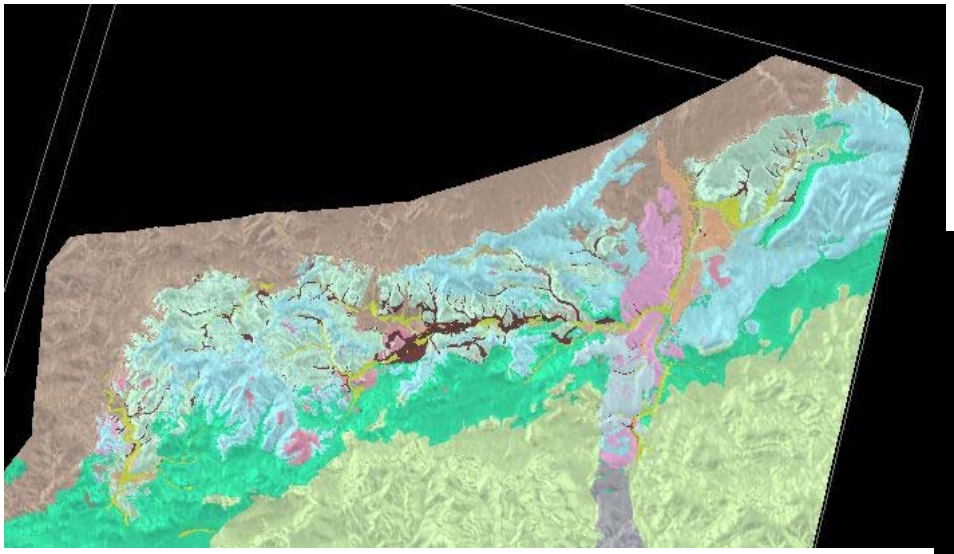


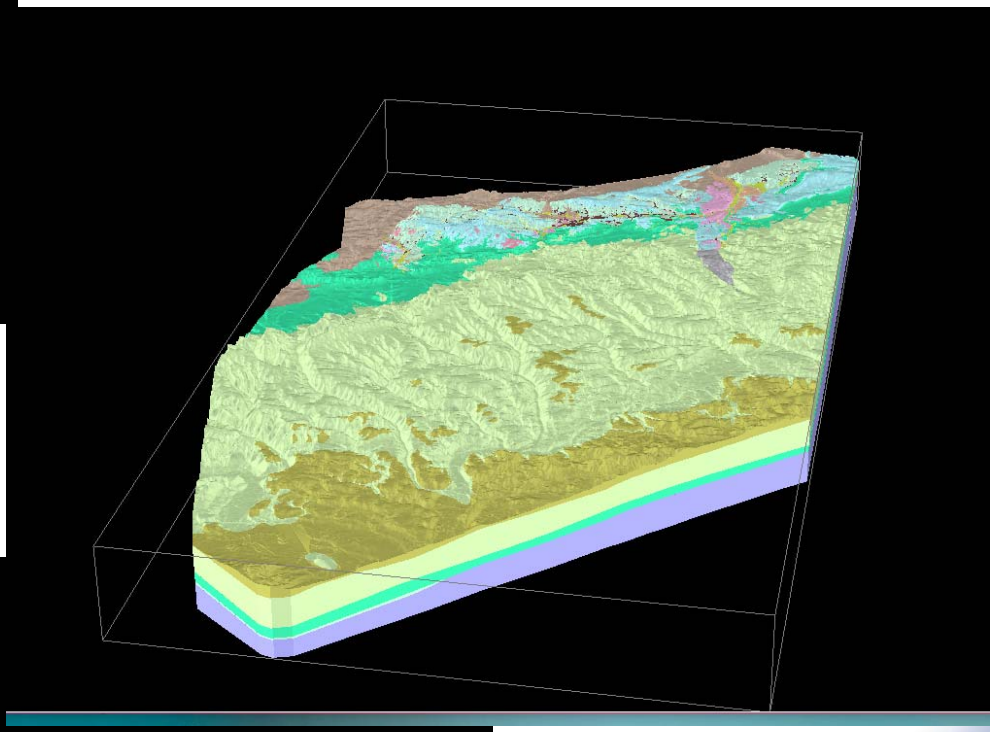
Example cross section:

