



## Integrated Inter-Asset Management of Street Works

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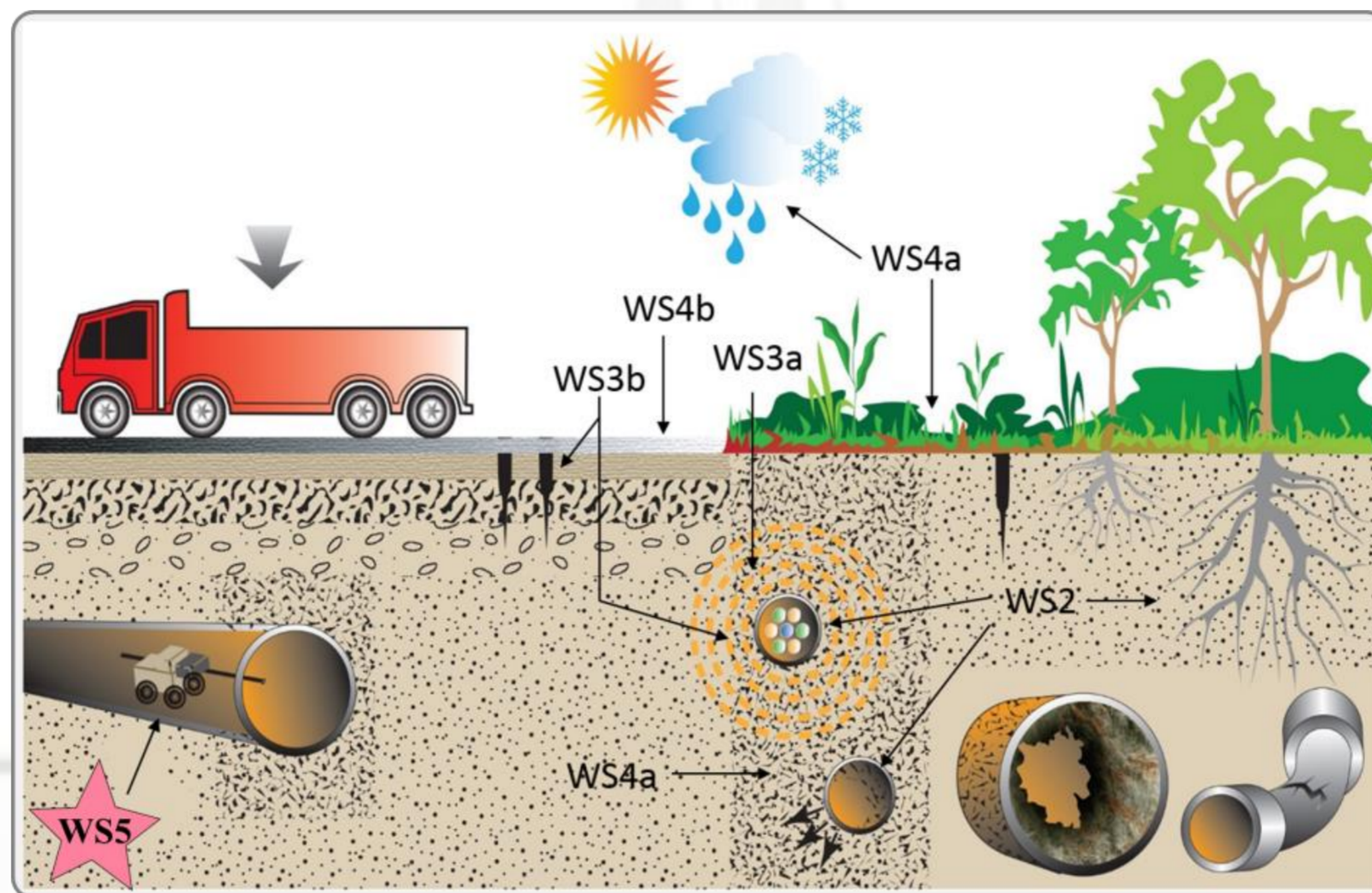
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### A System of Systems Decision Support Approach

**ATU Decision Support System (ATU-DSS):** Interactive computer system that supports asset management decisions by **integrating and reasoning** with diverse information sources about assets and their relationships.

