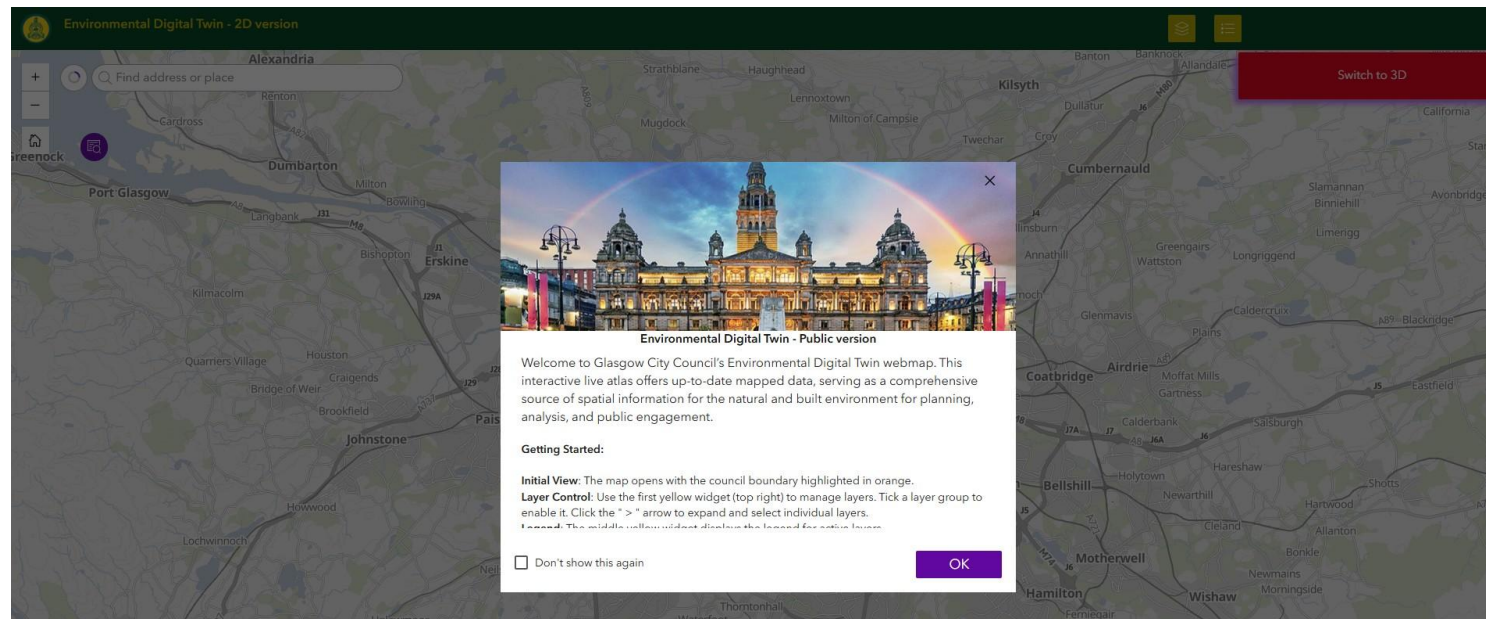


Introduction to the Environmental Digital Twin for Glasgow City Council

Presenters:

Athanasios Daravanis - GIS Analyst

David McAllister - MPhil (Urban Policy), B.A. (Hons), MRTPI Planning Officer



Climate Change

Burning fossil fuels – over 75 per cent of global greenhouse gas emissions



Deforestation for agricultural purposes

Biodiversity Loss

- Pollution
- Climate change
- Agricultural management
- Urbanisation
- Invasive non-native species
- Forest and woodland management



Scottish Response



Climate Change (Emissions Reduction Targets) (Scotland) Act 2019; brought the national target for net-zero emissions from 2050 to 2045.

