

GEOSPATIAL DATA ANALYSIS AND VISUALISATION IN R AND PYTHON

Ordnance Survey

Public Sector Data Science Graduate Programme

Data Science Team

The Data Science team within Ordnance Survey uses data science to develop OS's long-term capability and geospatial data assets. We explore the derivation of new foundational datasets and insights from OS and third-party data, and support data science teams within customer organisations to better understand and meet their future needs.



Chris Jochem
Data Scientist



Anna Labetski
Data Scientist



Kate New
Data Scientist



Seb Stansfield
Data Scientist



Tom Peterken
Data Scientist



Steve Kingston
Senior Data Scientist

GeoDataViz Team

Supporting customers across the public sector and beyond to make sense of data through compelling visuals.



Hannah Wright

Technical Relationship Consultant



Paul Naylor

Technical Relationship Consultant

Tuesday's Agenda

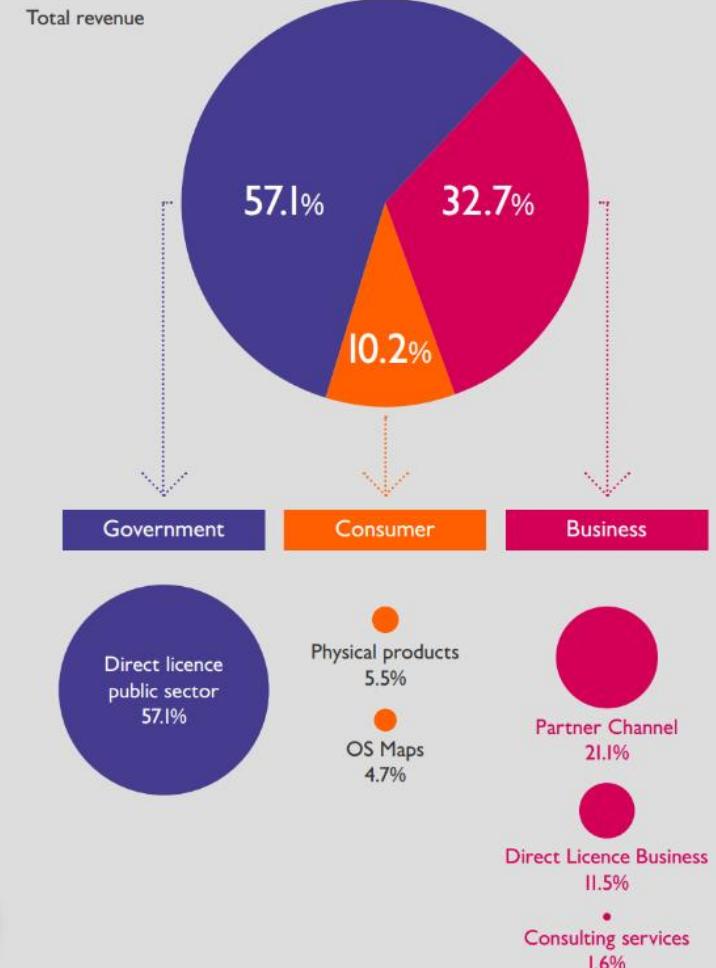
Time	Topic
09:30 – 09:45	An introduction to Ordnance Survey and access to the National Geographic Database (NGD) via the Public Sector Geospatial Agreement (PSGA)
09:45 – 10:00	Posit Cloud platform access and walkthrough
10:00 – 11:45	OS Open Greenspace exploratory data analysis
11:45 – 12:00	Break
12:00 – 12:30	Introduction to Geographic Data Visualisation (GDV)
12:30 – 13:00	Cartographic design principles & colour
13:00 – 14:00	Lunch
14:00 – 14:30	Thematic mapping and exercise
14:30 – 15:00	Map critique and exercise
15:00 – 15:15	Break
15:15 – 15:30	An introduction to the OS Data Hub
15:30 – 15:45	Using the osdatahub package(s) to download OS data
15:45 – 16:00	Wrap-up

Wednesday's Agenda

Time	Topic
09:30 – 10:45	Colour palettes, classification schemes, and choropleth mapping
10:45 – 11:00	Break
11:00 – 12:00	Exercise - ‘Visualising the Spatial Distribution of MSOA Accessibility to Green Space’ exercise exploring the integration between Office for National Statistics (ONS) and Ordnance Survey (OS) data’
12:00 – 12:15	Break
12:15 – 13:00	Exercise
13:00 – 14:00	Lunch
14:00 – 15:30	Exercise
15:30 – 15:45	Wrap-up and close

Ordnance Survey

As the **National Mapping Service**, Ordnance Survey (OS) creates, maintains, and disseminates consistent, definitive, and authoritative geospatial data of **Great Britain**.



