Electricity Transmission

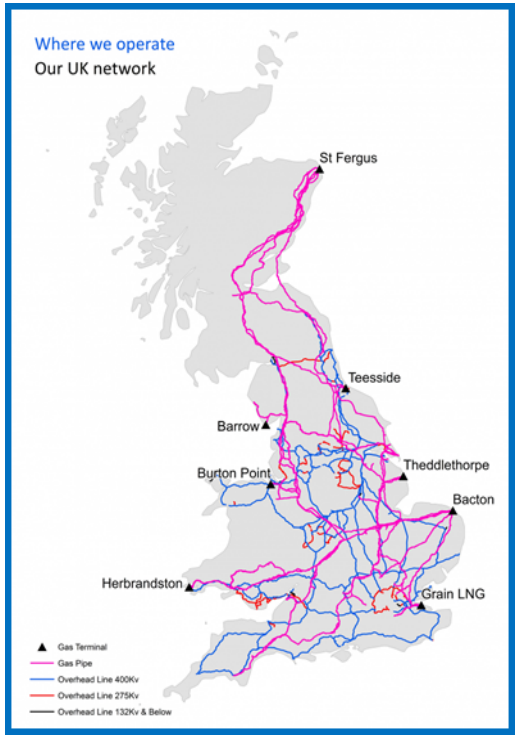
GeoGrid

The Power of Mapping

Derrick Dunkley, Data Lifecycle Manger

nationalgrid

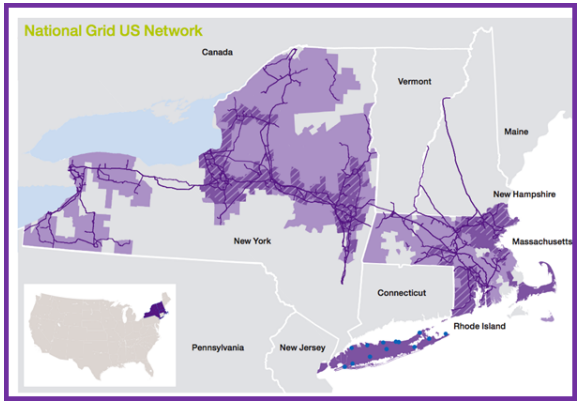
Who are National Grid?



UK Regulated – Elec & Gas

nationalgrid ventures

UK & US Businesses



US Regulated – Elec & Gas

We deliver world class **safety and reliability**

£25 or 4% Annual Domestic Electricity Bill in UK

We are transforming our **customer proposition**

We are National Grid

Transmission

We own and operate electricity transmission in England and Wales and gas transmission across Great Britain, connecting homes and businesses to the energy they use safely, reliably and efficiently.

