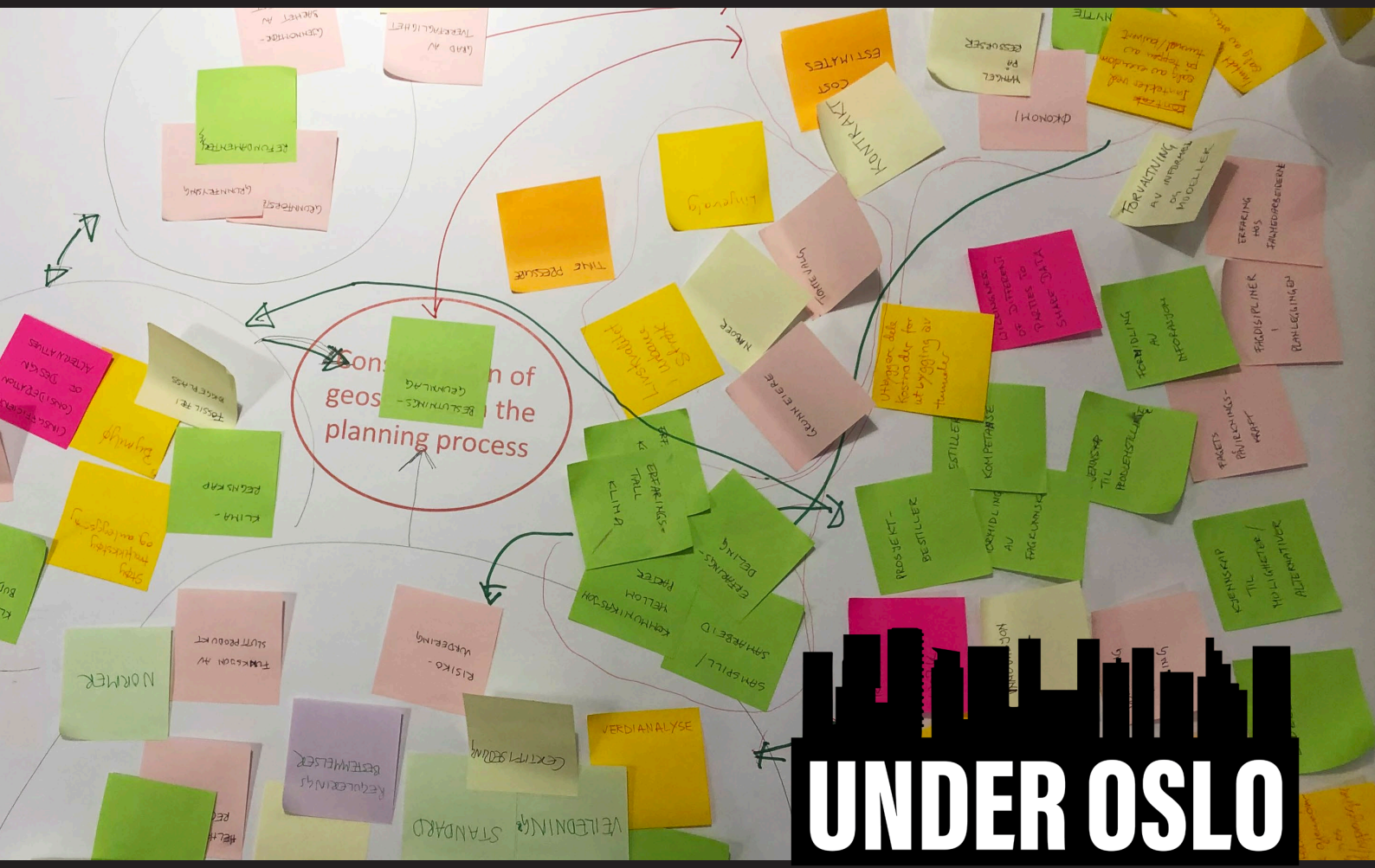
Under Oslo WP3 HOLISTIC PLANNING

Mapping the consideration of geoscience in planning - workshop results



WHY GEOSCIENCE IN (URBAN) PLANNING?

Illustrasjon: Statens vegvesen/Aas-Jakobsen

> *"For sustainable urban development the relationship between the city and the ground beneath it needs increased attention. The underground volume might provide additional urban space, but it cannot be treated in the same way as above-ground space. Cross-disciplinary research and professional collaboration are needed to better understand […] the variety of processes at play, and […] the role of geotechnical engineers and geoscientists in working towards sustainable underground urbanism." (von der Tann et al., 2020)*

Under Oslo's work package Holistic Planning aims to develop a better understanding of how and when geotechnical engineers are usually involved in project planning to identify opportunities to bring geotechnical expertise into planning processes earlier. We work on the hypothesis that ground investigations and geotechnical assessments in the early planning phases are often insufficient and that, consequently, opportunities to design cost-efficient and sustainable solutions might be missed.

