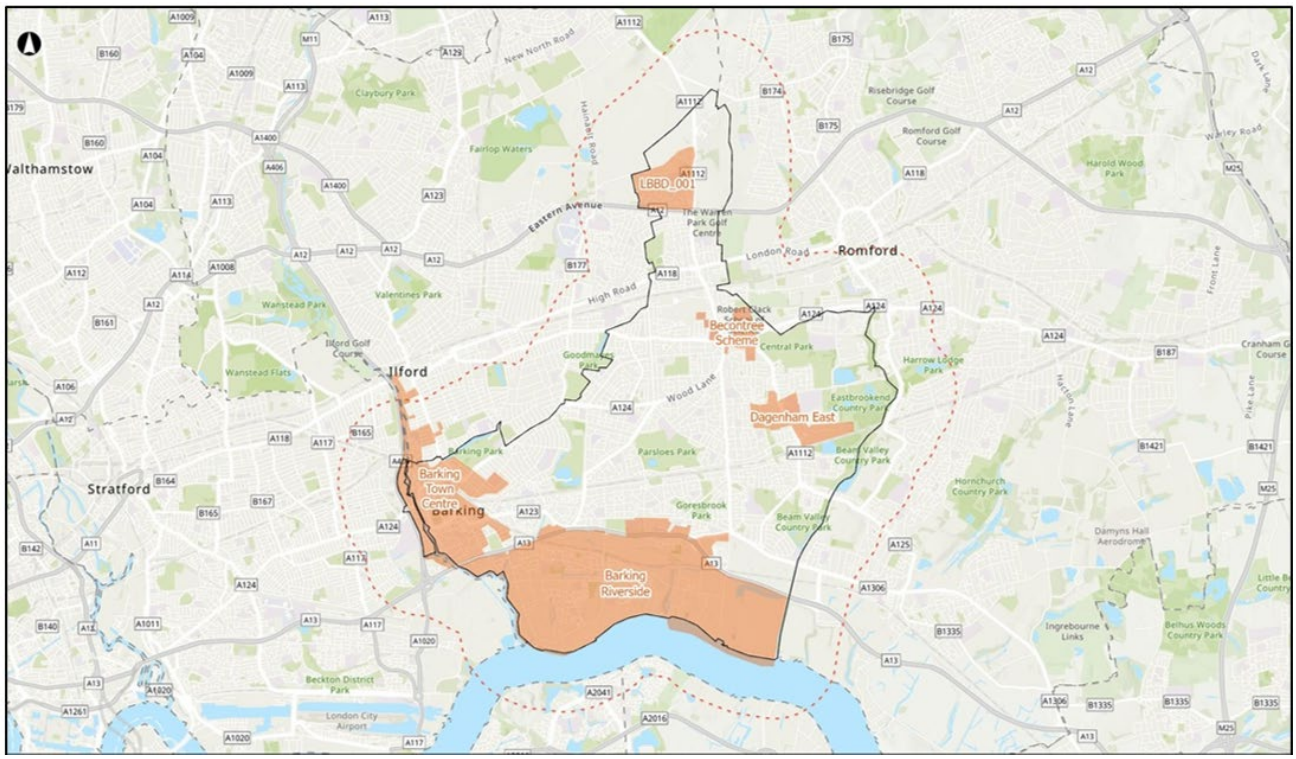
Department for Energy Security & Net Zero

London Borough of Barking and Dagenham

Heat Network Zoning

Zone Opportunity Report



June 2025

Disclaimer

Please read the following licence conditions thoroughly to understand your responsibility for use of this report and data presented within it.

This report contains outputs from the Heat Network Zoning Pilot Programme. The Pilot was undertaken prior to full details of the Heat Network Zoning policy being available. Therefore, the contents, including data shown in maps, technical and economic data within the report, are likely to change and potentially sensitive information is withheld. No part of this report shall be relied upon for any business decisions.

Acknowledgements

This document was produced by Ramboll in partnership with from London Borough of Barking & Dagenham. We are grateful to all stakeholders who participated in the Pilot programme for their time and assistance.

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Contents

Executive Summary 4

1) Introduction 6

Heat Network Zoning Pilot Methodology 7

Heat Network Zone Identification 7

Initial Zone Opportunities 8

Study Scope 9

Advanced Zoning Programme 9

2) LBBD Heat Networks Context 10

2.1) LBBD Overview 10

2.2) LBBD Net Zero Targets and Commitments 10

2.3) Delivering Heat Networks in LBBD 12

2.4) LBBD Heat Network Zones 12

3) Strategic Heat Network Zones 15

Strategic HNZs in LBBD 15

3.1) Barking Riverside 17

3.2) Barking Town Centre 22

4) Other Heat Network Zones 30

Appendix 1 – Maps and Legends 32

A. London Borough of Barking & Dagenham Typology Map 34

B. Key Heat Demands 35

C. Key Heat Sources and Potential Energy Centres 37

D. Existing and Planned Heat Networks 38

E. Physical Constraints 39

F. Off-Gas Grid Areas in LBBD 40

Appendix 2: Data Room Resources 41

Executive Summary

About Barking & Dagenham: The London Borough of Barking and Dagenham (LBBD) is an Outer London borough with a population of approximately 212,000, featuring a mix of residential and industrial areas.

