

Developing Subsurface Planning – 3D BIM, Glasgow pilot for the UK

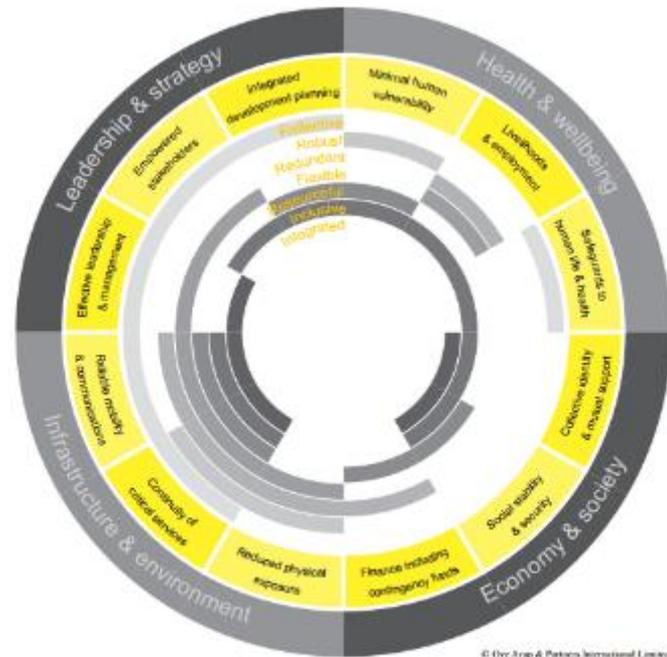


Gillian Dick Place Strategy & Environmental
Infrastructure Team; Development Plan Group

gillian.dick@glasgow.gov.uk

Key Drivers

- Placemaking Principal
- MGSDP
- Resilient Glasgow – Rockefeller RC 100
- Integrated green Infrastructure
- Climate mitigation / Geology
- Glasgow’s urban Model
- Risk awareness in decision making – not risk averse
- De-risking development for developers
- Effective & efficient use of resources



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City Business Framework - The Rockefeller Foundation | Arup

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**PEOPLE
MAKE
GLASGOW**



LDP commitments include

- Supplementary Guidance spatial and subject based
- City Centre spatial planning
- Economic area Review
- Network of centres Review
- Sub surface planning
- GCVGN priorities
- Renewable Energy mapping
- MGSDP
- Includes geodiversity in Natural environment policy

The European Commission defines **green infrastructure** as “the use of ecosystems, green spaces and water in strategic land use planning to deliver environmental and quality of life benefits. It includes parks, open spaces, playing fields, woodlands, wetlands, road verges, allotments and private gardens. Green infrastructure can contribute to climate change mitigation and adaptation, natural disaster risk mitigation, protection against flooding and erosion as well as biodiversity conservation.”

So **green** infrastructure is not just about greenspaces like parks and open spaces, it also incorporates **blue** infrastructure including sustainable urban drainage, swales, wetlands, rivers and canals and their banks, and other water courses. The figure below seeks to demystify ‘green infrastructure’ by setting out in basic terms examples of individual components of green infrastructure, at different scales.

Considering green spaces or connections as **infrastructure** arises because simple things like trees, greenspaces and watercourses can provide valuable services in an ecological way. Green infrastructure can deliver on functions and services such as shelter, access and travel, sustainable urban drainage, pollution mitigation and food production – as part of a wider ecosystem. Moreover this approach has the added benefit of enhancing habitats and creating attractive places. This multifunctional nature of green infrastructure is one of its intrinsic benefits and can operate at differing levels.

Individual elements of green infrastructure can serve a useful green infrastructure purpose, without being connected. However, when green infrastructure components are linked together to form **green networks** further combined benefits can be achieved at a strategic level.

