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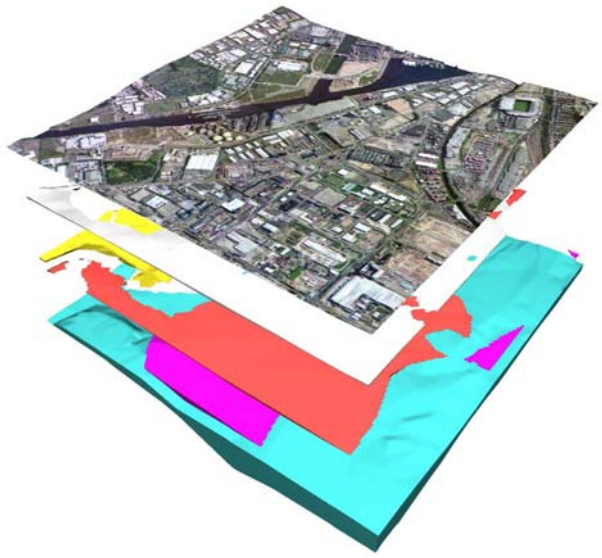
Lower Mersey Corridor Integrated Project Area Strategy Document

Physical Hazards & Geology and Landscapes South Programme

Internal Report IR/06/056



BRITISH GEOLOGICAL SURVEY

PHYSICAL HAZARDS & GEOLOGY AND LANDSCAPES SOUTH PROGRAMME

INTERNAL REPORT IR/06/056

Lower Mersey Corridor Integrated Project Area Strategy Document

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3-D model of part of Trafford Park, Salford.

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Foreword

This document presents the strategy for the creation, development and delivery of the National Geoscience Framework in the Lower Mersey Corridor in NW England from 2006 to 2010.

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1 Project area

The proposed project area is shown in **Figure 1**. The area will comprise a detailed (Lithoframe10) series of models along the Lower Mersey Corridor from Manchester and Salford in the east, through Warrington to Liverpool in the West and will be tied to regional Lithoframe50 model covering the larger part of the area. The area is generally coincident with the underlying Sherwood Sandstone aquifer but may extend to the South Lancashire Coalfield area dependant on resources and potential co-funding.

The area forming the Lancashire and northern parts of the Cheshire plains will be modelled as a regional model to broadly correspond to Lithoframe50. In each case the attributed, 3-D models will provide the underpinning information to enable BGS to deliver its strategic programme through the 3-D geoscience framework, sustainable water management, sustainable soils management and physical hazards and to meet the needs of its customers.

The project will build on existing 3-D modelling developed within the Physical Hazards Programme in the Manchester and Salford area and existing regional commissioned work.

2 Strategic Context

The Lower Mersey Corridor occupies one of the major population centres in the UK and forms a major zone of interaction between geoscience information and urban populations. Major redevelopment of previously used and derelict land is planned along the M62 corridor, particularly to the north of Warrington. A major new crossing is planned across the River Mersey between Runcorn and Widnes. Liverpool has also been awarded European City of Culture status for 2008 and is a major driver for redevelopment in the city and docks area.

Much of the area expanded rapidly as a result of the use of natural resources during the Industrial Revolution. This, and subsequent unsustainable anthropogenic activity has left behind a legacy of difficult ground conditions, contaminated land and poor water resource management. Geoscience information has been proven to provide sustainable solutions to some of these issues in the Manchester and Salford areas and will continue to provide solutions in other areas of the Lower Mersey Corridor.

The area overlies the regionally important Sherwood Sandstone aquifer. It forms a key part of the Mersey and Bollin Catchment (CAMS) area defined by the Environment Agency to govern the management and regulation of surface and groundwater resources.

3 Client and business needs for geoscientific information, products and services

The strategy in the Lower Mersey Corridor is likely to be influenced by environmental planning and sustainable development issues, sustainable water resource management and aquifer protection. The provision of 3-D geological models in superficial deposits has already been successfully demonstrated by the direct application of the Manchester and Salford 3-D model by the Environment Agency and its consultants in the characterisation of hydrogeological domains.

