BURO HAPPOLD

BUILT & SPATIAL DATA FOR TECHNOLOGY-DRIVEN INFRASTRUCTURE PLANNING & DEVELOPMENT

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Cities

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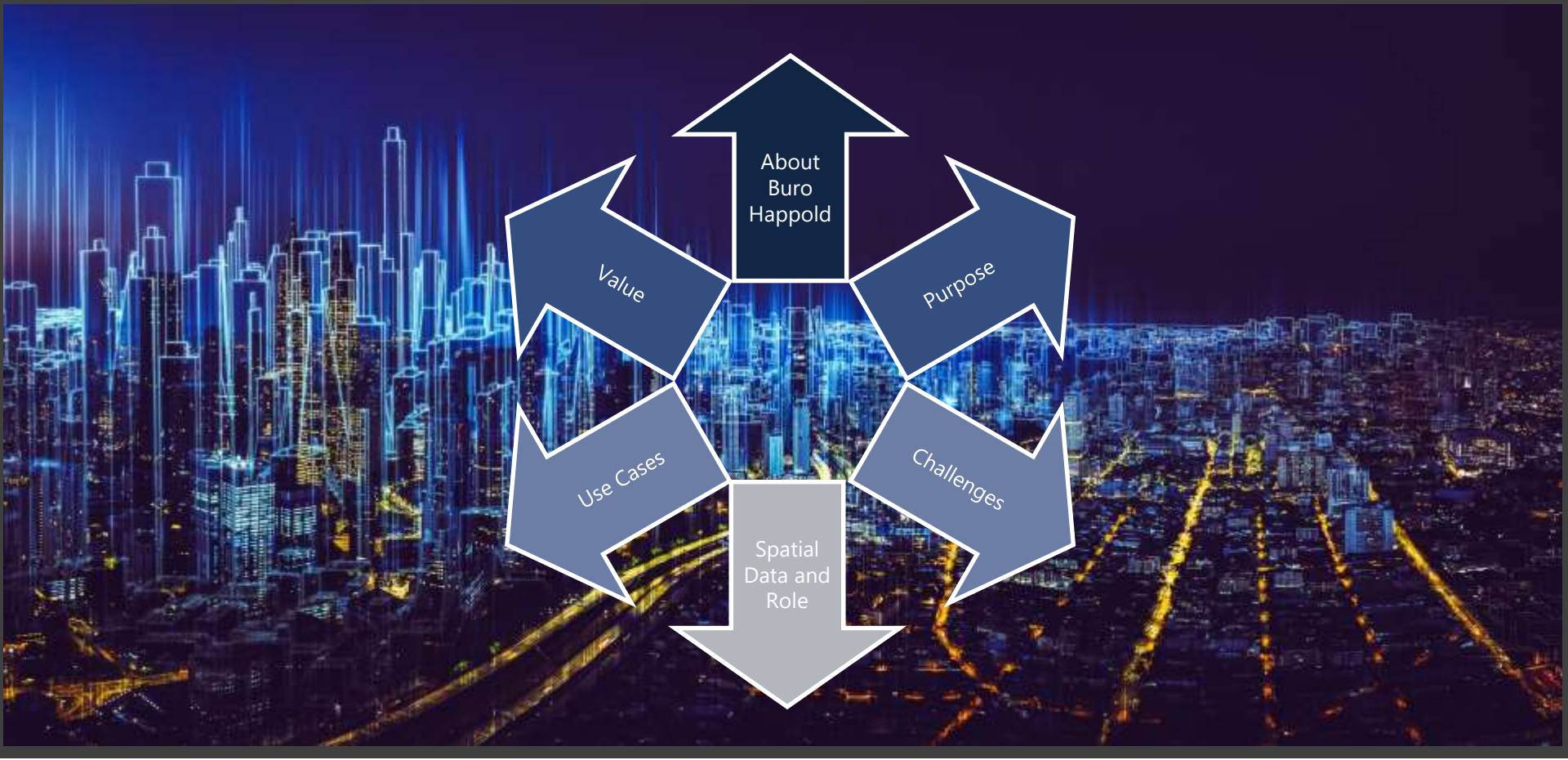
SCOPE



ABOUT BURO HAPPOLD LTD

WHERE WE ARE

WHO WE ARE

An independent, global practice of over 1,900 engineering and consulting professionals working in the built environment.

