Triple Point HEAT NETWORKS INVESTMENT MANAGEMENT

Showcasing our funded projects

Harnessing heat from rivers and waterways

Housekeeping

The session will be recorded. The video and slides will be available.

Turn off your camera unless you are speaking.

Please feel free to comment in the chat.

We will take questions throughout the session. Please type your question into the Q&A

Raise your hand if you have a question during a discussion.

Agenda

Session	Speaker
Welcome and Housekeeping	Michael Williams, **Gemserv, a Talan Company**
Welcome and technical overview of the technology	Alex Duckworth, **AECOM**
East London Energy	Amy Baker, **Bring Energy**
Bristol City Centre	Jon Sankey, **Vattenfall** Jason Lee, **Vattenfall**
Live Q&A	Samantha Shea, **Gemserv, a Talan Company**
Closing Remarks & Thank You	Samantha Shea, **Gemserv, a Talan Company**

Triple Point HEAT NETWORKS INVESTMENT MANAGEMENT

Introduction to the technology

Alex Duckworth, AECOM

Photo by Benjamin Lizardo

Photo by Ivan Bandura

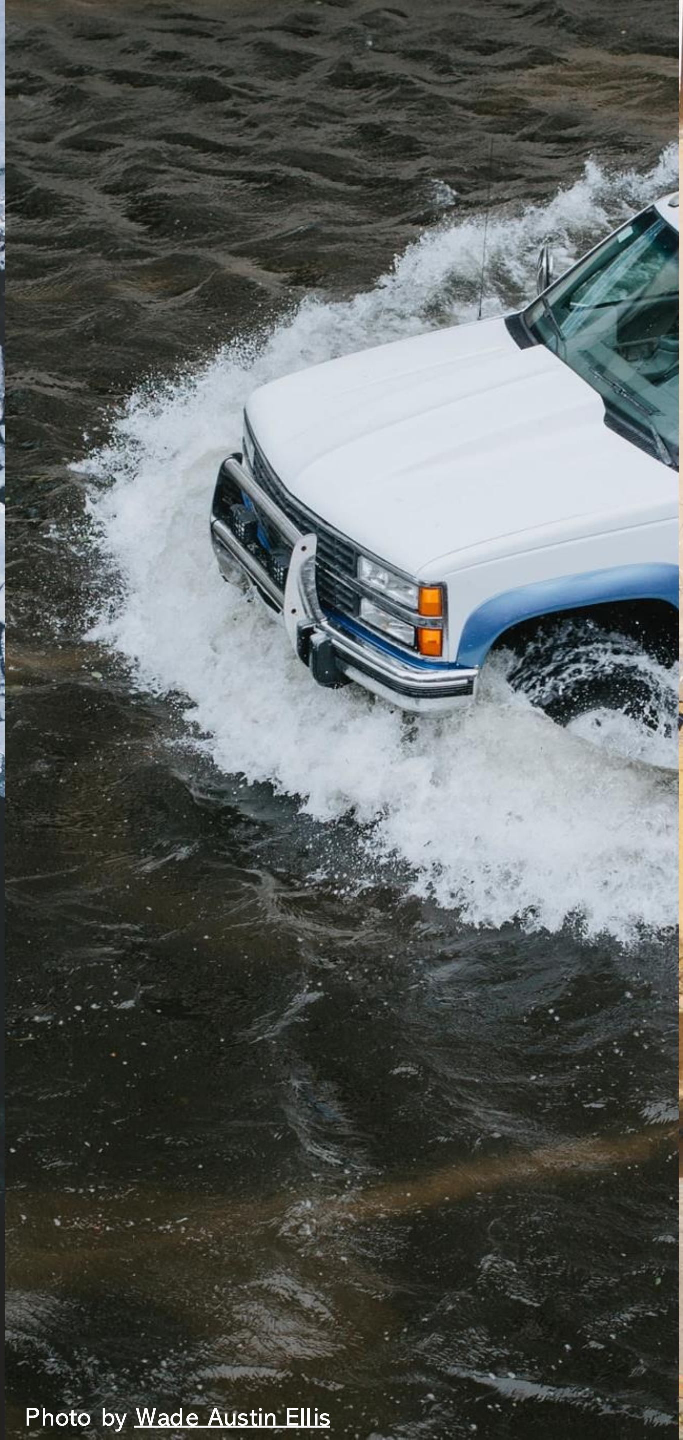

Photo by Wade Austin Ellis

Photo by humberto chavez

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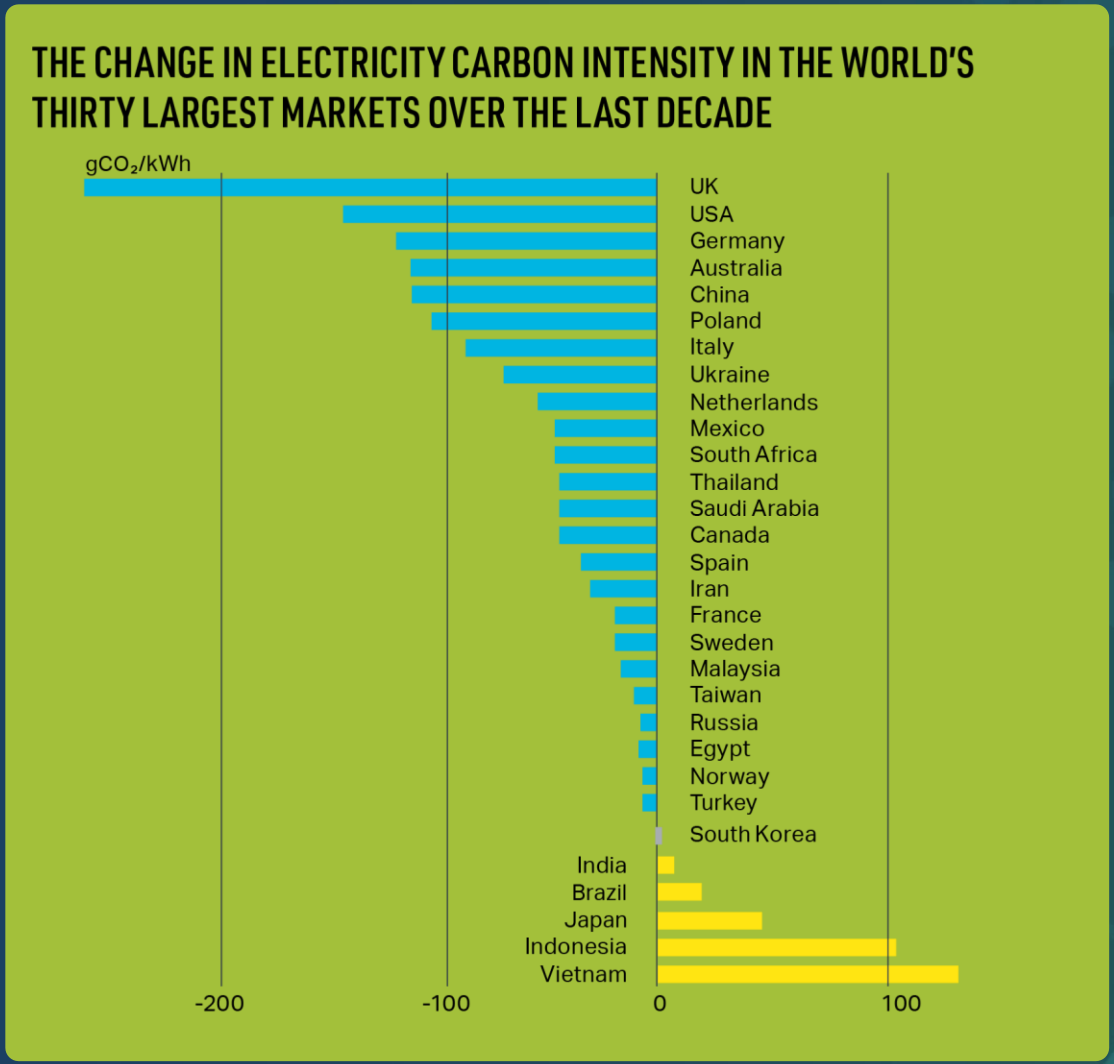
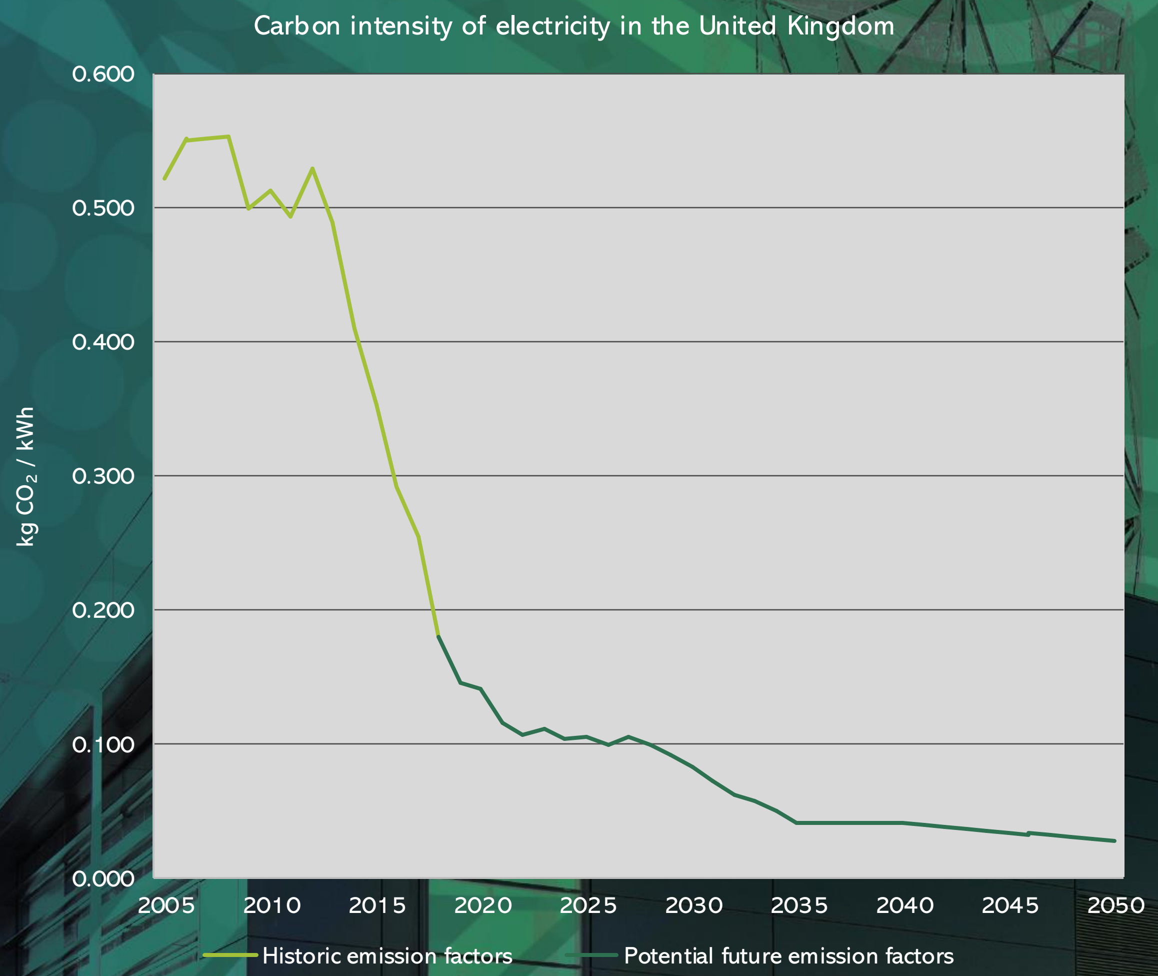