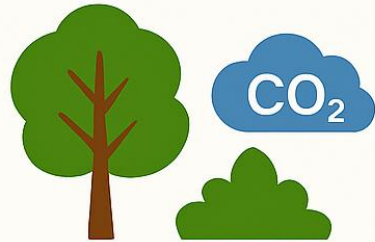


Climate Change Plan 2018-32 updated – green recovery



Scottish Biodiversity Strategy to 2045; Target: expand protected areas to at least 30% of the country's land, and seas, using nature-based solutions. It also looks to encourage nature-based solutions, expand canopy cover

The Importance of Trees and Hedgerows

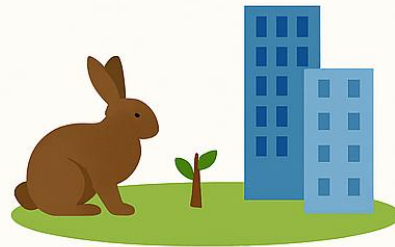


Through photosynthesis, trees remove carbon dioxide

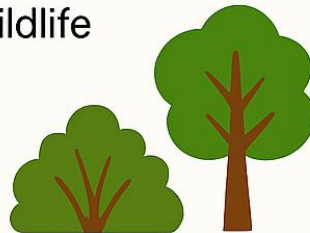
Protecting all trees and hedgerows, including replacing lost ones, helps



Expanding canopy cover aids carbon-absorption and biodiversity



Trees and hedgerows form natural links for wildlife



The Planning (Scotland) Act 2019



Primarily focused on reforming Scotland's land-use planning system, and aligns it with broader environmental goals as it incorporates sustainability and climate change considerations into planning policies.

Importantly, the Act requires local authorities to prepare a forestry and woodlands strategy, which should,

