

# HS2

## Phase One

# Heritage Data Management (Utilising GIS and BIM)

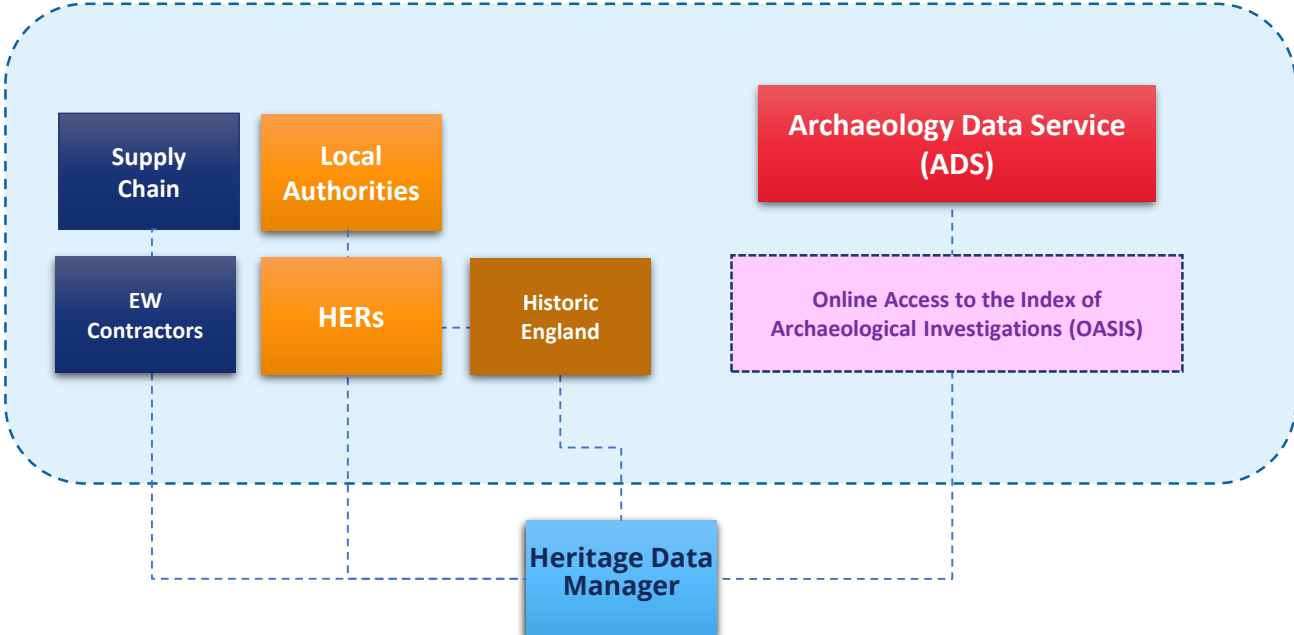
Phase One Heritage Sub-group Event

The 15<sup>th</sup> of September 2020

Phase One Heritage Data Manager, HS2 Ltd.