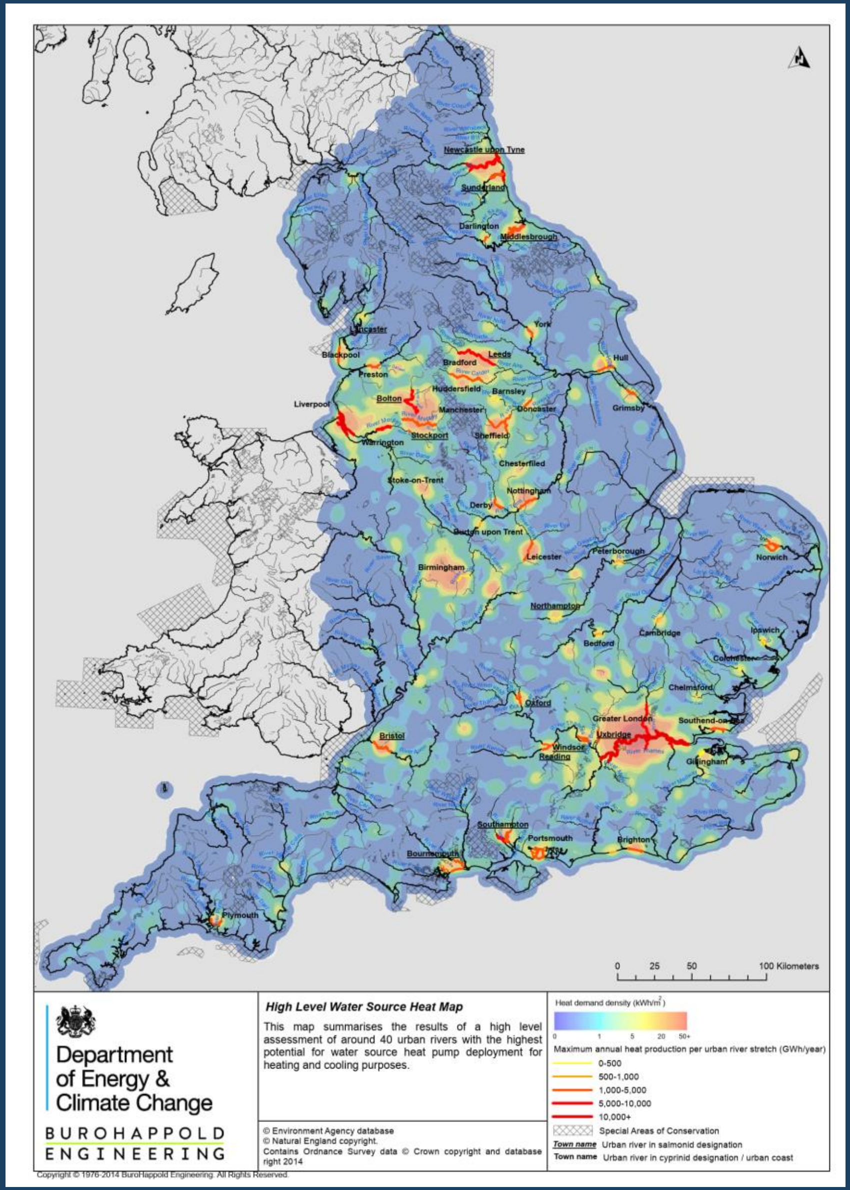
Water Heat Source

- Heat Pumps: These are required to elevate the available source to a useable temperature – predominately for heating and hot water.
- High Thermal Inertia: Water's high specific heat capacity allows it to store and transfer significant thermal energy, meaning that Water Source Heat Pumps (WSHPs) can consistently extract or reject heat without experiencing rapid temperature swings.
- Consistent Water Temperatures: Water bodies such as rivers, lakes, and canals maintain relatively steady temperatures throughout the year compared to the fluctuating air temperatures, particularly in winter.
- Seasonal Efficiency: High thermal inertia and more consistent temperatures will usually allow WSHPs to provide greater output and energy efficiency when demand is greatest compared to air source heat pumps (ASHPs).

Painting by W J Baker 'Pool of London'

Rivers, Waterways and Growth

- For thousands of years, rivers have been essential for providing fresh water, supporting agriculture, enabling transportation and trade, offering fishing opportunities, and serving defensive purposes.
- In the UK, numerous towns and cities have grown up alongside rivers, expanded waterways, and with development has come heat demand.
- Over time the use of rivers and waterways for commerce may have declined, however, the heat demand remains and with it the need to decarbonise.
- The watercourses offer a potential route to supply the heat demand with a source for cost effective low carbon heat – and often right to the centre of the highest demand.



Feasibility

- There are lots of resources and data available to undertake initial feasibility assessments for the potential water source heat.
- Initial sifting
  - National Heat Map
  - Ranked Rivers
- Water level, flow and temperature data
  - National River Flow Archive
  - Environment Agency
- Site specific surveys and measurements necessary to develop feasibility and understand the opportunity and potential limitations for the proposals.

Month	Monthly Average River Temperature [°C]	Average River Flow rate [m³/s]	Average Abstractable flow rate (5%) [m³/s]	Average Heat Pump Output [kW]	Average River Level [m]
January	7.5	22.9	1.14	24,000	0.71
February	6.0	23.7	1.18	25,200	0.70
March	7.6	18.2	0.91	19,100	0.64
April	7.3	9.9	0.50	10,400	0.52
May	10.1	8.5	0.43	8,800	0.49
June	11.9	6.6	0.33	6,700	0.46
July	16.6	7.9	0.40	7,700	0.48
August	15.6	7.9	0.40	7,800	0.48
September	14.8	8.0	0.40	8,000	0.51
October	10.0	15.7	0.78	16,100	0.61
November	7.7	20.4	1.02	21,400	0.68
December	6.3	26.1	1.31	27,700	0.75
Annual Average	10.1	14.7	0.73	15,200	0.59

Feasibility

- Record data to inform initial feasibility
  - Average temperature
  - Average flow rate
- An Environment Agency abstraction and discharge licence is required which will include restrictions.
- In this example an assumption of 5% of the river flow rate could be available and if the temperature of this flow rate is reduced by 5 degrees in summer a heat pump output could be 6 MW.
- With greater rainfall expected in winter the flow rate could increase allowing a larger heat output even with a lower water source temperature change.
- Higher heat availability during winter when demand is likely to be at its greatest is beneficial.

Access

- Not all heat demand has direct access to the water source so unlike ASHPs, this solution is likely to rely on development of a heat network to provide the heat demand.
- Whilst there may not be a significant difference in Energy Centre scale between centralised ASHP and WSHP solutions the buildings may be less imposing.
- Improved energy efficiency compared with local ASHPs can allow the heat network distribution losses and network construction costs to be offset.
- Heat network development is complex and requires engagement with many stakeholders so early consideration of the specific site and environmental challenges are essential to ensure the heat source is feasible.

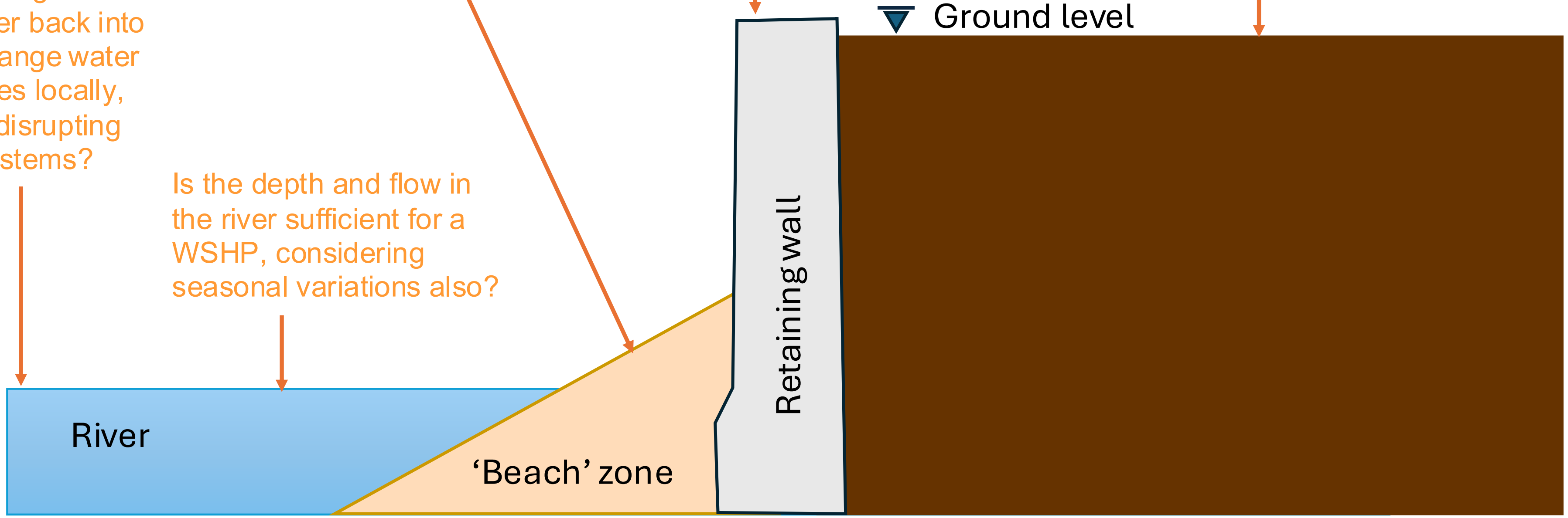
Is there any available information on the construction/ownership of the retaining wall?