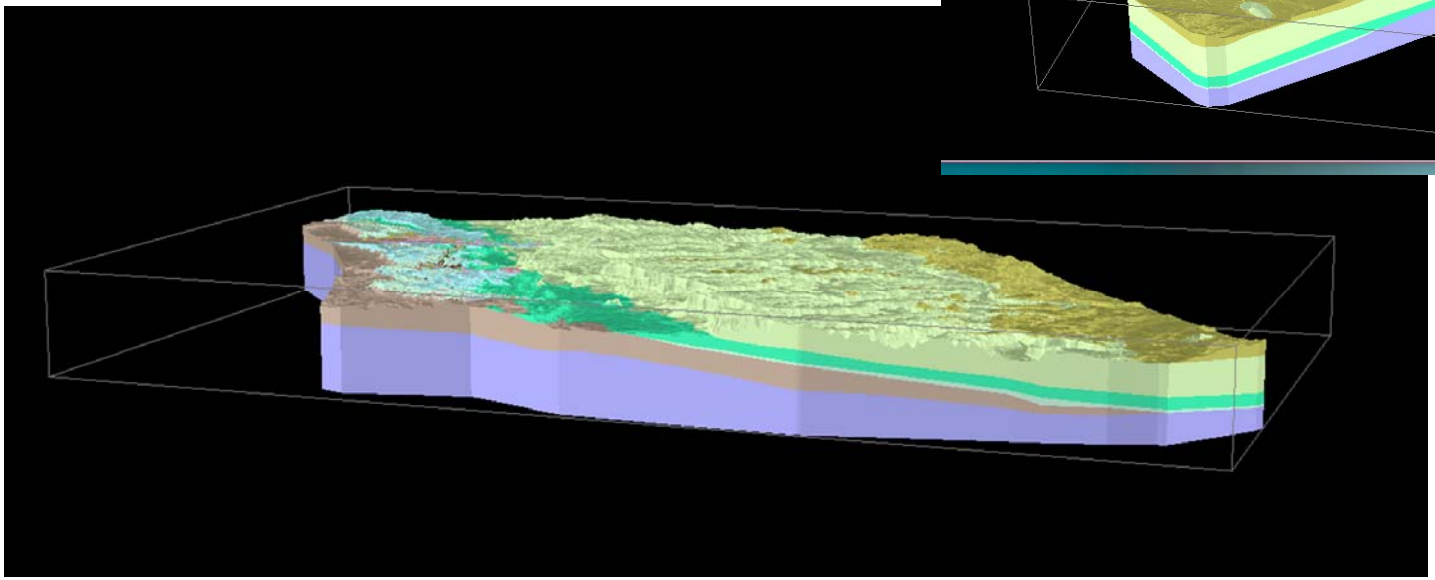


LGS_NW_SE_04_CC









Hydrogeological Charactisation:

Melinda Lewis

Senior Hydrogeologist

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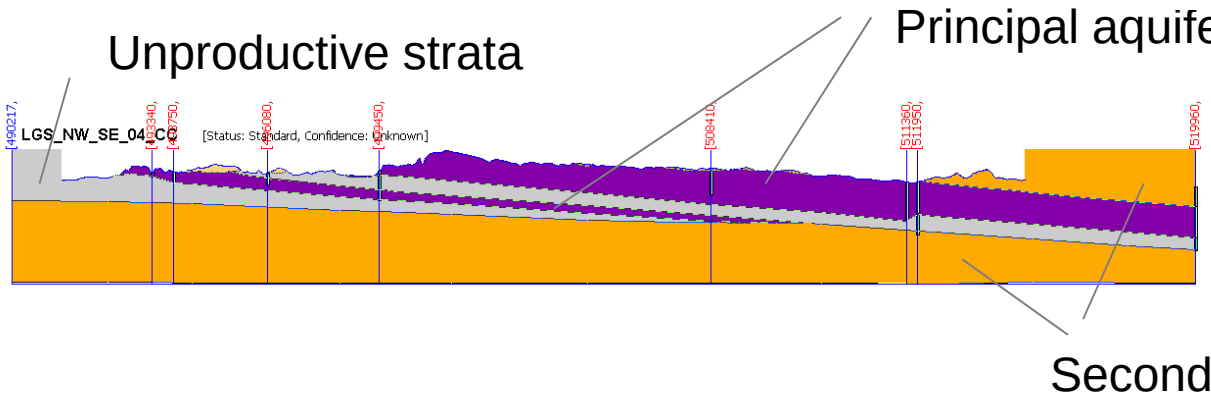
Tel: 01491 69 2459