100,000 km²

of Great Britain flown every year



200

surveyors

geoplace® **GeoHub**



UPRNs

38,717,925



USRNs

1,525,567 3,318,735 ASD submitted

Data Sources

348

Planning
Authorities
In England & Wales

174

Local Highway
Authorities
In England & Wales

One Scotland
Gazetteer

From the
Improvement
Service in Scotland



From Land &
Property Services in
Northern Ireland



From the Isle of Man
Government



From the Channel
Islands via Digimap



Royal Mail



Valuation Office
Agency

4

National/
Regional
Highways
Authorities

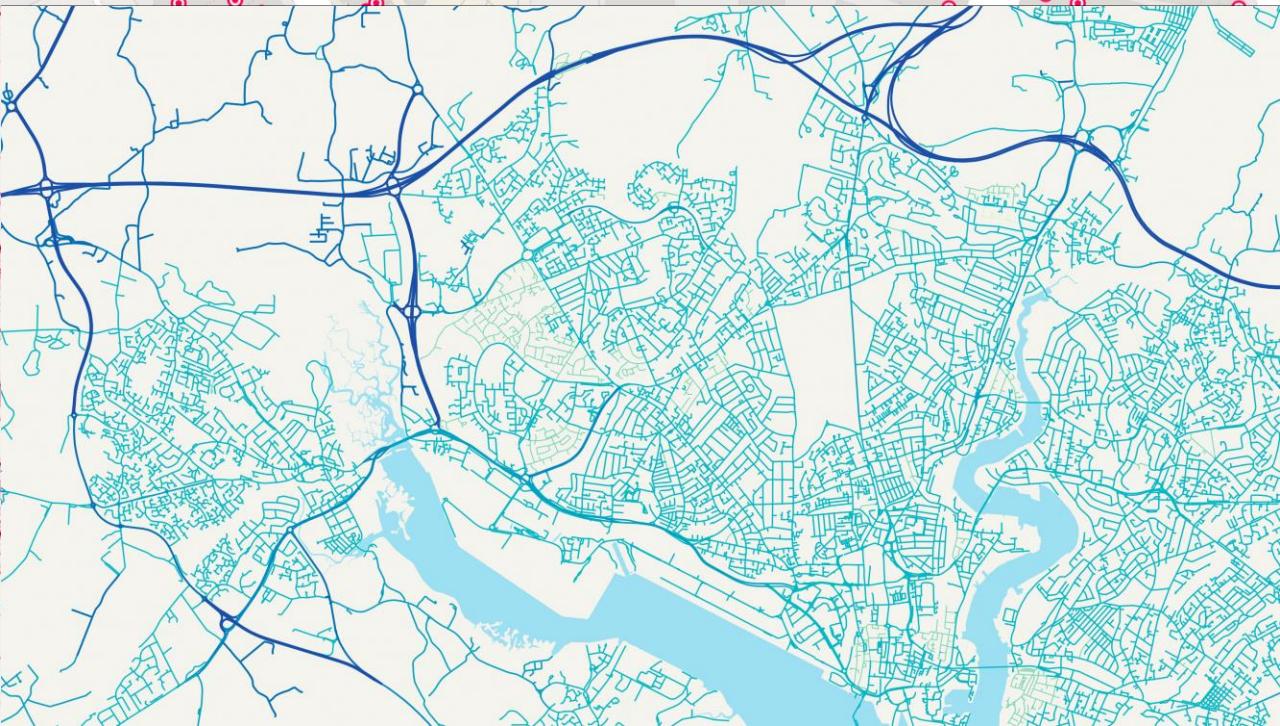
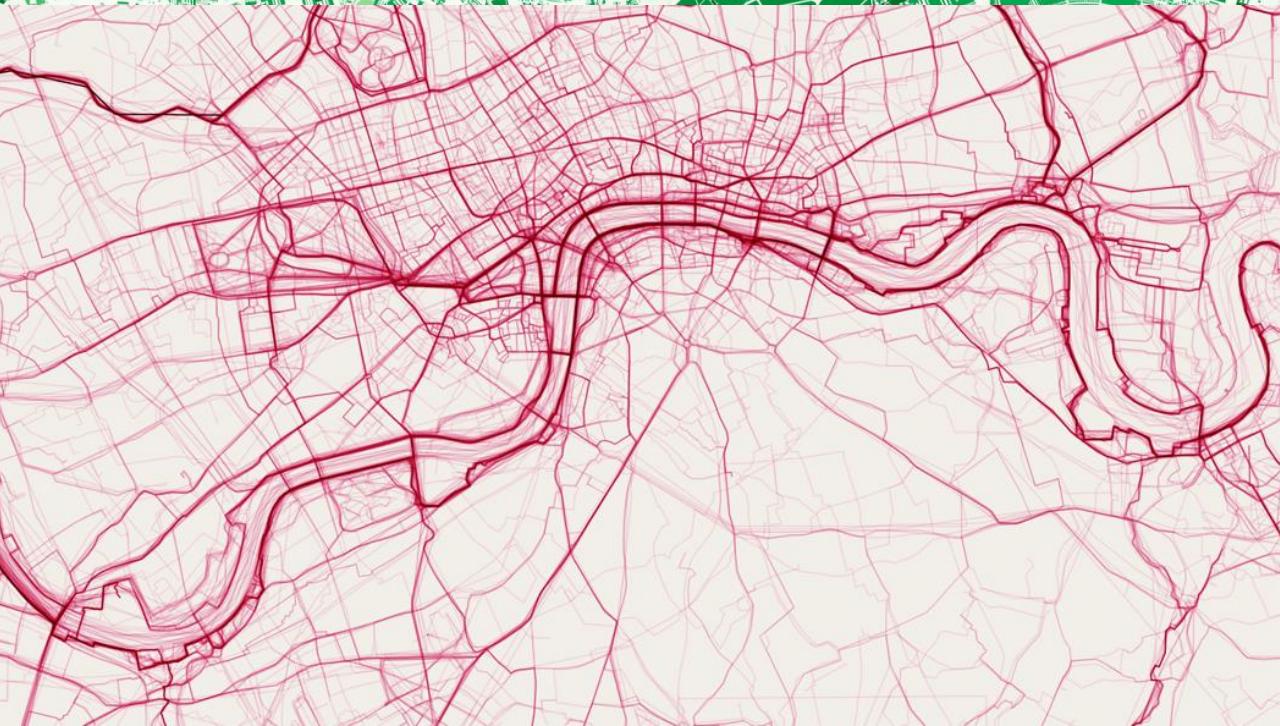
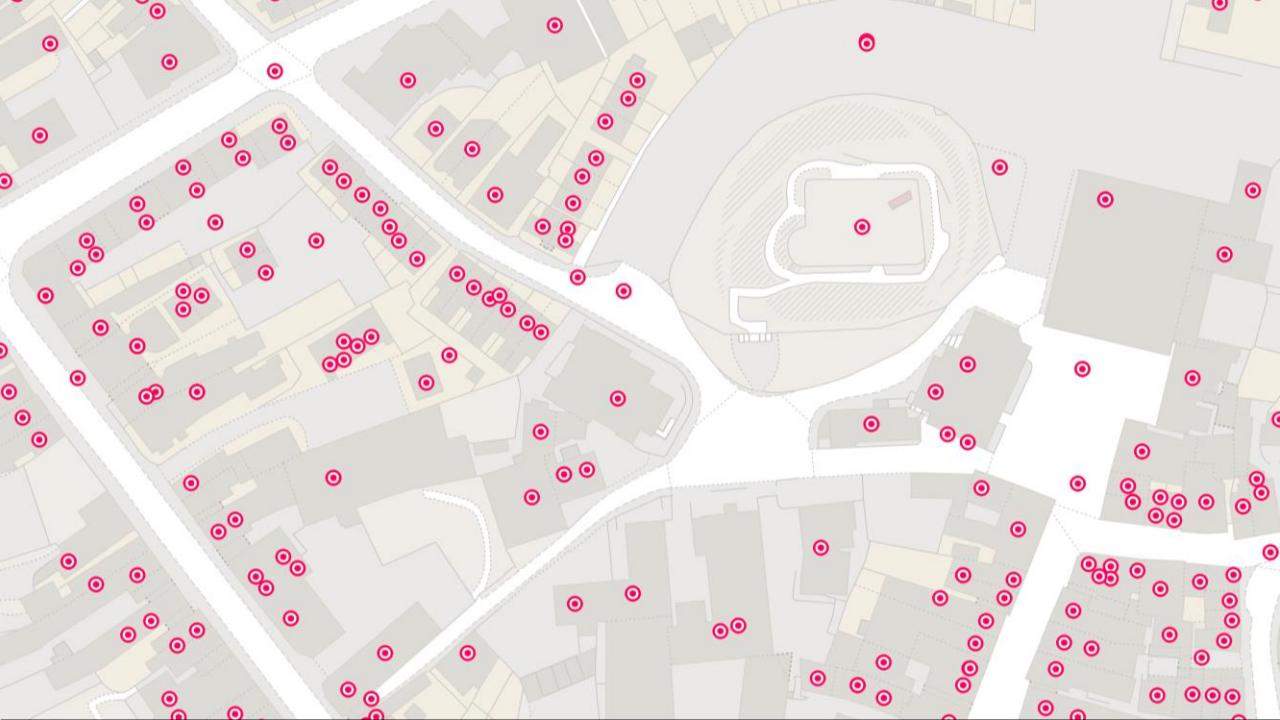