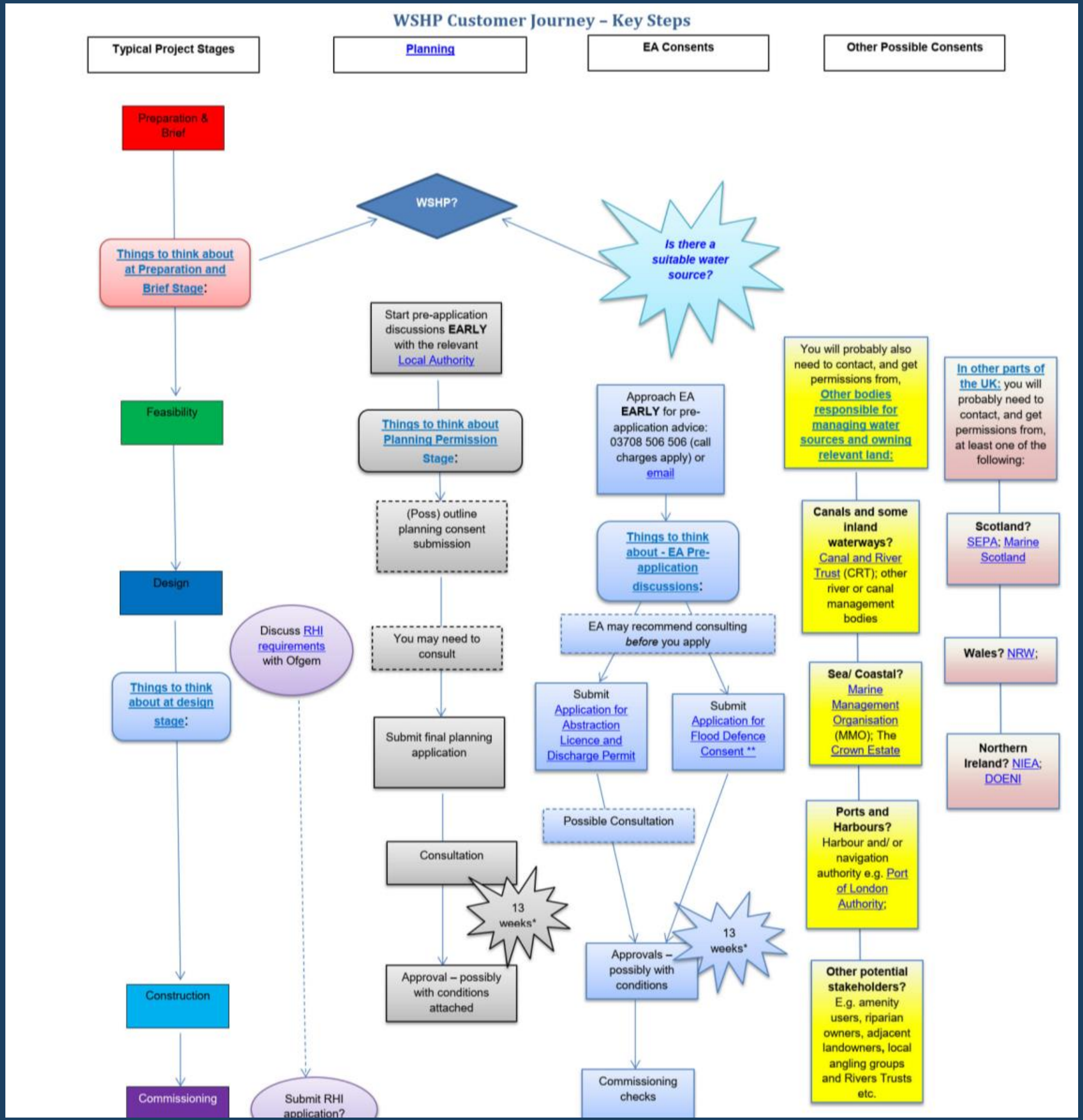
What is the status of the 'beach' zone, is it possible to remove this feature in the permanent condition? Will removal or alterations to this cause issue with the retaining wall?

Is the site at its current level adequately protected against flooding or will site levels require to be raised?

Could discharge of cooled water back into the river change water temperatures locally, potentially disrupting local ecosystems?

Is the depth and flow in the river sufficient for a WSHP, considering seasonal variations also?





Extract from DECC Water Source Heat Pumps – Navigating the Way: A Customer Journey for potential developers (link)

Permissions

- Many stakeholders need to be engaged with, to gain consent and to determine commercial viability.
- Some of the key stakeholder bodies include:
  - Local Planning Authority
  - Environment Agency
  - Canal and River Trust
  - Ports and Harbours Authorities
  - Land Owners
- The timelines need to align with developing the commercial case for the heat network or making plans to develop an interim and investible solution.
- Given the technical and permission challenges it may be appropriate to disconnect development of a heat network from the water source solution in the short to medium term and consider the use of other heat sources and with aim of returning to this source to increase capacity and improve performance and economics.

Triple Point HEAT NETWORKS INVESTMENT MANAGEMENT

THANK YOU

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www.aecom.com

East London Energy

Amy Baker, Bring Energy

Bring Energy

Growing Sustainable Networks

East London Energy

River WSHP Project – 6th November 2025

Bring Energy Overview

We operate

13 city centre scale energy schemes

We finance, design, construct, maintain, and expand.

We have

over 30 years' experience in providing district energy

We serve

residential and commercial, in partnership with public sector bodies and/or developers

We are

the UK's largest city centre scale district energy company supplying more heating and cooling through district schemes than anyone else

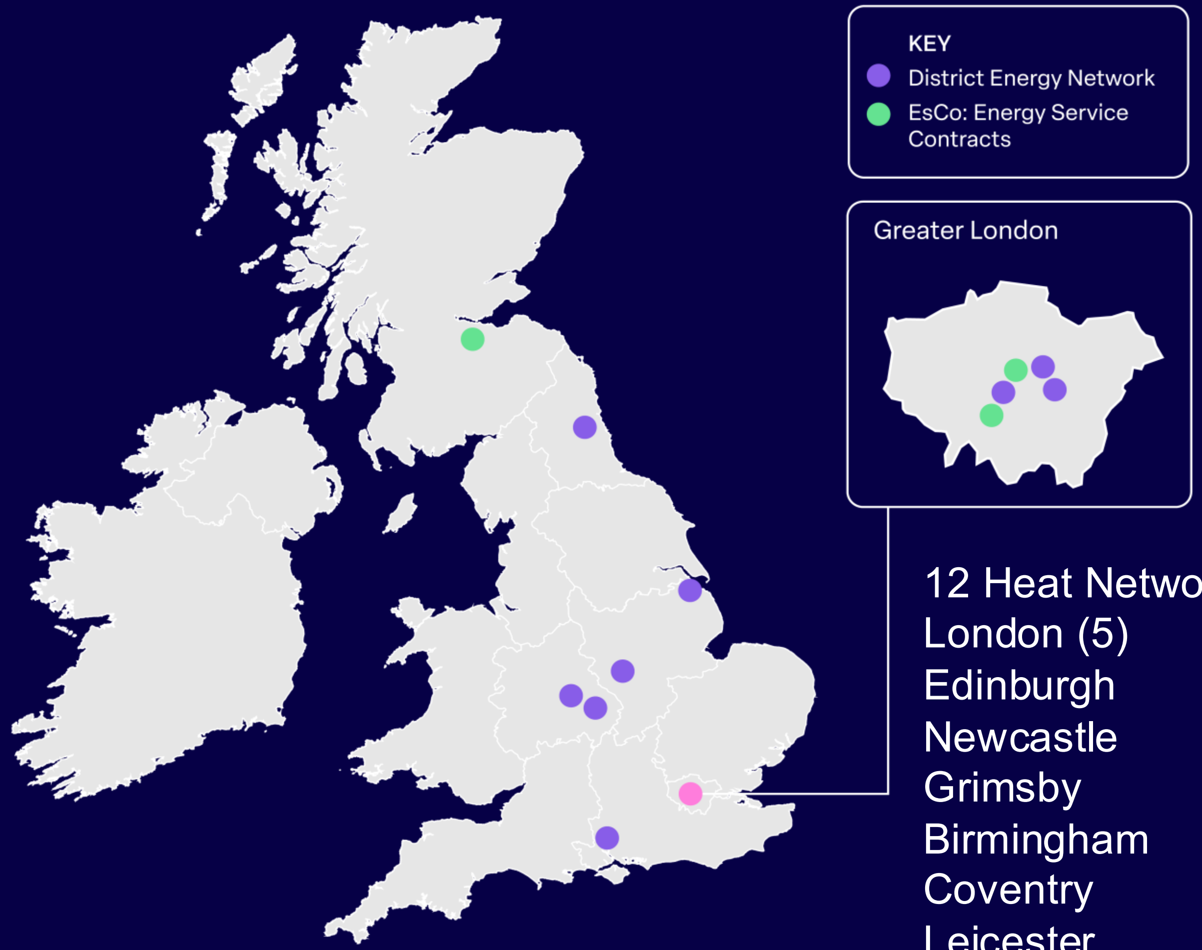
Established clients and schemes backed by strong investors

Introduction to Bring Energy

432 MW
Heating capacity

117 MW
Cooling capacity

67 MW
Electricity capacity



12 Heat Networks
London (5)
Edinburgh
Newcastle
Grimsby
Birmingham
Coventry
Leicester
Southampton

Bring Energy

History of the Olympic Park

2005 - 2012

2012 – 2024

2005
UK Win the bid for the 2012 Olympic Games

2006
- Stratford redevelopment plan initiated and the London Development Authority