- Expand the range and type of woodlands to provide multiple benefits



Broad information types

Boundaries

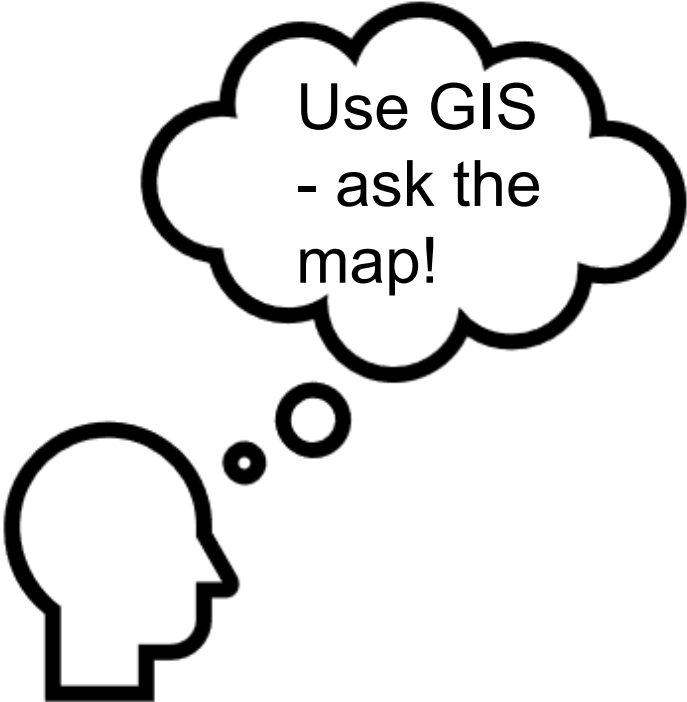
- Local Authority
- Wards

Environmental Designations

- National designations
- Local designations

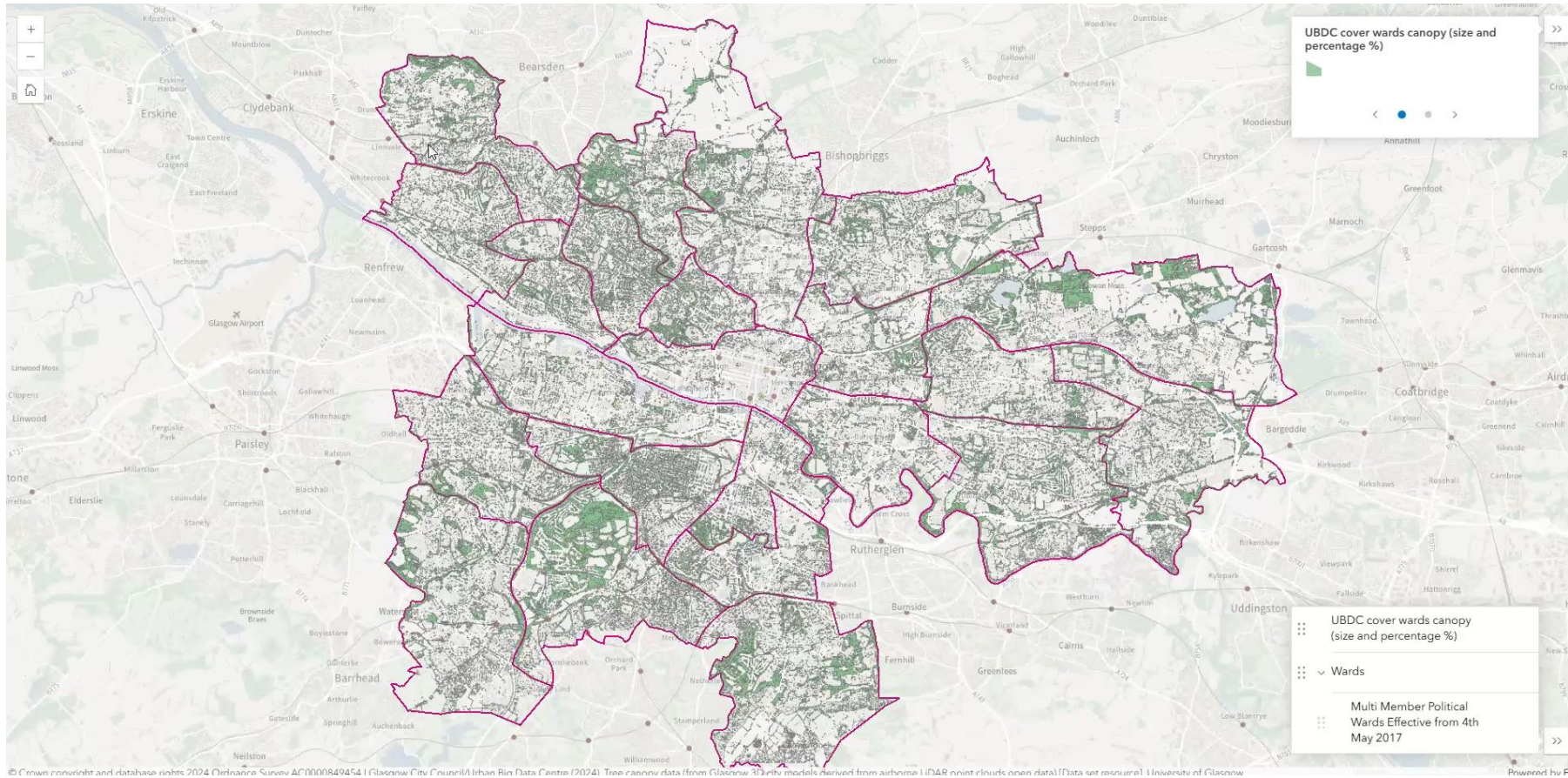
Habitats and species

- Irreplaceable/High nature conservation value
- Protected species



Use GIS
- ask the
map!

Forestry and Woodland Strategy: Tree canopy per ward



Versions of the EDT: **Public** and **Internal**.



Picture 1. A 3D reconstruction of Glasgow City Centre. By moving into 3D, we gain a complete and more immersive visualisation of the city.