#### Knowledge Base

- **Ontology** that defines main concepts and relationships of buried assets, ground conditions, environment, human activities.
- **Real world datasets** that come from existing mapping, geotechnical, utility data bases (Ordnance Survey, BGS, UK Water Industry Research, etc.) or are produced by ATU streams.



**System of Systems Approach:** Urban street works management requires bringing together various asset diagnosis and management systems in a holistic system which offers more complex functionality.

#### Sustainability Model

- **Cost model** to compare the outcomes of different utility services options with regard to cost efficiency.
- **Alternative practices** to suggest different investigation options for utility assessment, including both invasive and non-invasive methods.

### Example Scenario: 'Small but Mighty' Pothole

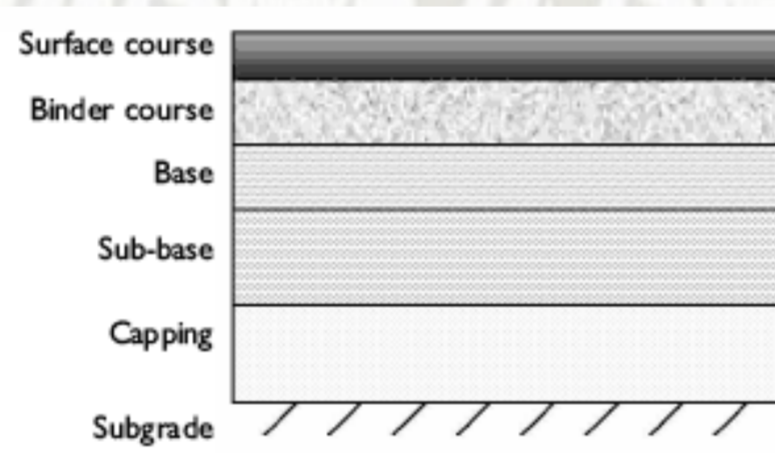


Category 2 (minor)

Foreseeable?

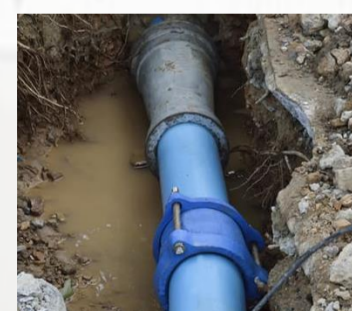


Road structure?



Ground movement beneath road?

Failure of subsurface infrastructure

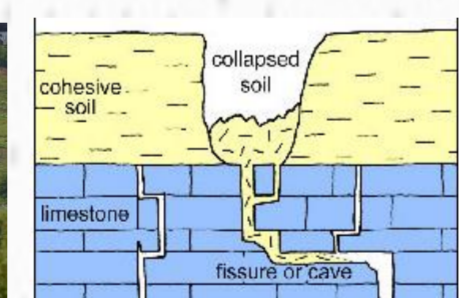


Geological causes (Hazards)

Water increase



Landslides



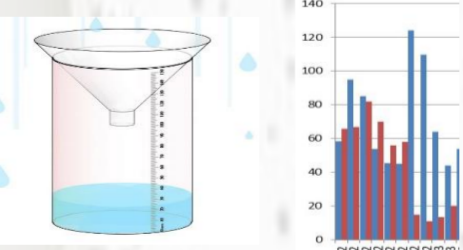
Karst

Drought



Shrinkage

Rainfall?



Weather and climate (Met. Office)

Alternatives for investigation?



