OS Open Zoomstack – Technical Specification

Ordnance Survey

Version History

Version	Date	Description
1.0	24/01/2019	Initial release

Purpose of this Specification

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Contents

1. Introduction

Overview

OS Open Zoomstack is a comprehensive vector basemap showing coverage of Great Britain at a national level, right down to street-level detail. Described as a "game changer" by users, it's one map, in one file that can be used for GIS, web, mobile or for offline use.

Zoomstack is supplied in GeoPackage and Vector Tiles formats.

Purpose

This document supports the Open Zoomstack Getting Started Guide and provides you with detailed technical information relating to the product.

Resources

The following documents are associated with OS Open Zoomstack and which are accessible from our [website](#):

1. OS Open Zoomstack Product Guide

2. OS Open Zoomstack Getting Started Guide

3. **OS Open Zoomstack Technical Specification**

Target Audience

This document is intended for:

- Users with technical knowledge in GIS.

Supply Formats

- GeoPackage (zipped) – Approximately 3.8GB zipped and 11.8 unzipped

- Vector Tiles (MBTiles) – Approximately 2.6GB

Coverage

This data covers content for Great Britain (England, Wales and Scotland).

2.   Comparison Between Vector Tiles and GeoPackage

Why are they slightly different?

We have designed the data schemas slightly differently due to the way they are used and applied within a range of software. These differences are:

- **Projection** – This is the most noticeable difference. The GeoPackage is in British National Grid (EPSG: 27700) whilst Vector Tiles is in Web Mercator (EPSG: 3857).

- **Number of layers** - They contain a different number of layers (21 for GeoPackage, 18 for Vector Tiles) as we endeavoured to make the data as performant as possible, across a range of technologies. The nature of a Vector Tiles pyramid means that many different geometries can exist in the same layer and only be rendered at given zoom levels – a concept not apparent in many GIS software. Therefore, we made decisions to split layers out based on their spatial resolutions (e.g. roads are split into 3 layers; national, regional and local).

- **Depicting the extent of Great Britain** - The GeoPackage contains a Land layer to depict the extent of Great Britain whereas the Vector Tiles contain a Sea layer which is the inverse but gives the same visual appearance.

3.   List of Layers

The table below provides the list of layers and a brief description for each one.

Layer	Description
Airports	A centre point for all major airports including a name.
Boundaries	National boundary lines between England - Scotland and England - Wales.
Building	Generalised building footprints at both local and district resolutions. The local buildings have a unique identifier which can be used to style features distinctly. The identifier will not be persistent between product versions and therefore there will be no change history information for a feature.
Contours	These contours lines have a 10-metre interval with an index every 50 metres. Each contour contains a value.
ETL	Electricity Transmission Lines.
Foreshore	These polygons depict the part of the shore or beach which lies between the Mean Low Water Mark and Mean High Water Mark.
Greenspace	Polygon features representing the extent of places such as parks and sports facilities that are likely to be accessible to the public.
Land	This layer depicts the shape of Great Britain. (GeoPackage only)
Names	Use this point layer to render contextual labels on your map.
National Parks	Theses polygons depict the extent of the 15 National Parks in Great Britain.
Railway Stations	This layer contains a point for all stations and includes a name.
Rail	Lines representing the railway network. They are broken where they pass under bridges, buildings or other obstructing detail.
Roads	Lines representing the road network. A road is defined as a metalled way for vehicles.
Sea	This layer depicts the sea around Great Britain. (Vector Tiles only)
Sites	Polygon features that represent the area or extent of certain types of function or activity.
Surface Water	These polygons represent inland water bodies that are sufficiently wide enough to be captured as an area.
Urban Areas	These are generalised polygons representing built-up areas for use at smaller scales.
Waterlines	Lines representing rivers, canals, drains and other linear bodies of water.
Woodland	The polygons represent areas of trees: coniferous, non-coniferous and mixed.

4.   Description of the Cartographic Styles

There are four pre-made styles available for Zoomstack. These can be downloaded from GitHub, and instructions for applying them are available in the associated Getting Started Guide. This section contains a brief overview of the four available styles to help you choose.