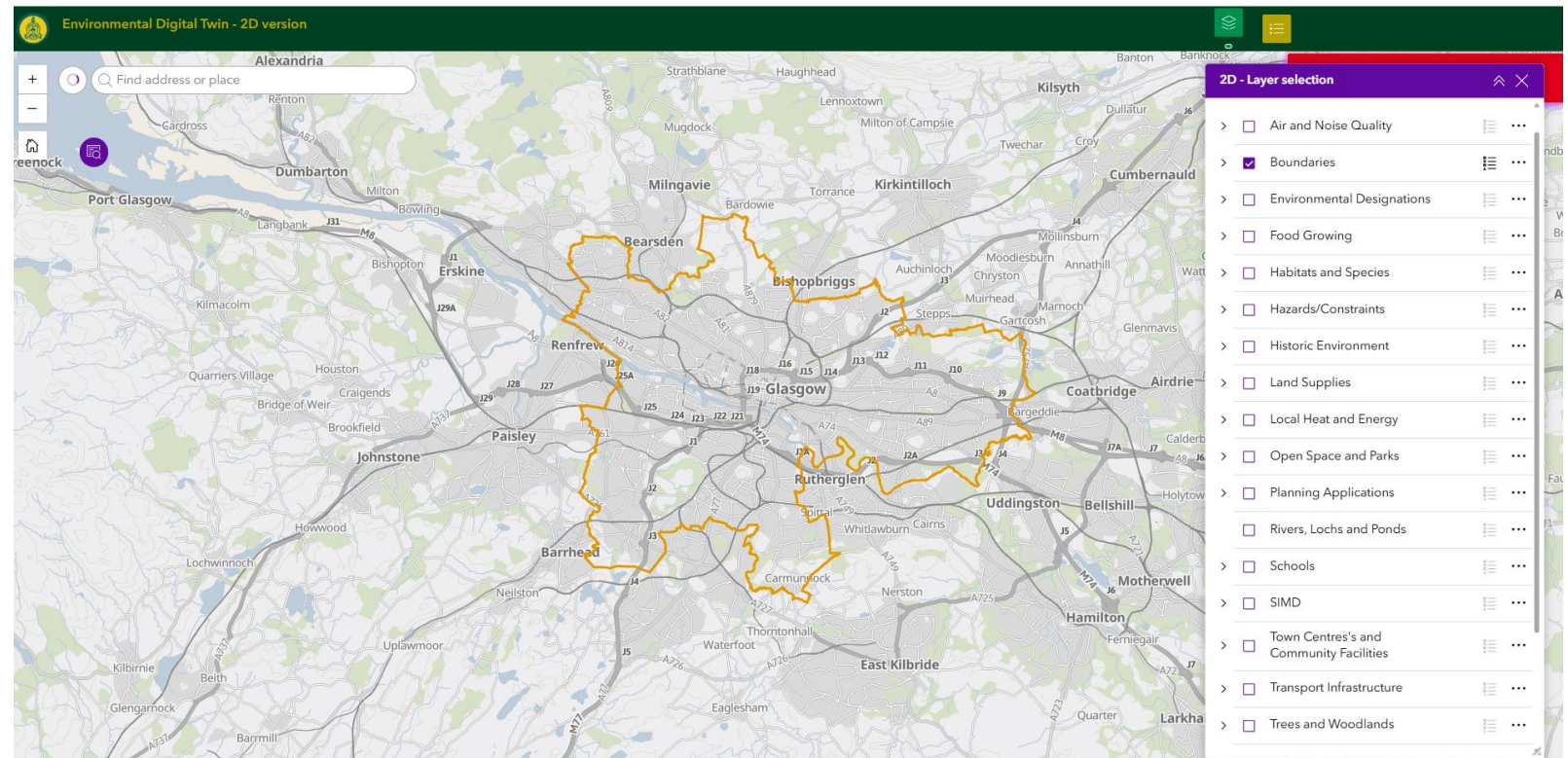
- 3D version and 2D version
- Thematic grouping of layers
- Layers exist as separate shapefiles on DataHub
- Periodic review and update of layers

WMS layers sourced from **Scottish Environment Protection Agency (SEPA)** and **Mining Remediation Authority**. Canopy cover data from **Google Environmental Insights Explore**

Public Version:

What is the Environmental Digital Twin (EDT) model?