E-mail Melinda Lewis

Aquifer type:



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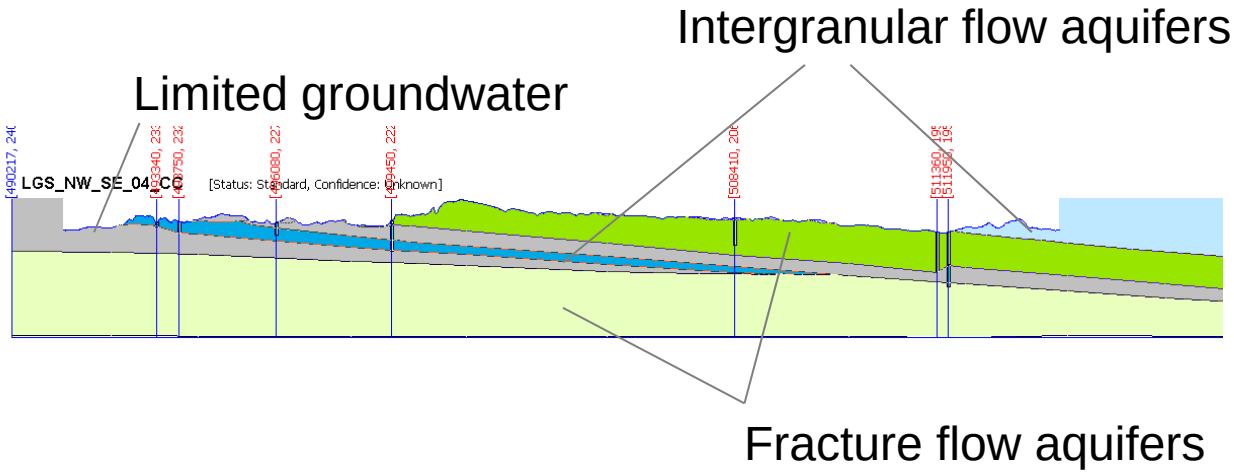