Road
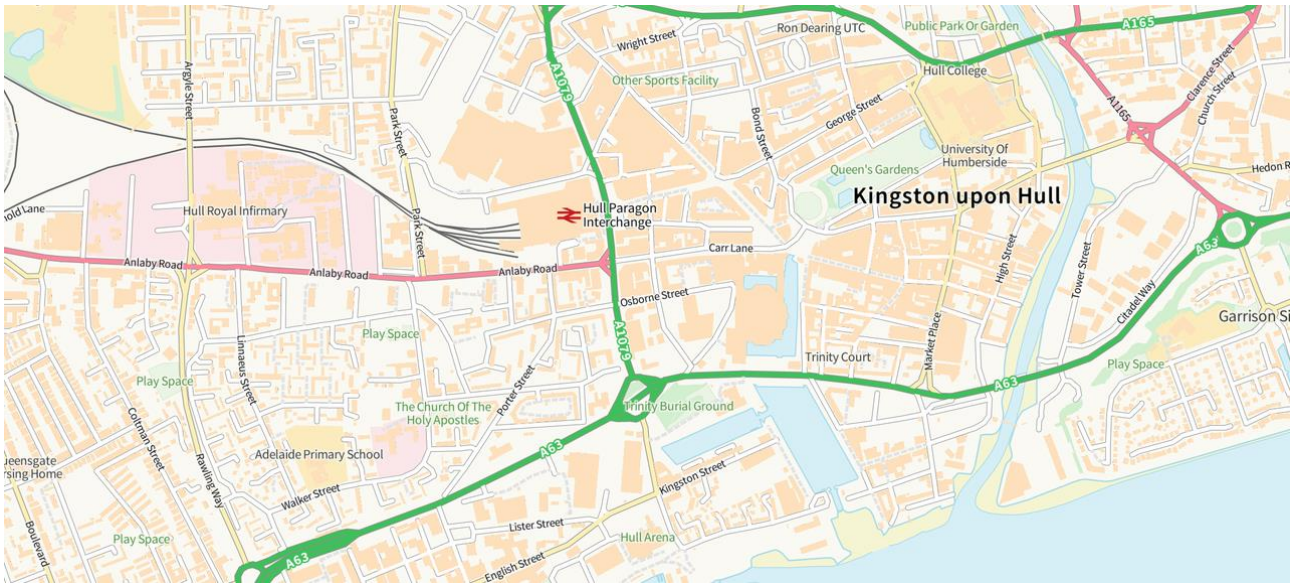
This style focuses on transport networks, specifically highlighting the Great British road network. High in contrast with lots of detail and colour, this style will fit many uses and satisfy those who are familiar with traditional OS maps.