Local Energy Policy: LBBD aims to become the 'Green Capital' of the Capital, with a Carbon Neutral target for the Local Authority by 2030 and Borough, by 2050. Recent roadmaps and plans include growth of low carbon heat networks.

Existing heat networks: B&D Energy owns and operates two existing heat networks in Barking Town Centre and Becontree, whilst there is an existing network at a large redevelopment in Barking Riverside.

Zones identified: Five potential heat network zones were identified within LBBD, with an overall heat demand of 225GWh/yr. LBBD are now exploring larger strategic opportunities in collaboration with the London Borough of Newham.

Strategic heat network zones: Two strategic heat network zones were identified with an overall heat demand for all buildings potentially required to connect within strategic zones of ~200GWh/yr.

Key heat demands: The overall heat demand for buildings connected to the initial zone opportunities is estimated at 75GWh/yr. Key buildings include Barking Riverside new development and buildings in Barking Town Centre.

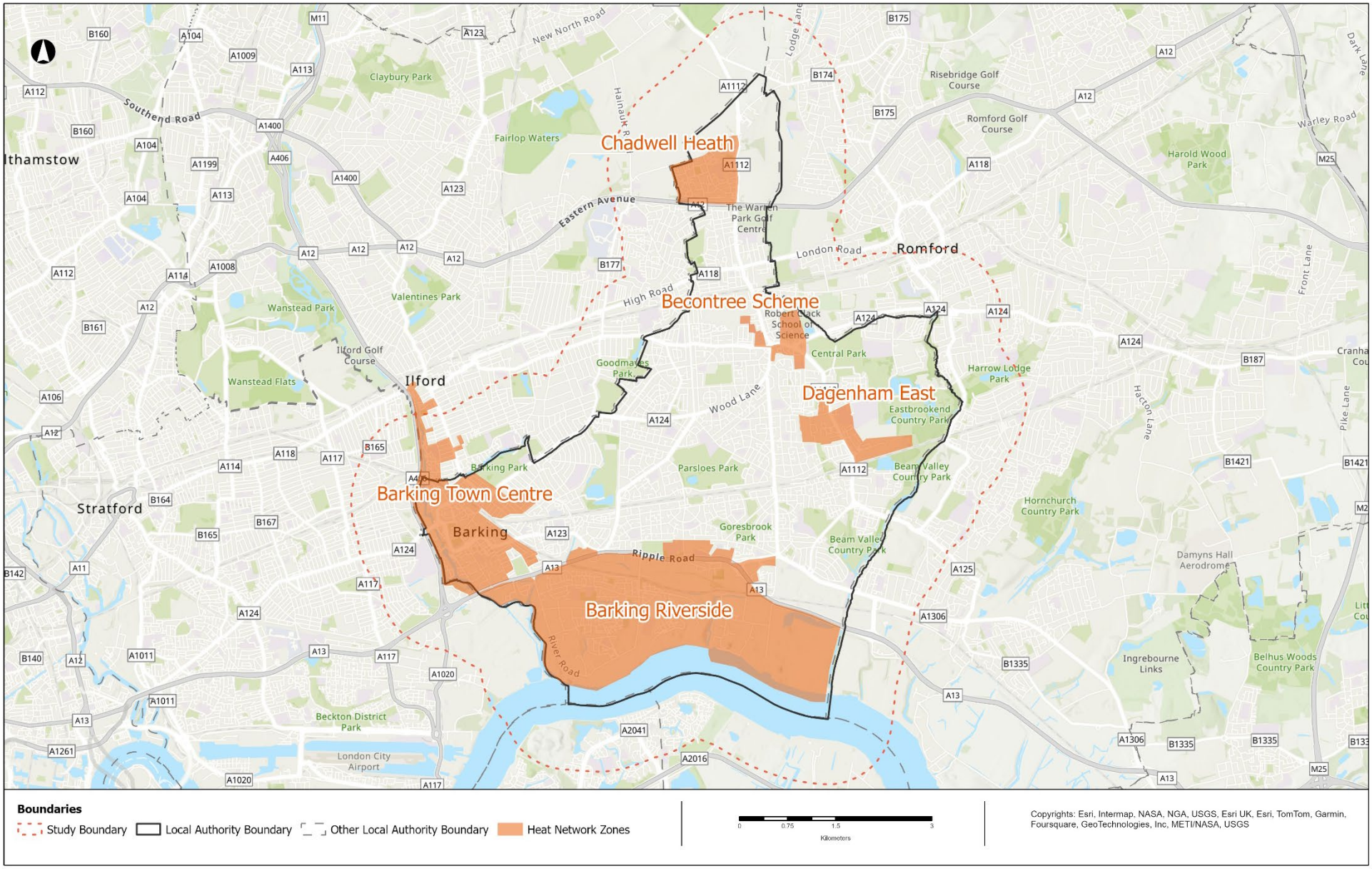
Key heat sources: Key heat sources include an EfW plant, Beckton Sewage Treatment Works, and a water source heat pump (WSHP) recovering heat from the River Roding.