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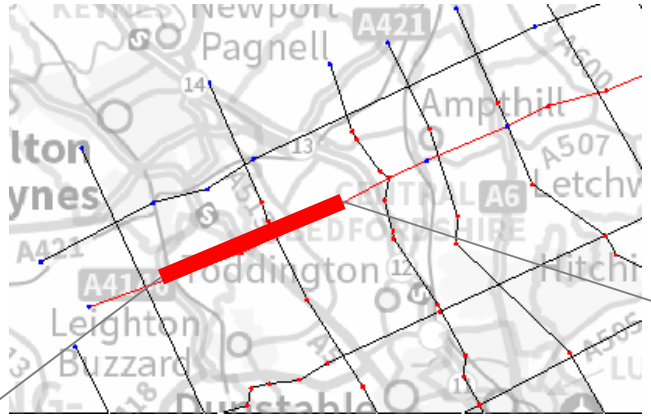
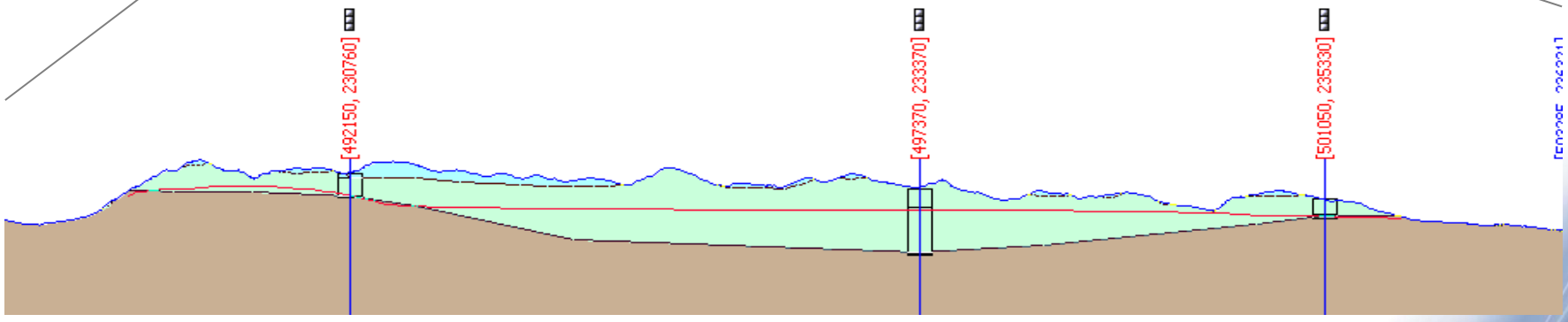
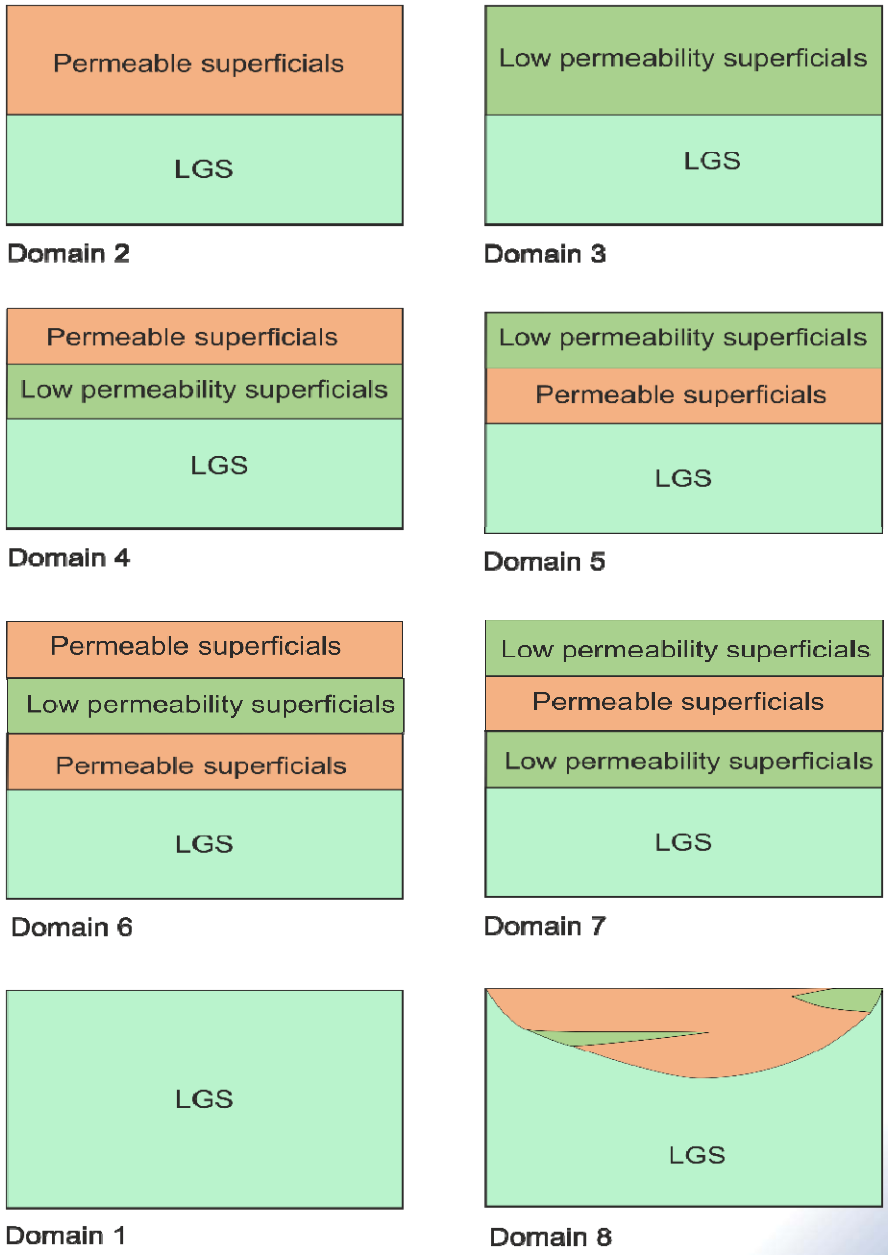


