This report summarises the midpoint findings of a three year NERC Knowledge Exchange (KE) Fellowship examining how NERC (BGS) subsurface environmental data could have higher impact to city development processes, planning and policy.

The NERC Fellowship is the first to see a NERC (BGS) researcher to be embedded within local government (Glasgow City Council) over a significant time period (three years) working with multiple service teams and levels of local government (LG), from senior management, to development policy teams, to geotechnical, engineering and project design groups within Development and Regeneration and Land and Environmental services.

At present, there is a key gap in the use of NERC (BGS) research within early strategic decisions in LG development planning and policy — Figure (i). This is despite the relevance of the research and data to these decisions, the significant historical investment by NERC (BGS) in LG data acquisition, and the availability of regional datasets of subsurface ground conditions. Strategic knowledge of likely ground conditions and resource opportunities is essential for LG to inform Local Development Plan (LDP) policies, to be able to ‘screen’ and utilise land assets to greatest effect, to stimulate most appropriate city development and investment, and to deliver required housing and infrastructure. Key upfront LDP decisions are made largely in the absence of any strategic subsurface knowledge or screening data of subsurface ground conditions, (e.g. likely construction and remediation costs) with the exception of mining, or subsurface opportunities (e.g. building space, geothermal energy). This is in stark contrast to the high level of utilisation of NERC (BGS) data by the insurance industry to inform decisions of risk and land value/costs, and by both LG and engineering and geotechnical consultancies in the later-stages of the development process to inform project-scale decisions of design and construction — Figure (i).

There are, therefore, key disconnects in the current use and impact of NERC (BGS) data within early stages of city development planning and policy. There is now a significant opportunity to bridge the knowledge gaps within both NERC (BGS) and LG, and to understand: what are the most relevant knowledge of subsurface conditions and opportunities for LG development planning and policy; and, what is the most accessible and relevant mechanism for delivery of the optimal knowledge.
Awareness, understanding and utilisation of NERC data and research is relatively good at project-scale decisions and workflow processes, but almost completely absence at strategic levels.

The aim of this Fellowship is to develop in-depth learning and understanding with Glasgow City Council (GCC), and other LG’s, to establish how NERC (BGS) data could be most appropriately and effectively utilised within early-stage strategic decisions of city development processes and LDP policy, and what are the most appropriate roles and processes within both organisations to connect to develop more resilient and sustainable pathways to impact in the future. The pilots and case studies being developed by the Fellowship, both with GCC and other local authorities and key national stakeholders in Scotland (e.g. Improvement Service), will develop robust test-bed for how wider replication and uptake of the learning outcomes can be achieved. Existing data and knowledge exchange mechanisms (e.g. the national e-planning and e-building portals), and LG platforms (e.g. national Improvement Service, Scotland) will be incorporated wherever possible by the work.

Glasgow City Council is the first LG in the UK to formally recognise the subsurface within it’s City Development Plan, and as such, forms a key pilot to examine how relevant NERC (BGS) data could be most appropriately and effectively used to inform LG city development planning policy, to aid earlier identification and mitigation of ground conditions, as well as increased utilisation and management of subsurface resources.

The importance of greater utilisation of relevant, high quality strategic data to inform LG Development Plan (LDP) policy and planning processes, through increased collaborative working between professions to cascade downstream benefits and enable LG to deliver transformational city development and investment solutions, is recognised and being called for by the current ongoing national Planning Review in Scotland (Scottish Government 2016[1], 2017[2]). Utilising greater knowledge earlier, the review is calling for LG planning and LDP policy to take a more strategic view of land required for housing, potentially new zoning of land to assist housing delivery, and a proactive approach to infrastructure planning to deliver integrated, low carbon city development and improved communities (Scottish Government 2017[2]). Evidence suggests that earlier use of appropriate environmental data brings substantial added value and cost benefit — one unit of
planning is estimated to reduce response actions by 4–7 units of downstream expenditure and to reduce risk and uncertainty for developers (Department for Communities and Local Government 2006, Aecom 2015). The work activities and pilots of the Fellowship with GCC are providing tangible case studies of how these recommendations of the current national planning review can be realised.

The mid-point findings from the Fellowship are:

1. **New cross-organisational understanding is required between LG and NERC (BGS), which is not tied to individual projects or research programmes**

   Mutual organisational understanding, is an essential prerequisite for increased collaborative working between the professions and for LG and NERC (BGS) to identify: what subsurface data and knowledge are required for different scales of decisions, at different stages in the city development process; and, how relevant knowledge and data can be most effectively be mapped through organisational workflows, and evidence-based policy.

   Developing this cross-organisational understanding, identifying which roles and processes in both organisations should be connected, and what are the most effective platforms for the roles to engage, will take significant time and investment in the first instance. In the future, this rich cross-organisational understanding must be part of both organisations ‘DNA’, and not tied to individual projects or research programmes.

   *It is essential that there is greater cross-organisational understanding at executive levels in the future, in order for increased evidence-based policy to be realised, and wider linkages to be identified and cascading down through organisational roles, in line with the recommendations of the current planning review in Scotland.*

2. **Increased engagement with national training programmes to LG, and LG networks, forms a key vehicle to increase awareness of NERC (BGS) data, and the capacity of LDP to utilise relevant evidence to inform policy**
Developing stronger links between NERC (BGS) and national LG training programmes or platforms will be instrumental to develop more resilient organisational contacts between NERC (BGS) and LG — and in increase cross-organisational understanding of how each organisation, and individual roles and processes within, could most effectively interact and contribute to the overall LDP and city development process.