BGS has developed strong links with the Environment Agency NW in the provision of 2-D and 3-D geoscience information and models to support water management decisions in the area. It is intended that this will continue as the EA focuses on the Liverpool and Warrington part of the Lower Mersey Catchment.

Attribution of 3-D geological models will form a key part of the delivery of 3-D geoscience information in the Lower Mersey Corridor. The implementation of such attributed models is likely to be facilitated through Local Authorities (principally, but not limited to Manchester City Council, Liverpool City Council, Halton Borough Council, Cheshire County Council and Lancashire County Council) site investigation consultants and potentially, regional development agencies and city scale local development partnerships.

4 Review of information currently made available to users

Figure 2 summarises the scale and type of geoscience information already provided to users in the Lower Mersey Corridor project area. At present, 2-D and 3-D geoscience information has been provided in the form of 3-D models, 2-D maps and sections relating to bedrock, artificial ground and natural superficial deposits and gridded surfaces of major bedrock units to Carboniferous basement. Information has been provided to the Environment Agency and Trafford Borough Council.

5 Strategy to meet user needs

Figure 3 schematically summarises the proposed strategy in the Lower Mersey Corridor area. It is anticipated that detailed, attributed (broadly equivalent to Lithoframe10) models will be constructed along the Lower Mersey Corridor, incorporating Warrington and Liverpool and depending on available resources, Runcorn and Widnes. The construction of detailed models in these urban areas is essential to meet the expected needs of users requiring high resolution, attributed geoscience information to characterise the variability in urban ground conditions.

The modelling will coincide with continued revision of the Preston, Wigan, Runcorn and Stockport geological map sheets. The work will be fully integrated between the Physical Hazards Programme and the Geology and Landscapes Programme as work in both programmes will be mutually beneficial.

It is likely that a regional model covering the Lancashire and northern Cheshire Plains will be constructed to provide 3-D geoscience information in semi-rural and rural areas. In these areas, the spacing of cross-sections used to construct the models will be wider and will be broadly equivalent to Lithoframe50 model resolution. In these areas, borehole density is also likely to be less compared to urban centres and so this borehole spacing will reflect the confidence in the models.

6 Priority objectives for 2007-8 to 2009-10

The priority objectives listed below are all dependant on available funding and staff resources. Areas and the order of work may be subject to change depending on priority commercial areas and changing customer need.

- To construct a Lithoframe10 resolution model in the Warrington development area (likely to be 2006 – 2008).

- To construct a Lithoframe10 resolution model of Liverpool City Centre and docks area and Birkenhead/Wallasey (likely to be 2007 – 2010). Development of Lithoframe10 in Birkenhead and part of Wallasey will provide a direct link to recent geological mapping and resurvey of the Liverpool sheet.

- To create a larger area, lower resolution Lithoframe50 regional model to tie the detailed Lithofram10 models together (likely to be continuous between 2006 and 2010). The outputs of this will provide enhanced regional coverage and definition of rockhead elevation, superficial deposits thickness and surface geological linework.

- To research into the attribution of the 3-D models to meet user needs (ongoing). Linked to Lower Mersey Engineering Project and PropBase.

- To qualify the confidence associated with the 3-D models at different resolutions (ongoing). Linked to ongoing research within 3DG project.

- To collect relevant data and information in key areas including Warrington and Liverpool (ongoing).

- To continue map revision on Preston and Wigan.

7 Resource Implications

The table below estimates the existing likely staff and finance resources required in the Lower Mersey Corridor project area. It assumes roughly equal funding (similar to 2006 – 2007) over the next four years. If additional funding becomes available or co-funded work is achieved, some of the activities identified on the horizon scanning could be brought forward. Resources may also be dependant on the possible addition of fully commissioned work.