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WHERE WE MAKE A DIFFERENCE

SECTORS

AIR AND RAIL

COMMERCIAL

CULTURAL

EDUCATION

SCIENCE AND TECHNOLOGY

SPORTS AND ENTERTAINMENT

URBAN DEVELOPMENT

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OUR SPECIALISMS

ACOUSTICS

AIRPORT PLANNING

ANALYTICS

ASSET CONSULTANCY

BIM AND DATA MANAGEMENT

BRIDGE ENGINEERING AND CIVIL STRUCTURES

BUILDING SERVICES ENGINEERING (MEP)

DELIVERING BUILDING PERFORMANCE

DESIGN PROJECT MANAGEMENT

ECONOMICS

ENERGY CONSULTING

ENVIRONMENTAL CONSULTANCY

FACADE ENGINEERING

FIRE ENGINEERING

GROUND ENGINEERING

HEALTH, WELLBEING AND PRODUCTIVITY

INCLUSIVE DESIGN

INFRASTRUCTURE

LIGHTING DESIGN

ORGANISATIONAL TRANSFORMATION

PEOPLE MOVEMENT

RISK AND RESILIENCE

SECURITY AND TECHNOLOGY

STRATEGIC PLANNING

STRUCTURAL ENGINEERING

SUSTAINABILITY

TRANSPORT AND MOBILITY

VISUALISATION

WASTE MANAGEMENT

WATER

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INTER-DISCIPLINARY AND HOLISTIC

Our inter-disciplinary way of working inspires a truly holistic approach to solving the complex problems facing an ever changing world.

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PURPOSE AND CHALLENGES OF INFRASTRUCTURE PLANNING AND DEVELOPMENT

Purpose of Infrastructure Planning and Development

- Economic Development
- Creation of liveable spaces and places
- Connectivity
- Pathways to Net Zero
- Attraction of people and investments to certain locations
- Balancing spatial distribution of infrastructure
- Understanding of what infrastructure is needed and how to deliver
- Environmental Sustainability

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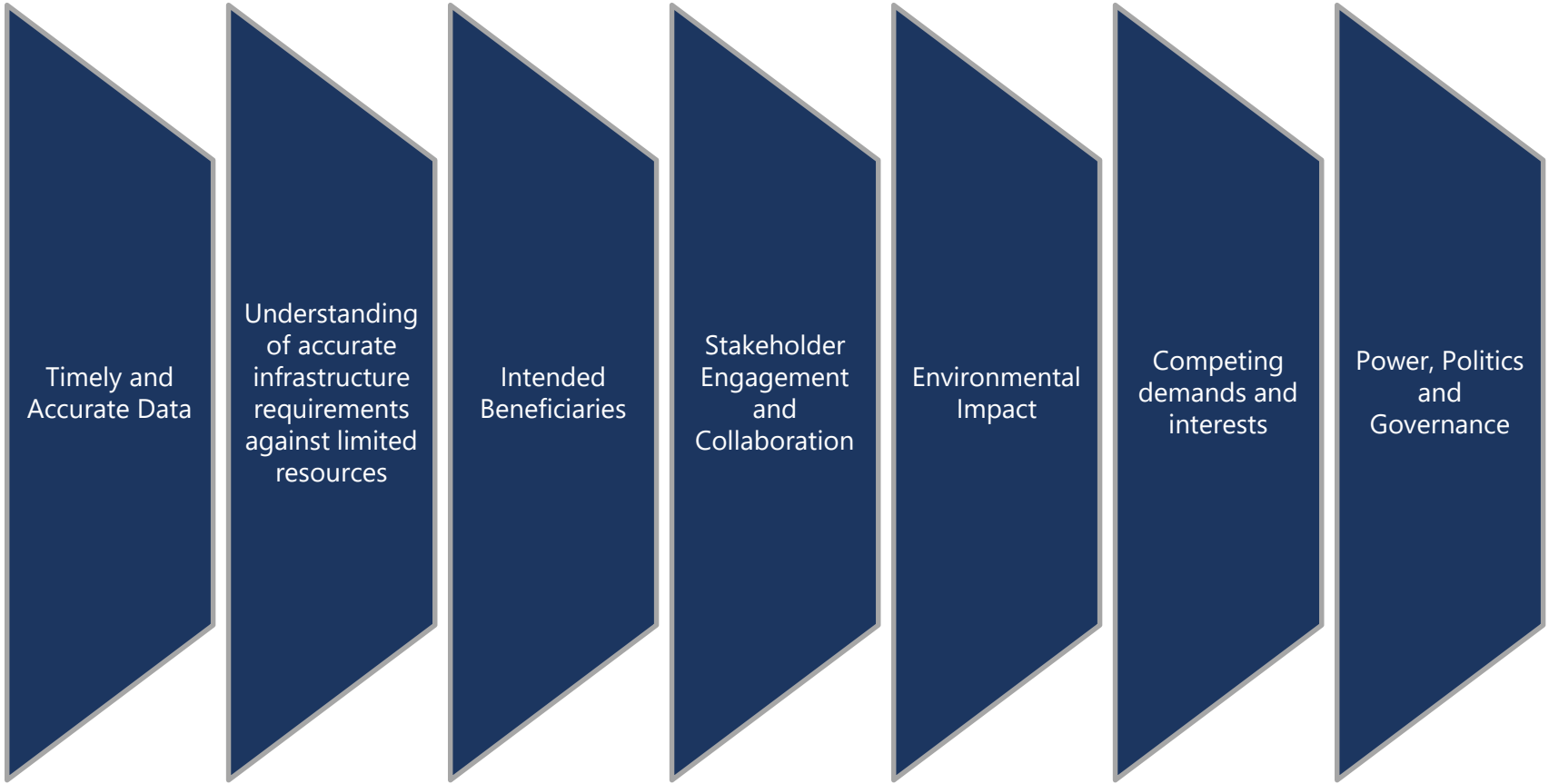
Challenges of Infrastructure Planning and Development in the Built Environment