Estimated CapEx: The estimated capital expenditure (CapEx) for the heat network projects is anticipated to be at least £100-200m+ which will increase as cross-borough opportunities are explored.

Other heat network zones: Other heat network zones identified include Dagenham East, Becontree and Chadwell Heath.

Carbon savings: The estimated carbon savings from the heat network projects are approximately 11ktCO_{2e}/yr.

Figure 1: Overview of Heat Network Zones in London Borough of Barking & Dagenham



1) Introduction

Heat networks will play a crucial role in decarbonising heat in buildings. Heat networks take heating, cooling or hot water from a central source(s) and deliver it to a variety of premises such as public buildings, shops, offices, hospitals, universities, and homes. They are also an important part of securing the UK's energy independence through local, low carbon heat sources and reducing the cost of living through efficient, affordable heating in densely populated areas. Our analysis shows that heat networks could provide about 20% of total heat by 2050. They currently provide about 3%.

The Department for Energy Security and Net Zero (DESNZ) is enabling the development of heat network infrastructure through a range of targeted funding, policy and legislative support to de-risk projects and attract investment. The Energy Act 2023 establishes the regulatory framework for heat networks in Great Britain and provides powers to introduce heat network zoning in England through secondary legislation. A heat network zone (HNZ) is a formally designated geographical area in England where heat networks are expected to provide the lowest-cost solution for decarbonising heating.

Under heat network zoning, central and local government will work with industry and local stakeholders to identify and designate areas of England where heat networks are expected to be the lowest-cost solution to decarbonising heat. Heat network zoning will be essential to speeding up the development of new heat networks and we hope to catalyse growth where it's most needed.

Heat network zoning will significantly increase private sector investment in the sector by removing the barriers which currently limit the pace of developing large scale heat networks. It will also give local communities the tools to accelerate the development of heat networks in their own areas and ensure that more homes and businesses can have access to greener, cheaper heat. It also has the potential to create tens of thousands of jobs across the country.

This report shows the Pilot programme outputs for LBBD and is intended to showcase potential heat network zones in the borough. The report indicates the heat network investment opportunity, the potential location of heat network zones, and key opportunities for initial heat network development within those potential zones.

Please note that all information presented in this report, including the location of identified heat network zones, is subject to change. These are the findings of Pilot programme that were developed alongside the emerging Heat Network Zoning policy and therefore reflect our understanding at a moment in time. As the methodology improves, we will update these reports to improve our understanding of how heat network zoning may be rolled out in each area. Any potential zones that are identified fully, or partly, in an adjacent local authority area will need to be discussed further once local zone co-ordinators are established.

Heat Network Zoning Pilot Methodology

Heat network zones will be identified using a standardised national zoning methodology[1]. The Heat Network Zoning Pilot Programme (hereafter Pilot programme) set out to develop a process to identify potential zones in a consistent and standardised manner across a range of towns and cities in England. The programme was fully funded and led by DESNZ, working alongside 28 Local Authorities, and multiple consultancy firms, to develop and test this approach at a local level. As such the final outputs are supported by each Local Authority but do not reflect an approved, endorsed, or adopted position on how zones may be delivered.

Lessons from the Pilot have been used to inform the development of the Heat Network Zoning policy. This includes improvements to the identification approach itself, but also wider policy design relating to the number and size of potential zones; existing heat networks; and the impacts of the policy on a range of stakeholders. Once the response to the heat network zoning consultation is published, we will update the methodology to reflect the final policy position.

The key concepts, definitions and complementary workstreams relevant to this report are introduced below. For a fuller description of the Heat Network Zoning policy, and up to date information regarding its implementation, please visit https://www.gov.uk/government/collections/heat-network-zoning.

Heat Network Zone Identification

Heat network zones will be identified using a standardised national zoning methodology. The December 2023 consultation on Heat Network Zoning proposes that the methodology will consist of two stages:

1. a national mapping exercise (using a data-led spatial energy model – the National Zoning Model, (or NZM), to identify indicative heat network zones across England;
2. a refinement stage where relevant local stakeholders will input to the review and refinement of potential heat network zones prior to formal designation.

For the purposes of this study, indicative heat network zones have been identified using a prototype version of the NZM. These indicative zones were then refined by technical consultants with input from local stakeholders. The NZM outputs are already of considerably higher quality than those shared for this work and therefore these reports will improve over time.

This study split heat network zones into two different categories. These are **'strategic'** zones – the largest zones which are generally seen as strategically significant to developing heat networks in an area; and **'other'** zones – which are generally smaller and discrete. These are terms specific to the Pilot programme and the report focuses primarily on the strategic zones.