# HERDS Data Manager

## External Connections

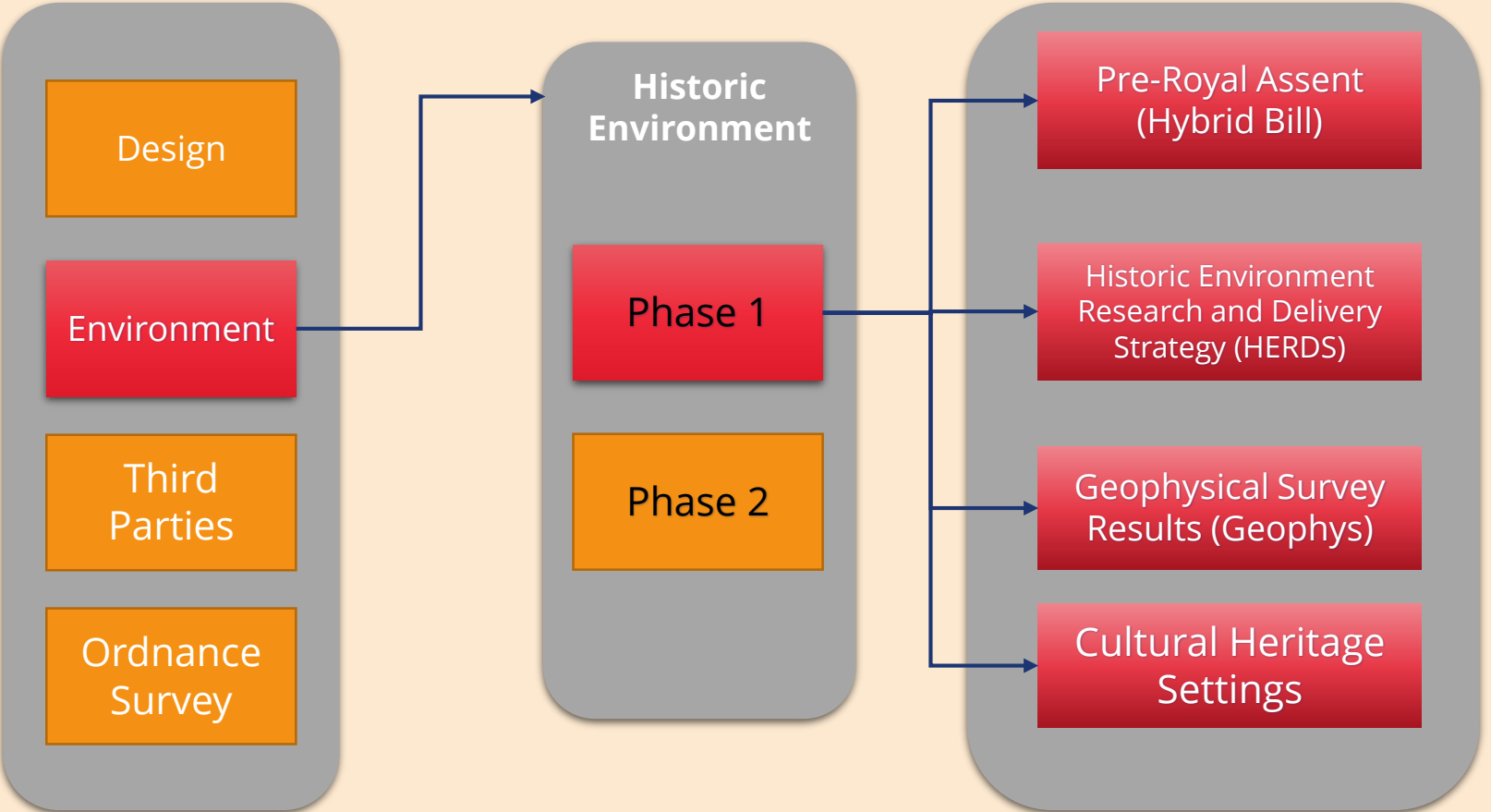


# HS2 HERDS: Historic Environment Research and Delivery Strategy (Phase One)

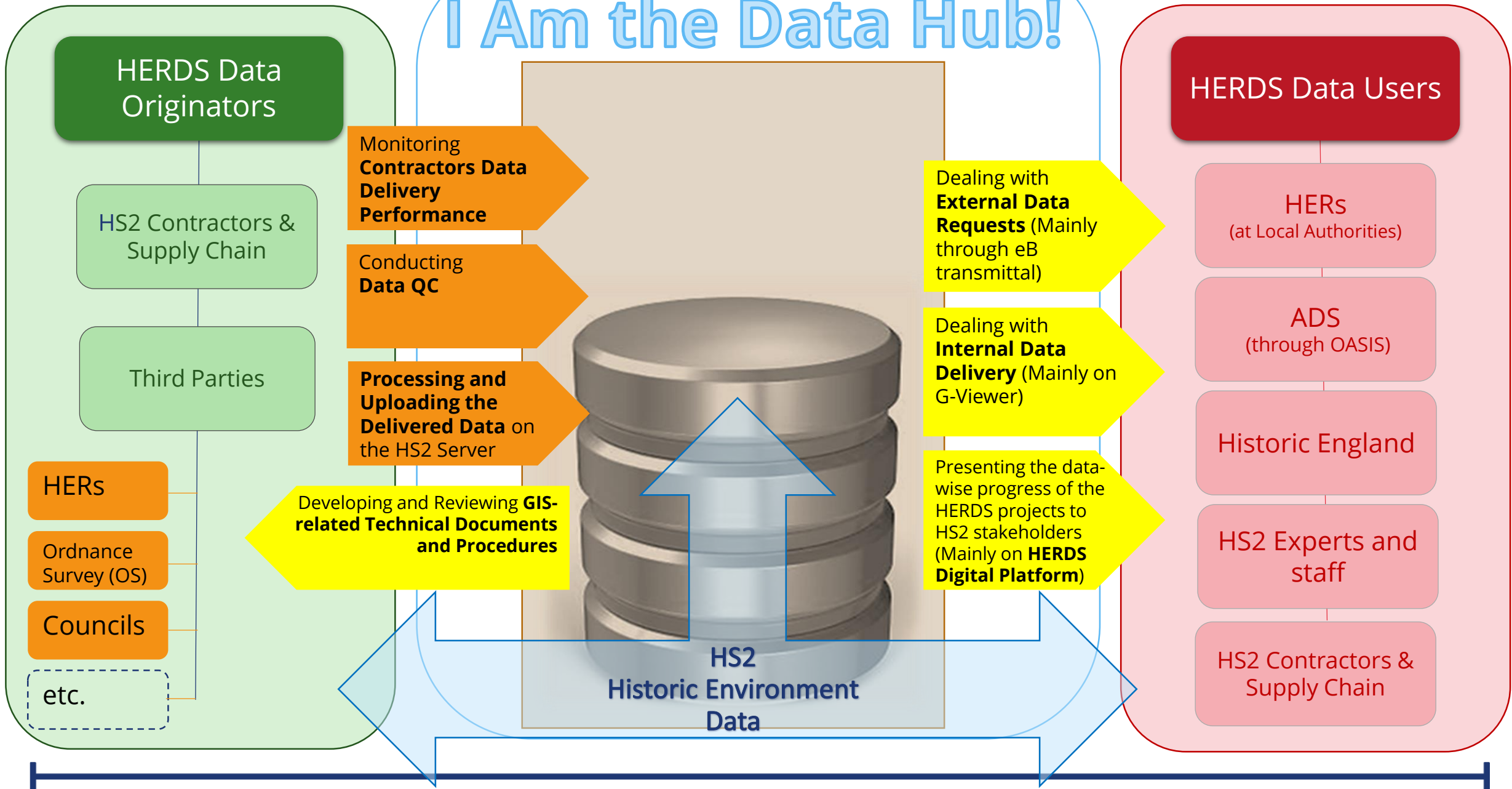
## □ The key elements HERDS Data Management:

- Utilising GIS and HS2 Building Information Modelling (BIM) for recording and capturing all archaeological assets and their interrelationship, alongside designed construction elements across the project lifecycle, including:
  - design,
  - Construction,
  - and operational stages.