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SPATIAL DATA AND ITS ROLE IN INFRASTRUCTURE PLANNING AND DEVELOPMENT

Built & Spatial Data – Geometric And Topological Constructs Of Spaces, Places and Locations Representing Complex Systems

Source: https://www.cgal.org/

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Vision

The use of Geospatial Big Data, Urban Analytics, Computation and Digital Twins to Design, Improve and Use Smart & Sustainable Spaces, Places, Location

Strategic Focus - A Smarter Approach to Data

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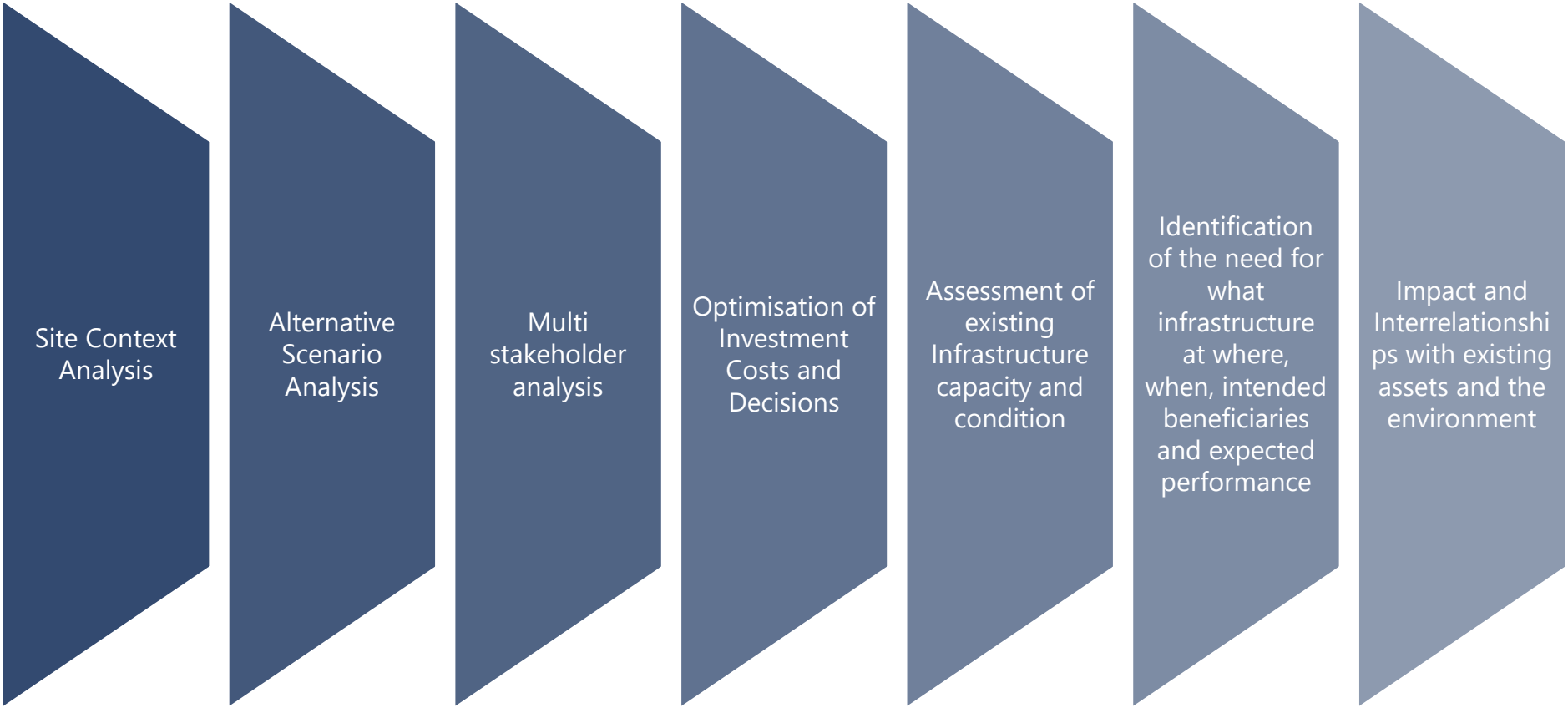
Making Sense of Vast Quantities of Spatial Data From a Variety of Sources