Invasive



Non invasive (Geophysics)

### DSS Functions and Architecture

#### DSS Stakeholder Requirements

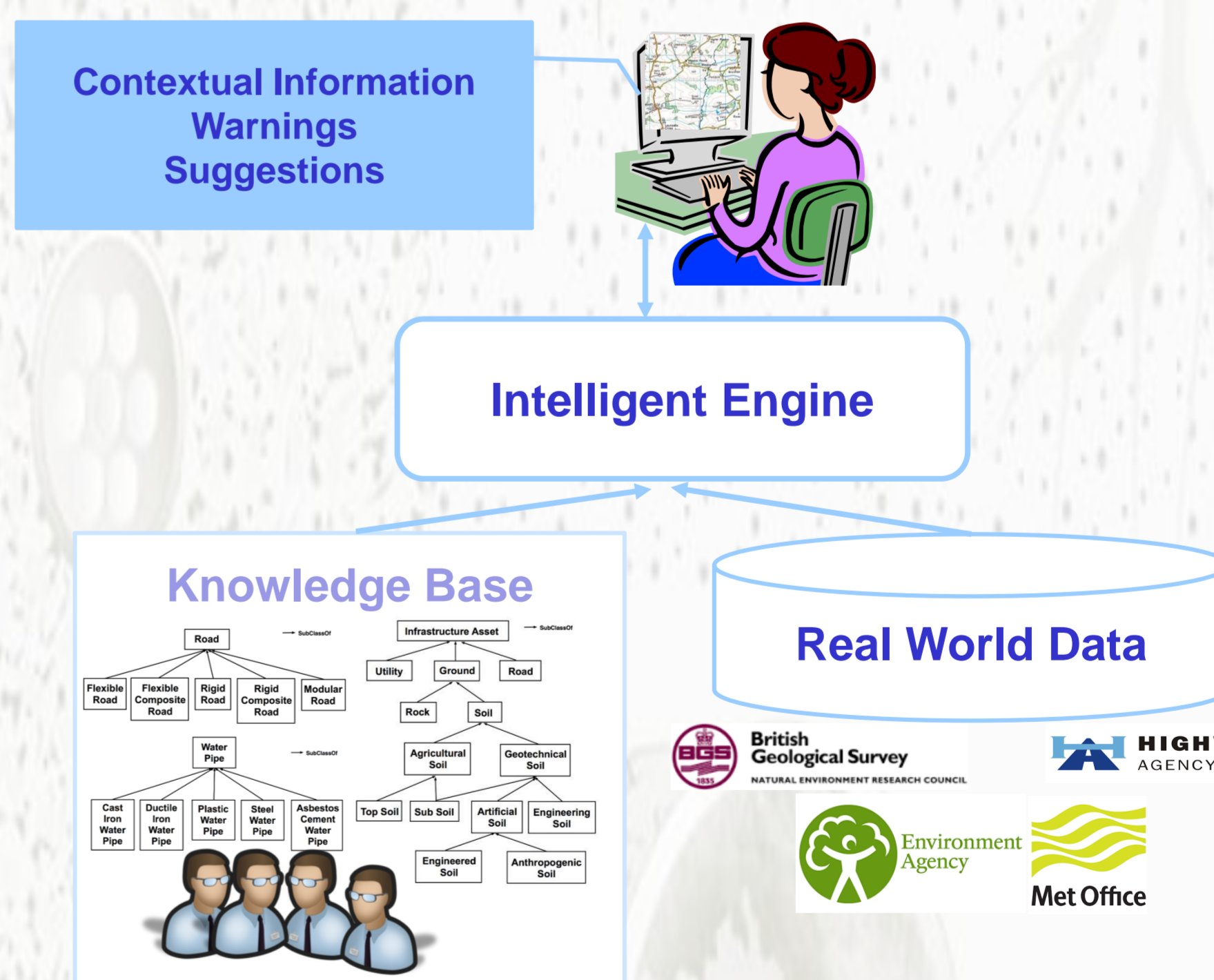
The ATU stakeholder workshop in December 2013:

- Supply one authority to plan and manage underground space;
- Provide knowledge about asset management alternatives;
- Help with quantifying the costs/benefits.

#### DSS Provides

- Contextual information referring to links with other assets;
- Warnings about things that may be overlooked;
- Suggestions about possible actions.

#### DSS Architecture



#### Current State and Future Work

- Contextual model that captures domain experts' knowledge of ground, roads, pipes asset management (complete);
- Logical coding of the knowledge base (partially complete);
- Implementing the intelligent engine;
- Collecting and refining scenarios with stakeholders;
- Validation based on the scenarios.