7,200km of overhead lines

1,500km of underground cables

7,660km of gas pipeline

24 compressor stations

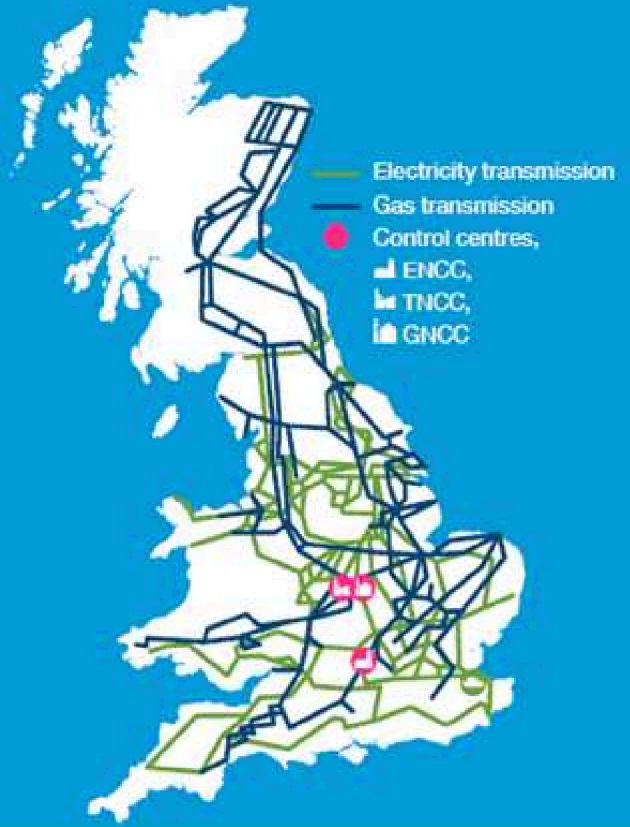
Employees

We employ around 6,000 workers across the UK

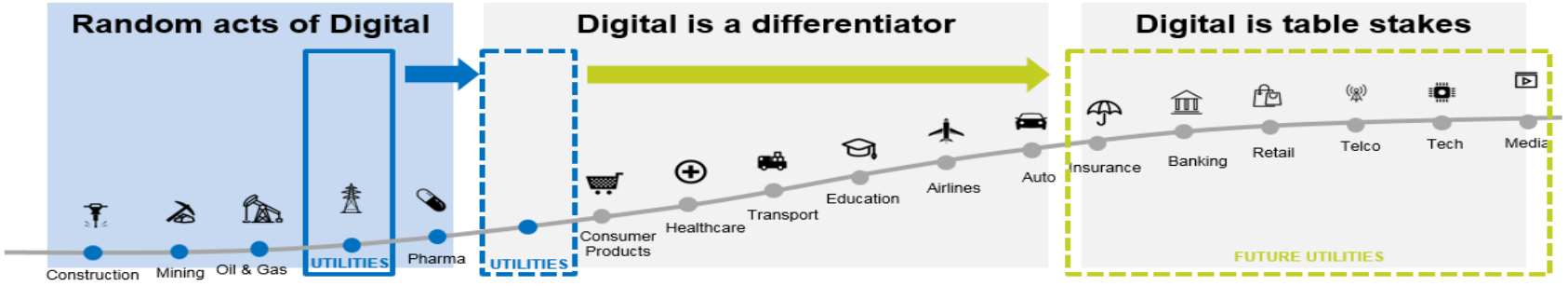
78% of UK employees own National Grid shares

18,465hrs volunteered by employees in 2016/17

0.08 lost time injury frequency



Utilities are in early digital transformation, responding quickly could present a competitive advantage



Companies **experiment with digital products around the edges** of the business, often forming **partnerships**

No changes to operating model or ways of working

No cohesive digital strategy, just pockets of investment

Companies are **aware of and respond to signs of digital change**

Digital is **enabling new entrants** to the market and compelling **incumbents to consider big bets**

Digital strategies are emerging in **silos**

Companies have an understanding of and ability to execute the **capabilities required to win**

You must **always be in 'beta' mode**, **willing to disrupt** your core business

Digital strategy is embedded within the enterprise strategy

Digitisation

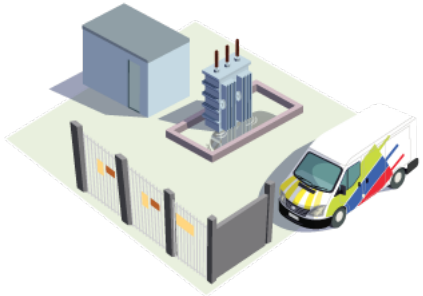
Digitisation is the automation of existing manual and paper-based processes, enabled by the Digitisation of information; from an analogue to a digital format.

Digitalisation

Digitalisation means the use of the digital technologies and of data (digitised and natively digital) in order to create revenue, improve business, replace/transform business processes (not simply digitising them) and create an environment for digital business.

Digital Transformation

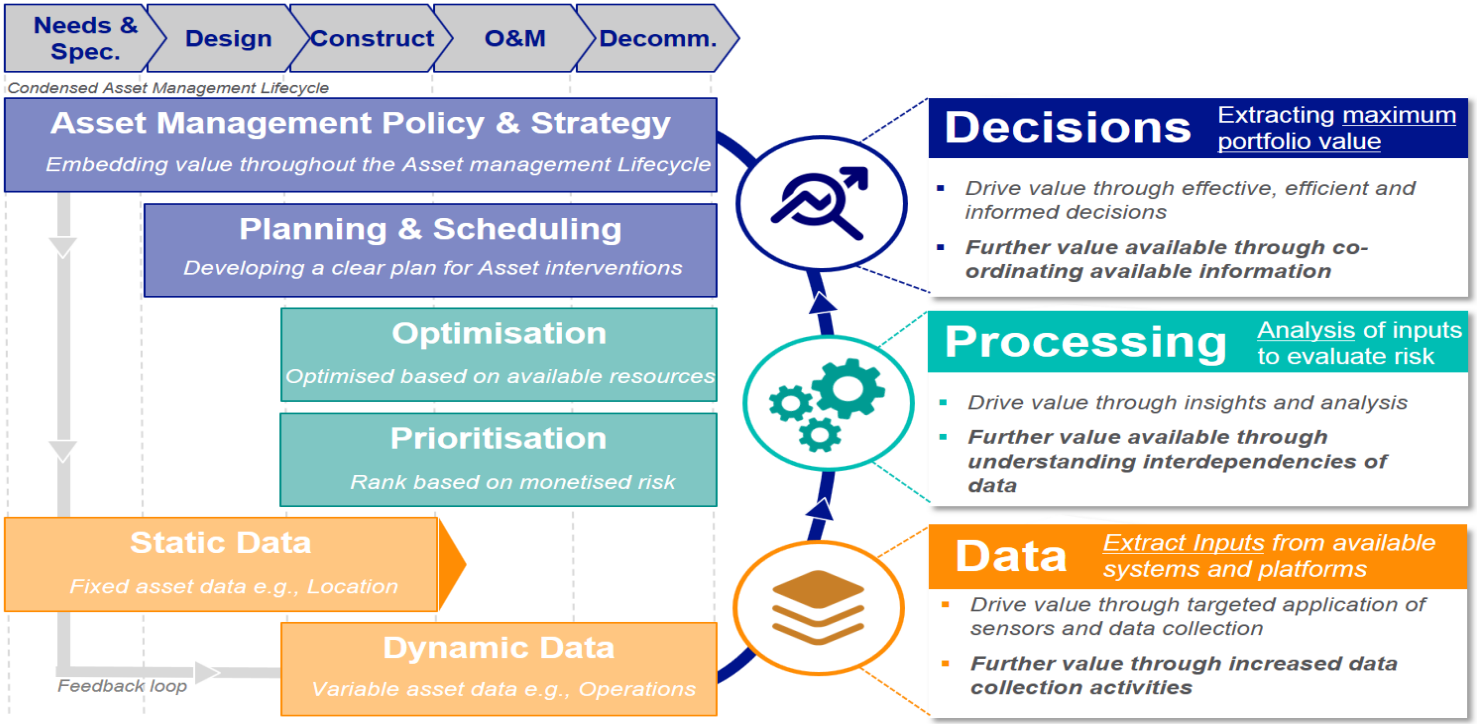
Digital transformation is the profound and accelerating transformation of business activities processes, competencies and models to fully leverage the changes and opportunities of digital technologies and their impact across society in a strategic and prioritized way.



