The development of a decision support system for regional planning and the assessment of brownfield sites: A case-study

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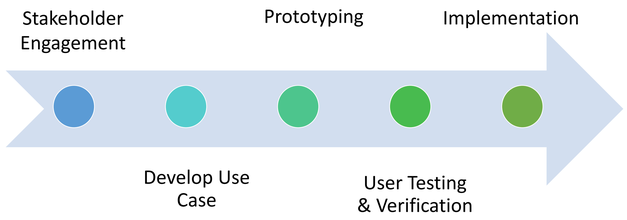
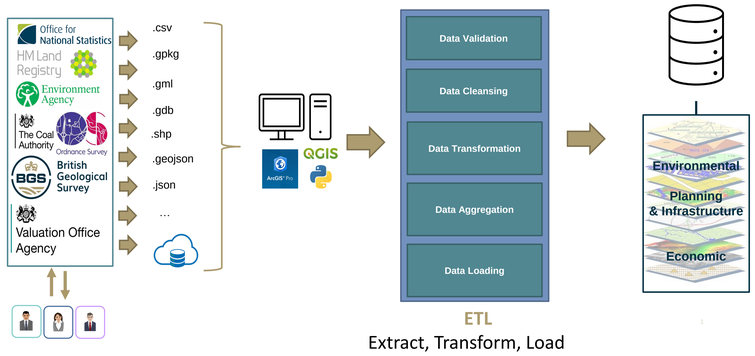
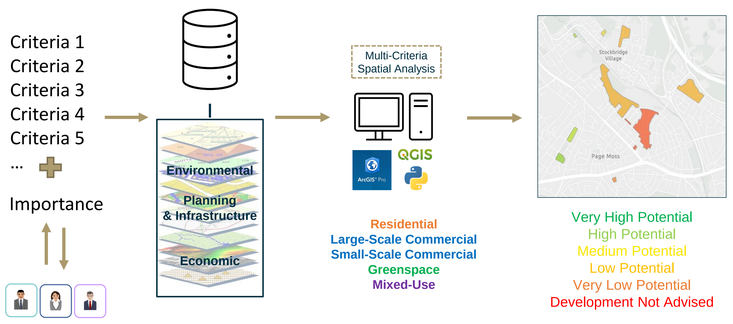
INTRODUCTION

- Decision support systems (DSSs) are often used to support the complex task of brownfield redevelopment
- DSSs tend to focus on site-specific, late-stage applications, such as the selection of remediation strategies.
- Socioeconomic factors are often overlooked
- There is a need for innovative DSSs that provides support for early-stage decision making for brownfield planning and redevelopment at city region scale
- We present a user-friendly WebGIS-based DSS that integrates (1) land-use potential models (2) chemical and geotechnical hazards assessments, and (3) an enhancement of data pertinent to economic viability assessment.