LGS_SW_NE_09_CC

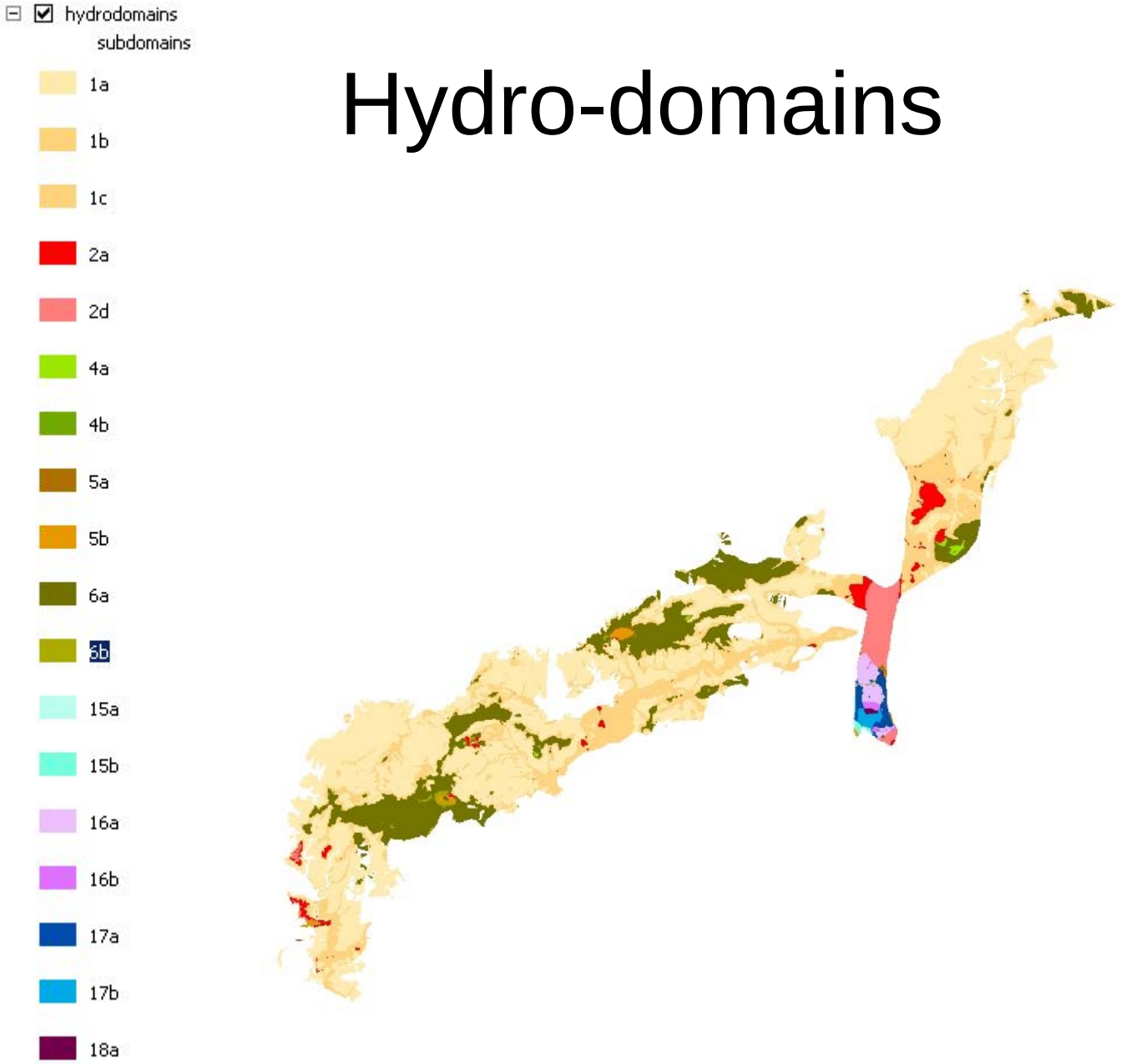


1 km

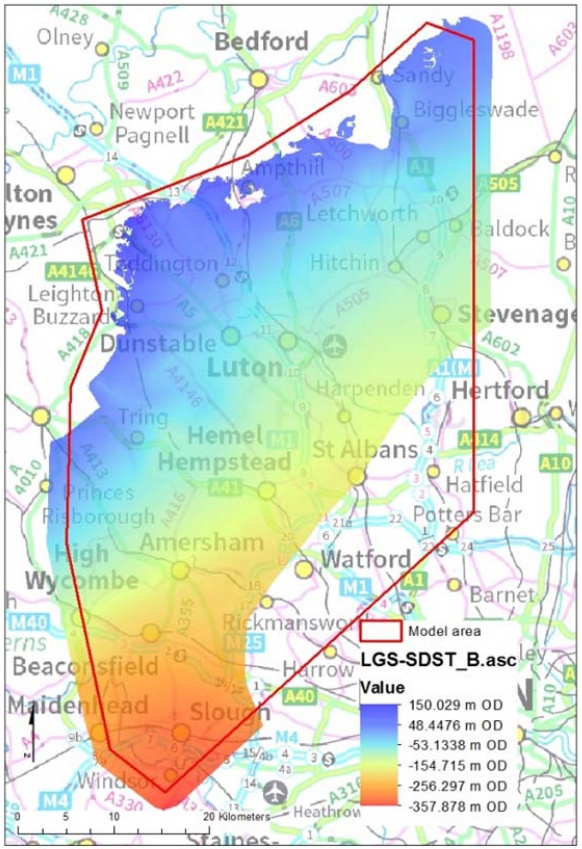