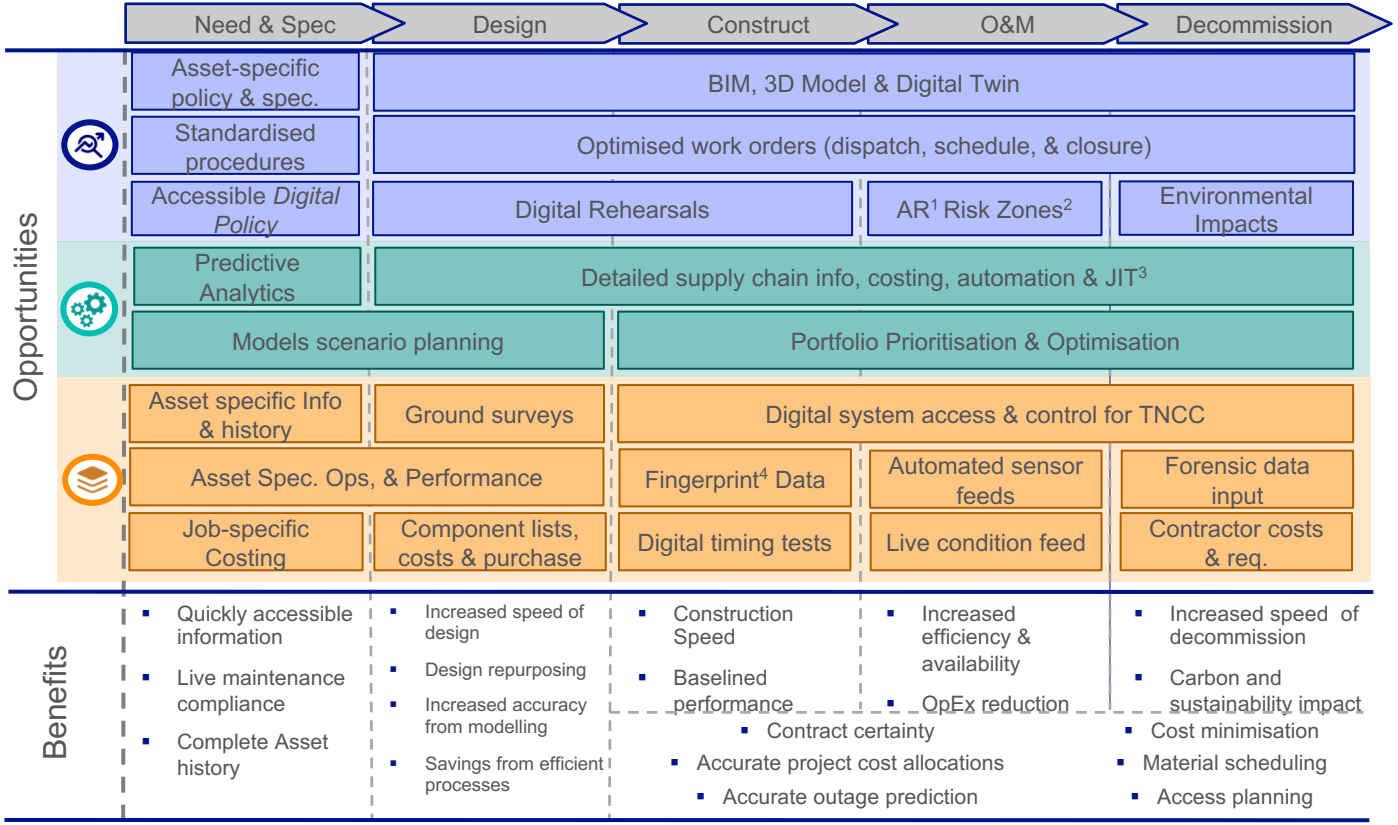
Digital can be categorised into four key focus areas for National Grid