# Geospatial Data on HS2 Server



# I Am the Data Hub!



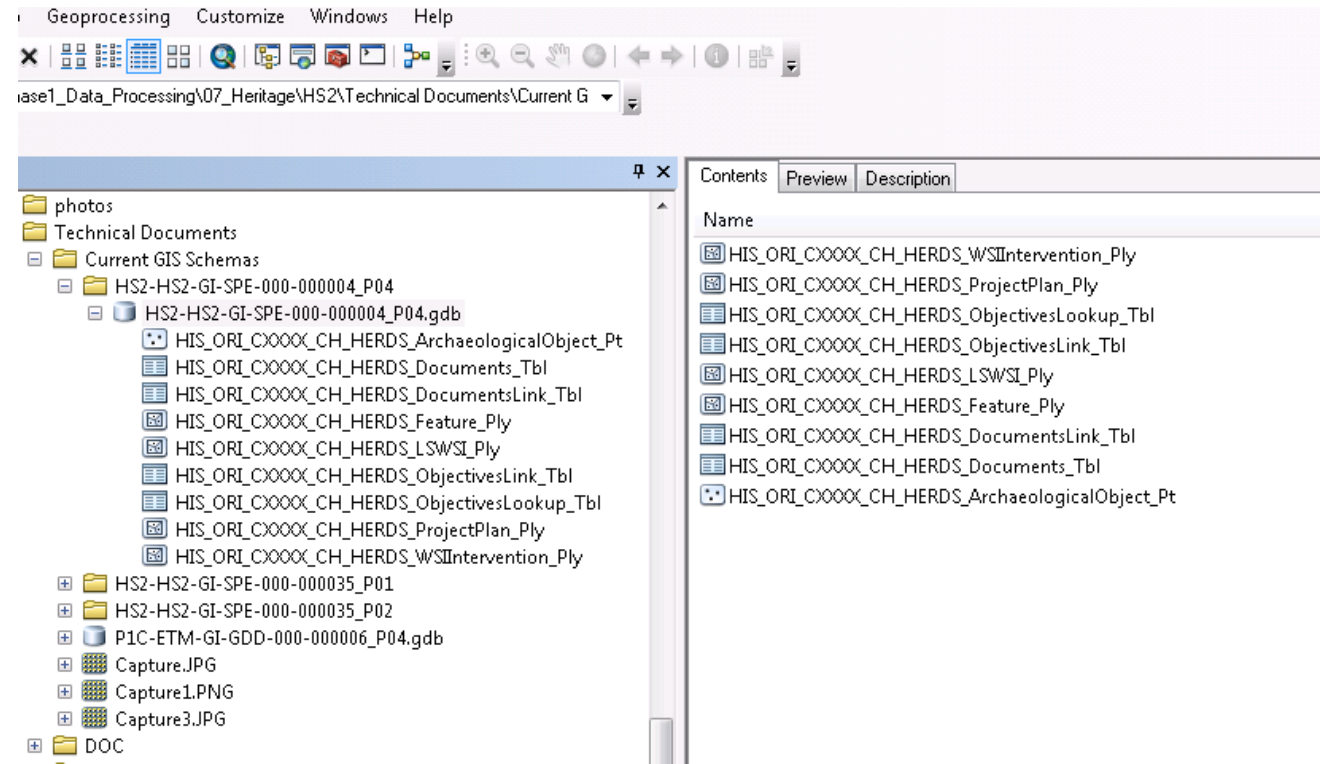
# HRDS Data Manager Responsibilities

- Using Esri ArcGIS and FME tools to conduct **data QC, data processing and spatial data visualisation** of the data delivered by HS2 contractors and their supply chain;
  - **Liaising with HS2 contractors** about their data-relating performance, their TQ and RFI, and dealing with their issues with regard to data delivery;
  - Dealing with **external data request packages**, especially for LA's HER;
  - Improving, reviewing, commenting and updating data-relating HS2 Historic Environment Research and Delivery Strategy (**HERDS**) **documents and GIS schemas**;
  - Keeping **HERDS Digital Platform** (which is based on Microsoft SharePoint system) updated with the recent highlights, photos, media, and pieces of technical content;
  - **Reporting and publishing data-wise progress of Phase One HERDS project** to my managers;
-

# HEI and HS2 GIS Schemas

What are HS2 GIS schemas?

Basically, they are empty GIS layers templates with its specific fields, domains, and metadata, given to the contractors and their supply chain to be filled on the basis of their fieldworks and surveys.



# Historic Environment GIS Specifications

HEI Technique	Project Plan Submission				
	HS2 Cultural Heritage (HERDS) GIS Specification	HS2 Cultural Heritage (Survey Results) GIS Specification	HS2 Cultural Heritage (Settings) GIS Specification	HS2 Cultural Heritage (Surface Collection) GIS Specification	HS2 Cultural Heritage (Remote Sensing) GIS Specification
	HS2-HS2-GI-SPE-000-000004	HS2-HS2-GI-SPE-000-000035	HS2-HS2-GI-SPE-000-000036	HS2-HS2-GI-SPE-000-000069	HS2-HS2-GI-SPE-000-000070
Archaeological excavation	Yes				
Archaeological monitoring	Yes				
Archaeological recording	Yes				
Archaeological science	Yes				
Borehole survey	Yes				
Building survey	Yes				
Construction Integrated recording	Yes				
Deposit Modelling	Yes				
Detailed Desk Based Assessment	Yes				
Earth resistance (resistivity) survey	Yes	Yes			
Electrical resistivity tomography	Yes	Yes			
Geo-archaeological trench	Yes				
Ground Penetrating Radar survey	Yes	Yes			
Historic Landscape recording	Yes		Yes		
LiDAR survey	Yes				
Magnetometry survey	Yes	Yes			
Measured survey	Yes				
Metal detecting	Yes				
Fieldwalking survey	Yes				
Test Pit	Yes				
Topographic survey	Yes				
Trial Trench	Yes				
Departure	Yes				
Topographic survey (inc. GNSS Total Station survey)	Yes				
Terrestrial Laser Scanning survey	Yes				