Table 1Financial resources for Lower Mersey Corridor 2006 - 2010

TASK*	2006-2007		2007-2008		2008-2009		2009-2010		Estimated Total Cost (£)
	MAN DAYS	RAW COST (£)	MAN DAYS	RAW COST (£)	MAN DAYS	RAW COST (£)	MAN DAYS	RAW COST (£)	
3-D Modelling & GIS	140	23830	160	28852	162	30441	140	26234	109357
Borehole coding	60	6262	65	7056	65	7338	70	8219	28875
Confidence modelling	6	1769	5	1534	5	1595	5	1659	6557
Hydrogeology	20	4348	10	2261	15	3527	15	3669	13805
Marketing/Communication	20	4827	10	2036	10	2117	10	1958	10938
50k Map Revision	310	70000	300	70000	290	70000	275	70000	280000

*Geotechnical attribution will be carried out as part of the Lower Mersey Engineering Project within the Physical Hazards Programme and PropBase.

8 Marketing and co-funding strategy

It is intended that the existing 3-D models and 2-D maps will be marketed through contact with potential and existing customers. In particular, the 3-D Manchester and Salford model will be delivered to the Greater Manchester Geological Unit (GMGU) and engineering consultants Halcrow for marketing and user feedback.

Team members have already contributed to building client contacts in the area and attending seminars and meetings to communicate the results of work so far and the intended work programme over the next four years. This has included a key Environment Agency meeting attended by representatives from regional, national and policy departments.

It is intended to continue to build strong links with the Environment Agency NW and to attempt to establish contact and discuss opportunities with regional development agencies and councils or city scale development partnerships.

9 Collaboration

Potential collaboration exists with universities whose earth and environmental science courses and research have a strong link to the objectives of the Lower Mersey Project and those of the BGS Programme as a whole. In particular, there is potential for collaboration with the applied and environmental postgraduate courses at the University of Manchester.

In addition, there has already been contact with the University of Salford (Research Centre for the Built Environment) and the Environment Agency as part of the new Virtual Environment Planning (VEPS). It is intended to set up a collaboration and data exchange to test how BGS 3-D products may fit into the VEPS strategy.