Our vision is a planning process that enables decision makers to take well-informed decisions. This requires the involvement of geoscientific expertise and communication of key information related to the ground.

VISION

A planning process that – related to the geoscience – enables the right people at the right time to take well-informed decisions.

AIM

To develop propositions how and when to bring geotechnical expertise into the planning process different to the status quo.

von der Tann, L., Ritter, S., Hale, S., Langford, J., Salazar, S., 2021. From urban underground space (UUS) to sustainable underground urbanism (SUU): Shifting the focus in urban underground scholarship. Land Use Policy 109, 105650. https://doi.org/10.1016/j.landusepol.2021.105650

The Omidyar Group, 2017. Systems Practice Workbook. https://docs.kumu.io/content/Workbook-012617.pdf

> *"We fail more often because we solve the wrong problem than because we get the wrong solution to the right problem." Russell A. Ackoff*

WHAT IS A SYSTEM?

In thinking about processes and the industry we operate in as a system, we evaluate the parts that make up the system and the effect of the system as a whole. Aristotle said: "The whole is greater than the sum of its parts." The added value of a system thus lies in the connections between its parts, so it is the connections that we want to investigate and understand better. Within our systems lie both unintended consequences and potential for reinforcing positive outcomes. We want to identify leverage points and embrace complexity for continuous learning.

In ***socio-technical*** systems such as the built environment, in addition to the technical element, a large number of human actors is involved. Different people will have different insights and opinions regarding what elements and dynamics are relevant, and where they see the biggest needs and opportunities for change.

Systems mapping as a workshop method allows us to develop an understanding of these complexities and dynamics by building a joint picture of the current situation together with workshop participants. Under Oslo explored the methodology of systems mapping to better understand – mainly from the geotechnical point of view – which are the most relevant factors influencing the consideration of geoscience in planning processes, and how these factors are interrelated. The Omidyar Groups workbook on Systems Practice (The Omidyar Group, 2017) was used as the main guiding document for the process.

GUIDING QUESTIONS

- **What are the main elements that influence the consideration of geoscience in the planning process?**
- **What are the main effects the consideration – or lack of consideration – of geoscience in the planning process might have for urban planning and construction projects?**
- **How are these different elements connected?**
- **What main problem statements emerge?**
- **How could these problems be approached?**

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Narrative #1: Misalignment between expertise and responsibility

Problem description: One of the main concerns of workshop participants was insufficient experience and understanding of geoscience, in particular amongst project managers on the client side. Reasons for this include the tendency of experts to prefer specialist work to work involving more coordinating or managing tasks, the higher valuation of specialist knowledge in society compared to"holistic" knowledge, and the sheer number of projects ongoing in parallel. The project manager of a project involving ground-related considerations needs to link holistic oversight over the whole project with more specialist knowledge. The ability to do so will manifest in project descriptions (e.g., in tender documents) that set the parameters for a project's implementation. The quality of these descriptions will influence experts' trust in the client and, in turn, the overall communication between client and designer. Difficulties in communication will lead to less knowledge transfer whilst good communication will facilitate the building of expertise for the project manager.

Example for leverage point: If it is recognised that the project manager of a project might need support, additional expertise could be mobilised early on in an advisory role for the project manager. Working as a team in this way would facilitate efficient management of interfaces, and holistic and specialised knowledge would be better linked.

> *"There is so much construction in Norway that young people have to work on complex projects even though they might not be experienced enough." Workshop participant*

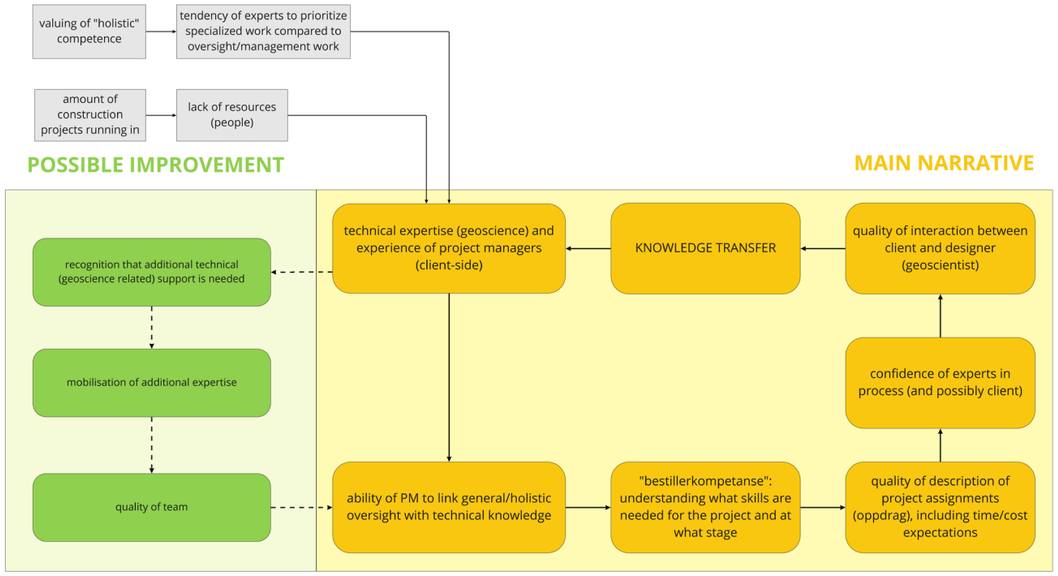
> *"Specific professional expertise is valued much more than holistic understanding." Workshop participant*