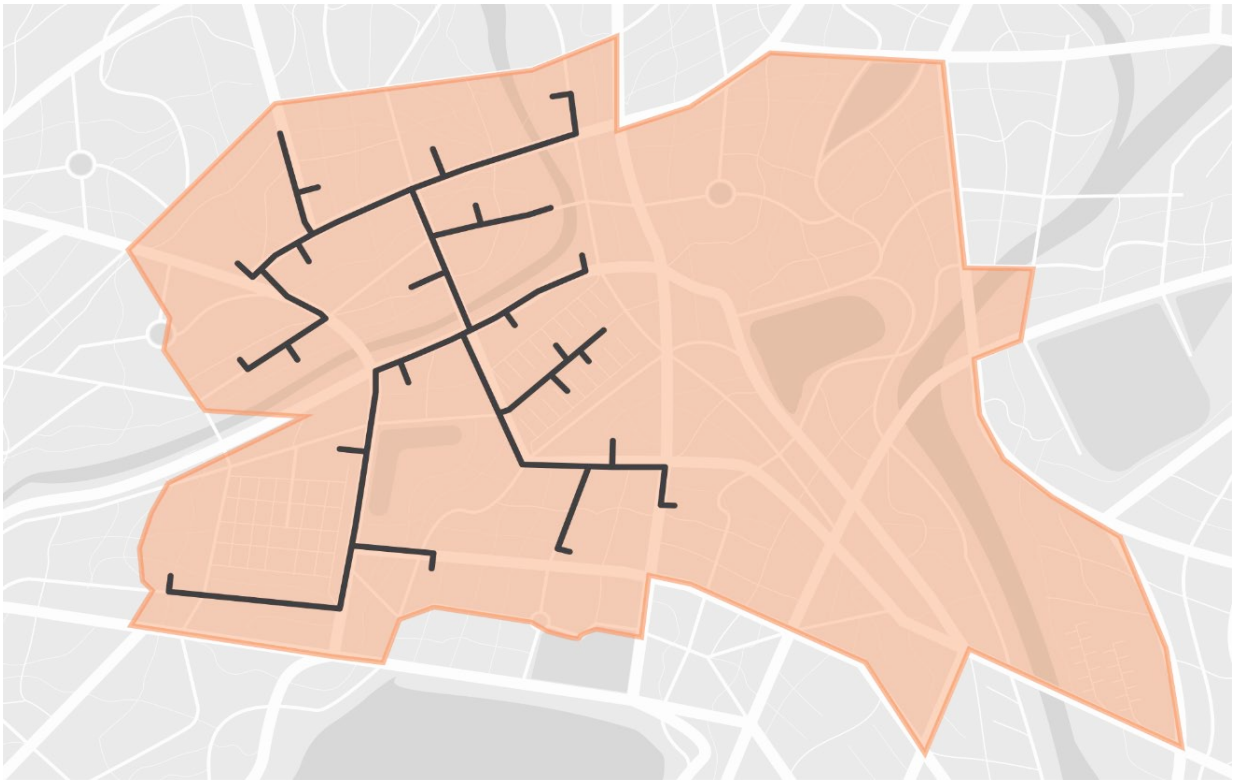
[1] More information can be found in the Heat Network Zoning Methodology Statements (Appendix 3, 4 & 5)

Initial Zone Opportunities

Alongside the identification of potential heat network zones, the Pilot programme has attempted to define areas within zones where the most attractive heat network development opportunities might exist. For the purposes of this programme *only* these are called an "initial zone opportunity" (or IZO). The approach considered economic viability, investment scale and returns, decarbonisation impact and deliverability. They were developed solely around buildings which could potentially be required to connect[2] under the proposed Heat Network Zoning policy and did not consider potential voluntary connections.

Initial zone opportunity design targeted a linear heat density (LHD) of 4MWh/m/yr, for the existing built environment. This is considered a relatively low proxy for economic viability with the heat network sector in England. A more flexible approach was used for new development sites, where different economic success criteria are likely to be applied. To standardise the way opportunities were assessed, the IZOs presented in this report may differ from, or overlap with, existing or planned heat network infrastructure. Campus style heat networks (e.g. in hospitals or university campuses) were considered as potential heat loads with a single point connection. Figure 2 below shows an example of a heat network zone and an IZO.

Figure 2: Illustration of a Heat Network Zone (HNZ) and an Initial Zone Opportunity (IZO)



[2] The building categories being considered as potentially required to connect include new developments, large non-domestic buildings, and communally heated residential blocks as described in Heat Network Zoning Consultation (2023)

Study Scope

This document is presented as a zone opportunity report as it was developed in advance of the final policy design. As such, the report does not include:

- references to the **central authority** or **zoning co-ordinator** roles;
- assumptions about rights of **existing heat networks,** or **zone delivery areas**;
- an options appraisal on which **routes to market** may be taken;
- calculations on the **cost of heat** (connection/tariffs) to specific buildings**;**
- any inferences as the suitability for **public/private sector delivery** unless it's matter of fact (existing network or Heat Network Investment Project/Green Heat Network Fund project);
- references to **local community benefit** or **consumer protection** (subject to a live consultation).