Focus Areas		Definition	Example Application
Internal Operations	Back Office	▪ Automation and optimisation of **processes and outputs** to **drive performance** and efficiency, using **digital tools** and capabilities	Reduced human intervention through automation ▪ *E.g., German utility automated 50-80% of finance function processes through robotic process automation (RPA)*
	Employees	▪ **Optimised employee output**, to drive performance and efficiency using **digital tools** and capabilities	Digital tools and mobile enablement for field force ▪ *E.g., PG&E'S mobility tool with integrated GPS technology enables dispatchers to act in real-time on automated alerts to drive technician performance*
Network Management	Asset Lifecycle Management	▪ **Optimisation of intervention planning**, scheduling and resource dispatch using automated **digital solutions**	Predictive maintenance analytics and techniques to reduce inspection and maintenance frequency ▪ *E.g., US utility is targeting 25% cost reduction by optimising cycle schedules and increasing crew productivity using advance machine learning model*
	Grid Operations	▪ **Automation** and **optimisation of network performance** using **data-driven** tools, **processes** and capabilities	Improve network stability, reduce costs, and increase network capacity ▪ *E.g., ConEd deferred $1.1bn substation construction through a variety of DER programmes*
Customer & Stakeholder Enablement		▪ Digitally **optimised** and **automated end-to-end** customer **journey**	Automation and digitisation of the end-end processes of customer journeys ▪ *E.g., Innogy built a Customer Experience factory to harmonise customer journey across countries*
New Products & Services		▪ **Create ideas** for new, digitally enabled **revenue pools** and to **scale new**, insights-based **business activities**	Expand revenue opportunities into new business areas ▪ *E.g., European utility with ~2mn clients developed an early warning machine learning model to predict B2C bad debt*

Digital applications exist across the Asset Management Lifecycle; value-driven decisions from Processed Data



Digital opportunities present benefits throughout the Asset Management Lifecycle



[1] AR – Augmented Reality (In the form of head-set visualisation)
[2] Risk Zones; More specifically Risk Management Hazard Zones (RMHZs)
[3] JIT – Just in Time production
[4] "Fingerprint" is the initial performance data when an asset is commissioned, acting as a baseline for future reference

GeoGrid
The Power Of Mapping

Using 3D data & BIM Models

Adrian Moisey, Geospatial Data Officer

nationalgrid

What Applications Do We Use

Desktop Based

- ArcGIS
- FME Desktop
- AutoDesk Revit

Web Browser Based

- GeoCortex (GeoGrid)
- FME Server

What do we use them for

RMHZ (Risk Management Hazard Zones)

RMHZs allows safe working around assets with a potential risk

Geographically displaying Asset Health data

Allows us to visually see where assets that need replacing based on their criticality score

Resource Management

Better planning our work allows us to ensure resources are working where they need to be