Hydro-domains



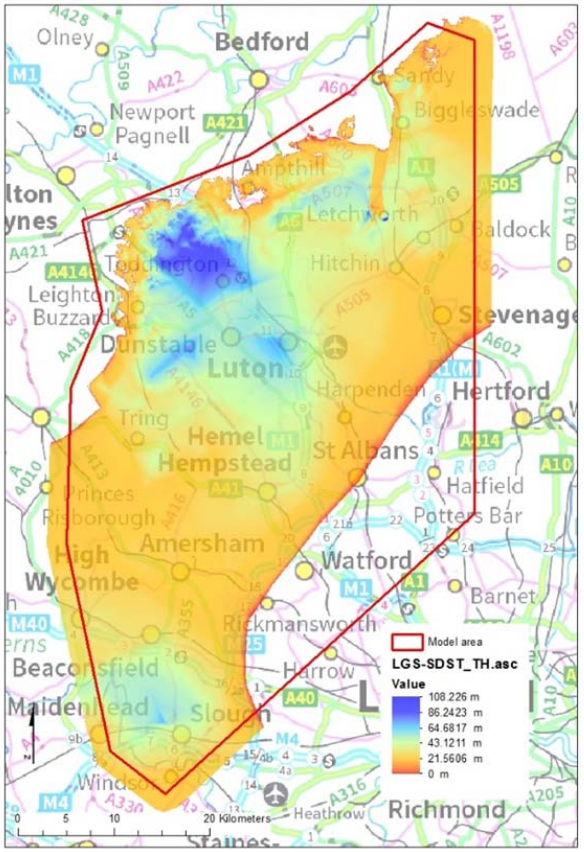
Hydro-domains