Outdoor
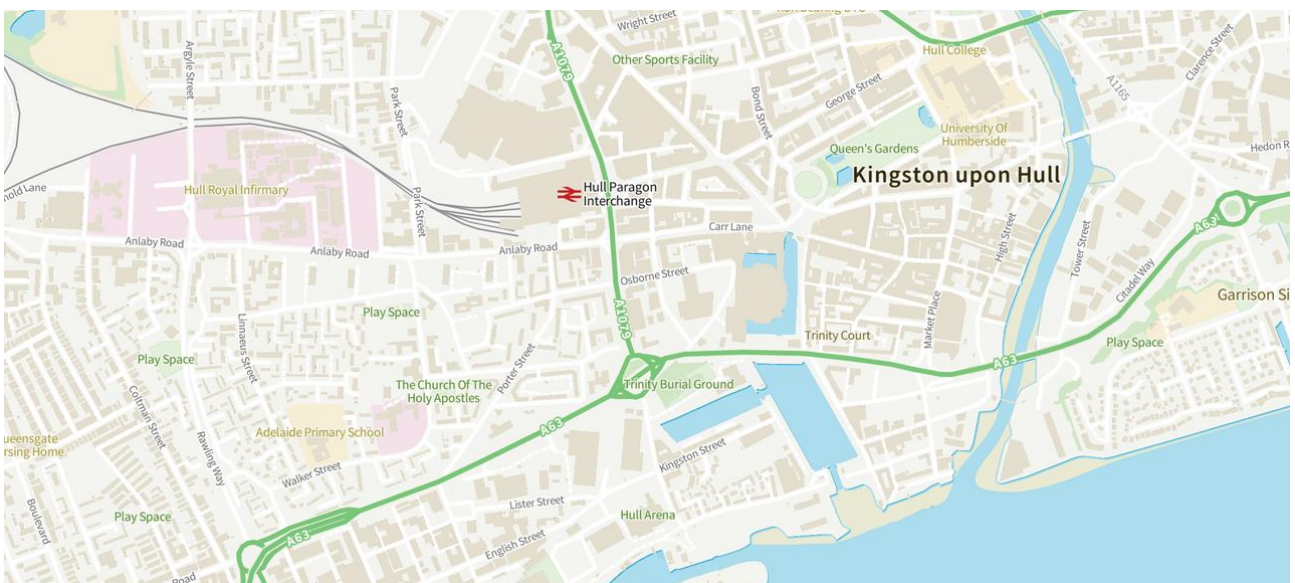
Designed for outdoor leisure and used within our OS Maps desktop and mobile application. Borrowing certain design elements from our traditional paper maps this style focusses on terrain and land cover, has a minimal colour palette and contains familiar symbology.

Light
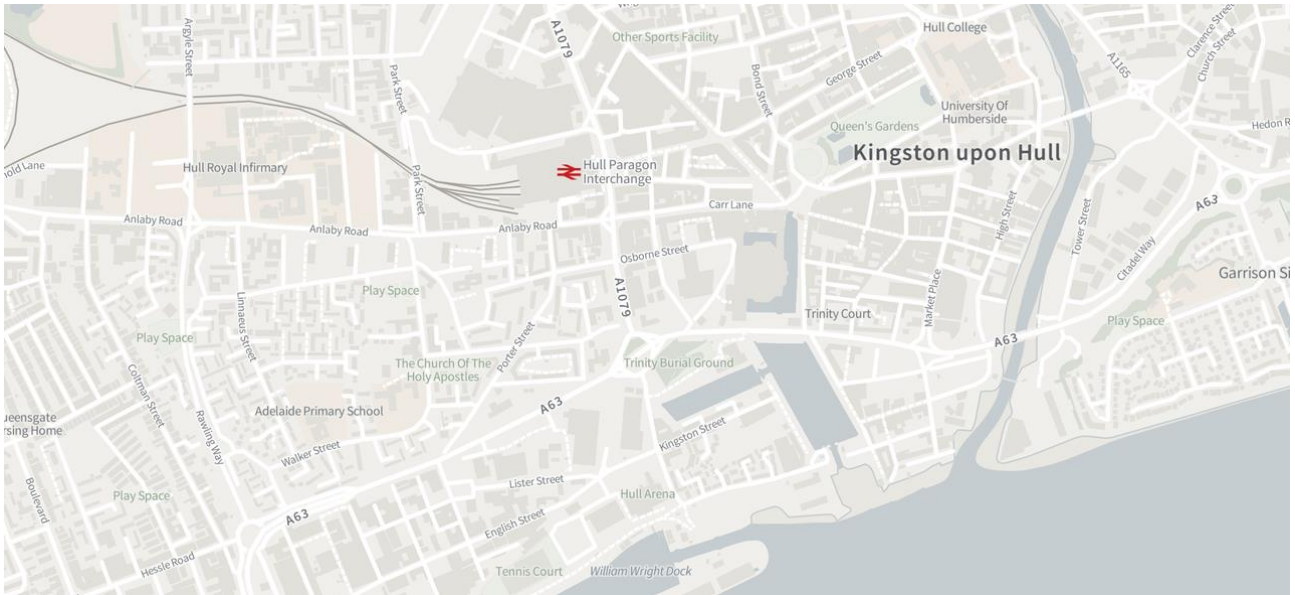
Designed specifically for data visualisation, this style has a subtle palette and is simple and clear. Use it to add geographic context and make your own data shine.