- Dynamic, living atlas
- Thematic group of spatial information
- Regularly reviewed and updated
- Single source of truth for the organisation



Public Version

1. Click the Layer widget
2. Click the small triangle next to a group name to expand it
3. Tick the box next to the group title to activate it
4. Then, select the specific layer names you want to display on the map



Public Version

Enables members of the public to:

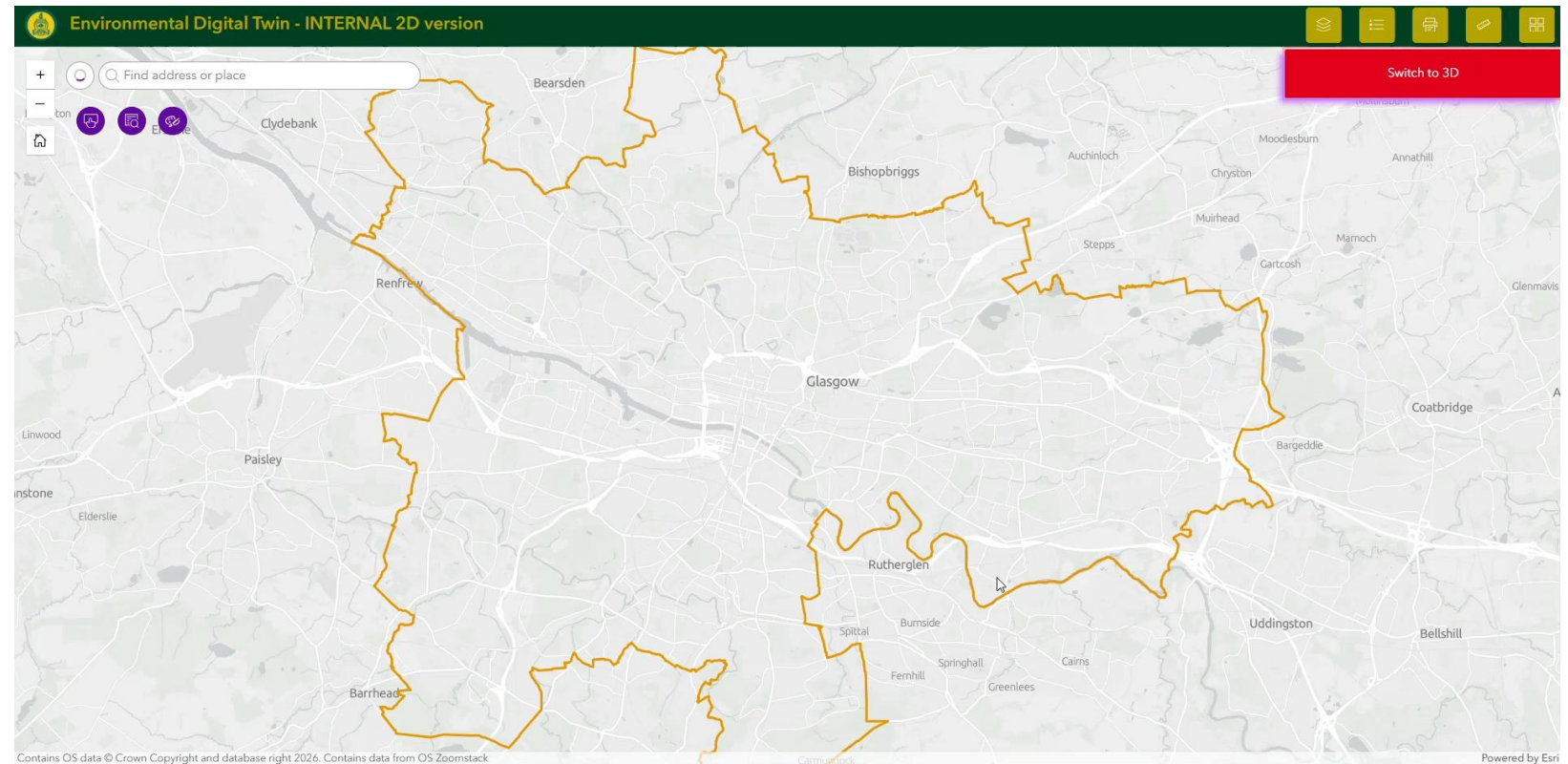
- Instantly zoom to their area of interest by typing an address or navigation
- Toggle and combine layers with a click
- Access layer feature information through pop-up tables
- Explore data directly - No need to download shp or import WMS/GeoJson

