

# OR/14/029 Modelled surfaces/volumes

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H Burke, S J Mathers, J P Williamson, S Thorpe, J Ford and R L Terrington. 2014. *The London Basin superficial and bedrock LithoFrame 50 Model*. Nottingham, UK, British geological Survey.

## Geological units modelled

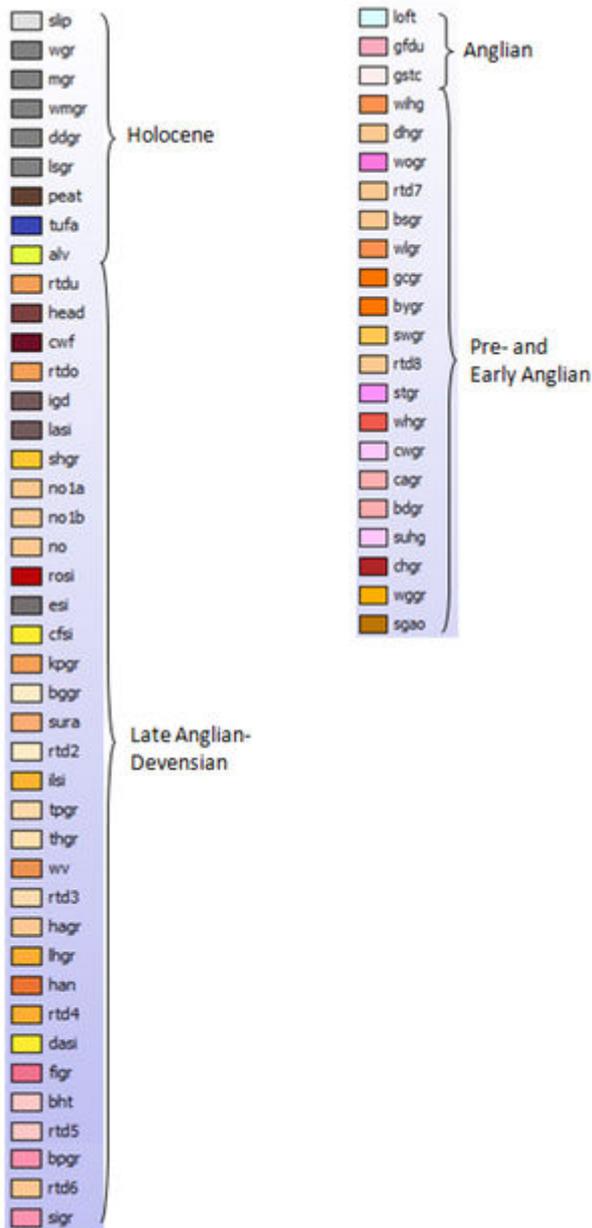
In total, 64 superficial and artificial geological units were modelled (including mass movement deposits). Table 1 lists the units in broad stratigraphic order together with the BGS stratigraphic lexicon code for each (see <https://www.bgs.ac.uk/lexicon/>) and lithology. Standard BGS map colours have been used for all superficial units in the model (Figure 2). These should be referred to when viewing images of the model in this report. Note that the Head and Clay-with-flints deposits are known to be polycyclic, and in the case of the latter, its formation is likely to have started as early as the Pliocene.

Table 1 Stratigraphic table of artificial and superficial geological units modelled.

Inferred age	LEXICON CODE	Full name	Lithology
	slip	Landslide deposits	Mass movement deposits; variable composition, dependent on the nature of the upslope material
	wgr	Worked Ground	Artificially lowered area, or void, through man-made excavation, e.g. a gravel pit
	mgr	Made Ground	Artificially raised areas, variable composition
<b>Holocene deposits and artificially modified ground</b>	wmgr	Worked & Made Ground	Area of artificial cut and fill, e.g. a backfilled quarry, variable composition
	ddgr	Disturbed Ground	Area of disturbance associated with surface or near-surface collapse
	lsgr	Landscaped Ground	Extensively remodelled areas where it is difficult to delineate zones of Made, Worked or Disturbed Ground. Variable composition
	peat	Peat	Humic deposits, consisting of wet dark brown partially decomposed vegetation
	tufa	Tufa	Inorganic calcium carbonate or sinter deposited at or near springs and seepages
	alv	Alluvium	Fluvial deposits of modern flood plains, consisting of clay, silt, sand and peat