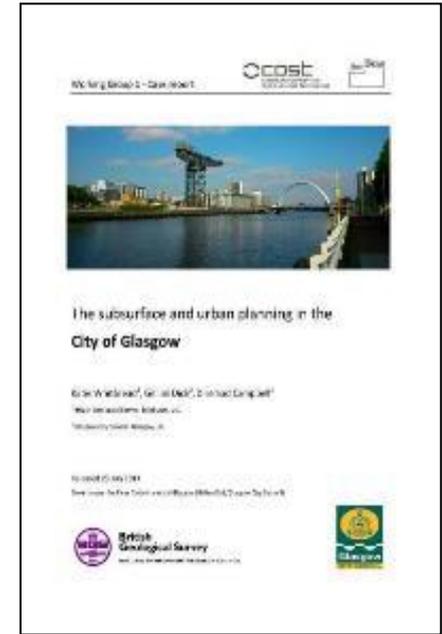
The building – home, garden or workspace	Connections	The street	Connections	Neighbourhood	Connections	Strategic places
 <ul style="list-style-type: none"> • Green roofs • Living walls • Gardens or grounds • Rainwater harvesting systems • Driveways (permeable) 	 <ul style="list-style-type: none"> • Pedestrian paths and rights of way • Cycling routes • Green Links and corridors 	 <ul style="list-style-type: none"> • Boundary features eg hedges • Street trees • Verges • Swales • Porous paving • Sustainable Urban Drainage Systems (SUDS) 	 <ul style="list-style-type: none"> • Pedestrian paths and rights of way • Cycling routes • Green Links and corridors 	 <ul style="list-style-type: none"> • Amenity greenspace • Informal recreation spaces • Playspaces • Allotments, community growing spaces • Playing fields • Sports areas • Urban parks • Burial grounds, cemeteries • Swales • Urban woodlands • Ponds • Water courses 	 <ul style="list-style-type: none"> • Pedestrian paths and rights of way • Cycling routes • Green Links and corridors • River and canal corridors including their banks 	 <ul style="list-style-type: none"> • Civic scale spaces • Public parks and gardens • Green Networks • Country & Regional Parks • Natural/semi-natural greenspaces • Forests and Woodlands • Grasslands • Designed landscapes • Formal gardens • City farms • Blue Networks • Rivers, lochs and Wetlands

IGI commitments include

- Supplementary Guidance – Green Belt & Green Network; Water Environment; Resource Management
- Embedded within Open space strategy
- Embedded within Placemaking and spatial strategy
- Embedded within Strategic development Framework
- Exploring new ways to identify opportunities for IGI

Subsurface planning now integral to Glasgows City Development Plan –

The proposed [City Development Plan](#) or Glasgow recognises the importance of the subsurface environment in the development of spatial strategy, policies and proposals for the future use of land and infrastructure in Glasgow, reflecting the growing awareness of the importance of subsurface knowledge for the City.



[www.glasgow.gov.uk/development plan](http://www.glasgow.gov.uk/developmentplan)



Drivers of ASK Network Glasgow

Increasing need to use & manage the subsurface

Large of data, but inaccessible

large amount of data generated from the site investigations/re-development/remediation of contaminated land in the city – but couldn't be used easily by the council

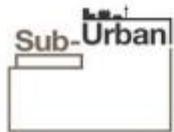


Influencing best practice in Europe

Collaboration between cities & geological surveys

Developing subsurface planning

- relating sub-surface infrastructure such as utility services, district heating, energy and broadband infrastructure and transport, SUDS and water management infrastructure