# Historic Environment GIS Specifications

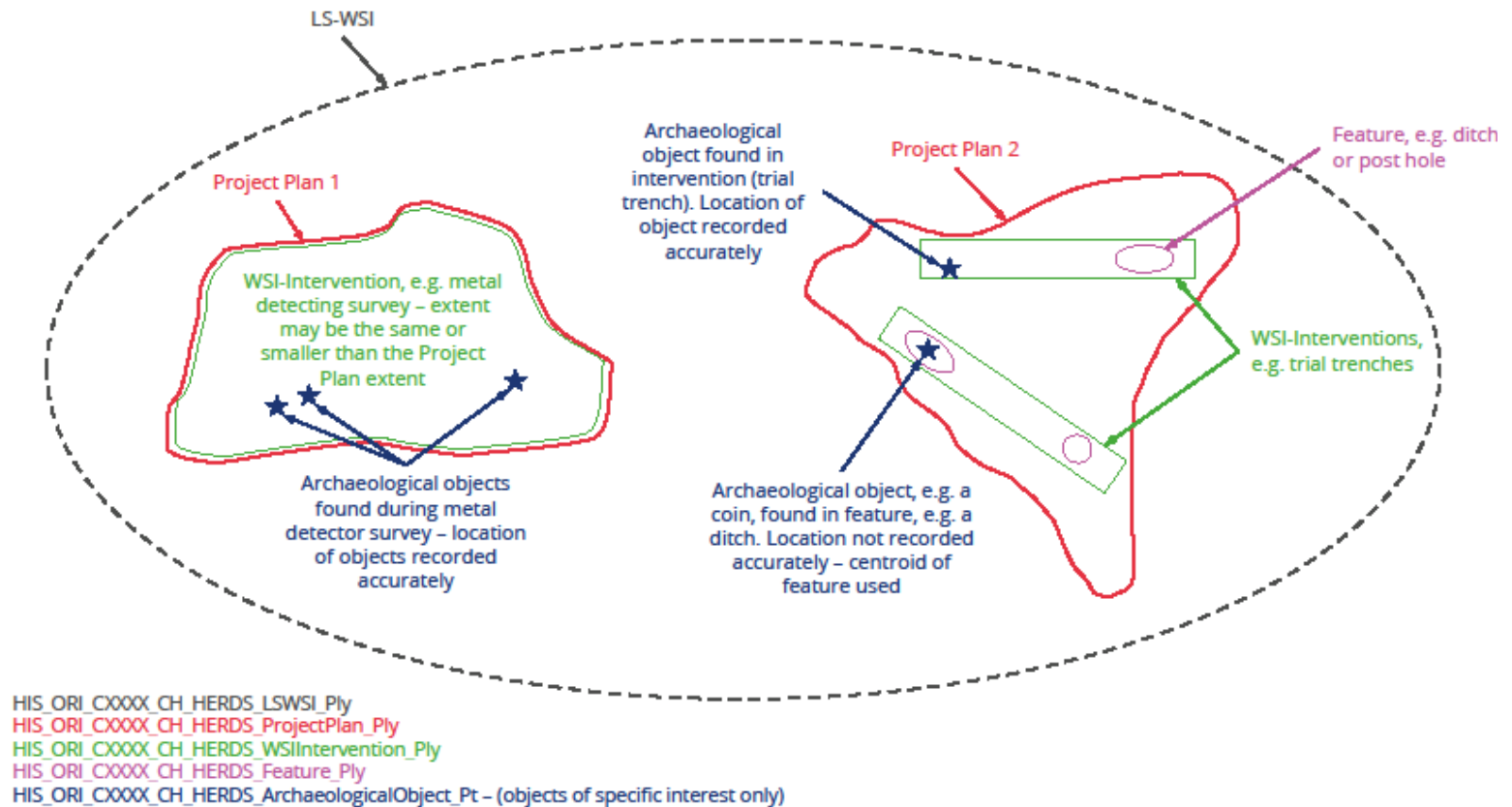
## HS2-HS2-GI-SPE-000-000004\_P04

### Vector data

- HIS\_ORI\_CXXXX\_CH\_HERDS\_ArchaeologicalObject\_Pt
- HIS\_ORI\_CXXXX\_CH\_HERDS\_Feature\_Ply
- HIS\_ORI\_CXXXX\_CH\_HERDS\_ProjectPlan\_Ply
- HIS\_ORI\_CXXXX\_CH\_HERDS\_WSIntervention\_Ply
- HIS\_ORI\_CXXXX\_CH\_HERDS\_LSWSI\_Ply

### Tables

- HIS\_ORI\_CXXXX\_CH\_HERDS\_Documents\_Tbl
- HIS\_ORI\_CXXXX\_CH\_HERDS\_DocumentsLink\_Tbl
- HIS\_ORI\_CXXXX\_CH\_HERDS\_ObjectivesLink\_Tbl
- HIS\_ORI\_CXXXX\_CH\_HERDS\_ObjectivesLookup\_Tbl