More resilient organisational linkages within national training programmes/workshops, would negate the reliance on contact on individual projects or individuals for LG utilisation of NERC (BGS) data and research. Awareness of relevant NERC (BGS) datasets, and LG capacity to utilise these data, could be significantly increased with LG for relatively little time and cost to NERC (BGS). Importantly, it would mean the training, awareness and understanding being developed was between different roles and levels in LG and NERC organisations.

The Fellowship is organising the first such workshop in Scotland, between all 32 LG LDP teams, 3 May 2017, in conjunction with the Scottish Improvement Service and COSLA.

3. The potential role of national Improvement Service for Local Governments in Scotland and the APSE (UK)

Within Scotland, the national Improvement Service (IS) for LG’s forms a key vehicle for enabling resilient, organisational engagement and knowledge exchange between NERC (BGS) and LG. There are clear synergies between the aims of the IS and NERC (BGS) to ensure increased impact of available research and data to LG and policy. Some of the key IS activities of relevance to NERC (BGS) are: IS Workshops — these are open to all local governments in Scotland and are used to provide training, or discussion forums, for different personnel and roles within local governments; and the Spatial Data Innovation Hub which is aimed at centralising key spatial data for LG nationally. The Association for Public Service Excellence (APSE) forms a similar vehicle for engaging with LG, and potentially disseminating NERC (BGS) data, at a UK scale.
4. **The role of 3D information for early strategic decisions in LG development planning and policy needs to be better understood**

Greater understanding is still required across a range of actors (LG’s, NERC (BGS), universities, software vendors, consultancies, public services) as to what is the most appropriate and relevant integration of above and below ground datasets to inform new spatial planning approaches — existing research and derived spatial information may be relevant, but refined presentation and delivery are required for these to provide optimal and accessible knowledge to the key questions being asked in LDP. Increased understanding of what is the most relevant knowledge of ground conditions to support strategic city development policy decisions is essential.

3D presentation of information can be a powerful visualisation tool, but this does not increase capacity of non-specialists to understand and translate the information to inform relevant LDP. Finally, there remains a lack of clarity and understanding of what is the most effective and accessible software platform to do examine a range of information products at city-scale. There also remains lack of understanding to; and,

5. **Targeted information that synthesise and summarise comprehensive geoscience data is essential for NERC (BGS) data to be accessible to LDP policy and city planning**

Traditional 2D and 3D geological information, which is used extensively within latter stages of the development process in design and construction, has limited relevance or accessibility to early strategic decisions in city planning.

Traditional comprehensive NERC (BGS) information (e.g. geological sequences, geological cross-sections) needs to be translated to key subsurface horizons (e.g. depth to bedrock, depth to groundwater, or depth to geotechnical risk horizons), to support evidence based approaches on land asset utilisation and strategic development frameworks. Similar thematic screening data of subsurface conditions and resource opportunities from NERC (BGS) have been successfully used by the insurance industry and regulators to inform policies. Lessons learnt from these approaches to knowledge delivery, could be applied to city development planning.
Where existing NERC (BGS) datasets have already been refined to show key subsurface properties (e.g. depth to groundwater), learning from the Fellowship indicates further small changes to the presentation of these would also significantly increase the accessibility of datasets to informing city development policy.

Detailed work between geologists and city development policy teams in the cities Oslo and Glasgow, indicates the same key strategic knowledge of subsurface conditions, is required by LG development policy teams, irrespective of different drivers for knowledge and urban context (Municipality of Oslo 2017[5]). This suggests a replicable package of relevant and accessible data and research can be created by NERC (BGS) for cities, not only in the UK, but of equal relevance internationally (Campbell 2016[6]; van der Meulen et al. 2016[7]; Seoul Metropolitan Government 2016[8]).

6. There are limited systematic flow paths of data or knowledge between NERC and Local Governments

Developing new systematic and automated data ingestion processes from local government framework contracts and data procurement processes is essential for: a) NERC (BGS) to have sufficient data to develop higher quality strategic research and information for cities in the future; and b) for LG to have increased open data, better internal data management and data re-use reducing duplication, and improving data analytics capacity, in line for example with the aspirations and drivers of the Future Cities programme.

Shallow subsurface data (typically <50 m depth) represent a key data gap within NERC National Geoscience Data Centre (NGDC), in the absence of legislative requirements to report this data to NERC (BGS) as the UK National Geoscience Data Centre (NGDC). LG’s procure a large amount of the new, high quality, ground investigation data to the shallow subsurface generated each year in the UK.

7. The ASK (Accessing Subsurface Knowledge) Network — a successful knowledge exchange network between NERC, LG’s and stakeholders

The ASK (Accessing Subsurface Knowledge) Network is a UK knowledge exchange Network being led by the Fellowship, linking a broad range of stakeholders (local and national), who either use and/or generate subsurface data within different stages of the city development process.
The network is providing an effective forum for piloting and rolling out new automated data ingestion processes to NERC(NGDC-BGS) using standardised, validated digital data format (AGS). There has been strong success and increasing uptake of the pilot through national stakeholders. Of equal importance, the network provides an effective forum for NERC(BGS to have on-going conservations and iterative knowledge development with a very wide range of stakeholders. Network discussions have addressed questions of what new knowledge could be relevant to unlocking future city development; what data services will be required/desired in the future; and new data procurement processes between LG’s, stakeholders, and NERC (NGDC-BGS) to develop increased centralised knowledge.

The network is being extended to include other NERC research centres (e.g. EDIC-CEH), and other research councils (e.g. the EPSRC Urban Big Data Centre) and a broader range of outside stakeholders (e.g. LDP officers, developers, urban designers, community services).

References


Category:
- OR/17/005 Integrating NERC (BGS) subsurface research and data to city development processes and policy (NERC briefing note)