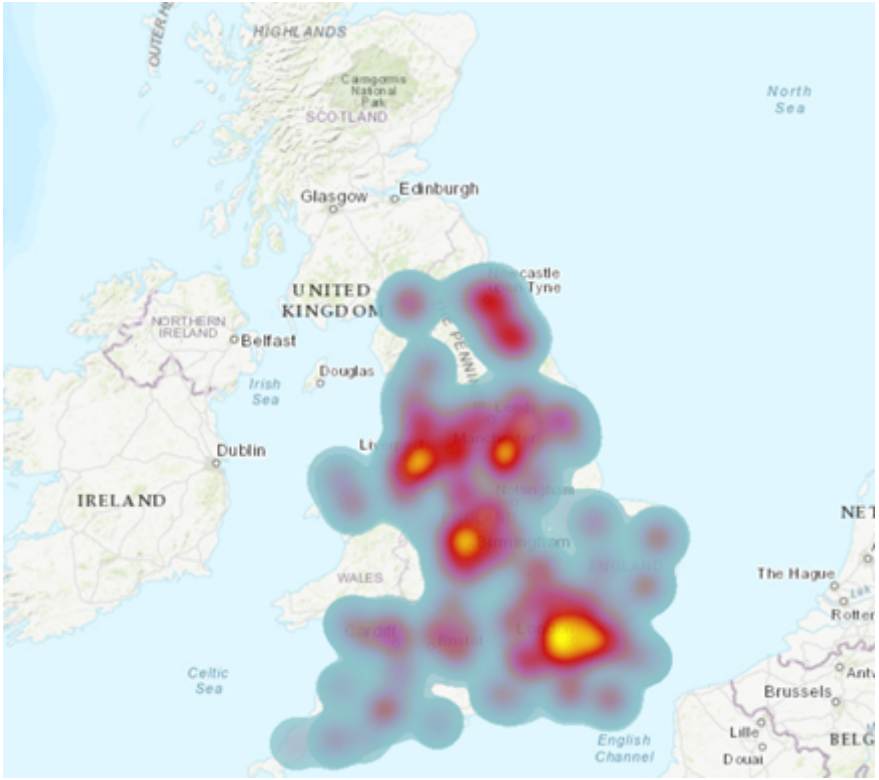
Safety

Safety of our staff & the public

Asset Health

Heatmap

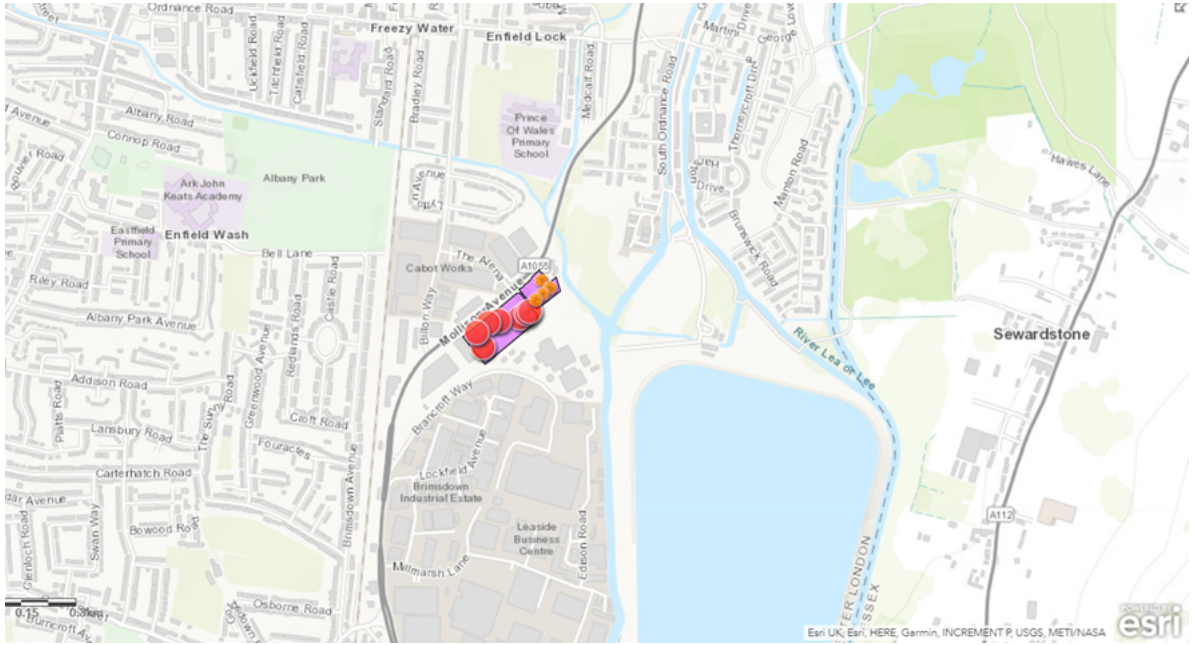
Allows us to easily visualise where vulnerable assets are at a UK level.



Asset Health

Criticality Score

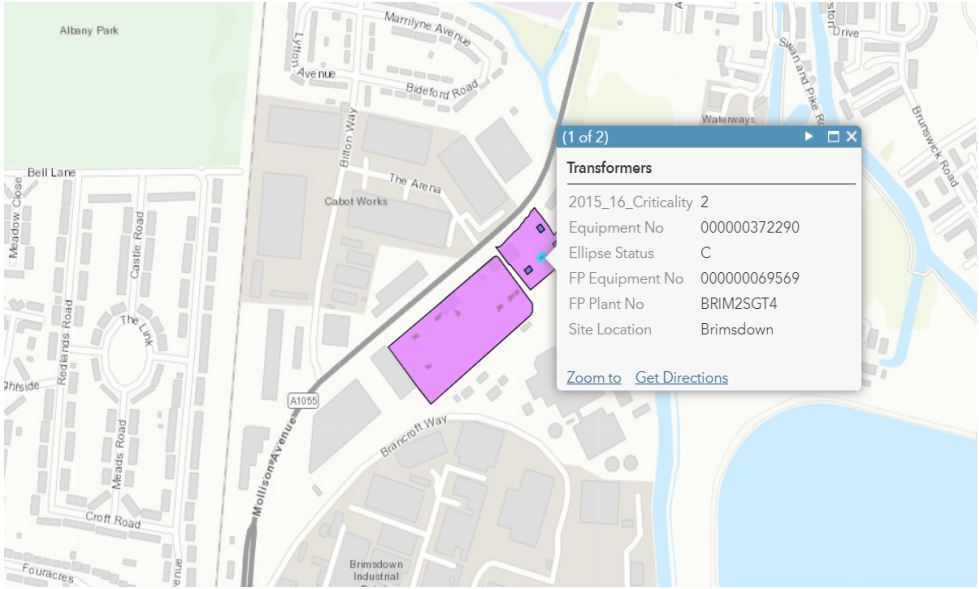
As we zoom in on the map, we start to see the assets represented by their criticality score for the year ahead.