# Historic Environment GIS Specifications

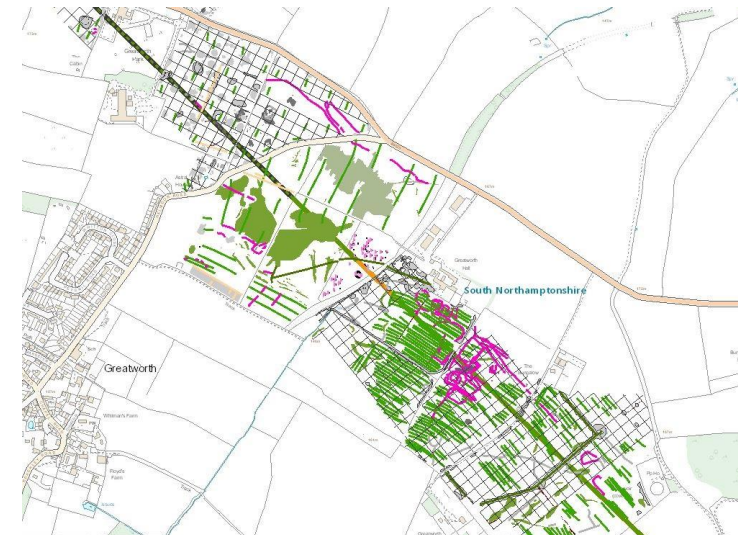
HS2-HS2-GI-SPE-000-000035\_P01

## Raster Catalog (split by site codes)

- HIS\_ORI\_CXXXX\_CH\_GeophysSurveyResults
- HIS\_ORI\_CXXXX\_CH\_GeophysSurveyResults\_MinProc

## Vector Data

- HIS\_ORI\_CXXXX\_CH\_GeophysSurveyResults\_Ply
- HIS\_ORI\_CXXXX\_CH\_GeophysSurveyResults\_Ln
- HIS\_ORI\_CXXXX\_CH\_GeophysSurveyGrid\_Ln



# Historic Environment GIS Specifications

HS2-HS2-GI-SPE-000-000036\_P02

## Vector data

- HIS\_ORI\_CXXXX\_CH\_Settings\_Ln
- HIS\_ORI\_CXXXX\_CH\_Settings\_Ply
- HIS\_ORI\_CXXXX\_CH\_Settings\_Pt

## Setting Type

- Ancillary Building
- Associated Structure
- ✱ Designed View/Vista
- Intended Boundary
- ▲ Key View
- Kinetic View
- ★ Landmark
- ✚ Optimal View
- ⊙ Permanent Aspect
- ◆ Principal Elevation
- ⊠ Tower
- ▲ Viewpoint
- ✕ Visual Barrier
- Not Applicable

# Historic Environment GIS Specifications

## Hybrid Bill (Pre-Royal Assent) Data

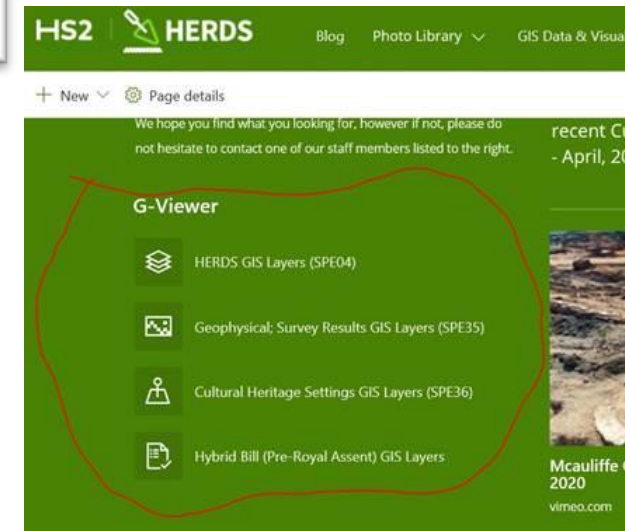
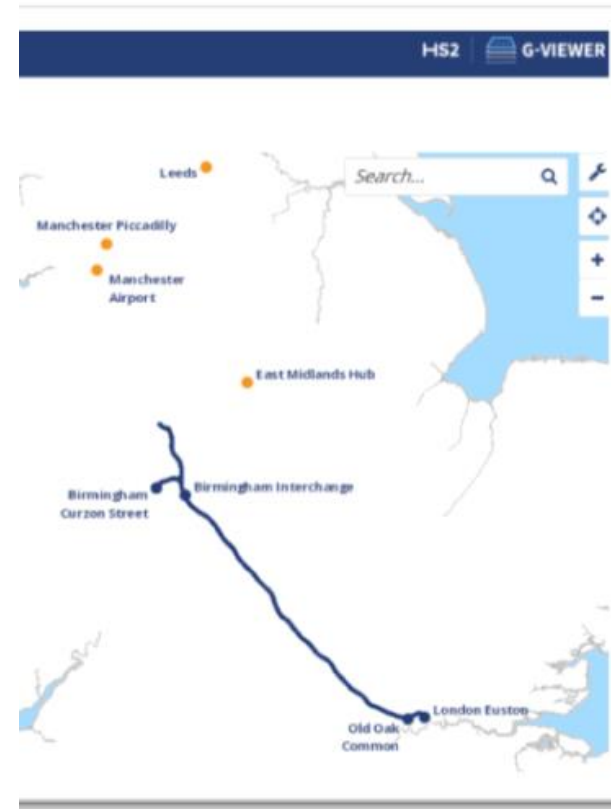
### Vector data