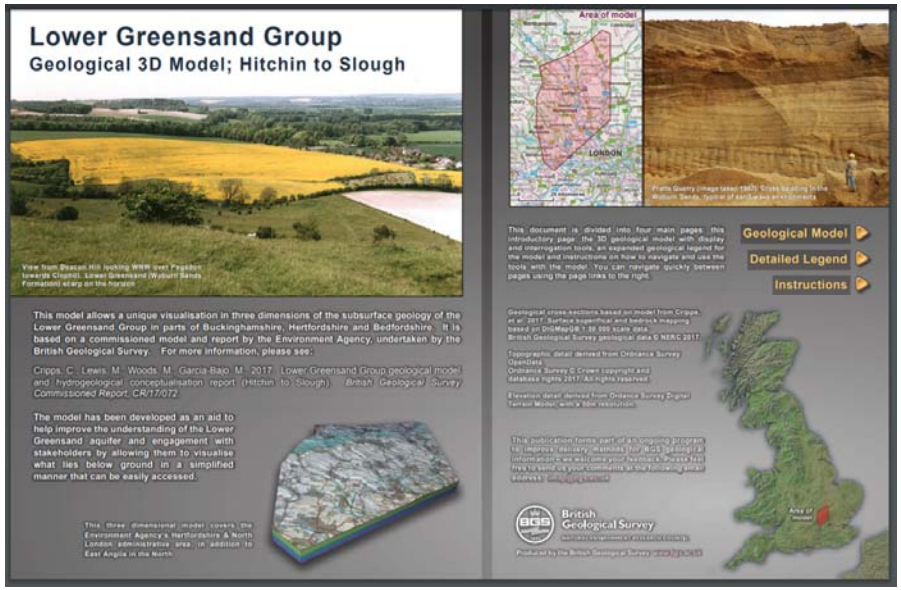


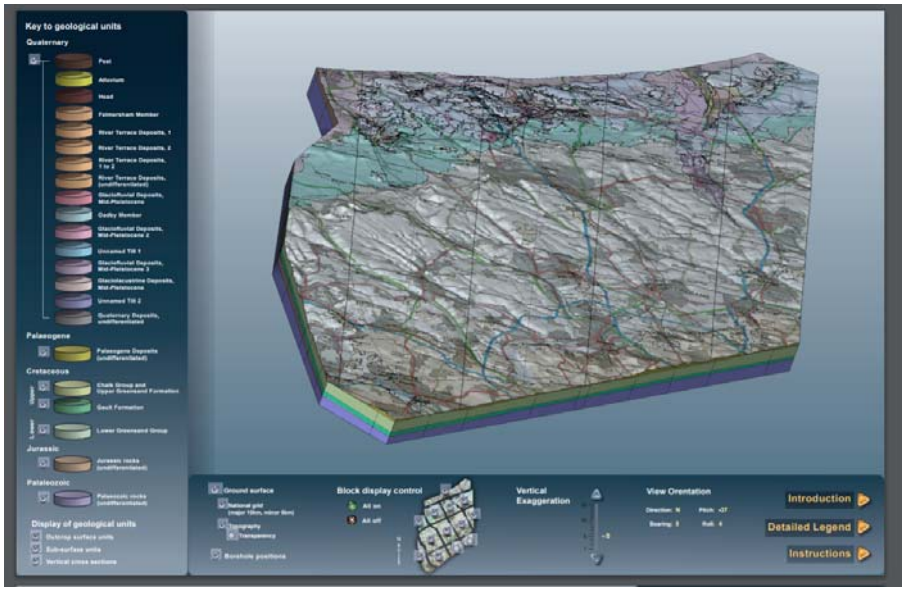
LGS Base:

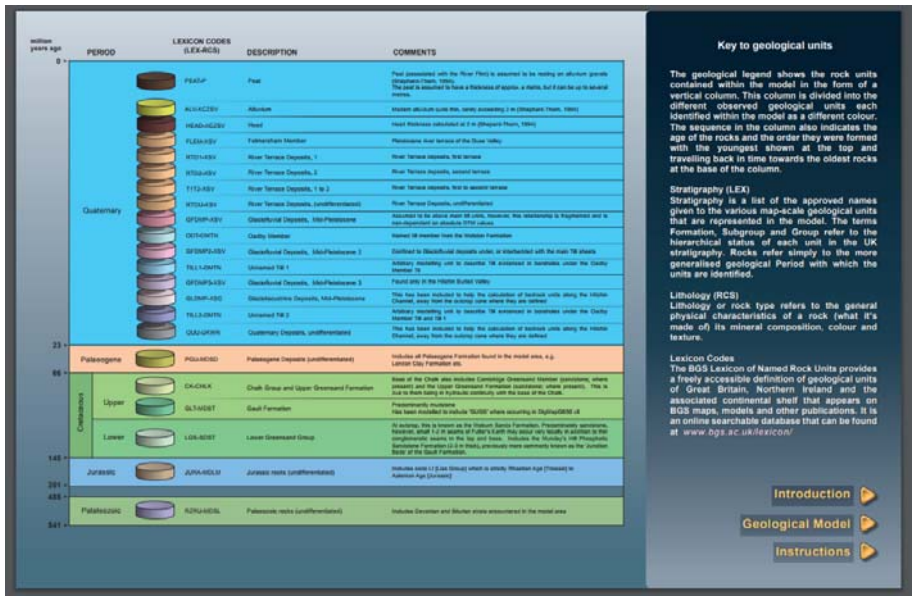


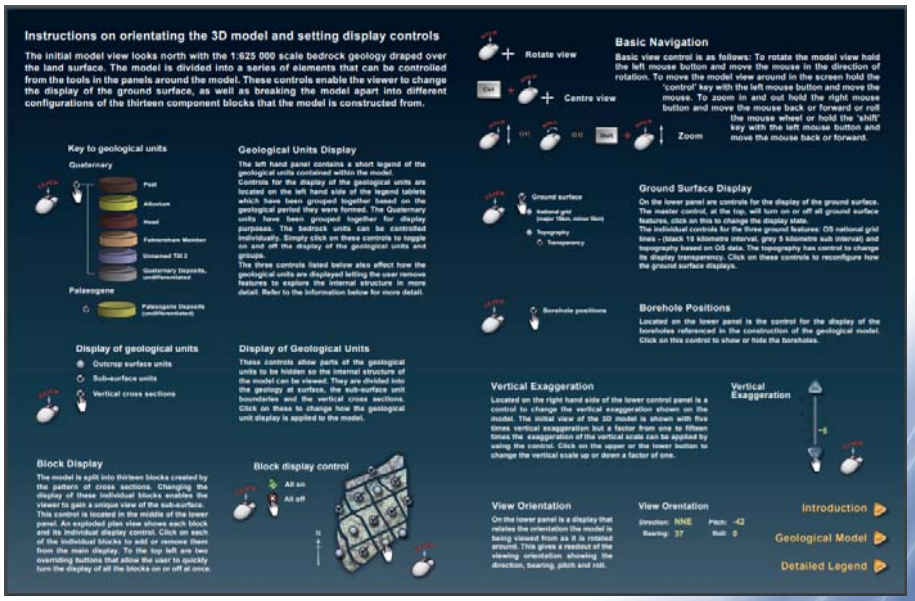
LGS thickness:

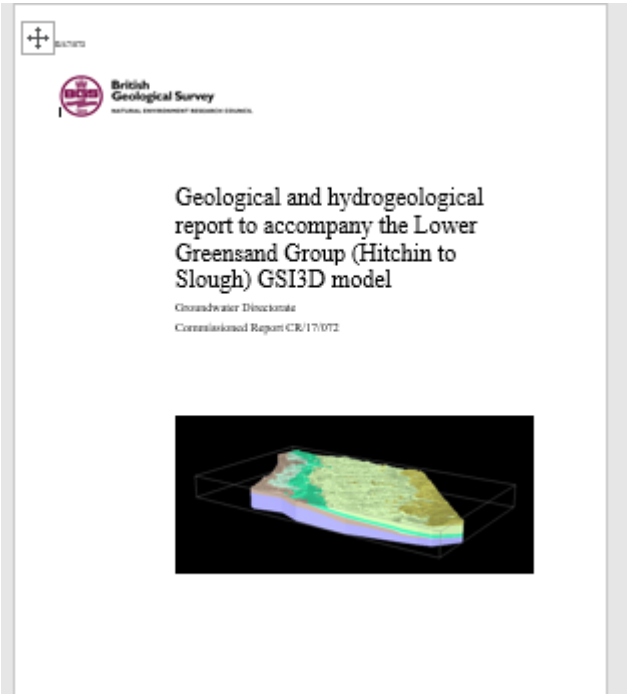












Cripps, C., Lewis, M., Woods, M., Thorpe, S. 2017. Geological and hydrogeological report to accompany the Lower Greensand Group (Hitchin to Slough) GSI3D model. *British Geological Survey Commissioned Report*, CR/17/072. 118pp.

Further collaboration with the Environment Agency…

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