2007
(ELYO) Urban Energy wins bid to build low carbon energy system to supply the Olympic Games

2008
Construction Started on ELE Energy System

2010
First Heat delivered to the network

2012
First Energy supply for the London Olympic Games.

2023 to now
BEL produce decarbonisation plan and delivery of low carbon energy

Bring Energy

Decarbonisation roadmap process

Phased process for development of decarbonisation plan of each scheme…

1 Options Appraisal	2 Roadmap to decarb refinement	3 Detailed project development & commercialisation	4 Iteration of roadmap	✓ Delivery / Investment
▪ Produce long list of options ▪ Shortlist options based on technical & economic factors	▪ Refined staged roadmap & timeline of projects ▪ Development of early incremental decarbonisation & system optimisation projects	▪ Detailed project development including financial, commercial and management. ▪ Business case development.	▪ Roadmap iteration (learning from project delivery), incorporating strategic and innovation opportunities, evolution and refinement	▪ Day 1 delivery approach ▪ Incremental decarbonisation and system optimisation projects developed and delivered

…Considering 3 activity layers

A – System optimisation
- Increase network efficiency
- Reduce heat losses

B – Incremental decarbonisation projects
- Installing heat pumps running in hybrid with existing gas boilers and CHPs

C – Strategic opportunities
- Connection to large heat sources (e.g. EfW, data centres, deep geothermal)

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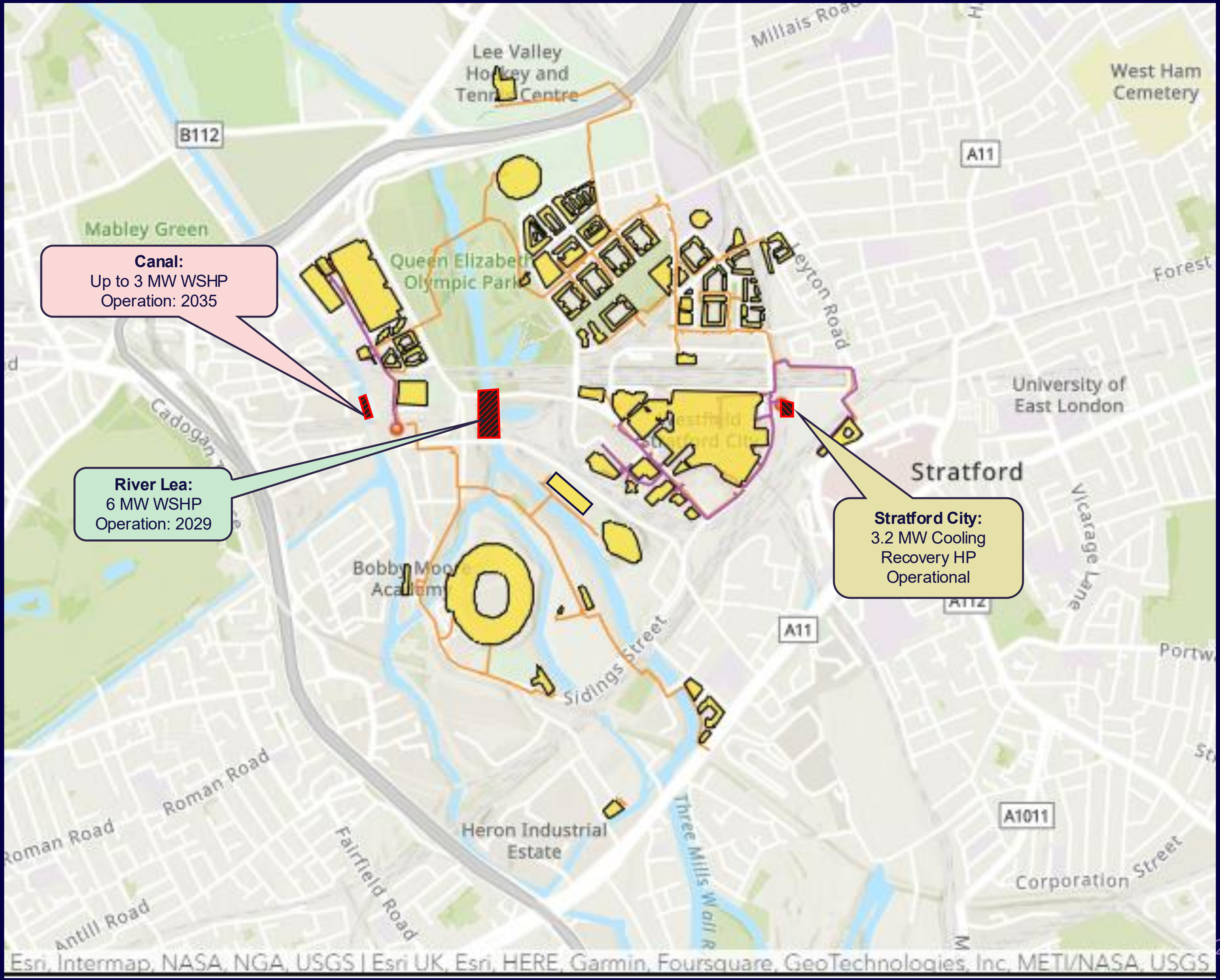
Local Context

- Initial Feasibility study completed by WSP
- Further feasibility & design to be completed

- Planning application to be re-submitted.
- Detailed design and environmental licence to be obtained.
- Concession to be agreed prior to final investment.



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Sequence of Activities

Heat Availability Assessment

Q1 2023

Abstraction & Discharge Location Optioneering

Q2 2023

RIBA Stage 2 – 3 Design Completed

Q1 – 2 2024

Pre-application of discharge licence approved by EA

Q3 2024

GHNF Application Submitted

Detailed Planning Submitted to Local Authority

Q3 2024

Planning withdrawn due to objection

Q4 2024

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Spatial Assessment

- Land available for pumphouse determined based on:
  - Known Land Ownership
  - Closest position to the Energy Centre
  - It allows the most direct route to the Energy Centre available
  - The location does not require pipework to rise up to clear obstructions (e.g. road embankments) which might result in airlocks in the system
  - Fewer risk of trees removal requirement.
  - Existing buried services in locations.
  - It is more easily accessed for construction and maintenance.

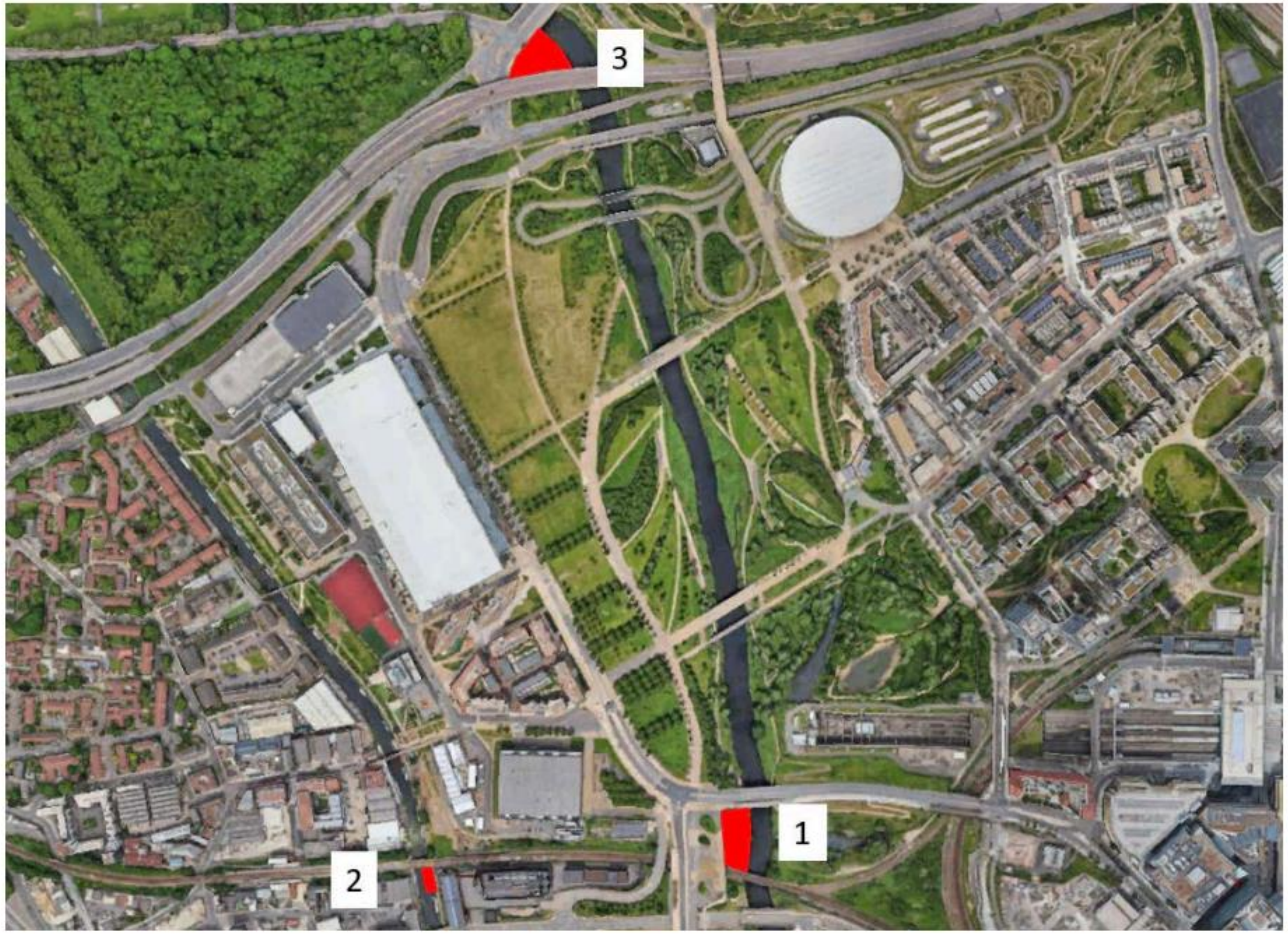

Image prepared by WSP. Source image: Google Maps

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Design Considerations

- Systems designed so unaffected by ice. (lowest temp c. 2.9dc, highest c. 25dc)
- To mitigate open loop system River water pumps would need to be located within the river.
    - Intake to be via multiple stainless steel self-cleaning basket strainers fitted with submersible pumps and a continuous backwashing system
    - A jetty would be fitted over the strainer pumps to protect them from damage, allow access and bridge the gap between the river wall and the pumps.
- Consideration to existing utilities for flow / return pipework