Link to the Public version of the Environmental Digital Twin model:

<https://experience.arcgis.com/experience/8acf2240c33a4c9c8768b05442632e24>

Internal Version

- Advanced functionality
- Measuring, selection by Ward and drawing
- GCC colleagues can define an area of interest, capture a screenshot, and submit a request directly via the email widget
- A request could either be a visual representation of layers, or an analysis (dashboard)
- Moreover, the GIS team could upload GIS outputs that are useful across the council (e.g. RAG rating for streets) as Web Feature Layers



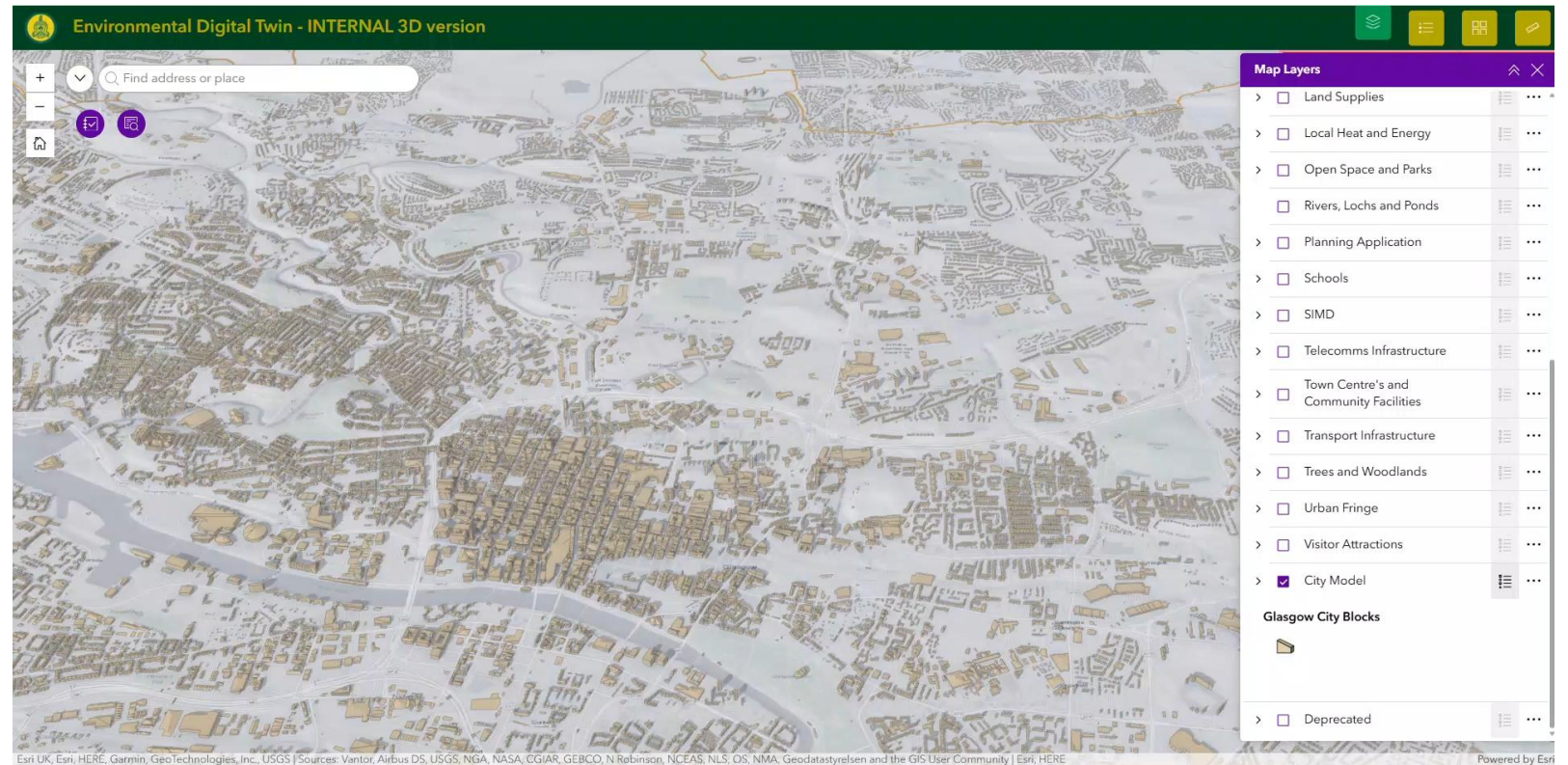