Asset Health

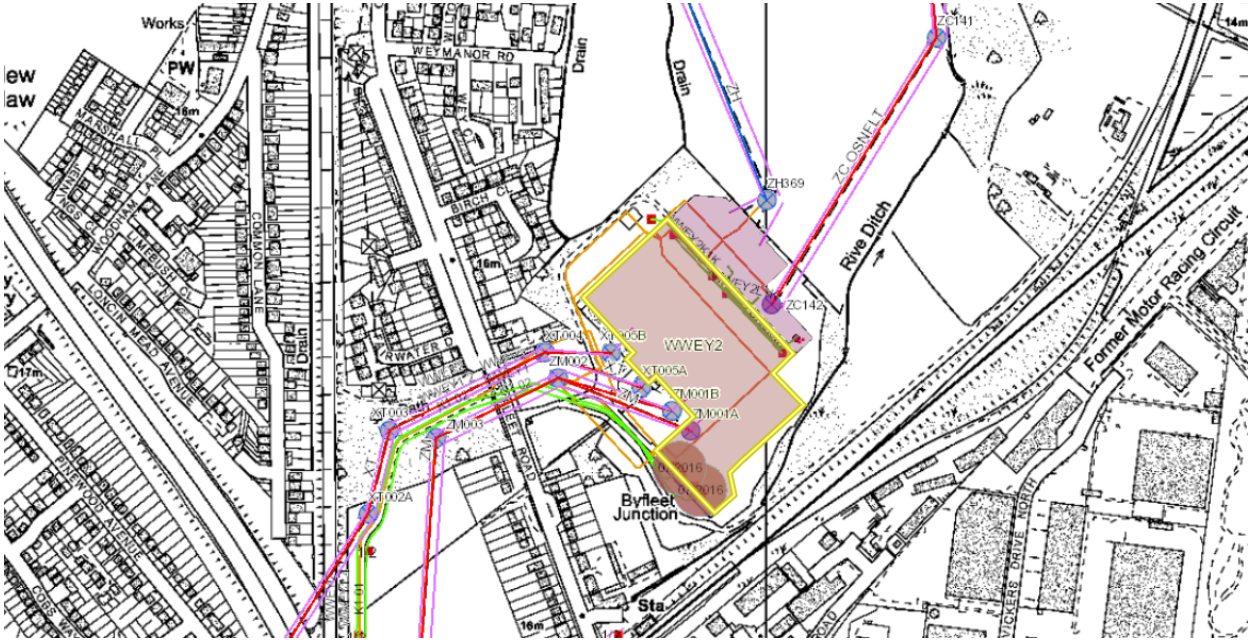
Asset Attribution

Now we can see individual assets



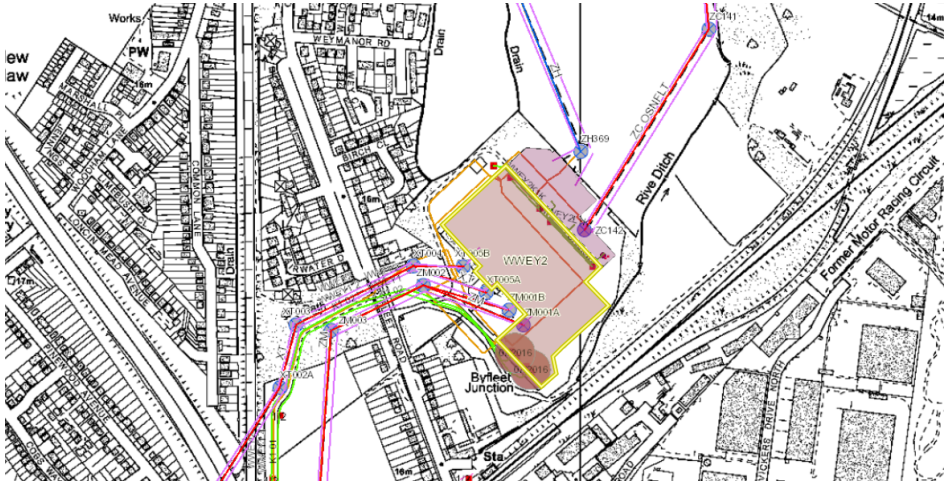
Risk Management Hazard Zones

Within our core ArcGIS system we record RMHZ as a 2D feature



Risk Management Hazard Zones

We store attributes related to the RMHZ within the system.



07/2016

NAME
WEST WEYBRIDGE 275KV S/S

TYPE
TYPE1

STATUS
OPEN

OESB DOCUMENT FOLDER
http://ecm2.nationalgrid.com/otcs/cs.exe?func=ll&objId=297124&objAction=browse&sort=name