Night
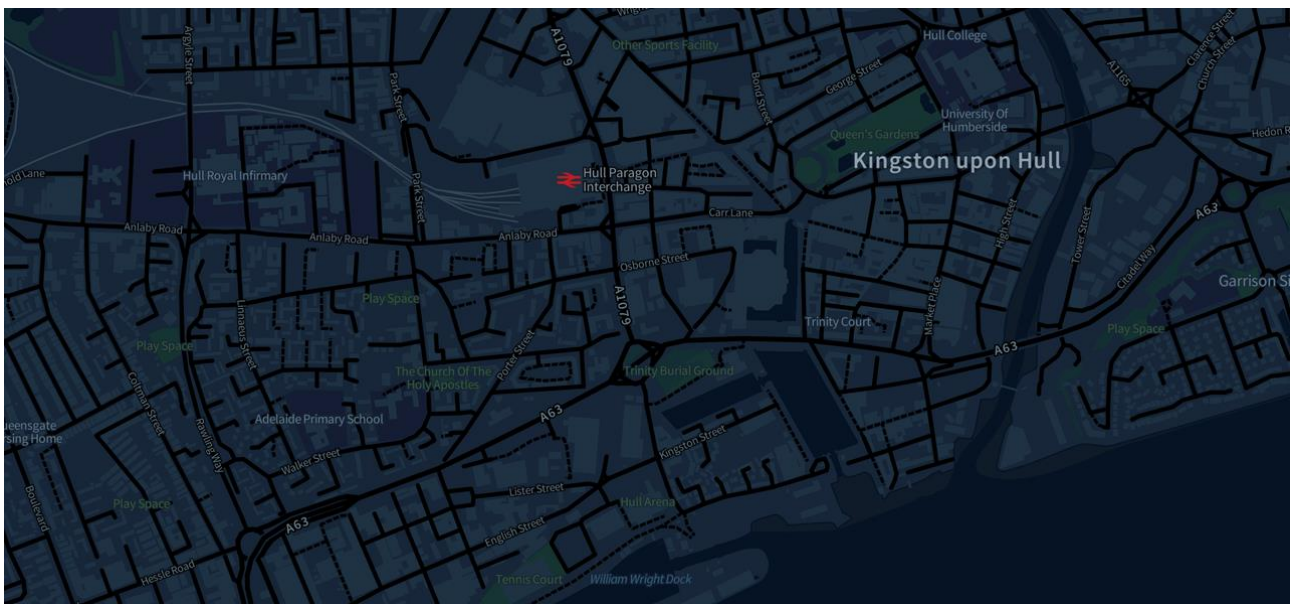
Night mode mapping that's great in dark environments. At its best on a mobile device and the dark pixels can help save your battery. Add a sense of style to your application and see your own data really pop using this style.

5.   Sea Extent and Name Languages

5.1   Vector Tile Sea Extent

If you're creating an interactive web map, you may wish to restrict the ability to pan beyond the extent of the sea polygon. The necessary coordinates for this are:

- -11.3, 49.4 - Southwest coordinates

- 3.5, 61.5 - Northeast coordinates

5.2   Name Languages

The names layer is multi-lingual. For settlement names (Cities, Towns, Villages, etc.) the *name1* attribute will contain the accepted or English name and *name2* will contain the Welsh, Gaelic or English name.

The *name1language* and *name2language* attributes let you select which names to display. For example, if you want to show all the Welsh language names then you can use these attributes to filter them out and render them on your map.

These are the attribute values in the language fields:

- cym = The name is in the Welsh language.

- eng = The name is in the English language.

- gla = The name is in the Scottish Gaelic language.

- NULL = The language type is not set if there is only one name, or if there are two names, and the language of one or both of the names is not recorded as English, Welsh or Gaelic.

