The glacigenic stratigraphy is laterally variable and locally very complex, and the succession modelled (GFDMP1/TILMP1/GFDMP/TILMP/GFDMP0) is a simplification to aid modelling. No lenses are used. Surface closures were constructed for TILMP1 where GFDMP is missing (Figure 9; Figure 19) and are fitted to topographic contours where possible, but locally where additional leaves/lenses are mapped (see grid square SP 66 33; Figure 10), the constructed boundaries of GFDMP1 and TILMP1 cross-cut these in order to close the GUs. If this complexity is required in the model, this will have to be revised.

The Forest Marble (FMB) and Blisworth Clay (BWC) formations are approximate correlatives (Sumbler, 2002, fig. 5)[1]; and as mapped by Sumbler in 2000 they are fitted in the model area at the line taken as the arbitrary join (see Modelled surfaces/volumes and Figure 7). For the purposes of the model they can be regarded as equivalent and BWC is merged into FMB-LSMD to aid modelling.

The White Limestone (WHL) and Blisworth Limestone (BWL) formations are approximate correlatives (Sumbler, 2002, fig. 5)[1]; the uppermost Bladon Member of the former is absent within the model area at the line taken as the arbitrary join (see Modelled surfaces/volumes) and for the purposes of the model they can be regarded as equivalent and BWL is merged into WHL to aid modelling.

The Rugby Limestone Member (RLS-MDLM) of the Blue Lias Formation is modelled beneath the Charmouth Mudstone Formation to the north-west in Area 4, adjoining Area 3. Its extent into Area 3 is very uncertain (see Model assumptions, geological rules used etc), and the location of its south-easterly pinch-out is unknown. Hence it is not modelled, creating a misfit with Area 4 model.

In order to achieve a successful volume calculation, it was necessary to simplify the linework in all geological units. A tolerance of 5 m does not degrade the map linework to an unacceptable degree and the calculation succeeds in about 12 minutes. All versions after v323 are simplified to this tolerance.

Faults were finally drawn as NONE lines (which were later deleted) dipping 60 degrees for drawing guidance. If the fault throw is less than the unit thickness (i.e. unit in contact across fault and envelope ‘unbroken’), correlated lines are stepped across, to join into the same unit in the footwall. If absent in the footwall, they are drawn to join the edge of the envelope at the surface or base of overlying unit. Where units are present on both sides at depth, but fault throw exceeds unit thickness (i.e. unit not in contact across fault and envelope ‘broken’), correlation lines are also broken and snapped to slits drawn in envelopes to aid calculation.

Many thin units (e.g. MRB) or those thinning laterally beneath others or the DTM, required node densification (automatically, to 100 m-spacing, or manually) to avoid thin-skin effects in 3D. Not all these effects are fixed.

Figure 3 shows all boreholes available in Area 3 with those coded in green. Figure 4 shows the boreholes chosen as possibly useful in cross sections in green with the lines of cross-sections, indicating where this subsurface data may constrain the model. This gives the model user some idea
where the model is most and least certain.

The three isopachyte maps from the Chipping Norton memoir (Horton et al., 1987, figs 15, 19 and 21)\[2\] were used as far as reasonably possible, with allowances made for new data and uncertainties near the edges of the figures.

References


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Category:
- OR/16/004 GSI3D model metadata report for HS2 Area 3 (Newton Purcell to Thorpe Mandeville)