PUBLISHED_DATE
16 Sep 2016 01:00

AUTHOR
Alan Ainsley

REMARKS
Disruptive Failure of Procelain and Composite 132kV XPLE CSE assets

ISSUE_NUM
2

PLANT NUMBER
WWEY248KS

RMHZ SPECIFICATION
30

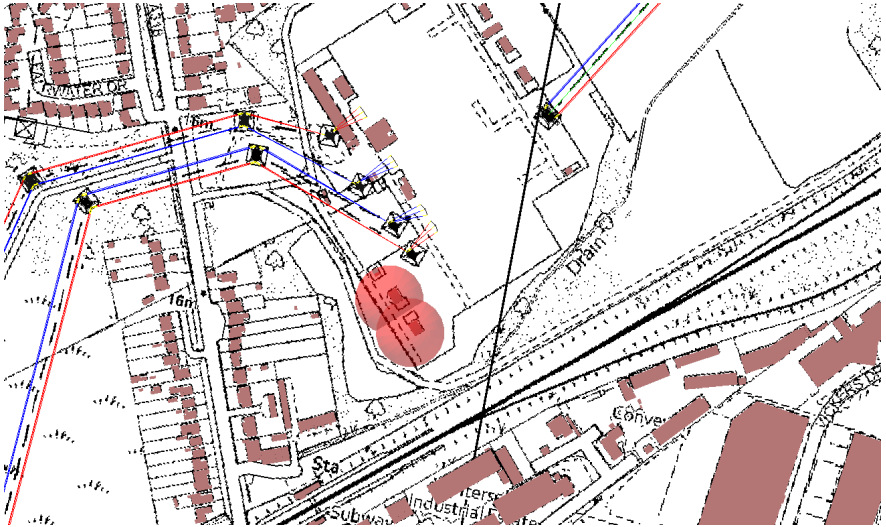
RMHZ_TYPE
OESB

OUTSIDE SUBSTATION
Yes

TABLEAU_REPORT
http://analytics/#/site/eto-prod/views/RMHZRelatedWorkOrders/RMHZWorkOrders

Risk Management Hazard Zones

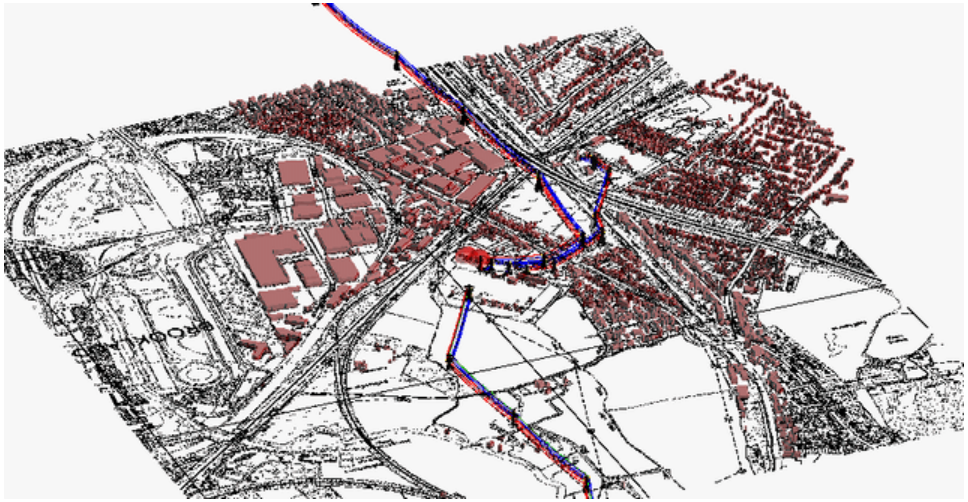
We can then turn these into a 3D representation using ArcScene.



REFERENCE	07/2016
NAME	WEST WEYBRIDGE 275KV S/S
TYPE	TYPE1
STATUS	OPEN
FOLDER	http://ecm2.nationalgrid.com/otcs/cs.exe?func=ll&objId=297124&ob
PUBLISHED_	20160916000000.00000
AUTHOR	Alan Ainsley
REMARKS	Disruptive Failure of Procelain and Composite 132kV XPLE CSE assets
ISSUE_NUM	2
KEY_PLANT_	WWEY248KS
RMHZ_BUFFE	30
MITIGATION	2 hours per week uncontrolled see Appendix C
RMHZ_TYPE	OESB
GLOBALID	{7263CFCF-6F55-49A8-B8E6-DF349BB6F89A}
ISBEYONDSU	Y
RMHZ_AREA	2827.452624
TABLEAU_RE	http://analytics/#/site/eto-test/views/RMHZRelatedWorkOrders/RMH