Transport for London,
Welsh Government,
Network Rail,
Highways England



Ordnance Survey data

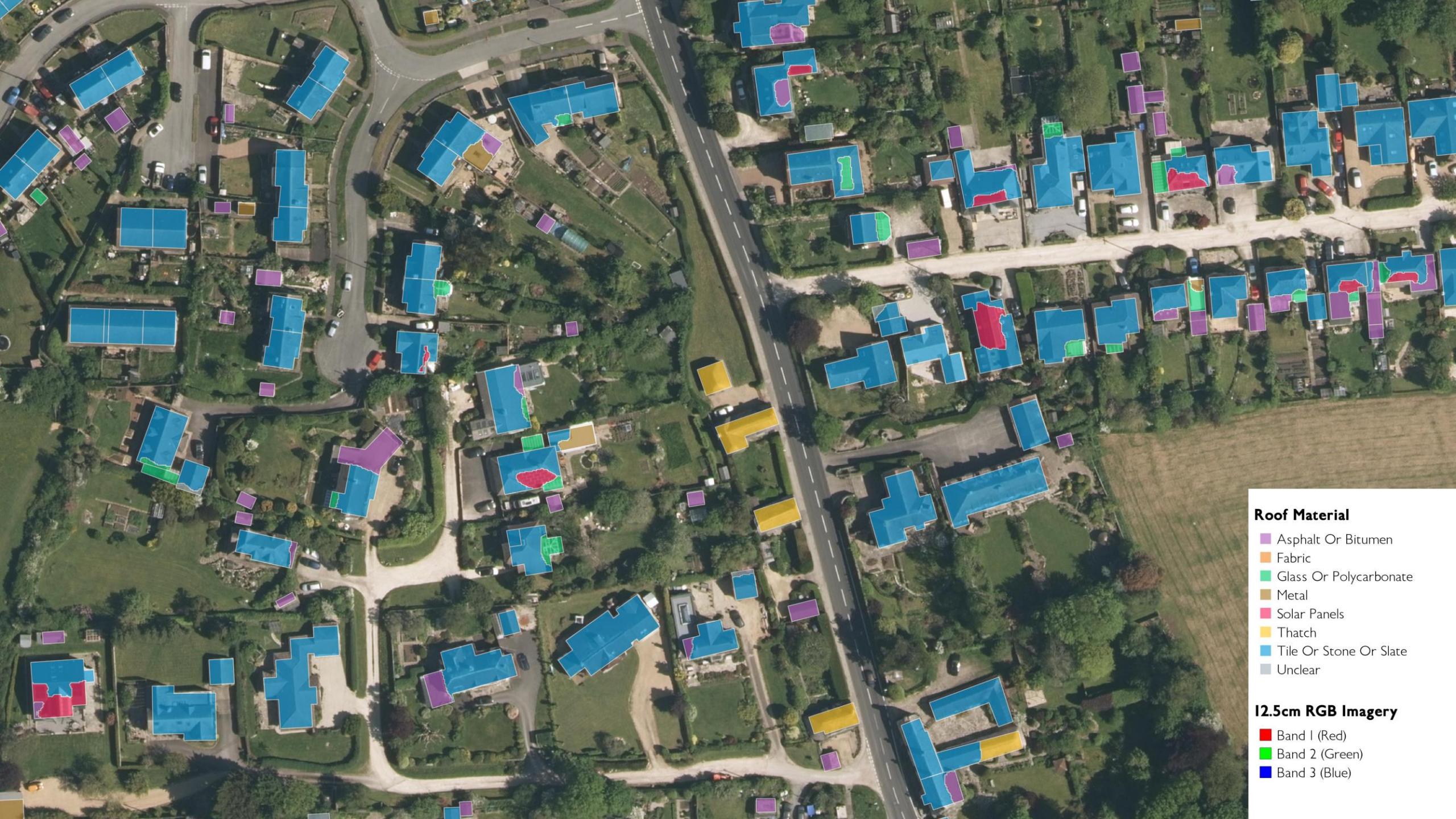




OS National Geographic Database

- The **Public Sector Geospatial Agreement (PSGA)** is the foundation of OS's national mapping services for Great Britain.
- The launch of the **National Geographic Database (NGD)** provides 6,000 public sector customers with location data and expertise, helping deliver more efficient public services.
- NGD data can be accessed via OS's data portal called the **OS Data Hub**.