In the future, it is intended that a document, similar in style, will be produced to incorporate these policy design aspects and be used as a Zone Market Prospectus (ZMP) to market heat network zoning opportunities in an area. Further detail on the methodology and initial zone opportunity criteria is provided in Appendix 4 and Appendix 5.

Advanced Zoning Programme

The Advanced Zoning Programme (AZP) is working with 19 areas to support the construction of new zone scale heat networks as quickly as possible following the launch of heat network zoning in 2025. Amongst the programmes aims are to accelerate the delivery and construction of heat network zones; develop best practice guidance; provide project development support services; and promoting market transformation ready for the national rollout of Heat Network Zoning policy.

The programme builds upon lessons learnt from the Pilot programme and these outputs. In October 2024, DESNZ announced that ground-breaking heat network schemes in Leeds, Plymouth, Bristol, Stockport, Sheffield, and two more in London will receive prioritised support to advance to construction by the end of 2026.

AZP uses the latest zoning methodology (i.e. developed after the Pilot programme) and has undertaken further detailed development work with local stakeholders to further improve confidence and accuracy. The programme may also have applied local strategic and commercial considerations and therefore the opportunities may differ slightly from those presented here, using a national standardised approach. Where there is overlap, AZP studies should be considered more appropriate for use than the outputs from this Pilot programme.

2) LBBD Heat Networks Context

2.1) LBBD Overview

The London Borough of Barking and Dagenham (hereafter LBBD) is an Outer London borough situated approximately 9 miles east of Central London. The southern border of LBBD lies within the London Riverside area of the Thames Gateway, a regeneration area aiming to boost the economy of the whole Thames Estuary region. LBBD borders on the River Thames to the south, and the boroughs of Redbridge to north, Havering to the east, and Newham to the west. The local and regional governing bodies are Barking and Dagenham London Borough Council and the Greater London Authority.

Barking and Dagenham is home to a population of approximately 212,000 across a total area of 36km^2. The borough's three main towns are Barking, Chadwell Heath and Dagenham. The built environment consists of a mix of residential and industrial areas, ranging from suburban neighbourhoods to urban environments. Housing types vary from traditional Victorian and Edwardian houses to modern developments, with approximately 16,500 properties being part of the Council's social housing stock.

The borough has a strong industrial history centred on the Ford plant in Dagenham. While some industrial areas still exist, there has been a shift towards developing commercial spaces and attracting new businesses to diversify the local economy.

Barking and Dagenham has undergone significant regeneration in recent years, with a focus on transforming former industrial sites and brownfield areas. These projects aim to create new housing, commercial spaces, and community facilities. Barking and Dagenham has a significant amount of social housing, and there have been initiatives to improve and modernise social housing stock, with notable housing estate renewal programmes on the Gascoigne estate and in Becontree Heath.

2.2) LBBD Net Zero Targets and Commitments

In 2018, the LBBD unveiled its ambition to become the 'Green Capital' of the Capital[3]. In line with this vision and in response to rising global temperatures, the borough further declared a 'Climate Emergency' in 2020[4] and pledged to be a carbon neutral Council by 2030 and a carbon neutral Borough by 2050. As such LBBD have accelerated their roadmap to achieving these targets and in In a study conducted for the Borough in 2021, the Borough's carbon emissions split by sector were quantified as:

[3] London Borough of Barking & Dagenham (2019). B&D Greener Together https://www.lbbd.gov.uk/sites/default/files/202208/B%26D_Greener_Together_Plans_for_the_Environment.pdf
[4] London Borough of Barking & Dagenham (2020). Barking and Dagenham Council declares climate emergency https://www.lbbd.gov.uk/news/2020/barking-and-dagenham-council-declares-climate-emergency