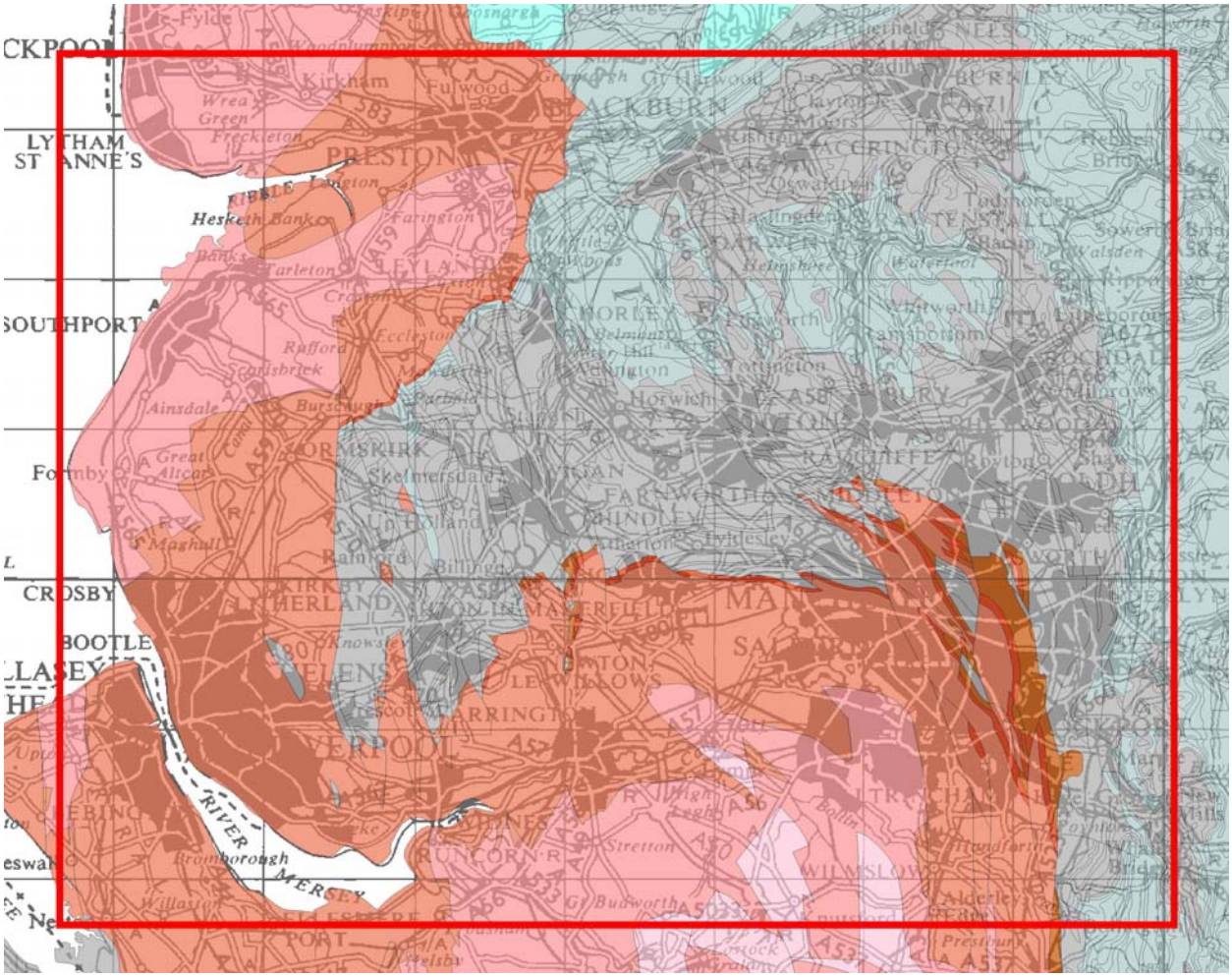
10 Horizon scan (beyond 3 years)

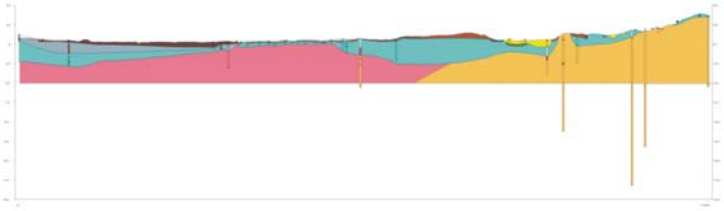
All suggestions outlined below are dependant on available funding and resources.

- The completion of a fully attributed 3-D geological model within the extent of the Outer Manchester Ring road (M60 motorway). At present, many 3-D models are constrained by national grid squares and do not coincide with development areas or local or regional authority boundaries. Information supplied within a defined area of interest would be readily useable by the user community.
- To extend the area to include the northern Lancashire former mill towns such as Preston, Blackburn and Burnley. Similarly, the Bury-Rochdale corridor may be an additional focus for redevelopment and land use issues. These areas may form the focus for regional development in a similar way to the East Manchester Redevelopment scheme.
- Complete, seamless linkage of all models including full, attributed Lithoframe10 modelling along the whole of the Lower Mersey corridor incorporating Runcorn and Widnes.