	rtdu	River Terrace Deposits (undifferentiated)	Sand and gravel deposits directly beneath alluvium
	head	Head	Solifluction or hillwash deposit, composition dependent on source material. Usually gravelly sandy clay
	cwf	Clay-with-flints Formation	Residual deposit formed through weathering of a previous cover of Palaeogene deposits, and through dissolution of Chalk bedrock. Typically orange-brown and red-brown sandy clay with flint nodules and pebbles
	rtdo	Pleistocene River Terrace Deposits (unclassified)	Exposed river terrace deposits (not below alluvium). Composed of sand and gravel
	igd	Interglacial Deposits	Composed of silty clay
	lasi	Langley Silt Member	Varies from silt to clay, usually yellow brown and massively bedded
	shgr	Shepperton Gravel Member	Gravel with clay and sand
	no1a	Northmoor Sand and Gravel Member	Sand and gravel
	no1b		
	no		
	rosi	Roding Silt Member	Varies from silt to clay, usually yellow brown and massively bedded
	esi	Enfield Silt Member	Varies from silt to clay, usually yellow brown and massively bedded
<b>Late Anglian - Devensian glacial deposits and river terraces, various catchments</b>	cfsi	Crayford Silt Member	Varies from silt to clay, usually yellow brown, often contains wind-blown sand
	kpgr	Kempton Park Gravel Member	Sand and gravel, with local lenses of silt, clay or peat
	bggr	Beenham Grange Gravel Member	Sandy clayey gravel
	sura	Summertown-Radley Sand and Gravel Member	Sand and gravel
	rtd2	2nd river terrace deposit	Sand and gravel
	ilsi	Ilford Silt Member	Sandy clay and silt
	tpgr	Taplow Gravel Member	Sand and gravel, locally with lenses of silt, clay or peat
	thgr	Thatcham Gravel Member	Sandy clayey gravel
	wv	Wolvercote Sand and Gravel Member	Sand and gravel
	rtd3	3rd river terrace	Sand and gravel
	hagr	Hackney Gravel Member	Sand and gravel, locally with lenses of silt, clay or peat
	lhgr	Lynch Hill Gravel Member	Sand and gravel, locally with lenses of silt, clay or peat
	han	Hanborough Gravel Member	Sand and gravel
	rtd4	4th river terrace deposits	Sand and gravel
	dasi	Dartford Silt Member	Varies from silt to clay, usually yellow brown, often contains wind-blown sand
	figr	Finsbury Gravel Member	Sand and gravel, locally with lenses of silt, clay or peat
bht	Boyn Hill Gravel Member	Sand and gravel with possible lenses of silt, clay or peat	
rtd5	5th river terrace deposits	Sand and gravel	
bpgr	Black Park Gravel Member	Sand and gravel with possible lenses of silt, clay or peat	
rtd6	6th river terrace deposit	Sand and gravel	
sigr	Silchester Gravel Member	Clayey, sandy gravel	