3D presentation

By moving into 3D, we gain a complete and more immersive visualisation of the city.

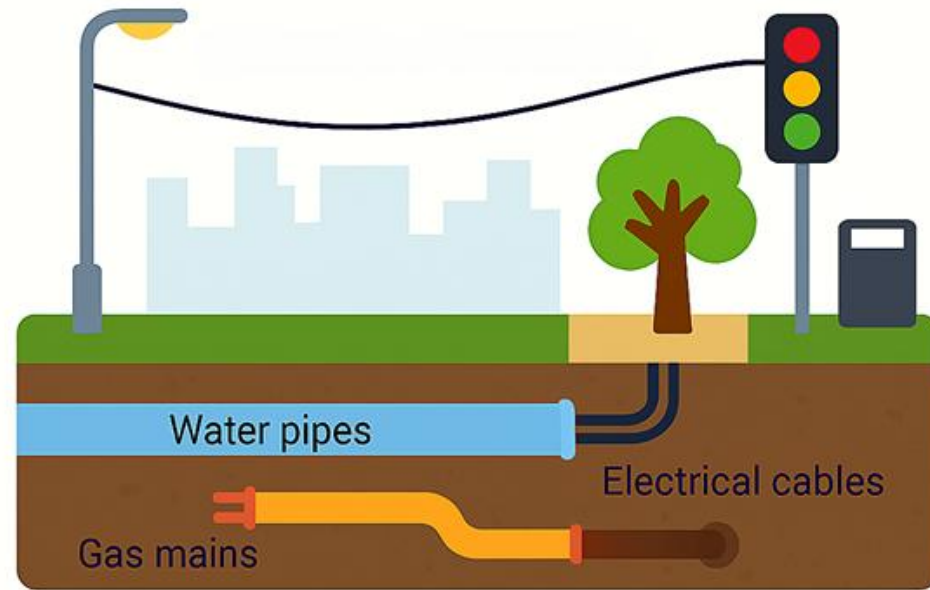
Please note: when switching to 3D, your previously active layers are not carried over automatically, so you'll need to reactivate them manually.

In this example, we'll turn on the 'Tree Maintained' layer and the 'Google Tree Canopy 2025' layer, then focus on the Kelvin parks area.

As you can see, the Google Tree Canopy data reveals a higher tree volume in some areas — suggesting that there may be many trees we haven't yet assessed in our maintained records.