- Clients
- Consumers
- Operators
- Industry
- Influencing stakeholders
- 3rd party commercial arrangements
- Open-source and public domain sources
- Derived data through a combination of the above using computation and analytics methods

Role of Spatial Data in Infrastructure Planning and Delivery



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USE CASES AND EXAMPLES

Use Cases and Examples

cdbb

DT Hub case study

Image 1: Buro Happold Digital Twin solutions delivery methodology

Image 2: User interface - energy centre network profiles, monthly heat energy supply, and heat nurses

Image 3: User interface - pipe capacity, velocity pressure and pressure gradient, pipe length and pipe diameter and flow velocity

Image 4: User interface - typical daily household heat energy profile, monthly and quarterly heat energy requirements

techUK
FOR WHAT COMES NEXT

Shaping policy Accelerating innovation

You're here: The UK's technology trade association > What we deliver > Insights >
Guest blog: Pathways to Net Zero – Smart Energy Digital Twin the Natural Evolution

Industry views 10 Mar 2021

Guest blog: Pathways to Net Zero – Smart Energy Digital Twin the Natural Evolution

Guest blog by Anthony Tuffour and Phil Proctor, Buro Happold Ltd

Data the new oil and Oil bad for the Environment

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Buro Happold: Generative design and game engine technologies for Energy Network Design as pathways to Net-Zero communities

The problem: Dealing with the complexity of developing net-zero pathways for communities by using generative design and game engine technologies for Energy Network Design.

The action: Buro Happold with strategic partners have developed a smart energy digital twin for Bridgend County Borough Council and Barcombe.™ It enables intelligent selection and validation of domestic heat network solutions by incorporating real-world data, generative design, gaming and 3D visualisation technologies.

The result: The tool uses an automated approach for a complex phased development plan and comparison of multiple options including distributed vs centralised systems. The outputs can be provided to multiple stakeholders to support decision making including local government, supply chain, and community energy organisations. For Barcombe, "the scheme will see an entire village switched from oil to electric heating that could become a blueprint for millions of homes".