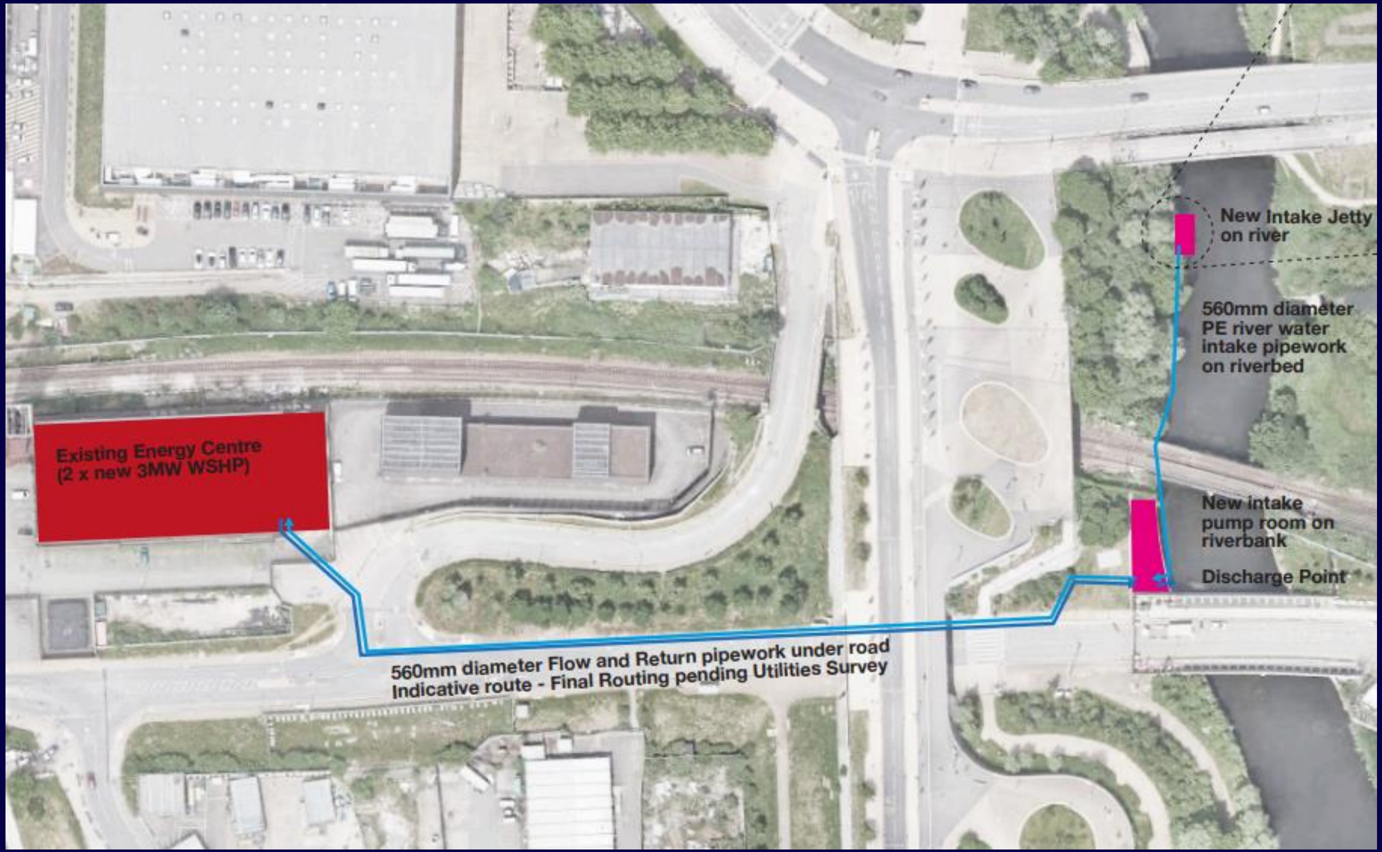

Diagram of connections between Jetty, Pump Room & Energy Centre (NTS)

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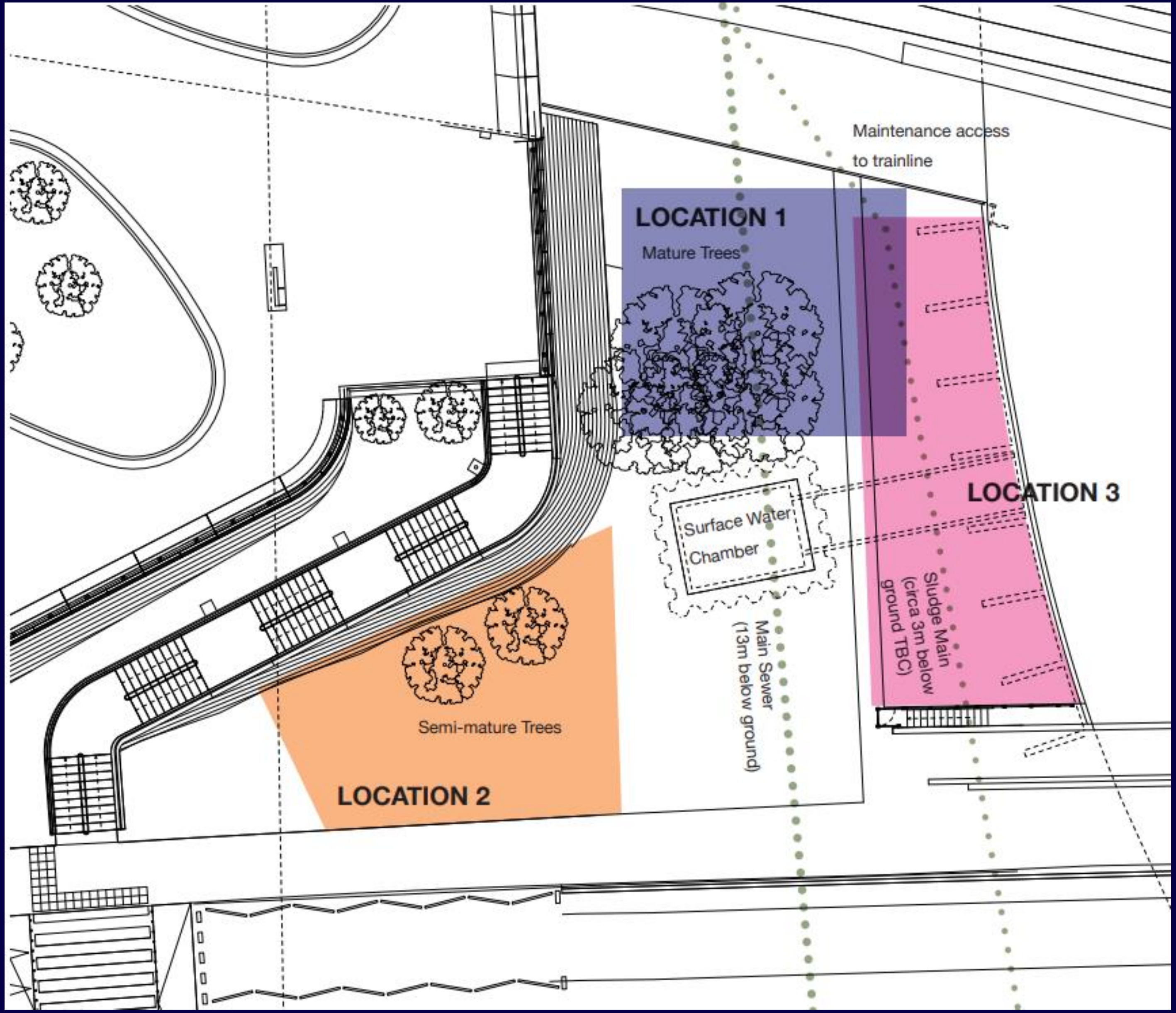
Plantroom Location

Constrained Space with no clear preferred space:

Location 1:
- Removal of Trees
- Maintenance to trainline required.

Location 2:
- Longer stretch of pipework required.
- Tree Removal
- Building form obscures sight lines countering other planning requirements.
- No infringement to other services.

Location 3:
- Logical presence on the riverside
- EA requirement of wall access for maintenance



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Project Challenges

- **Providing a water abstraction and discharge system using the River Lea in this location presents a challenge:**
  - The water level is substantially below the prevailing ground level, considerable vertical lift to get the water up to a usable level.
  - The riverbed is shallow at the edges and deeper in the middle, extracting at the edge is not practical
  - The water level in the river will vary depending on rainfall.

- **Environmental Agency concerns over:**
  - Building over flood defences and works within 8m of flood deference & watercourse.
  - Structural stability of existing flood defence
  - Access to River Wall for maintenance & emergency response.

- **Planning:**
  - Resubmission goes to 2 Local Authorities.

Image by OEB

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Timescales

- Intend to resubmit planning in 2025 / early 2026 to Local Authority.
- Subject to successful planning application – procurement of RIBA Stage 4 design Q2 2026.
- Aim to commence construction Q4 2026 – dependent on planning & licence requirements.
- Project procurement to be included on the Heat Network Exchange Noticeboard.

Thank You

Bring Energy

Triple Point
HEAT NETWORKS
INVESTMENT MANAGEMENT

Bristol Heat Network – Castle Park

Jon Sankey, Vattenfall
Jason Lee, Vattenfall

Castle Park Energy Centre
Bristol Heat Network

VATTENFALL

Vattenfall in Bristol

Bristol heat network

Vattenfall **fully owns and operates** the heat network in Bristol.

Over **the first five years**, Vattenfall will be investing £475 million to grow the Bristol heat network, providing enough heat to supply 12,000 homes.

Our vision is that **over half of all Bristolians living, working and learning in the city will be kept warm by the Bristol heat network by 2050**.

A ground-breaking twenty-year partnership has been created to deliver over **£1 billion of investment into Bristol's energy system**.