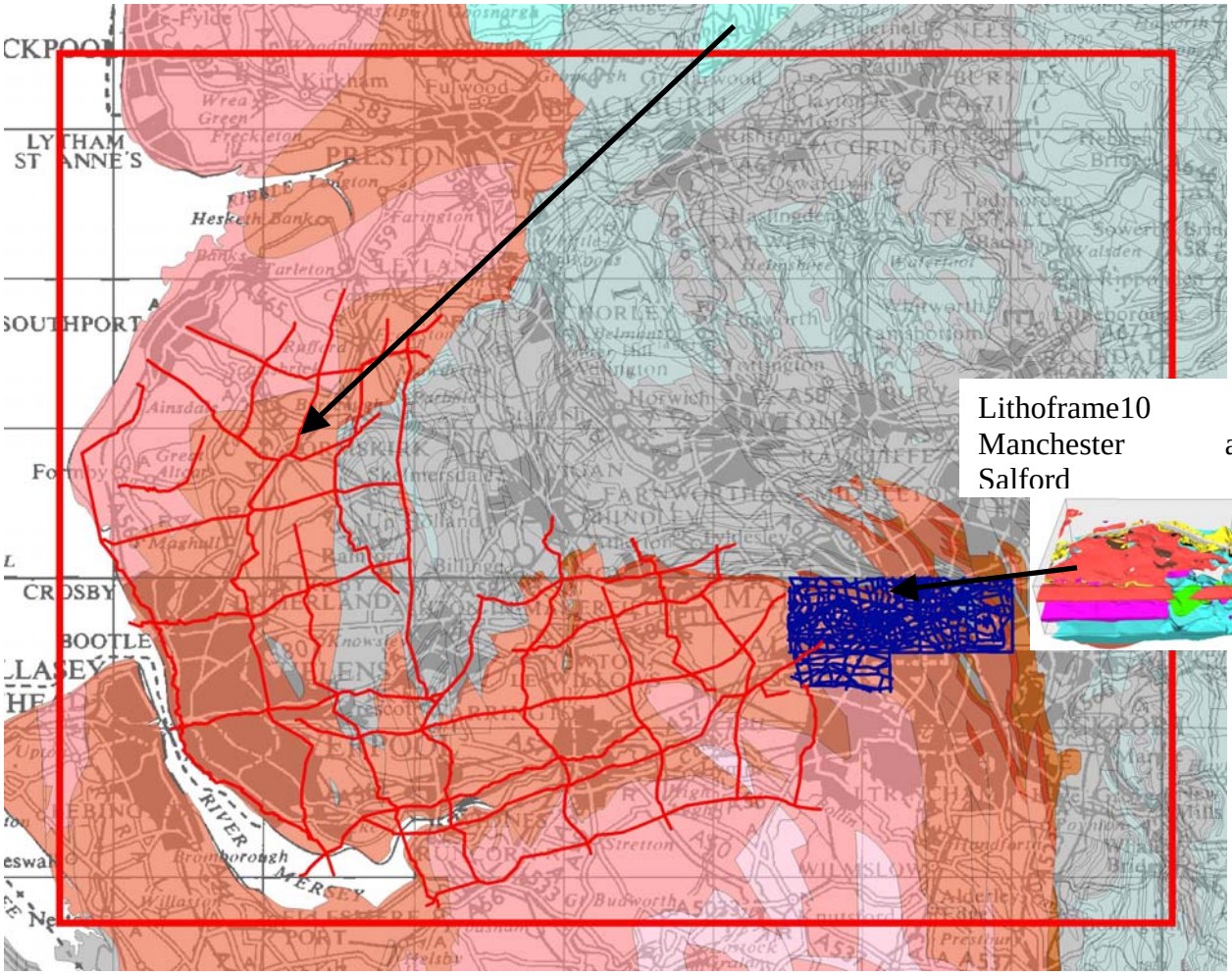
- Extension of modelling to north to include Preston and Blackpool (the Fylde) areas to characterise fault structure and link with Preesall Saltfield relevant to underground gas storage, hydrogeology and geohazards.

Figure 1Project area in relation to bedrock geology. Outline area, including buffer shown in green. Orange (Sherwood Sandstone group), pink (Mercia Mudstone), grey (Carboniferous, undivided – not included in Lithoframe 10 or 50. May only be represented by UK regional model).