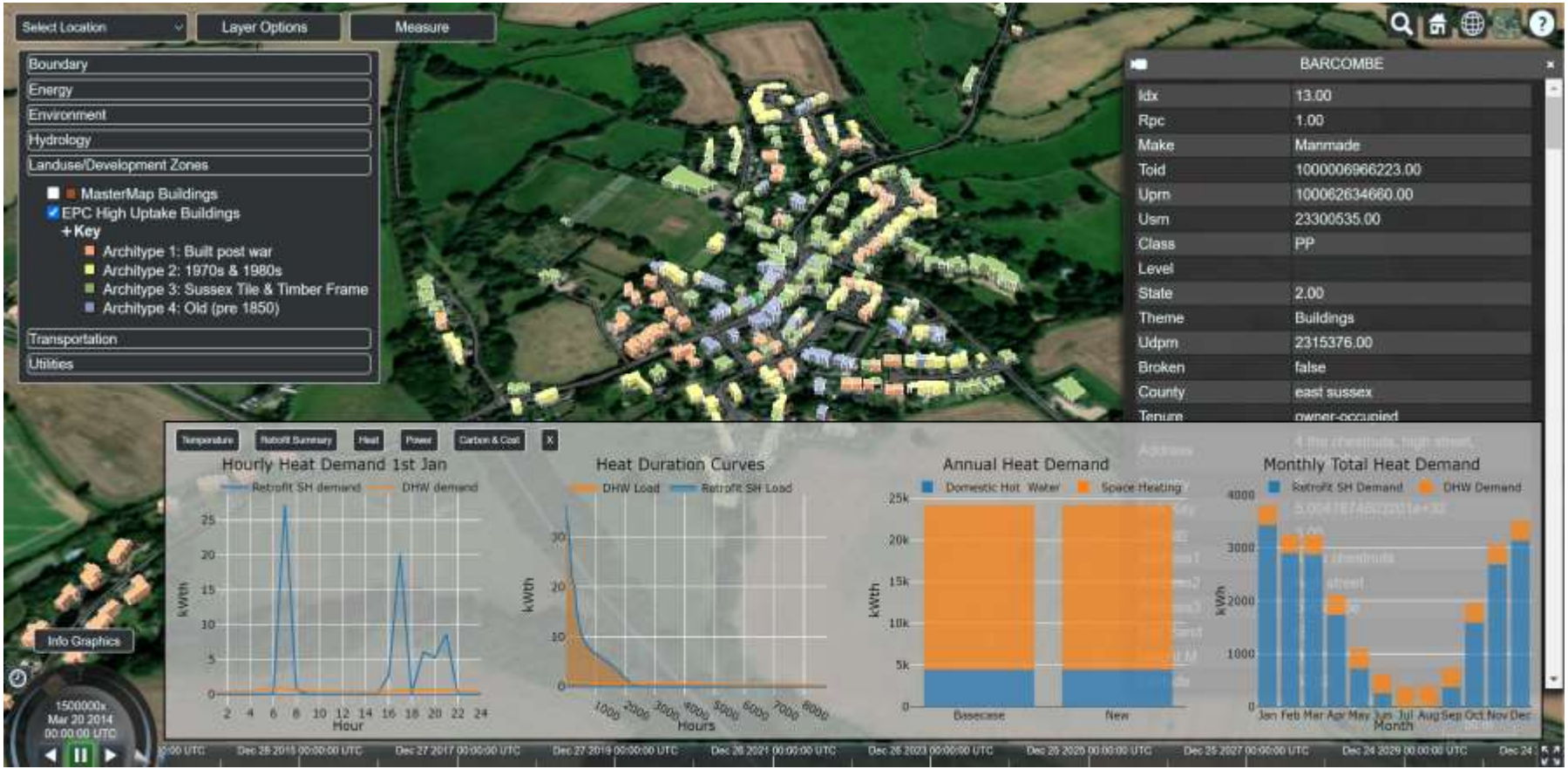
"The scheme will see an entire village switched from oil to electric heating that could become a blueprint for millions of homes."

Infrastructure and Projects Authority

Reporting to Cabinet Office and HM Treasury

Transforming Infrastructure Performance: Roadmap to 2030

Smart Energy Digital Twin – Pathways to Net Zero



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Smart Energy Digital Twin – Energy Network Design, Optimisation, Development and Operationalization

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Digital Masterplanning – District Heating and Potable Requirements Assessments

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Digital Masterplanning – District Heating and Potable Requirements Assessments