<b>Anglian glaciation</b>	loft	Lowestoft Formation	Till containing chalk and flint clasts
	gfd	Glaciofluvial deposits	Sand and gravel
	gstc	Glacial silts and clays	Composed of silt and clay
	wihg	Winter Hill Gravel Member	Clayey, sandy gravel
	dhgr	Dollis Hill Gravel Member	Sandy, clayey gravel, with some laminated silty beds and local silt, clay or peat lenses
	wogr	Woodford Gravel Member	Sand and gravel, locally with lenses of silt, clay, or peat and organic material
	rtd7	7th river terrace deposits	Sand and gravel
<b>Pre- and Early Anglian terraces, various catchments</b>	bsgr	Beenham Stocks Gravel Member	Clayey, sandy gravel
	wlgr	Westmill Gravel Member	Gravel and sand, with local lenses of silt, clay or peat and organic material
	gcgr	Gerrards Cross Gravel Member	Gravel and sand, with local lenses of silt, clay or peat and organic material
	bygr	Bucklebury Common Gravel Member	Clayey, sandy gravel
	swgr	Satwell Gravel Member	Sand and gravel
	rtd8	8th river terrace deposit	Sand and gravel
	stgr	Stanmore Gravel Formation	Flint-dominated gravel with a clay and sandy clay matrix
	whgr	Well Hill Gravel Formation	Gravel and sandy gravel
	cwgr	Chorleywood Gravel Member	Sand and gravel
	cagr	Cold Ash Gravel Member	Sand and gravel
	bdgr	Beaconsfield Gravel Member	Sand and gravel
	suhg	Surrey Hill Gravel Member	Flint-dominated gravel
	chgr	Chelsfield Gravel Formation	Sandy flint-dominated gravel
wggr	Westland Green Gravel Member	Sandy, clayey gravel	
sgao	Sand and gravel of uncertain age and origin	Sand and gravel	



**Figure 2** Superficial geological units modelled in GSI3D.

In addition 12 bedrock units (Tables 2 and 3) were included in the cross-sections and their distributions (envelopes or coverages) modelled in GSI3D, some of these units are faulted and the faults were also defined in the cross-sections. These data were then exported to GOCAD® for calculation of full faulted surfaces to complete the bedrock part of the model. The list of modelled bedrock units is given at Table 2 whilst their relationships and stratigraphic hierarchy is at Table 3.

Table 2. Bedrock units modelled in GSI3D-GOCAD

Lexicon code	Name
LNM	Lenham Formation
CMBS	Camberley Sand Formation
STHP	Stanners Hill Pebble Bed
WIDS	Windlesham Formation
SAHP	St Ann's Hill Pebble Bed
SWCL	Swinley Clay Member
BGS	Bagshot Formation
CLGB	Claygate Member
LC	London Clay Formation

HWH	Harwich Formation
LMBE	Lambeth Group
TAB	Thanet Formation

Table 3 Stratigraphy of the bedrock units; those modelled are shown in bold.

	<b>Formation</b>	<b>Member</b>
	<b>Camberley Sand Formation</b>	
Bracklesham Group	<b>Windlesham Formation</b>	<b>Stanners Hill Pebble Bed</b>
		<b>Swinley Clay Member</b>
	<b>Bagshot Formation</b>	<b>St Ann's Hill Pebble Bed</b>
		.
Thames Group	<b>London Clay Formation</b>	<b>Claygate Member</b>
		.
	<b>Harwich Formation</b>	.
<b>Lambeth Group</b>	Reading, Woolwich and Upnor Formations	
	<b>Thanet Sand Formation</b>	

Further details of each of the superficial units are given in McMillan et al. (2011)<sup>[1]</sup> and for all units in the systematic descriptions in the BGS lexicon of named rock units at <https://www.bgs.ac.uk/lexicon/> and the geology of each district in the London Basin is covered in the respective BGS geological memoirs and sheet explanations listed in the bibliography.

Finally deeper surfaces defining four further geological units were added to the base of the model to complete coverage to a depth of several hundred metres throughout. The base of the model does vary across the area rather than being terminated by a specified depth. These surfaces were imported from a lower resolution model of the whole London Basin developed in GOCAD® (Terrington et al. 2011<sup>[2]</sup>). The surfaces comprise the base of the Chalk Group, the Gault and Upper Greensand combined, the Lower Greensand and undivided Jurassic strata.

## References

1. ↑ MCMILLAN, A A, HAMBLIN, R J O and MERRITT, J. W. 2011. A lithostratigraphical framework for onshore Quaternary and Neogene (Tertiary) superficial deposits of Great Britain and the Isle of Man. *British Geological Survey Research Report*, RR/10/03. Available from: <http://www.bgs.ac.uk/downloads>
2. ↑ TERRINGTON, R L, MEE, K, ALDISS, D T and FORD, J R. 2011 Development of unified geological model surfaces from legacy 3D models in the Thames Basin catchment area In: *Model Fusion Conference, London, UK, 28-29 Nov 2011*. (Unpublished)

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