- HIS\_ARP\_C250\_CH\_ArchaeologicalCharacterSubZones\_Ply
- HIS\_ARP\_C250\_CH\_CHGazetteerIDBoundaries\_Ply
- HIS\_ARP\_C250\_CH\_CHStudyArea\_Ply
- HIS\_ARP\_C250\_CH\_NonDesignatedAssets\_Pt
- HIS\_ARP\_C250\_CH\_NonDesignatedAssets\_Ln
- HIS\_ARP\_C250\_CH\_NonDesignatedAssets\_Ply



# G-Viewer

- HS2 G-Viewer is an online web-map for visualising and interfacing different GIS layers from different disciplines.
- All the GIS layers mentioned in Historic Environment schemas have been visualised on G-viewer.
- Also, Historic Environment GIS layers, grouped by their specification via four different links built in on HERDS Digital Platform.



# G-Viewer

## HERDS GIS Layers (SPE04)

The screenshot displays the G-Viewer GIS application interface. At the top, a navigation bar includes 'HOME', 'MY G-VIEWER', 'SEARCH', 'ANALYSE', 'SHARE', and 'HELP'. The 'MY G-VIEWER' tab is active. Below the navigation bar is a toolbar with icons for 'Open', 'Save', 'Save as', 'Set Default PROJECTS', 'Restore Default', 'Show Layer Catalog ADD DATA', 'Upload Data', 'Point DRAWING', 'Edit', and 'Plot COORDI...'. The main map area shows a site plan with various colored overlays representing archaeological layers. A large red area is prominent, along with purple and green areas. A search bar is located in the top right corner of the map area. On the left side, a layer list is visible, titled 'SPE04-P04 (HERDS)'. It includes a notification: '26 layers have been recently added or updated.' Below this, there is a search filter and an 'Add Layers' button. The layer list is currently showing 'Phase One HERDS Archaeological' which is turned on. Underneath, it indicates 'HIGH SPEED 2' and 'Revision Date: Tue Sep 01 2020'. A description follows: 'Polygon feature class of built and buried heritage used for recording sites, archaeological features, buildings and structures. This feature class is related to'. A 'show more' link is present. Below the description is a legend with color-coded boxes for different historical periods: PALAEO-LITHIC (dark red), MESOLITHIC (brown), NEOLITHIC (green), IRON AGE (red), BRONZE AGE (orange), ROMAN (yellow), EARLY MEDIEVAL (purple), MEDIEVAL (pink), POST MEDIEVAL (light pink), and MODERN (blue). At the bottom of the map area, there is a 'Base Map' button and a coordinate system selector. A copyright notice is visible in the bottom right corner: '© Crown copyright and database rights 2020 OS 100049190. Use of this data is subject to terms and conditions.'

# G-Viewer

## Geophysical Survey Results GIS Layers (SPE35)

The screenshot displays the G-Viewer web application interface. The browser address bar shows the URL: <https://gviewer-dev.hs2.org.uk/MainHtml5/index.html?viewer=Main#>. The navigation menu includes HOME, MY G-VIEWER, SEARCH, ANALYSE, and SHARE. The main toolbar contains icons for Open, Save, Save as, Set Default, Restore Default, Show Layer Catalog, and Upload. The current project is identified as SPE35-P01 (GOPHYSICAL SU...). A notification banner states: "26 layers have been recently added or updated." The left sidebar shows the "Phase One Geophysics - Interpretative" layer is active. Below this, a "HIGH SPEED 2" label is present, followed by the revision date "Revision Date: Thu Sep 03 2020" and a description: "Interpretation of the survey data, carried out as part of the HS2 Archaeology fieldwork. Digitised to provide better representation of the finds below the ground." A "show more" link is available. The legend lists the following layers:

- Phase One Geophysics survey gridlines
- Phase One Geophysics survey results - lines
  - Archaeology
  - Archaeology discrete
  - Possible archaeology
  - Drain
  - Edge of Geophys area
  - F1 Interpretation area
  - E1 Interpretation lines

The main map area shows a geophysical survey grid overlaid on a base map of the Greatworth area in South Northamptonshire. The legend at the bottom of the map area includes "SPE35-P01 (Gophysical Survey Results)" and "Base Map".



A part of Geophysical Survey Results in Northamptonshire, HS2 Phase One.

# G-Viewer

## □ Cultural Heritage Settings GIS Layers (SPE36)

The screenshot displays the G-Viewer GIS interface. At the top, a navigation bar includes 'HOME', 'MY G-VIEWER', 'SEARCH', 'ANALYSE', 'SHARE', and 'HELP'. On the right side of the navigation bar, 'HS2' and the 'G-VIEWER' logo are visible. Below the navigation bar is a toolbar with icons for 'Open', 'Save', 'Save as', 'Set Default', 'Restore Default', 'Show Layer Catalog', 'Upload Data', 'Point', 'Edit', and 'Plot'. The main map area shows a geographical view with various colored lines and shapes representing cultural heritage features. A search bar is located in the top right corner of the map area. On the left side, a legend panel titled 'SPE36-P02 (CULTURAL SETT...' lists various features with corresponding symbols: Ancillary Building, Associated Structure, Designed View/Vista, Intended Boundary, Key View, Kinetic View, Landmark, Optimal View, Permanent Aspect, Principal Elevation, Tower, Viewpoint, Visual Barrier, and Not Applicable. The map area also includes a 'Base Map' button and a copyright notice: '© Crown copyright and database rights 2020 OS 100049190. Use of this data is subject to terms and conditions.'