WORKSHOP RESULT

CORE NARRATIVES

The result of the systems mapping workshops were two narratives describing aspects of the consideration of geoscience in planning that workshop participants perceived as key to (and problematic in) the current situation.

Connecting both narratives is the element of expertise. Where does it sit, and how is it passed on?

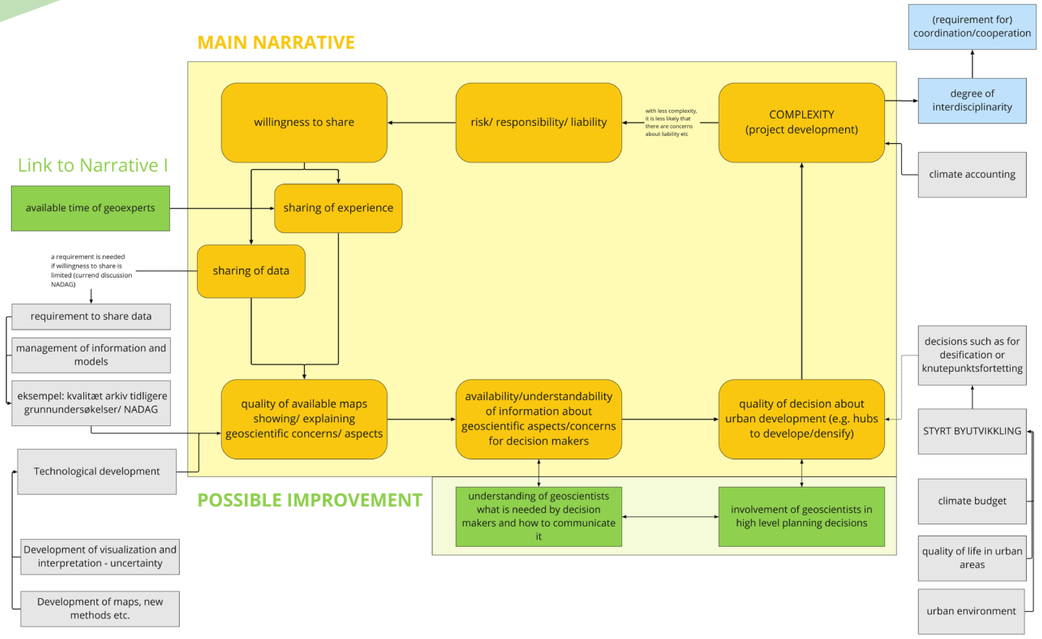


Narrative #2: Geoscience in urban decision making

Problem description: Decisions about how a city should develop into the future will be influenced by where the current political focus lies and aspirations of the relevant authorities. They include considerations about aspects such as climate change or liveability and will look at the spatial context of a city through these aspects. That means that strategic decisions will often not proactively take the spatial context into account but can have a large effect on the development of that context.

Most urban areas have been developed over a long period of time. Adding additional structures, specifically if located in or interacting with the subsurface, is getting more complex. Increased complexity often means that experts of different areas should be consulted. It also means that the uncertainties in the project and therewith the risks taken by project participants are higher. As different parties need to take responsibility for different project parts, they might be protective about certain project details reducing their willingness to share their experiences and data. This, in turn, has an effect on the quality of information that is available to decision makers, and ultimately the decisions they take.

Example for leverage point: One way to enhance the situation without improving the available data base could be for geoscientists to learn more about what knowledge might help urban decision makers to take well-informed decisions and how it could be communicated to them. Earlier involvement of geoscientists as advisors for planning decisions could be the result.