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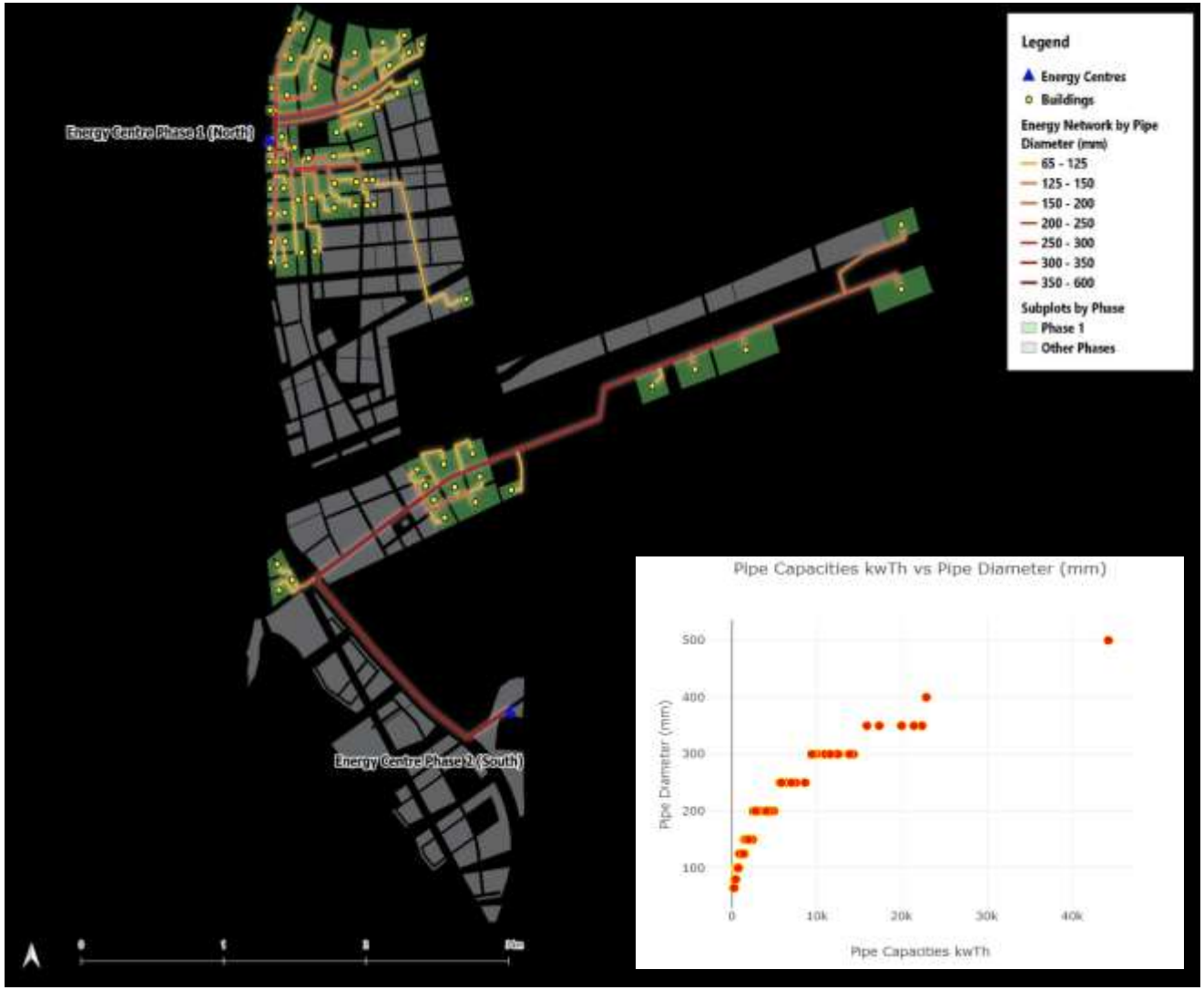
- District Heating Network Design Computation and Automation output