- Transport: 26%
- Domestic: 37%
- Industrial & Commercial: 33%
- Waste: 4%

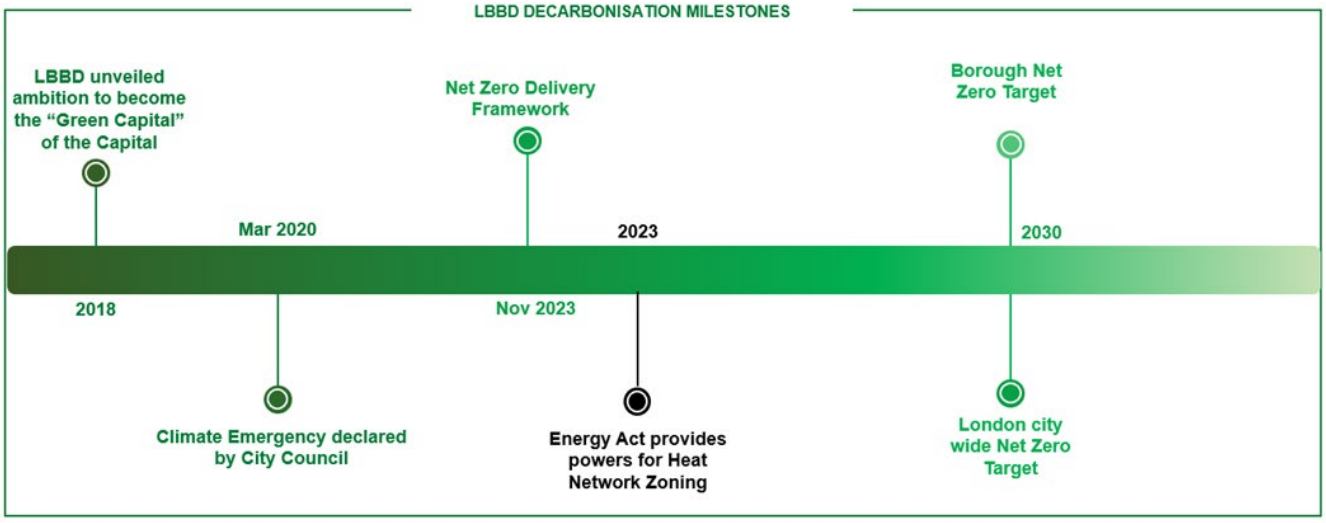
As part of the Borough's roadmap[5] to achieving carbon neutrality, the council released a Net Zero Delivery Framework which was underpinned by twelve key targets and corresponding emission reduction trajectories demonstrating the action required to meet their 2050 Net Zero commitment.

The roadmap highlights the importance of the District Energy Network in Barking Town Centre and the need to transition the network away from natural gas and towards renewable sources of heat, including a hybrid mix of heat pumps, hydrogen, and waste heat recovery. The expansion and decarbonisation of existing heat networks in the area is a key action to support the emission reduction pathways for new and existing homes as well as non-domestic and council owned buildings.

The carbon neutral target has been brought forward to 2030 by the council with their Inclusive Growth 2022 to 2026 publication[6].

Figure 3 below, summarises key dates in the Council's plans for decarbonisation and demonstrates their progress towards decarbonisation targets announced.

Figure 3: LBBD Decarbonisation Milestones



[5] London Borough of Barking & Dagenham (2022) Net Zero Roadmap https://lbbd.moderngov.co.uk/documents/s164600/Zero%20Carbon%20-%20App%201.pdf
[6] London Borough of Barking & Dagenham. Inclusive Growth 2022 to 2026 https://www.lbbd.gov.uk/council-and-democracy/plans-and-priorities/inclusive-growth-2022-2026

2.3) Delivering Heat Networks in LBBD

Vital to achieving LBBD's vision is the deployment of heat network infrastructure. Barking and Dagenham have a strong understanding and commitment to this vision, and both created and wholly own B&D Energy Ltd. B&D Energy is a core part of the Net Zero vision and currently supplies over 2000 homes with affordable, locally generated, and low carbon heat.

B&D Energy is a special purpose vehicle, exclusively owned by the Borough Council, committed to decarbonising LBBD and establishing district energy networks to provide low-carbon heat to residential and commercial properties. To date, B&D Energy have developed two heat network projects in Barking Town Centre (see Section 3.2.2) and Becontree (see Section 4).

In recent years, LBBD commissioned a strategic review in the context of UK energy market challenges. The review concluded there remained a compelling case for B&D energy to invest in district heat networks and noted that the AZP provided LBBD an opportunity to lead future development and investment. The report highlighted new building regulations being introduced in 2025 and the Future Homes Standard has incentives for property developers to connect to existing networks, creating a market which is ready for the company to grow its customer base. More information is provided in Section 3.2.2.

Elsewhere in the Borough, a large heat network is integrated into the Barking Riverside development. The network is owned by Barking Riverside Limited (BRL), a special purpose vehicle set up by the Greater London Authority (GLA) and London & Quadrant (L&Q). More information is provided in Section 3.1.2.

There are likely cross-borough opportunities to develop heat networks in east London and LBBD are working closely with the London Borough of Newham to explore potential opportunities. The modelling work undertaken here pre-dates the most recent work and therefore is not reflected in this report. These plans explore the utilisation of key waste heat sources such as Beckton Sewage Treatment Works.

Please refer to Appendix 2 for further information about the evidence compiled during the Pilot programme and held by DESNZ for LBBD. This includes a fully populated stakeholder directory and records of interactions with those stakeholders as well key studies and reports shared with DESNZ.