6. Vector Tiles Schema

Layer	Feature Types	Attributes	0 - 4	5	6	7	8	9	10	11	12	13	14
airports	n/a	name							▩	▩	▩	▩	▩
boundaries	National	type		▩	▩	▩	▩	▩	▩	▩	▩	▩	▩
buildings	n/a	uuid									▩	▩	▩
Contours	Normal	type, value									▩	▩	▩
	Index							▩	▩	▩	▩	▩	▩
etl	n/a	n/a											
foreshore	n/a	n/a						▩	▩	▩	▩	▩	▩
greenspaces	Allotments Or Community Growing Spaces	type							▩	▩	▩	▩	▩
	Bowling Green								▩	▩	▩	▩	▩
	Cemetery								▩	▩	▩	▩	▩
	Golf Course								▩	▩	▩	▩	▩
	Other Sports Facility								▩	▩	▩	▩	▩
	Play Space								▩	▩	▩	▩	▩
	Playing Field								▩	▩	▩	▩	▩
	Public Park Or Garden								▩	▩	▩	▩	▩
	Religious Grounds								▩	▩	▩	▩	▩
	Tennis Court								▩	▩	▩	▩	▩
names	Country	type, name1, name1language, name2, name2language		▩	▩	▩	▩	▩	▩	▩	▩	▩	▩
	Capital			▩	▩	▩	▩	▩	▩	▩	▩	▩	▩
	National Park				▩	▩	▩	▩	▩	▩	▩	▩	▩
	City			▩	▩	▩	▩	▩	▩	▩	▩	▩	▩
	Town					▩	▩	▩	▩	▩	▩	▩	▩
	Village								▩	▩	▩	▩	▩
	Hamlet							▩	▩	▩	▩	▩	▩

Zoom Levels shown in header spanning columns 0 - 4 through 14.

Group	Type	Attributes	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
names	Small Settlements	type, name1, name1language, name2, name2language													●	●	●
	Suburban Area												●	●	●	●	●
	Woodland													●	●	●	●
	Landform													●	●	●	●
	Landcover													●	●	●	●
	Water													●	●	●	●
	Greenspace															●	●
	Sites															●	●
	Motorway Junctions																●
national_parks	n/a	n/a		●	●	●	●	●	●			●	●	●	●	●	●
railwaystations	Light Rapid Transit Station	type, name													●	●	●
	Light Rapid Transit Station And London Underground Station														●	●	●
	Light Rapid Transit Station And Railway Station														●	●	●
	London Underground Station														●	●	●
	Railway Station														●	●	●
	Railway Station And London Underground Station														●	●	●
rail	Multi Track	type											●	●	●	●	●
	Single Track												●	●	●	●	●
	Narrow Gauge												●	●	●		●
	Tunnel												●	●	●	●	●
roads	Motorway	type, name, number, level		●	●	●	●	●	●	●	●	●	●	●	●	●	●
	Primary			●	●	●	●	●	●	●	●	●	●	●	●	●	●
	A Road						●	●	●	●	●	●	●	●	●	●	●
	B Road									●	●	●	●	●	●	●	●
	Guided Busway							●	●	●	●	●	●	●	●	●	●
	Minor												●	●	●	●	●
	Local														●	●	●
	Restricted														●	●	●
	Tunnels								●	●	●	●	●	●	●	●	●

Feature	Subcategory	Attribute	1	2	3	4	5	6	7	8	9	10	11	12	13
sea	n/a	n/a	■	■	■	■	■	■	■	■	■	■	■	■	■
sites	Air Transport	type										■	■	■	■
	Education											■	■	■	■
	Medical Care											■	■	■	■
	Road Transport											■	■	■	■
	Water Transport											■	■	■	■
surfacewater	n/a	n/a			■	■	■	■	■	■	■	■	■	■	■
urban_areas	n/a	type		■	■	■	■	■	■						
waterlines	National	type				■									
	Regional						■								
	District							■	■						
	Local												■	■	■
	MHW							■	■	■	■	■	■	■	■
	MLW						■	■	■	■	■	■	■	■	■
woodland	n/a	n/a			■	■	■	■	■	■	■	■	■	■	■