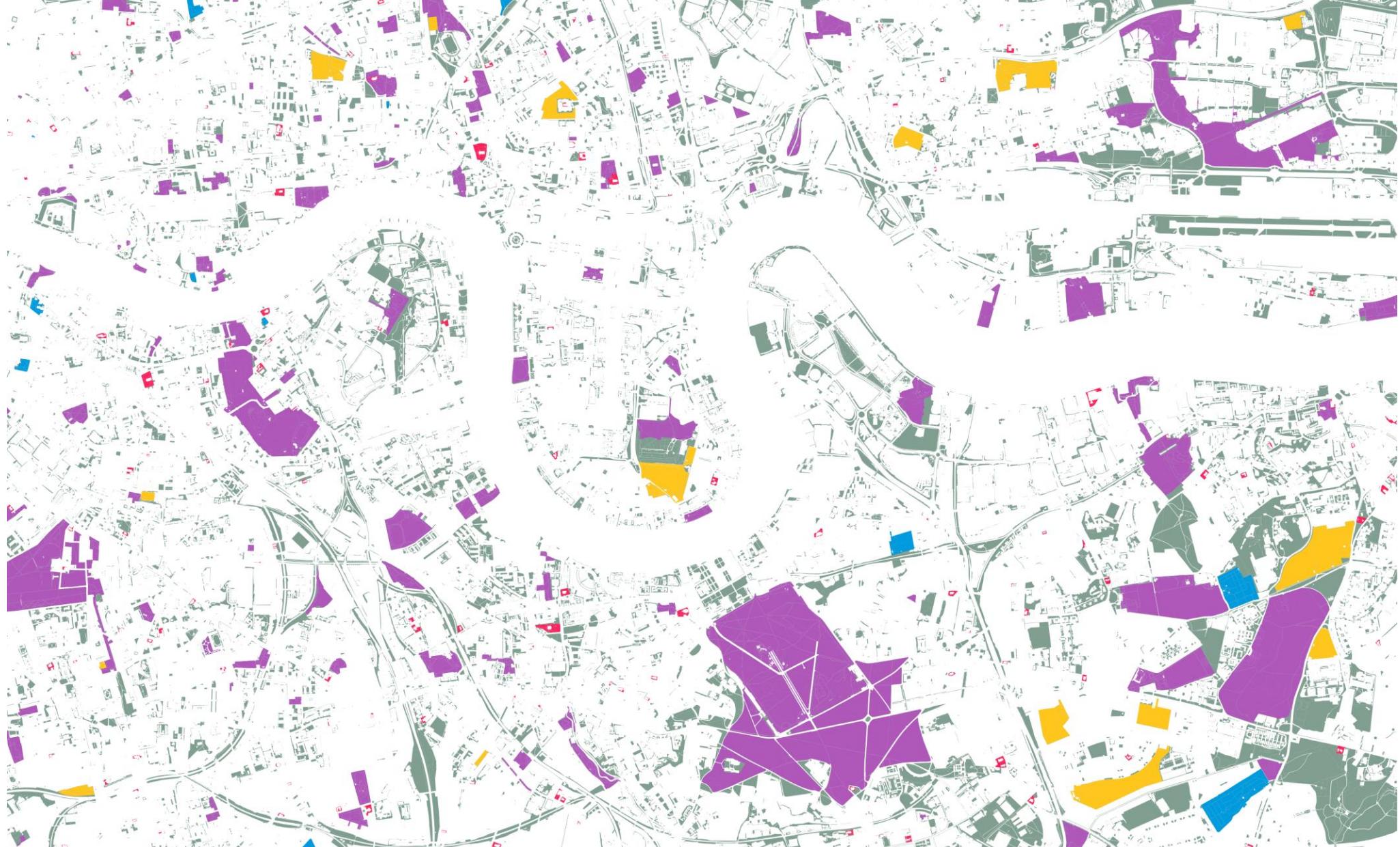


Roof Material

- Asphalt Or Bitumen
- Fabric
- Glass Or Polycarbonate
- Metal
- Solar Panels
- Thatch
- Tile Or Stone Or Slate
- Unclear

12.5cm RGB Imagery

- Band 1 (Red)
- Band 2 (Green)
- Band 3 (Blue)



Cemetery Playing Field Public Park Or Garden Religious Grounds

Posit Cloud

- Hosted Python and R environments on the AWS cloud via Jupyter and Rstudio ‘projects’.
- Cloud-based platform abstracts *most* local environment setup complexity away from us.
- Only a web browser required.



Posit Cloud Setup

- Invitation to Ordnance Survey's Posit Cloud 'spaces' as a 'contributor' for the Geospatial Module:
 1. Click on link.
 2. Accept entry into Ordnance Survey's 'space'.
 3. Click on the project which has been registered as an 'assignment' to clone the project.
 4. Click on your personal project to start and open the Jupyter notebook/RStudio server.
- Your project clone is isolated from all other user projects. Please feel free to edit this.
- If you have any issues, then you can always clone the original 'assignment' again.
- **Posit cloud will be accessible until Friday 14th of June.**

Create GeoDataFrame from GeoPackage (GPKG)

```
In [2]: # Create a GeoPandas GeoDataFrame from a GeoPackage (GPKG)
osogs = gpd.read_file(
    filename="../../data/ordnance-survey/os-open-greenspace-gb.gpkg",
    # GPKG Layer
    layer="greenspace_site",
)
```

```
ERROR 1: PROJ: proj_create_from_database: Open of /cloud/lib/envs/gfdsaa/share/proj failed
```