# G-Viewer

## Hybrid Bill (Pre-Royal Assent) GIS Layers

The screenshot displays the G-Viewer GIS application interface. The top navigation bar includes tabs for HOME, MY G-VIEWER (selected), SEARCH, ANALYSE, SHARE, and HELP. On the right side of the navigation bar, the HS2 logo and the G-VIEWER logo are visible.

The main interface features a toolbar with icons for Open, Save, Save as, Set Default, Restore Default, Show Layer Catalog, Upload Data, Point, Edit, and Plot. Below the toolbar, the main map area shows a geographical map with various layers overlaid. A search bar is located in the top right corner of the map area.

On the left side, a layer catalog is displayed for the project "HYBRID BILL (PRE-ROYAL ASS...)". A notification indicates that 26 layers have been recently added or updated. The catalog lists several layers, including:

- (CH-03) Archaeological Character Sub-  
**HIGH SPEED 2**  
Revision Date: Tue Jun 19 2018  
Areas of archaeological potential defined and characterised by current land use, topography, geology, historic character and distribution of known archaeological  
show more
- (CH-01/02) Heritage Assets Gazetteer ID
- (CH-01) Non-designated heritage asset  
**HIGH SPEED 2**  
Revision Date: Thu Apr 19 2018  
Assets that are not designated as any of the following, eg. Scheduled Monument, Listed Building, Registered Park and Garden, Registered
- Hybrid Bill (Pre-Royal Assent) Data

At the bottom of the interface, there is a "Base Map" button and a copyright notice: "© Crown copyright and database rights 2020 OS 100049190. Use of this data is subject to terms and conditions."

# Phase One HERDS Digital Platform

## Welcome to the HS2 Phase One HERDS Digital Platform

### About HERDS Digital Platform

Here users can find a variety of information, documentation and resources relating to the Phase 01 Scheme of Historic Environment Works and the adopted research strategy, standards and guidance that guide all HS2 archaeological investigation and built-heritage assessments.

We hope you find what you looking for, however if not, please do not hesitate to contact one of our staff members listed to the right.

### G-Viewer



HERDS GIS Layers (SPE04)



Geophysical Survey Results GIS Layers (SPE35)



Click on the picture below to enjoy the recent Curzon St Roundhouse drone footage - April, 2020



### News

[See all](#)

[+ Add](#)



#### Murder mystery at Wellwick Farm



Fred Farshid July 10  
1 view

#### New Curzon Street roundhouse footage released

Fred Farshid June 15  
2 views

#### Curzon Street Roundhouse 3D Model

# Some Phase 1 HERDS Statistics, so far!

## ❑ Data delivery monitoring (By the end of September 2020)

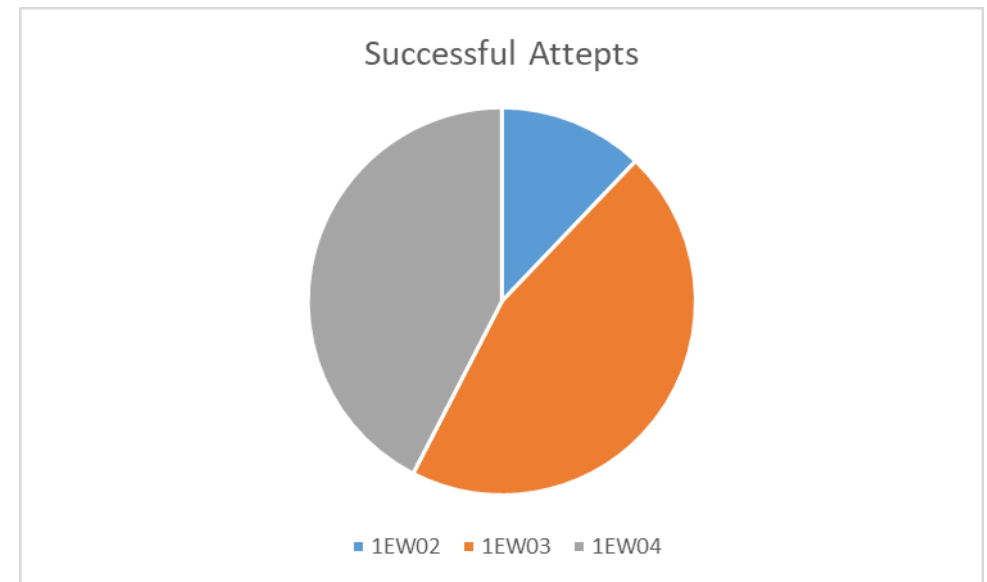
Successful Delivery														
Area Name	Contract	2018		2018 Total	2019				2019 Total	2020			2020 Total	Grand Total
		Q3	Q4		Q1	Q2	Q3	Q4		Q1	Q2	Q3		
South	1EW02	0	0	0	0	0	0	0	0	0	0	4	4	4
Central	1EW03	0	0	0	1	0	1	2	4	6	3	2	11	15
North	1EW04	0	0	0	0	0	0	1	1	3	8	2	13	14
Grand Total		0	0	0	1	0	1	3	5	9	11	8	28	33

Unsuccessful Delivery														
Area Name	Contract	2018		2018 Total	2019				2019 Total	2020			2020 Total	Grand Total
		Q3	Q4		Q1	Q2	Q3	Q4		Q1	Q2	Q3		
South	1EW02	0	0	0	0	0	0	0	0	0	0	0	0	0
Central	1EW03	4	4	8	5	2	3	0	10	4	1		5	23
North	1EW04	0	0	0	1	0	0	0	1	0	0	2	2	3
Grand Total		4	4	8	6	2	3	0	11	4	1	2	7	26