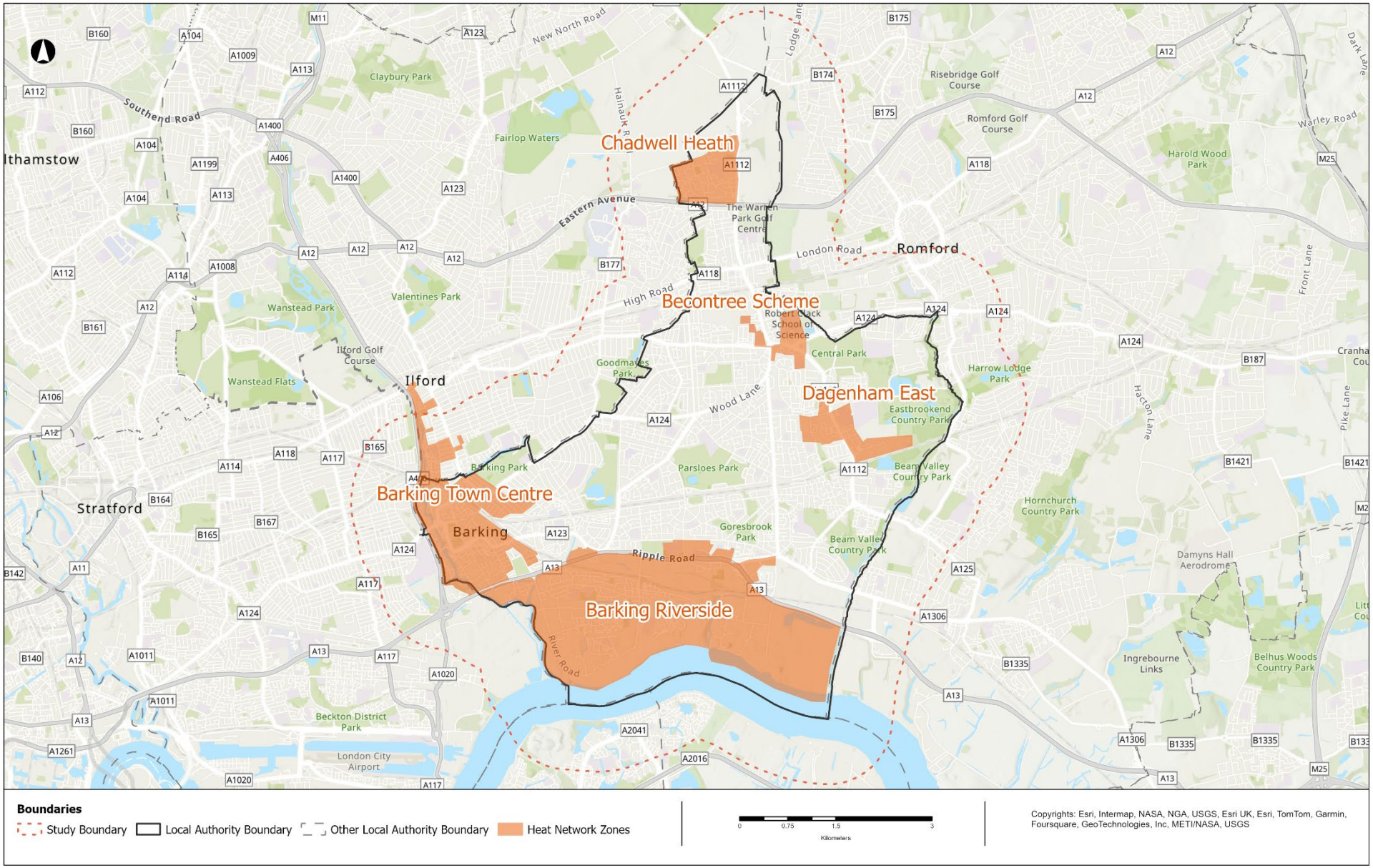
2.4) LBBD Heat Network Zones

A total of five potential HNZs were identified in LBBD, with two considered Strategic HNZs. Figure 4 shows the study area boundary, including the boundaries of all HNZs identified, with HNZs allocated a meaningful name agreed as relevant from a local perspective.

Please see Appendix 1 for the following maps giving more detail:

- A: LBBD Typology Map – Shows building typologies which dominate by area.
- B: Key Heat Loads Map – Highlights key buildings potentially required to connect by heat demand.
- C: Key Heat Sources Map – Highlights key heat sources by type and potential energy centre locations as well as any existing district heat network energy centres.
- D: Existing / Planned Heat Networks Map – Shows existing HNs and planned extensions to them as well as any planned HNs in advanced stages of development.
- E: Key Constraints Map – Shows key topographical constraints identified.
- F: Off Gas Grid – presents areas with differing levels of properties off the gas grid within the study area.

Figure 4: Heat Network Zones Identified within the LBBD Study Area



3) Strategic Heat Network Zones

Strategic HNZs in LBBD

This section examines the strategic HNZ and IZOs identified within it. This covers the key heat demands, heat sources, energy centre locations and potential constraints. Heat network distribution routes are conceptual and designed to illustrate the potential size and scale of the heat network opportunity that may be realised as part of the upcoming Heat Network Zoning policy. Other heat network zones are listed in Section 4.