7.   GeoPackage Schema

Layer	Geometry Type	Attributes	Attribute Types	Feature Types
airports	Point	id	SERIAL PRIMARY KEY	
		name	varchar	
		geom	Point	
boundaries	LineString	id	SERIAL PRIMARY KEY	
		type	varchar	National
		geom	LineString	
contours	LineString	id	SERIAL PRIMARY KEY	
		type	varchar	Index
				Normal
		height	double precision	
		geom	LineString	
district_buildings	Polygon	id	SERIAL PRIMARY KEY	
		geom	Polygon	
etl	LineString	id	SERIAL PRIMARY KEY	
		geom	LineString	
foreshore	Polygon	id	SERIAL PRIMARY KEY	
		geom	Polygon	
greenspace	Polygon	id	SERIAL PRIMARY KEY	
		type	varchar	Allotments Or Community Growing Spaces
				Bowling Green
				Cemetery
				Golf Course
				Other Sports Facility
				Play Space
				Playing Field
				Public Park Or Garden
				Religious Grounds
				Tennis Court
		geom	Polygon	
land	Polygon	id	SERIAL PRIMARY KEY	
		geom	Polygon	
local_buildings	Ppolygon	id	SERIAL PRIMARY KEY	
		uuid	varchar	
		geom	Polygon	
names	Point	id	SERIAL PRIMARY KEY	
		Type	varchar	Country
				Capital
				City
				Town

				Village
names	Point	type	varchar	Hamlet
				Small Settlements
				Suburban Area
				Woodland
				Landform
				Landcover
				Water
				Greenspace
				Sites
				Motorway Junction
				National Park
		name1	varchar	
		name1language	varchar	cym
				eng
				gla
				NULL
		name2	varchar	
		name2language	varchar	cym
				eng
				gla
				NULL
		geom	Point	
national_parks	Polygon	id	SERIAL PRIMARY KEY	
		geom	Polygon	
railway_stations	Point	id	SERIAL PRIMARY KEY	
		type	varchar	Light Rapid Transit Station
				Light Rapid Transit Station And London Underground Station
				Light Rapid Transit Station And Railway Station
				London Underground Station
				Railway Station
				Railway Station And London Underground Station
		name	varchar	
		geom	Point	
rail	LineString	id	SERIAL PRIMARY KEY	
		type	varchar	Multi Track
				Single Track
				Narrow Gauge
				Tunnel

		geom	LineString	
roads_local	LineString	id	SERIAL PRIMARY KEY	
		type	varchar	
				Local
				Minor
				Guided Busway
		name	varchar	
		number	varchar	
		level	integer	0
				1
				2
		geom	LineString	
roads_national	LineString	id	SERIAL PRIMARY KEY	
		type	varchar	Primary
				Motorway
		name	varchar	
		number	varchar	
		level	integer	0
				1
				2
		geom	LineString	
roads_regional	LineString	id	SERIAL PRIMARY KEY	
		type	varchar	A Road
				B Road
				Tunnels
		name	varchar	
		number	varchar	
		level	integer	0
				1
				2
		geom	LineString	
sites	MultiPolygon	id	SERIAL PRIMARY KEY	
		type	varchar	Air Transport
				Education
				Medical Care
				Road Transport
				Water Transport
		geom	MultiPolygon	
surfacewater	Polygon	id	SERIAL PRIMARY KEY	
		type	varchar	Local
				Regional
				National
		geom	Polygon	
urban_areas	Polygon	id	SERIAL PRIMARY KEY	
		type	varchar	Regional

				National
		geom	Polygon	
waterlines	LineString	id	SERIAL PRIMARY KEY	
		type	varchar	Local
				District
				Regional
				National
				MHW
				MLW
		geom	LineString	
woodland	Polygon	id	SERIAL PRIMARY KEY	
		type	varchar	Local
				Regional
				National
		geom	Polygon	