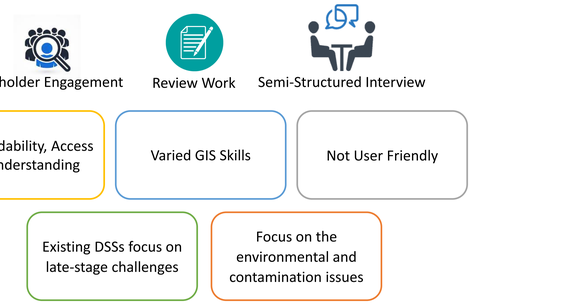
METHODS

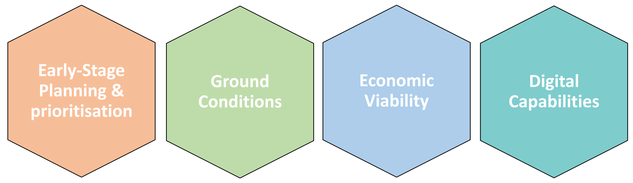






USE CASE

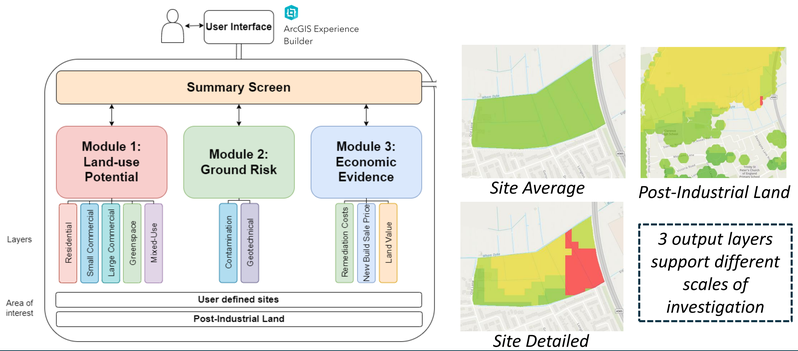




DECISION SUPPORT SYSTEM

Objectives

- Enhance the accessibility and visualisation of data
- Facilitate the evaluation and comprehension of ground risk arising from contamination and geotechnical instability
- Enhance the visualisation of data for economic viability assessment
- Facilitate evidence gathering for master planning through GIS-based multi-criteria modelling of land-use potential



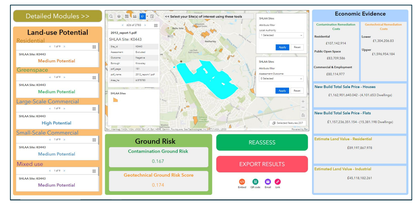
Site Average

Post-Industrial Land

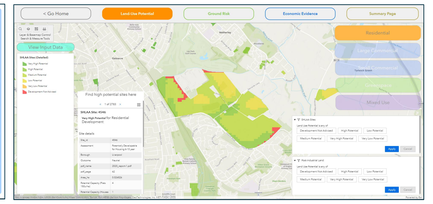
Site Detailed

3 output layers support different scales of investigation

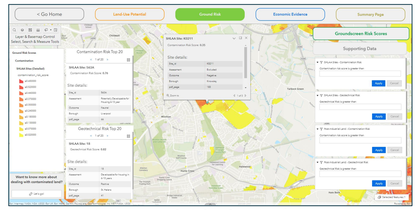
CASE-STUDY



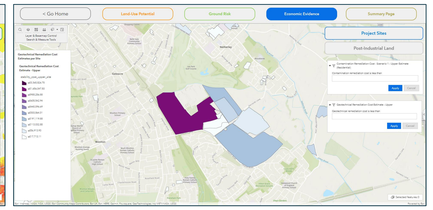
Reviewing a portfolio of sites for high-level deliverability: *Summary screen allows users to select a site, or range of sites, and returns the key classifications, scores, and values from DSS modules*



Assessing a sites development potential for different end-uses: *Identify sites, intra-site zones, and areas where different types of land-use may be more suitable, aiding site selection and design activities*



Investigating ground risk of a site/area: *Querying site design, development plans and the design of ground investigation activities to target areas of higher risk*



Evaluating economic viability: *Assess viability of site put forward for development, or challenge assumptions on planning and development applications*

USER TESTING & VERIFICATION

- Expert stakeholders rated the DSS highly on useability, content, accuracy, and the degree to which the DSS would help them make better decisions.
- Qualitative Verification (User Testing) detailed investigation of 12 sites by experts:

DSS outputs matched experts knowledge/expectation

- Quantitative Verification of Land-Use Potential Models (GIS Comparison):

Residential	Large-Commercial	Small-Commercial	Greenspace	Mixed-Use
88.2% match	96.5% match	98.1% match	96.3% match	96.4% match

CONCLUSIONS

Adopting user-centric design as best practice for the development of effective brownfield digital tools:

1. To gain strong understanding of the research landscape and sector
2. To develop a robust use-case, identify challenges, and understand user base
3. To execute and assess outputs using diverse case studies
4. To develop a DSS through iterative prototyping

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