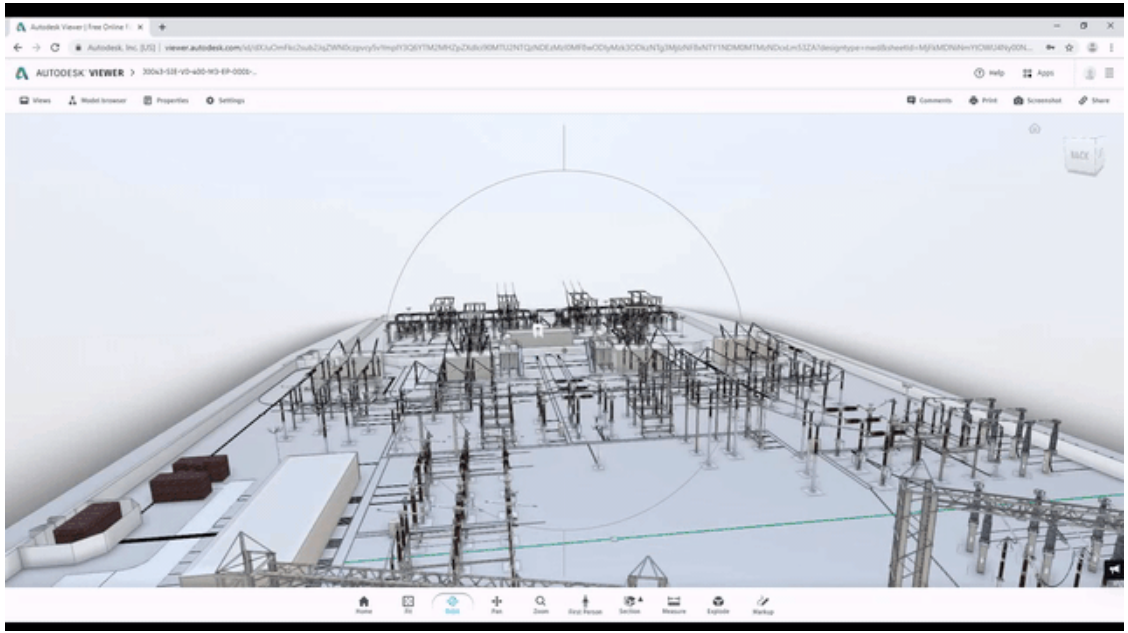
Risk Management Hazard Zones

3D Representation of Risk Management Hazard Zones



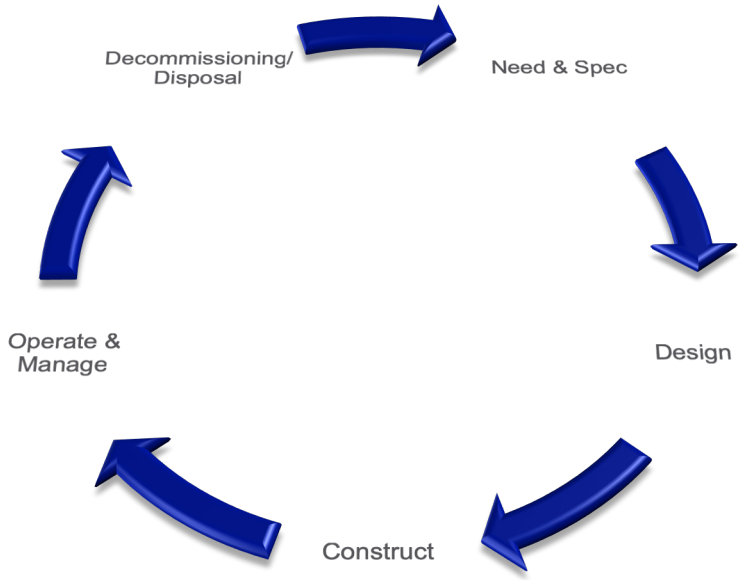
BIM Data

As a company we are using BIM Data within our construction projects.



What are the benefits?

The detailed view of the design has the following benefits.



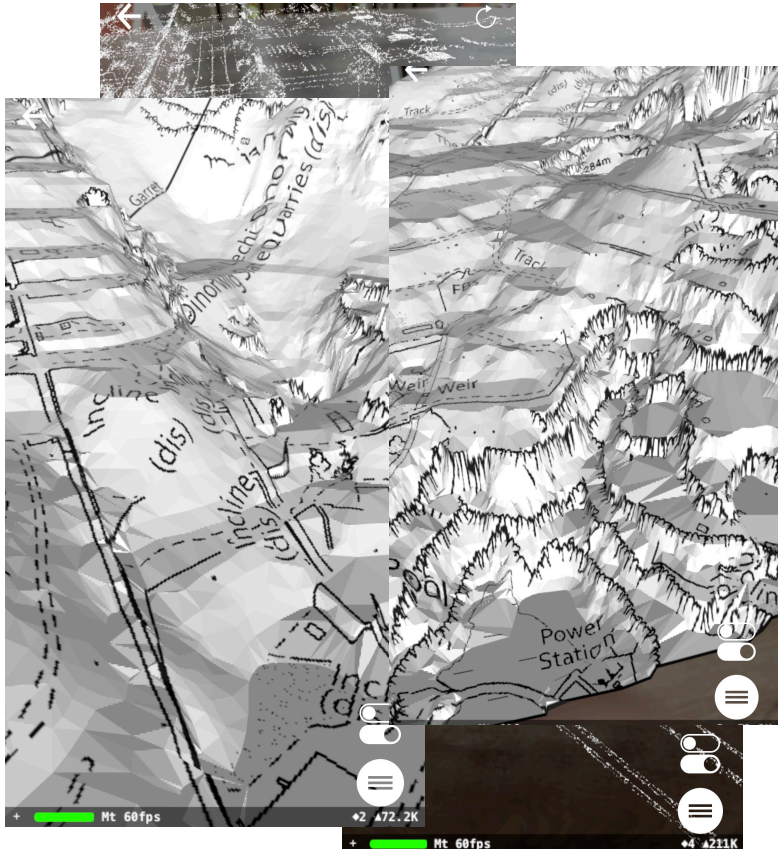
Augmented & Virtual Reality

Augmented Reality

Augmented reality using a Smart Phone.

Virtual Reality

VR is something we will be looking at



Time for a live demo……..hopefully

I thought it may be a good idea to show you some of more exciting things we can do with GIS.

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