Regional cross sections



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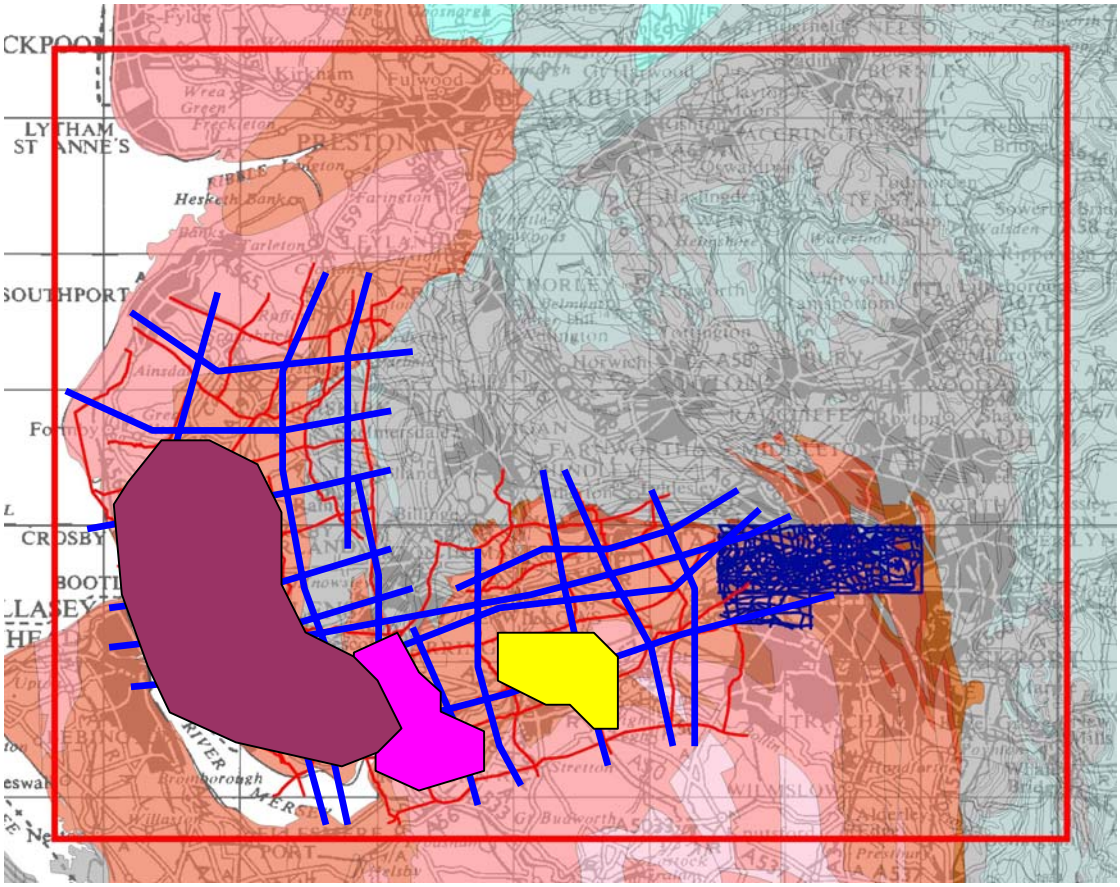

2006- 2008. Lithoframe10. 3-D Modelling and section construction, attribution and confidence modelling.

2007- 2010. Lithoframe10. 3-D Modelling and section construction, attribution and confidence modelling.

2006- 2010. Extension of regional section construction network. Cross section density will provide the framework for Lithoframe50 in superficial deposits. Integration with bedrock model (likely to be Lithoframe 250)

Dependant on available resources. Lithoframe10. 3-D Modelling and section construction, attribution and confidence modelling.

Figure 3 Schematic summary of proposed priority areas and modelling strategy 2006 – 2010. The extent, number and location of proposed sections is schematic only. It is intended in the regional area to illustrate the likely density of cross-sections required to build Lithoframe50 in the superficial deposits.

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Most of the references listed below are held in the Library of the British Geological Survey at Keyworth, Nottingham. Copies of the references may be purchased from the Library subject to the current copyright legislation.

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