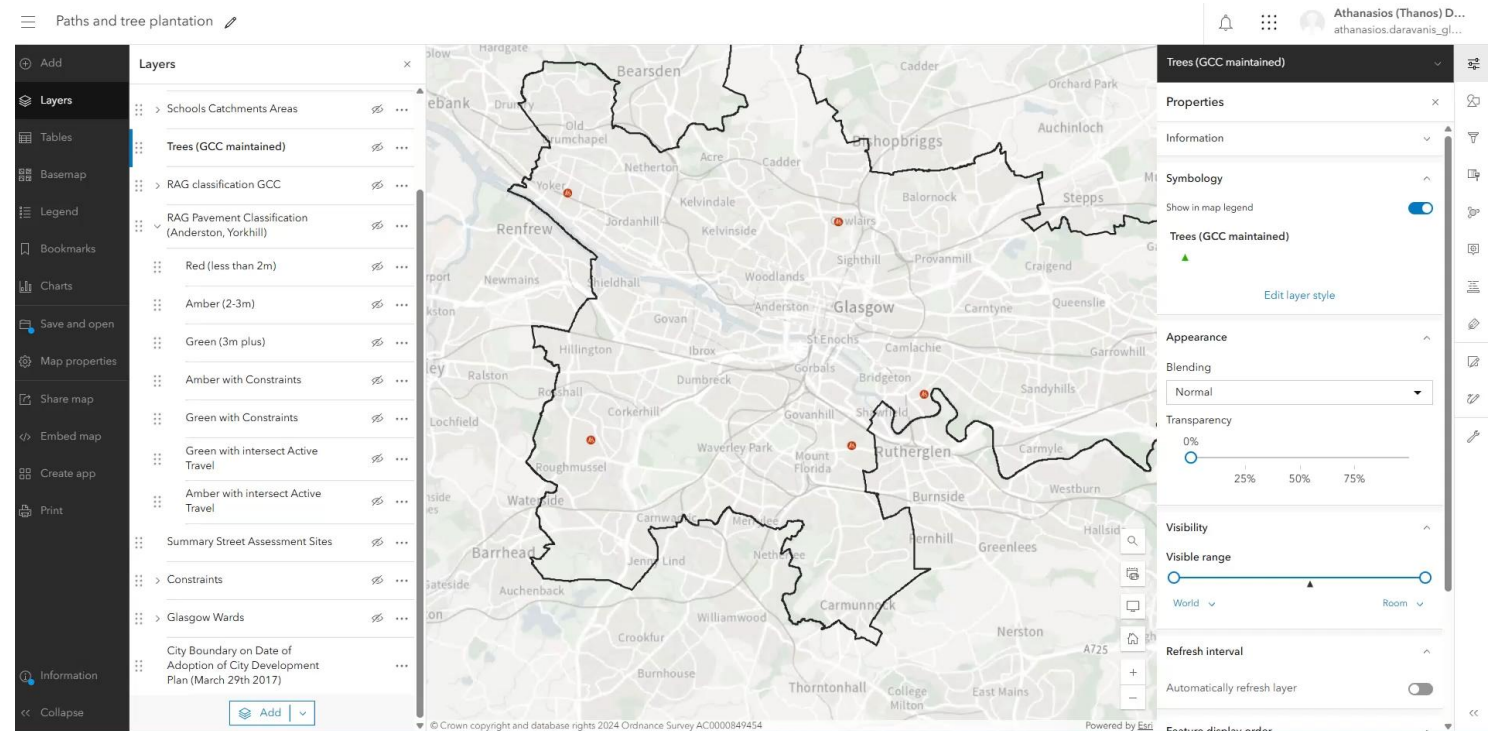


Potential Constraints to Planting Trees on Footpaths



Environmental Digital Twin applications

- Colleagues 'Ask the map' for layers
- Concentrate current and accurate layers
- Utilise ArcGIS pro for geoprocessing
- Results visible on AGOL
- Dashboard, Storymap, reporting
- Members of the public get direct access to spatial information through an app



Questions & Discussion *Spatial analysis supporting evidence-based decision making.*