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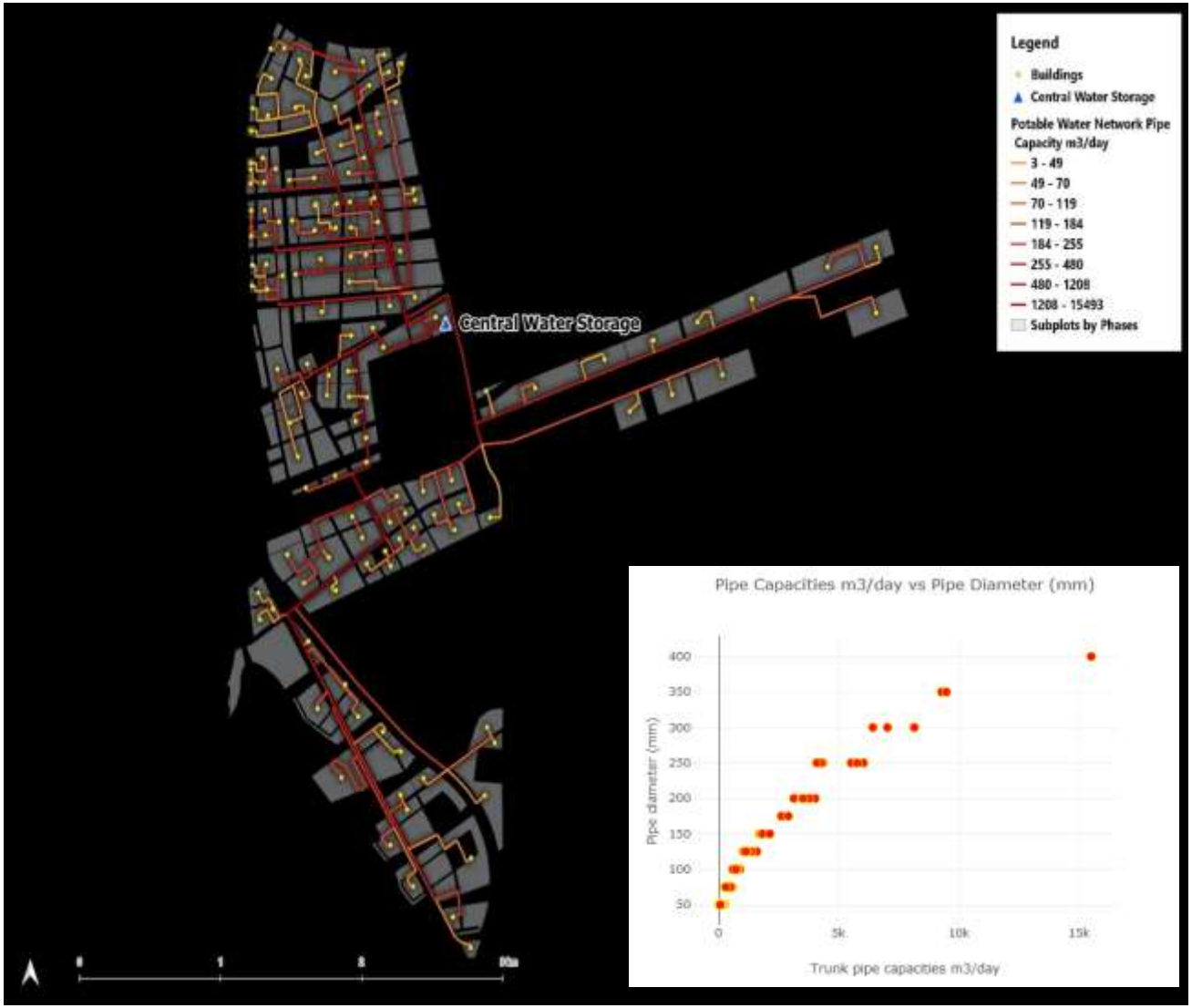
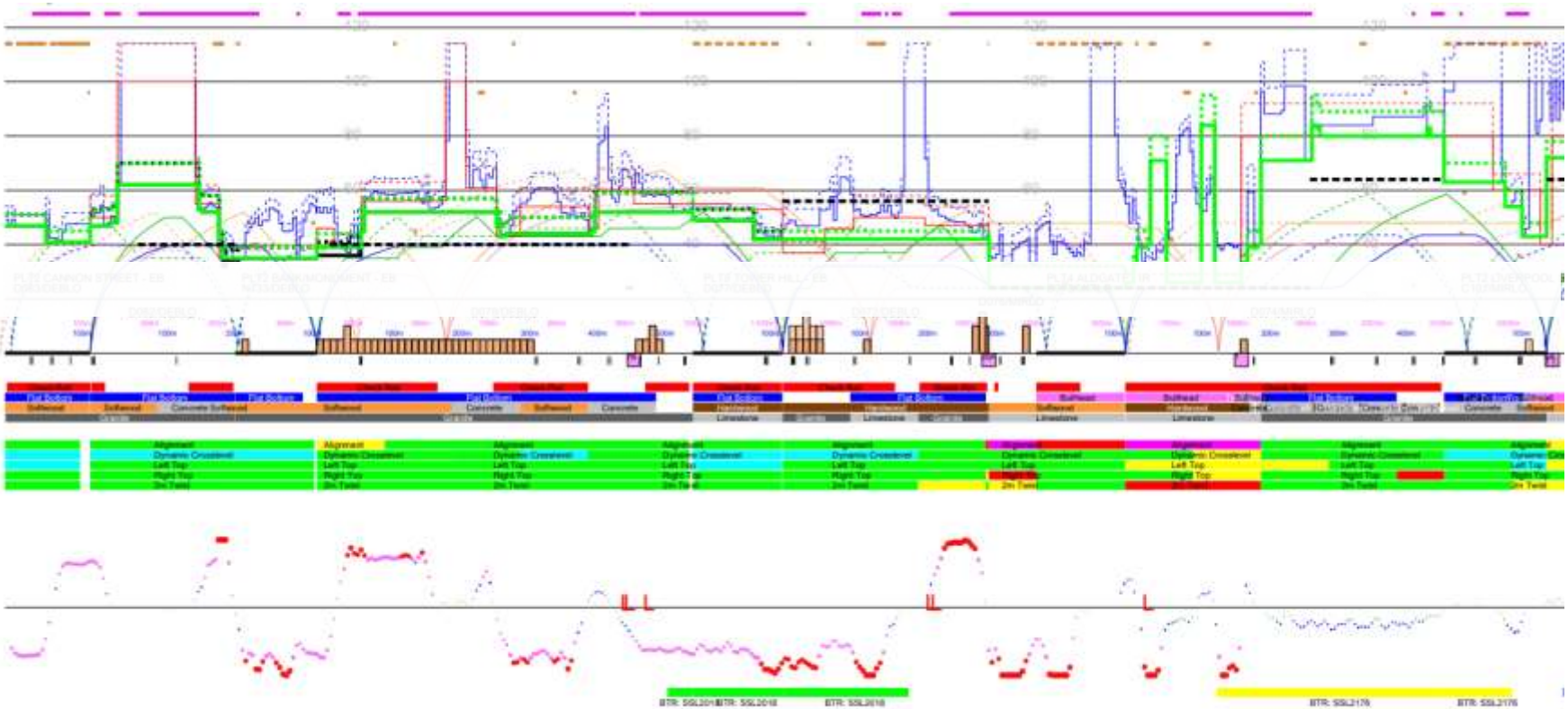
- Potable Water Network Design Computation and Automation