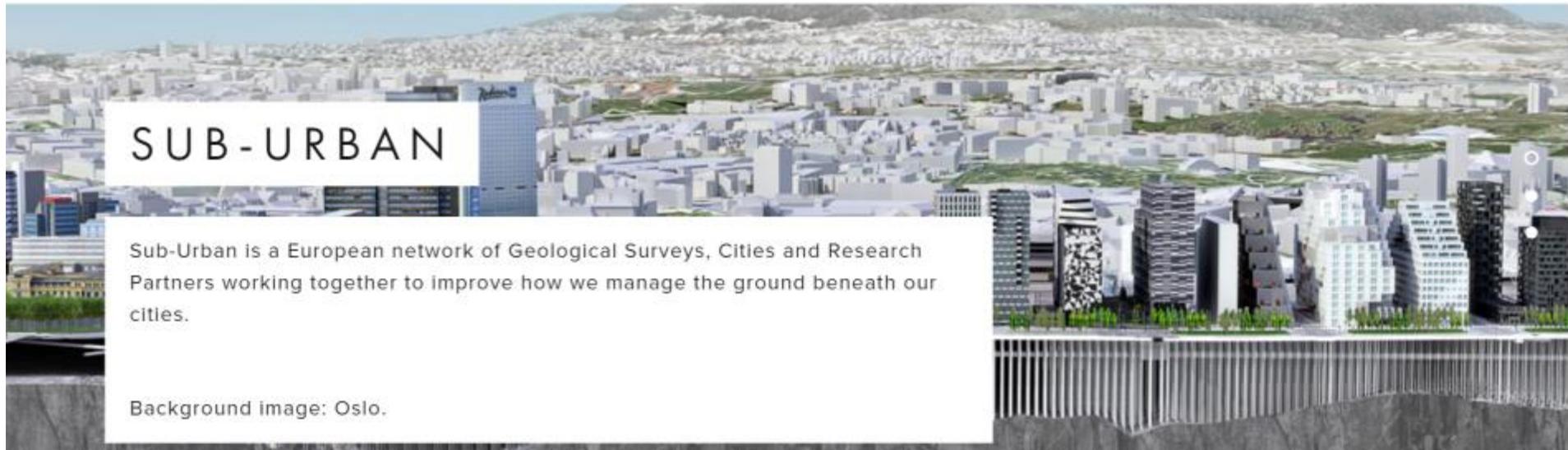


SUB-URBAN STATE OF THE ART CITY STUDIES
GOOD PRACTICE / BEST EFFORT KNOWLEDGE EXCHANGE TOOLBOX
EVENTS

SUB-URBAN

Sub-Urban is a European network of Geological Surveys, Cities and Research Partners working together to improve how we manage the ground beneath our cities.

Background image: Oslo.



presentation info - Dropl... Knowledge exchange - 5 x Gillian

sub-urban.squarespace.com/stsm/#eleven

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11. OSLO SUBSURFACE PROJECT; LESSONS FOR URBAN PLANNING IN GLASGOW

STSM AUTHOR: G. DICK (GLASGOW CITY COUNCIL, UNITED KINGDOM)

STSM HOST: I. ERIKSSON (AGENCY FOR PLANNING AND BUILDING SERVICES, CITY OF OSLO, NORWAY)

Background image: Glasgow underground, by [Stuart Chalmers](#), creative commons

Subsurface planning: challenges and lessons learnt in Oslo, Rotterdam and Glasgow

- Have an awareness of the impact on the sub surface of major proposals
- Identify who owns the sub surface infrastructure that currently exists
- Identify buffer zones between various sub surface uses
- Understand the opportunities and constraints that exist around energy wells – both closed and open systems
- Remember to plan outside the 3d red line of the site
- Understand the sub surface layers and who regulates them

Subsurface planning: challenges and lessons learnt in Oslo, Rotterdam and Glasgow

- Note that not all stakeholders are interested in all the layers of the sub surface. They all have different priorities and deliverables that impact on what they can and cannot do within the subsurface.
- Subsurface data layers require to be available to a wide audience of professionals within a GIS environment (both private & public data). They require to have a clear description; identified data owner and parameters. There should be an indication about which layer of the subsurface they relate to.
- Information on the sub surface spatial planning needs to be gathered in one place; in one format and needs to be an identified responsibility for a team or individual. Data management system may be required.

What next..

Development of Subsurface Supplementary planning guidance 2015-18

- UK first supplementary planning guidance
- NERC/BGS Fellowship to support this

Development of fully integrated above and below ground 3D BIM : 3D planning mechanism

- 2 major redevelopment sites in city being used as trials 2015-16
- NERC/BGS Fellowship to support this



Esri CityEngine & Minecraft

- Engaging Citizens in 3D City Planning -

Adapt Dutch tool 'Serious Game'

- assist improving understanding of importance and complexities of subsurface planning