# Some Phase 1 HERDS Statistics, so far!

□ Data delivery monitoring (By the end of September 2020)

Area Name	Contract	Successful Attempts	Unsuccessful Attempts	Total Attempts
South	1EW02	4	0	4
Central	1EW03	15	23	38
North	1EW04	14	3	17
Total		33	26	59



# Some Phase 1 HERDS Statistics, so far!

HERDS LWSI Item	Contract Name				Grand Total
	1EW02	1EW03	1EW04	EDP	
Archaeological Object	2224	1612	0	12	<b>3848</b>
Features	13159	949	0	26	<b>14134</b>
WSI Interventions	129	691	5075	669	<b>6564</b>
Project Plans	14	65	85	85	<b>249</b>
LS-WSI	10	24	0	0	<b>34</b>



# HERs exported Data Packages

- GIS data **within Local Authorities (County/District) boundaries, plus 1Km buffer around them;**
- To be sent out **every 6 months;**
- **First delivery, September 2020;**
- **HERs packages based on their offices at Local Authorities (LAs):**

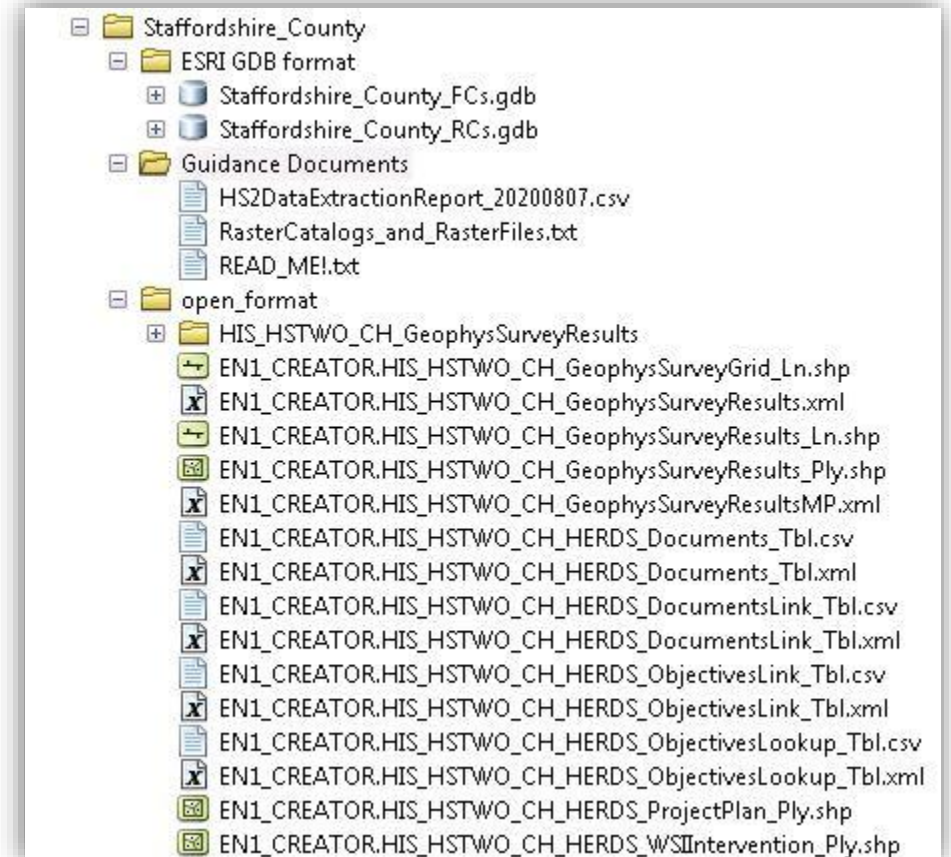
1	Greater London HER
2	Buckinghamshire HER
3	Hertfordshire HER
4	Oxfordshire HER
5	Northamptonshire HER
6	Warwickshire and Solihull HER
7	Birmingham HER
8	Staffordshire HER
9	Coventry HER



# HERs exported Data Packages

- Each data packages includes:

- All HERDS, Geophysical Survey Results and Historic Cultural Settings data within the boundary of LAs plus 1km buffer around them in ESRI GDB format;
- All HERDS, Geophysical Survey Results and Historic Cultural Settings data within the boundary of LAs plus 1km buffer around them in open format (Shapefiles);
- Area of Interest (Aoi): Polygon Boundary of each LA, in both open format (Shapefile) and ESRI GB format;
- GIS data guidance documents;



# The legacy of Phase One HERDS GIS Data

## Opportunities:

- HS2 HERDS data for the benefit of **HERs and LPAs**;
- HS2 HERDS data for the benefit of **Archaeology Data Service (ADS)**;
- HERDS data is beneficial for **post excavation analysis**;
- Experiments and lessons learnt from capturing, processing and archiving **archaeological data in a national scale construction projects**;
- **Utilising HS2 Building Information Modelling (BIM)** for recording and capturing all archaeological assets and their interrelationship, alongside designed construction elements across the project lifecycle, including design, construction and operational stages.

## Challenges:

- Large **Scale of HERDS data** to be managed and deployed by HERs;
  - Lack of **consistency** of nullable fields (e.g. Depth of Archaeological Features or Count of Archaeological Objects);
  - Contractors are not in the same **extent of accomplishment**;
  - **Different versions** of GIS schema between phase one and phase 2;
-



# HS2

**Thank you for your attention!**

**Any questions?**

Phase One Heritage Data Manager, HS2 Ltd.