140 tonnes of carbon saving

180MW of zero carbon generation assets

327GWh of zero carbon energy generated

£61.5m of social value including £50m of contracts delivered by local supply chain

A guaranteed £1.5m Community Energy Fund

410 new jobs created in Bristol and 1,000 jobs in total, all paying at least the 'Real Living Wage'

Brief

Vattenfall in Bristol

Case study: Castle Park Energy Centre

1) About the energy centre – project information & timeline, detail/spec, local network

2) Asset delivery and operation – challenges & opportunities

3) Stakeholders and engagement – who we work with and why

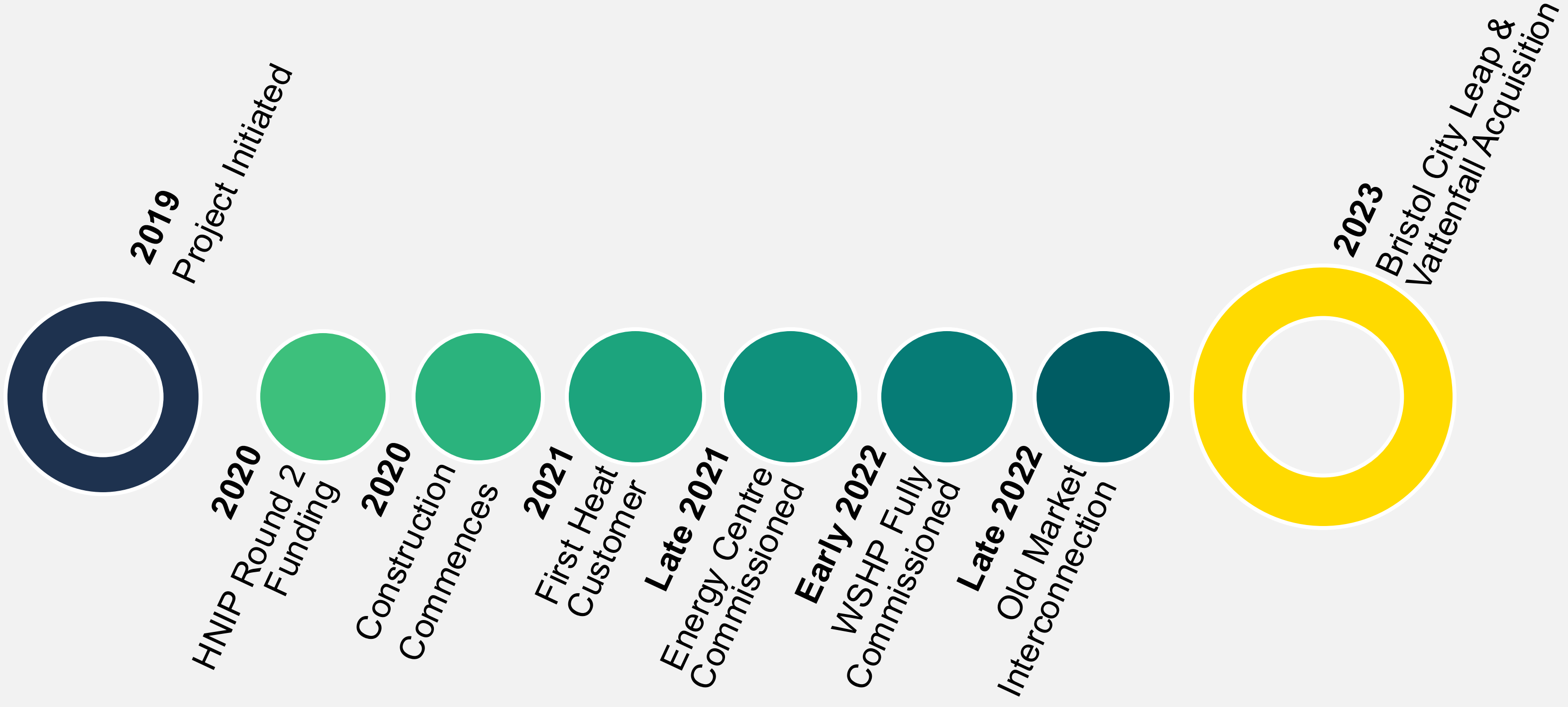
Project Focus

Vattenfall in Bristol

Case study: Castle Park Energy Centre

1) About the energy centre – project information & timeline

- Fund Round 2 – Heat Networks Investment Project (HNIP) – £6,590,000 Award
- Client: Bristol City Council – The Energy Service
- Principle Contractor: Vital Energi
- Project timeline:

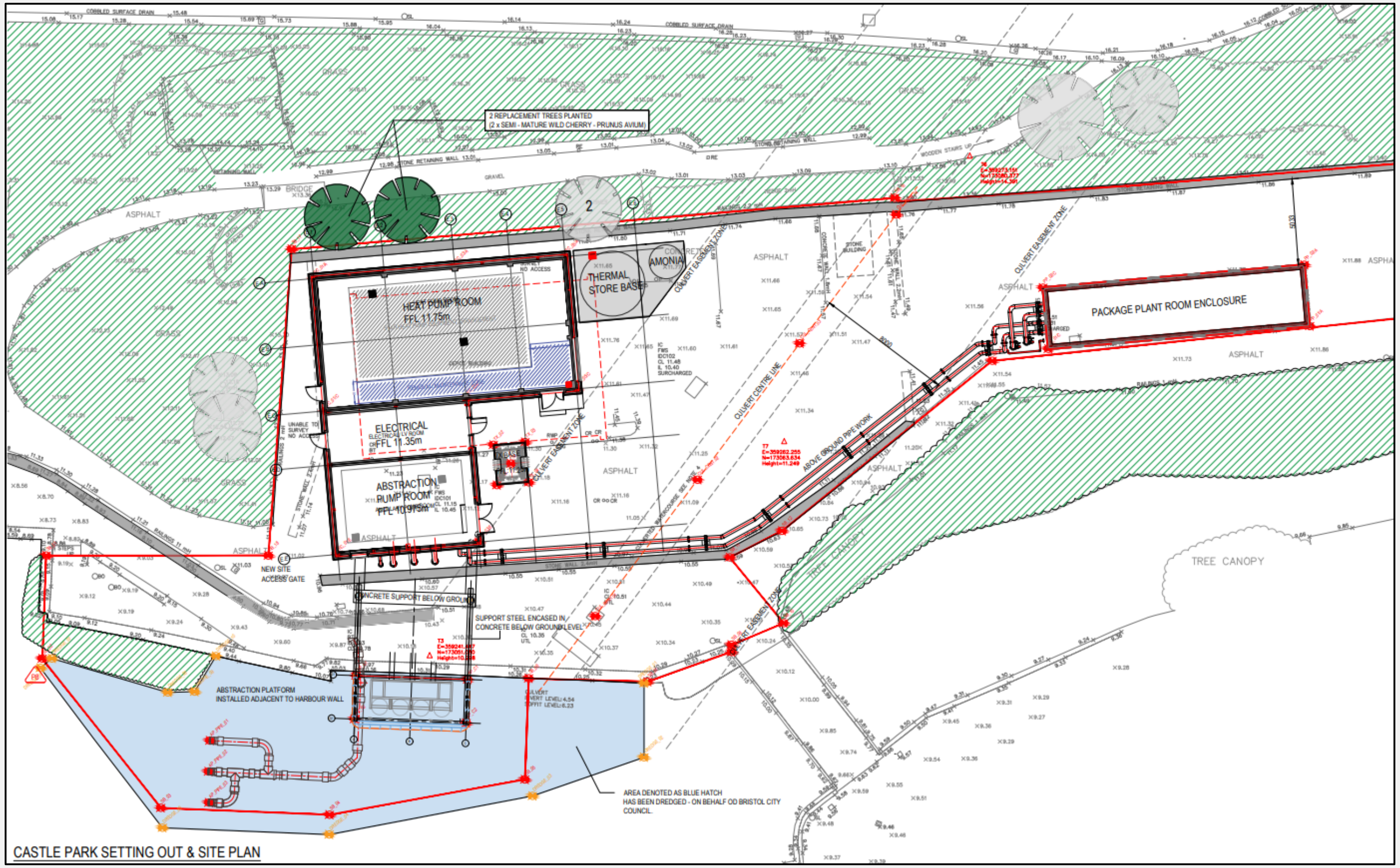


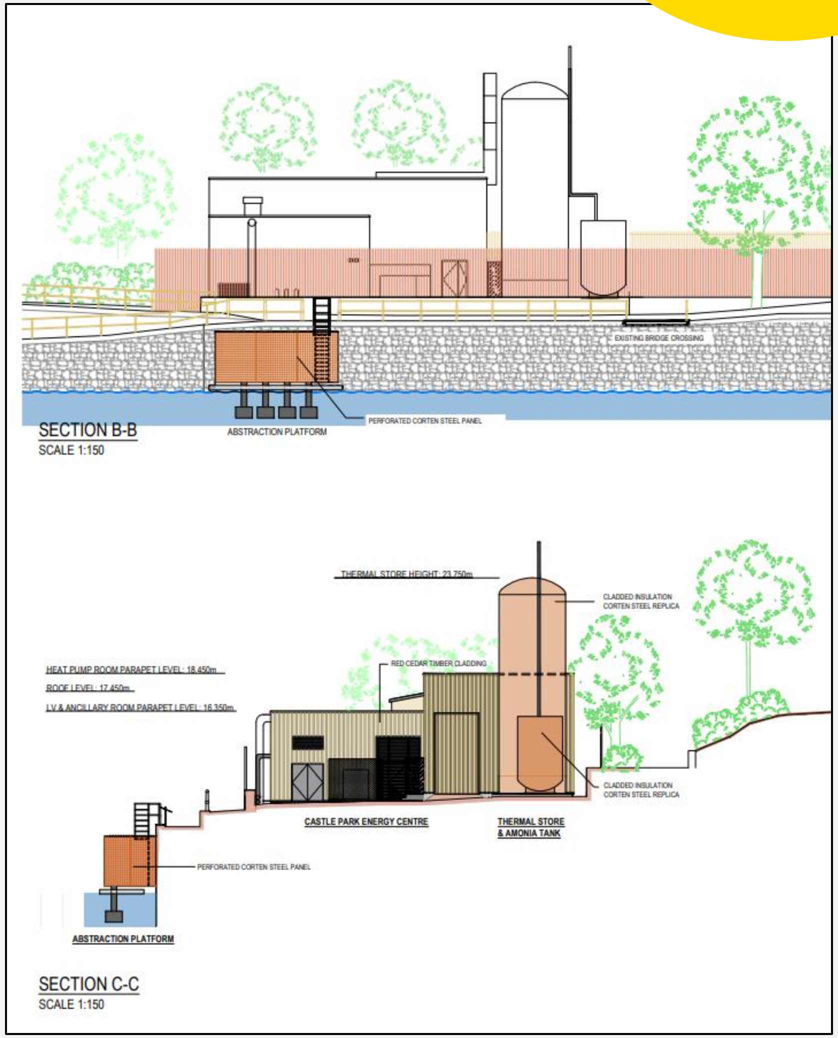
Project Focus

Vattenfall in Bristol

Case study: Castle Park Energy Centre

1) About the energy centre – site detail





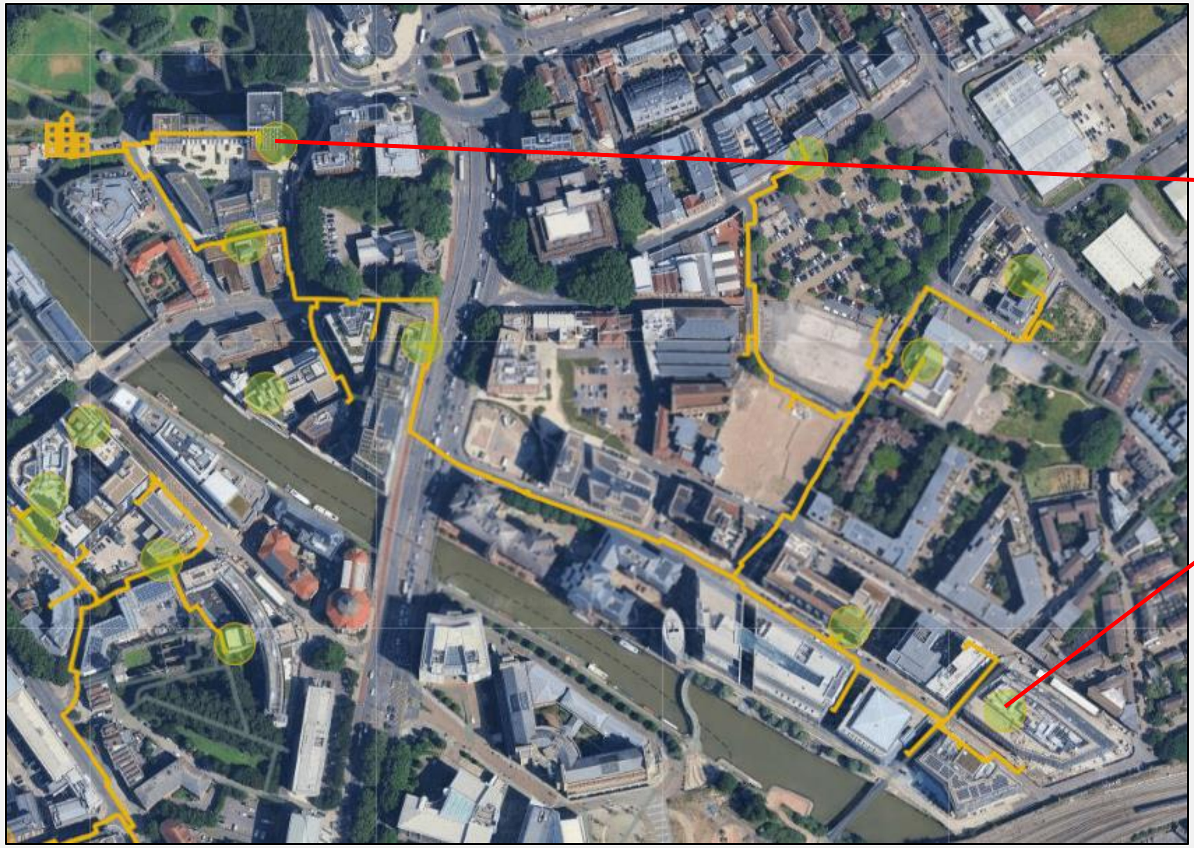
Project Focus

Vattenfall in Bristol

Case study: Castle Park Energy Centre

1) About the energy centre – local network

- **9 B2B connections consisting of:**
    - 4 residential buildings
    - 3 commercial office buildings
    - 2 public service buildings
- **20.09MWh of annual demand**
- **2.2-2.4MW of peak event load**
- **2500 homes equivalent heated**
- **4.17km of live DH pipe**
- **191m3 system volume (DH water)**
- **Non-chemical treated system**
- **Avg. primary export of 75°C**
- **Avg. secondary return of 50°C**



Anchor loads:

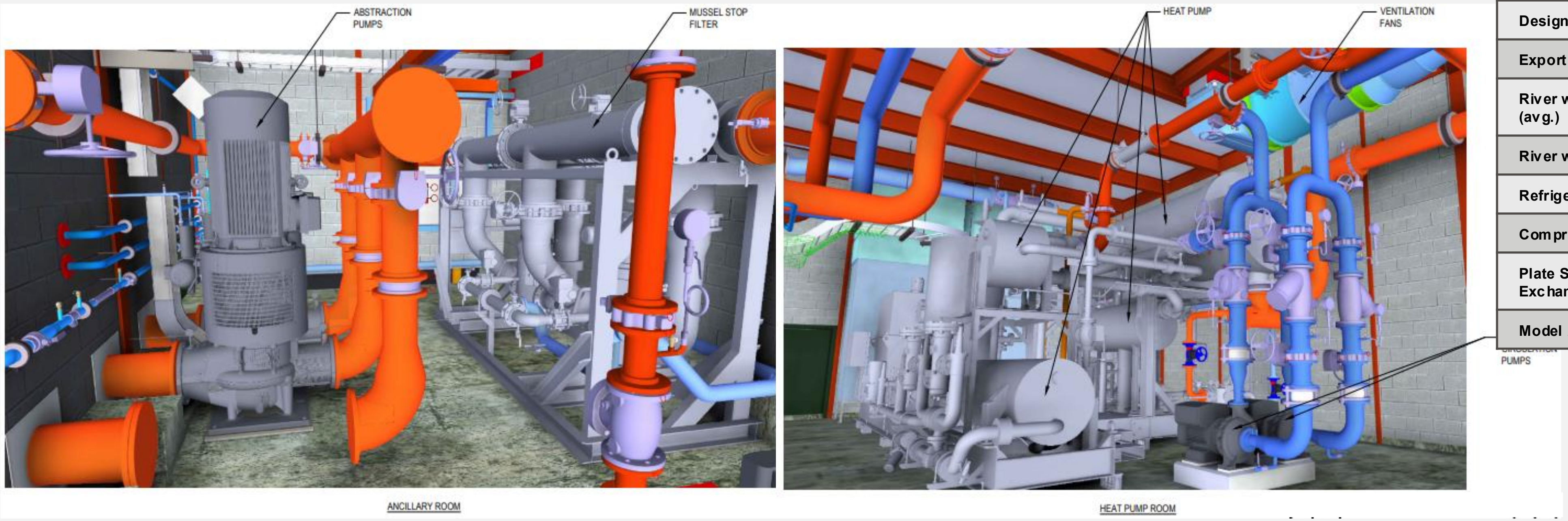
- Castle Park View (top)
- Welcome Building (bottom)

Asset Focus

Vattenfall in Bristol

Case study: Castle Park Energy Centre

1) About the energy centre – water source heat pump



Castle Park WSHP Specification	
Generative Capacity	3 (MW)
Design COP	3.06
Export Temp (to DHN)	75-80 (°C)
River water temp range (avg.)	3-24 (°C)
River water flow rate (max)	127.7 (kg/s)
Refrigerant	R717 - Ammonia
Compressor	Single-phase Screw Pack
Plate Shell Heat Exchanger(s)	4
Model / OEM	Neatpump / STAR Refrigeration

River Water

DH - Flow

DH - Return

Operations Focus

Vattenfall in Bristol

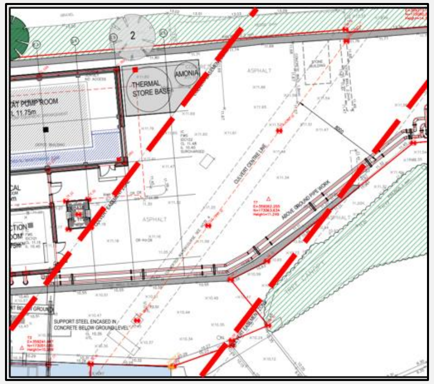
Case study: Castle Park Energy Centre

2) Asset delivery and operation – challenges & opportunities

CHALLANGES

1 – Environmental constraints

- Subterranean culverts (flood protection) within site boundary restricted operable space – 24/7/365 access requirement from EA.
- D&B incorporated overground pipework within zone and adapted original design – reducing possible generative capacity from 6MW to 3MW.
- Increasing generative capacity on compound requires land/planning acquisition – collaboration with council master planning for Castle Park.



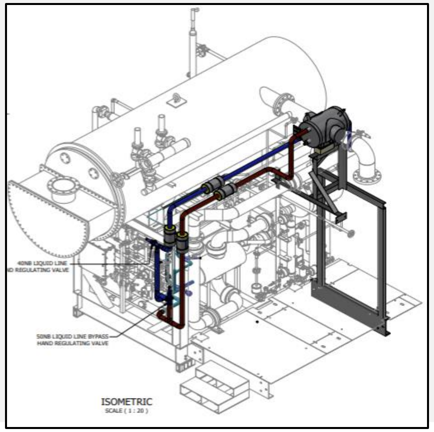
2 – Commissioning and operating below base-load

- WSHP designed for maximum efficiency exporting at 3MW base load.
    - Commissioning with load banks.
    - Asset generative capacity exceeds Old Market base-loads – reduced avg. operable efficiency & larger number of stop-starts.