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IDEAS AND WAYS FORWARD

The workshops revealed that there is a need

- (i) **to strengthen and further develop existing tools and data platforms for knowledge exchange**
- (ii) **for interdisciplinary education**
- (iii) **for better communication of geoscience, and training of communication skills amongst geoscientists.**

Idea #1 Special consideration zones (hensynssoner) for underground complexity in regional plans

Special consideration zones are intended in the Planning and Building Act (§ 11-8) to show where specific assessments are required or restrictions for development are set. One workshop group discussed the potential to create a new category of consideration zones (hensynssone) that marks areas of increased complexity – both above and below ground.

The idea is to introduce a requirement for projects in these zones to consult a multidisciplinary team and use BIM early in the planning process to enable multidisciplinary collaboration. Workshop participants discussed that the increasing complexity described in narrative #2 is not responded to with the appropriate resources to bring in all required areas of expertise. The establishment of special consideration zones could improve the integration of landscape planning and geoscience and lead to overall better solutions for urban development, as well as a reduction of costs and resource use.

Idea #2 Sharing project experiences

Currently, the learning from specific projects often stays with those involved in the planning, design, and implementation. How could this learning from projects be passed on better to inform future projects? A platform would be needed where experiences from both, public and private projects could be captured.

Workshop participants developed an idea for a central project database where standardised fact sheets are collated for all projects. Georeferenced, tagged with relevant keywords, and listing unexpected project challenges, these fact sheets could be referred to and project participants contacted when similar challenges are faced.As a starting point, the group suggested that public clients such as Statsbygg, Statens Vegvesen or the municipalities could populate such a project register.

> *“A geotechnical consultant needs to be able to explain issues the client does not have the competence for in a pedagogical way. A real dialogue is required to gain clarity [about geotechnical risks] as early as possible.” Workshop participant*

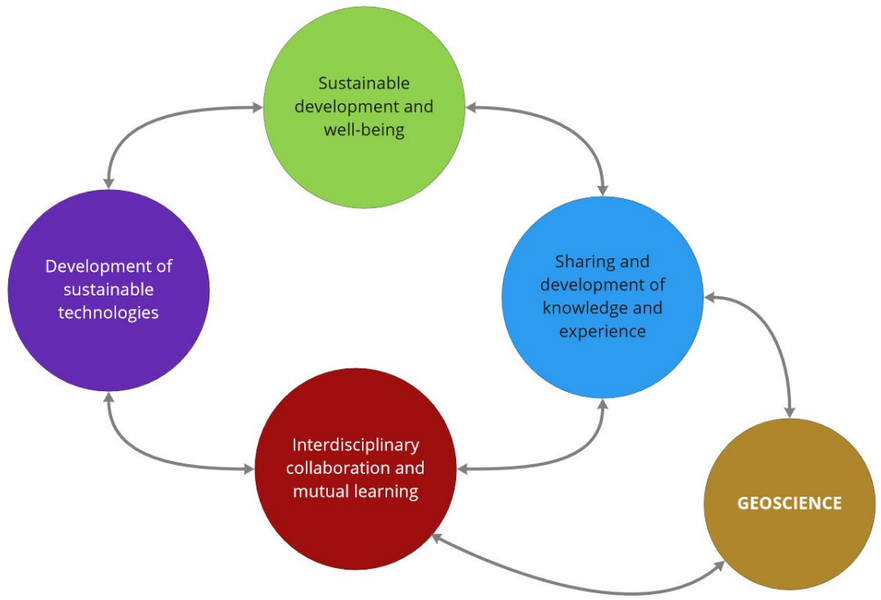
Idea #3 Mapping Alum Shale

Alum shale rock formations present an environmental challenge for construction activities. A lot of knowledge about the location of alum shale in Oslo is currently held by engineers and geologists who came across these formations when working on specific projects.

Initiated by Ingelöv Eriksson (Oslo Kommune), NGI together with Oslo Kommune will investigate opportunities to create an experience based map that could be populated through interviews and with existing data points. Such a map could provide new information for future projects, and facilitate conversations and learning across the industry.

Summarizing the developed systems map, four points appeared essential:

- (i) **Sustainable development and human well-being** can be supported by
- (ii) **sustainable technology** that fosters understanding of the environment by visualising and interpreting data.
- (iii) **Sharing and development of knowledge and experience** can prevent repeated mistakes and identify problems early. Both can be enabled through
- (iv) **interdisciplinary collaboration and mutual learning** between society and economy/business interests. This will lead to a more holistic understanding of situations and influence the associated decisions.



Knowledge in the geoscience needs to be efficiently shared within and beyond the geoscience themselves.
Geoscientists should be included in projects early on.

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Participants came from:

- Bane NOR
- AHO
- Statsbygg
- VAV
- Oslo Kommune
- Fornebubanen
- Skanska
- Veidekke
- Statens Vegvesen
- NGI

Workshops were facilitated by

Javier Guzman (SVV), Tone Ratcliffe Smaavik (NGI), and Loretta von der Tann (NGI).