Transportation and Access to Built Environment Services

Transportation - Linear Infrastructure Planning, Condition Assessment and Improvement Investments



Video Demo – Spatial Data and Game Engine Technology: Immersive Experience

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VALUE

Where might the value lie ?

INVESTMENTS, EFFICIENCIES AND EMPLOYMENT CREATION

- Efficiency in design & operations
- Improvements in efficiency through removal of duplication of efforts
- Improved resource management
- Reduced maintenance costs of assets
- Potential to encourage 3rd party investment to innovate and create new products and services from the data and information collected within the City
- Partner with industry R&D centres, incubators, etc.
- Enhanced brand value

COMMUNICATION AND ACCESSIBILITY

- Openness, transparency and accessibility to relevant data and information
- Real time data and information analysis, alerts and notifications
- Use of AR/VR to engage primary stakeholders

PLANNING, DESIGN, CONSTRUCTION, OPERATIONS & MAINTENANCE

- Master model to facilitate cradle to cradle information across all lifecycle stages with appropriate governance, architecture and infrastructure to support
- Underpins future planning applications, development appraisals, and decisions outcome using real time data and information
- Development control operations and environmental management.
- Provide the ability to rapidly prototype and simulate options, and determine impacts
- Improvements in services delivery
- Improved and more resilient infrastructure

CREATION OF LIVABLE ENVIRONMENTS (HEALTH AND WELLBEING)

- Environmental improvements and quality of life analysis and improvements
- Improvements to health and safety
- Improvements in quality of life

PARTICIPATORY PLANNING & STAKEHOLDER ENGAGEMENT

- Platform to highlight local initiatives and engender community involvement
- Project collaboration and innovative digital environment to solicit community feedback on local issues and planning applications
- Open data initiatives for individuals and community groups to undertake their own analysis of local issues

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JUMP ON BOARD!

We'd love to hear from you

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www.burohappold.com