OPPORTUNITIES

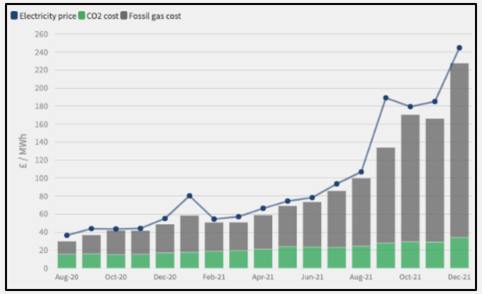
3 – Refrigerant super-heating (condensation cycling)

- Current cyclic running of WSHP increases risk of refrigerant condensation within the compressor.
- Prevention of condensation occurring – superheating of ammonia suction line.
- Utilisation of returning heat energy to plant (DHN return) – additional heat exchange cycle.
- Long-term protection over condition of compressor.



4 – Electricity use optimisation – thermal storage

- Optimising lower end electrical tariff rates – generating heat during lower night rate and storing through night.
- Generation of heat during lower-risk electrical demand cycles – predictive triad cycles through peak events annually.
- Increasing thermal storage capacity across the city.



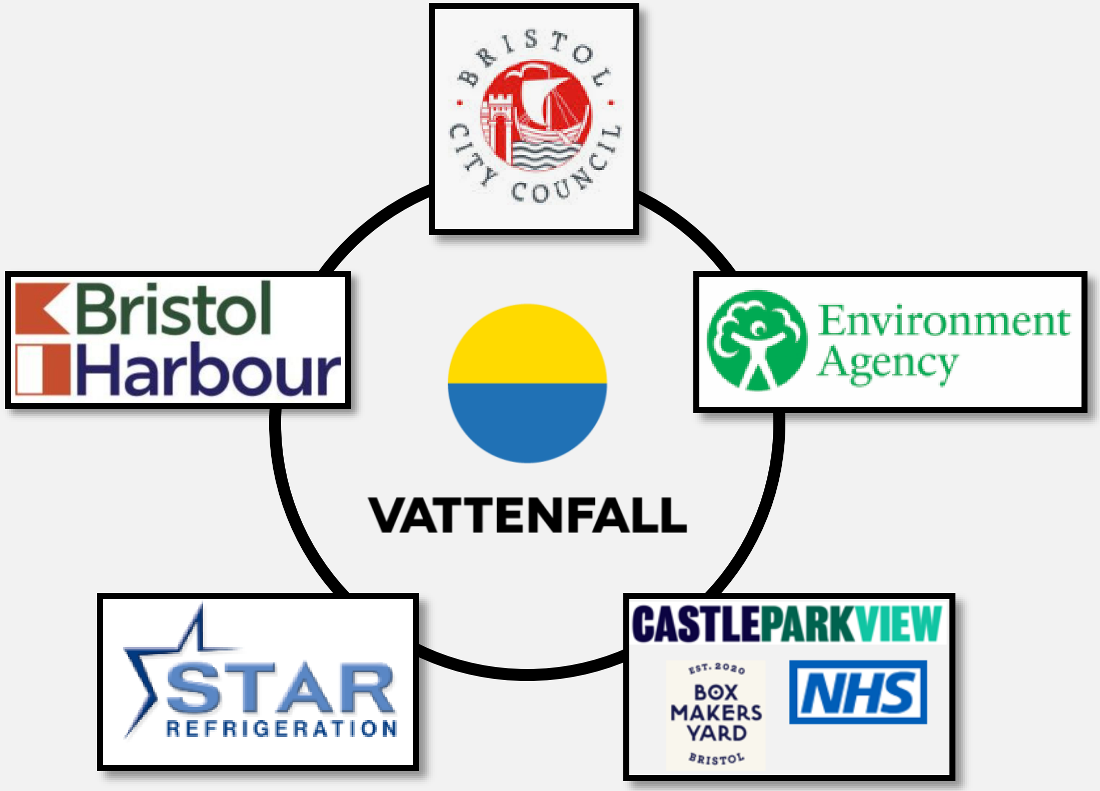
Stakeholder Focus

Vattenfall in Bristol

Case study: Castle Park Energy Centre

3) Stakeholders and engagement – who we work with and why

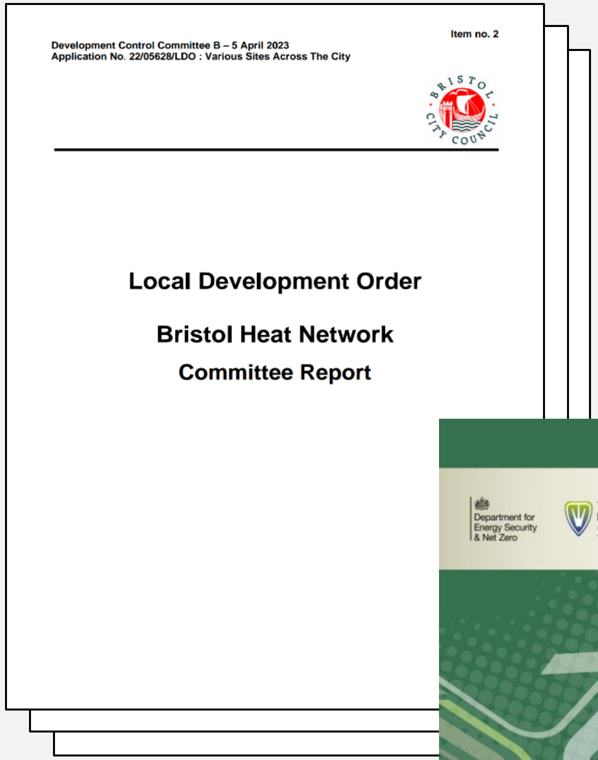
- **Bristol City Council**
    - Planning – site development
    - Parks & green spaces – impact on locally protected area
    - 2 public service buildings
- **Bristol Harbourmaster**
    - Abstraction & waterways – debris management
- **Environmental Agency**
    - Abstraction – license and permit to abstract water
    - Environmental evaluation – noise, pollution, breaches
- **STAR Refrigeration**
    - WSHP OEM – consultation and design optimisation
    - Maintenance – ongoing PPMs and call-out servicing
- **Our Customers**
    - Supply guarantee – uninterrupted heating/hot-water
    - Decarbonised supply – replacing fossil fuel dependency



Project Enablers

Vattenfall in Bristol

Case study: Castle Park Energy Centre


Item no. 2

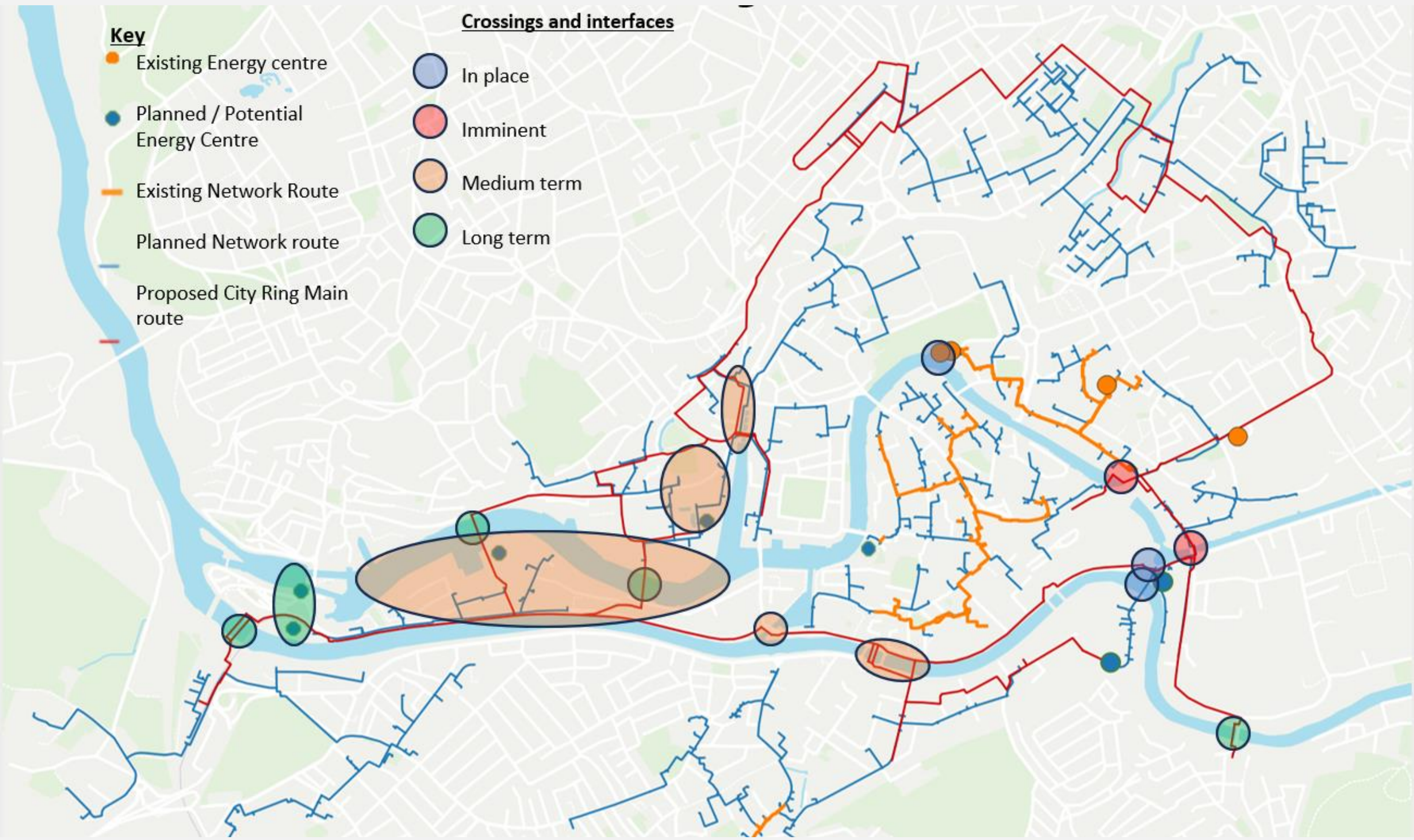
Development Control Committee B – 5 April 2023
Application No. 22/05628/LDO : Various Sites Across The City

BRISTOL CITY COUNCIL

Local Development Order

Bristol Heat Network

Committee Report



Vattenfall in Bristol

Keep in touch

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Scan the QR and sign up to our Bristol heat network newsletter

Get the latest on our progress, connections and future energy centres

Q&A

Samantha Shea, Gemserv, a Talan Company

Triple Point
HEAT NETWORKS
INVESTMENT MANAGEMENT

THANK YOU

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