Please ignore this PROJ warning

OS API Suite

OS Maps API

Up-to-date, detailed maps of Great Britain

OS Vector Tile API

Slick, quick vector maps with customisable content and style

OS Features API

Direct access to buildings, roads, greenspaces and much more

OS Downloads API

Automate your data downloads

OS Places API

Authoritative address search and verification

OS Names API

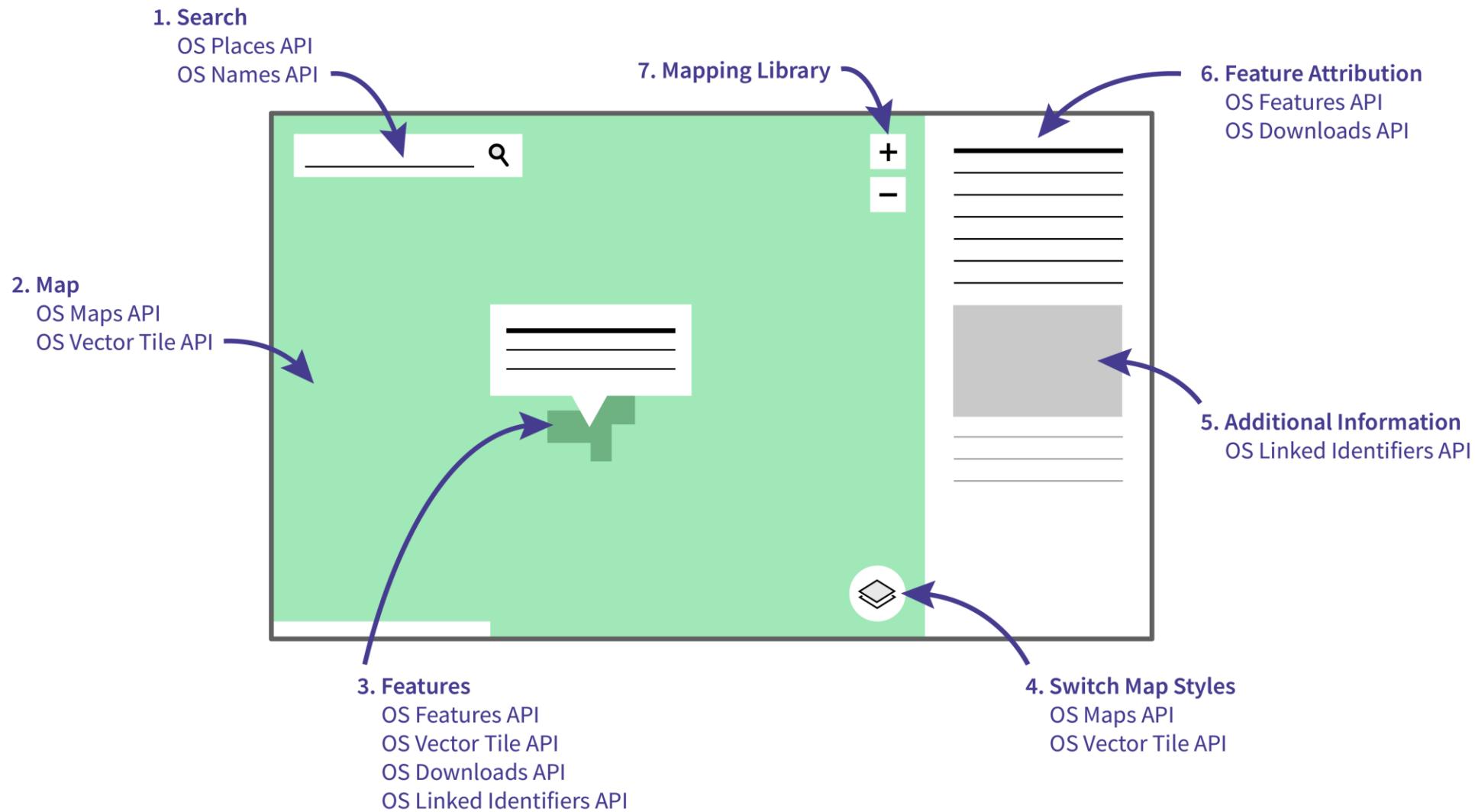
Find accurate locations of interest quickly

OS Linked Identifiers API

Discover the relationships between features to link data



Integrate OS data into your application



OS Maps API

Raster tile service

The **easiest** way to use Ordnance Survey's detailed, accurate and current maps as a backdrop

OGC standard WMTS and Restful ZXY means these maps work with almost all geospatial software (web, mobile and desktop GIS)

Two projections – British National Grid (27700) and Web Mercator (3857)

Four **cartographic styles** – choose the right map for your use case