Table 1 below presents a high-level estimate of the scale of opportunities across LBBD. Please refer to Appendix 4 for more detail. It should be noted that LBBD have recently signed a Memorandum of Understanding (MoU) with the London Borough of Newham to explore cross-borough heat network opportunities. This study does not reflect the most recent work which identifies opportunities with heat demands far in excess of what is listed below. These also make use of the Waste Water Treatment Works at Beckton, located in the east of Newham, close to the border with LBBD, which represents a significant opportunity to supply heat to the local area.

Table 1: Annual Heat Demand for Buildings in All Zones, Strategic Zones and IZOs

Scope	Annual heat demand (GWh/yr)
All buildings within zones[7]	225
All buildings within strategic zones	200
All buildings connected to the IZOs	75

Existing/planned heat networks that overlap with IZOs are described, though their locations may vary due to different approaches. The Pilot programme applied a standard set of technical and economic assumptions across each of the 28 areas that participated in the programme and uses a proxy for economic viability, see Section 1 and Appendix 4 for more detail. Existing and planned networks will often be based on more detailed design work and have taken account of strategic and commercial considerations that were relevant at the time of their development. Future iterations of this report will consider how to better align local studies whilst retaining a nationally consistent approach.

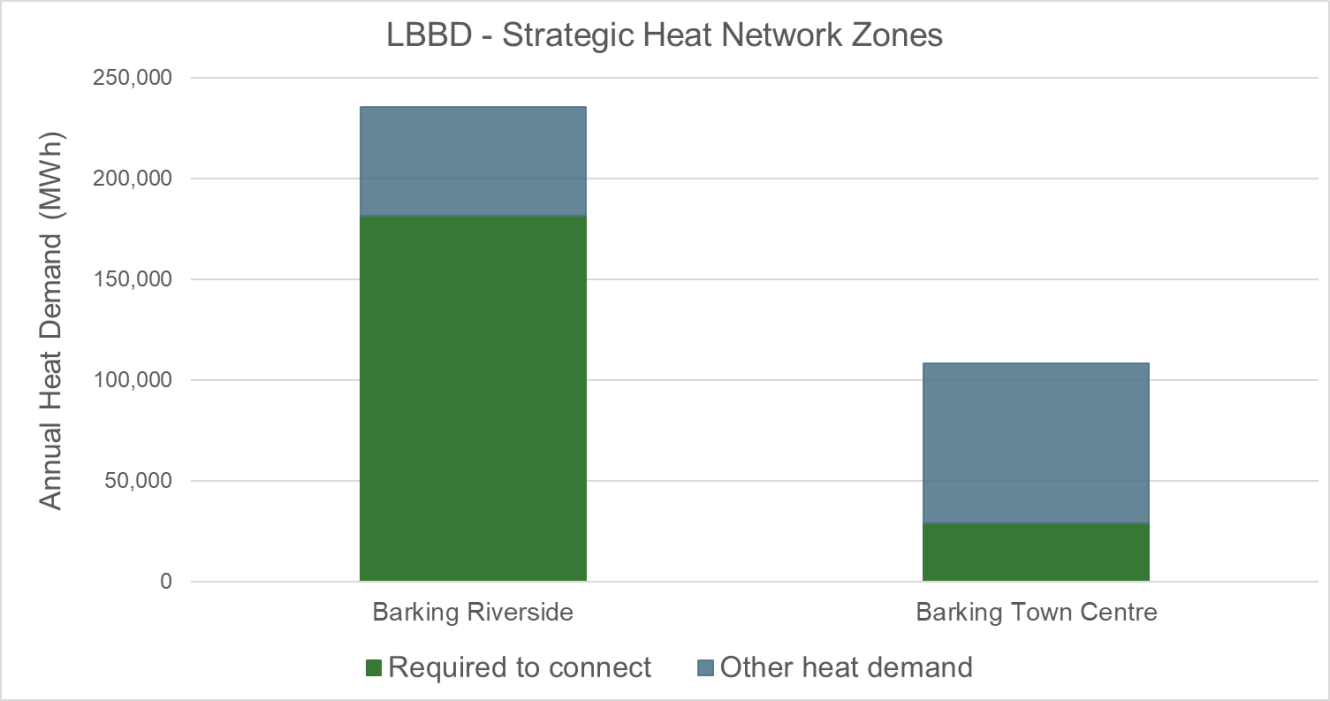
The two strategic zones are summarised below. Figure 5 illustrates the size of each, alongside the proportion of buildings that may potentially be required to connect.

[7] Row 1 is an estimate of heat demand across buildings potentially required to connect in all zones identified. Row 2 is as per row 1, but only within strategic zones. Row 3 includes buildings connected to the IZOs described and largely comprise of buildings potentially required to connect. Figures are generally rounded up to the nearest 25 or 50GWh/yr.

Barking Riverside is the largest potential zone identified, solely within LBBD, in terms of heat demand and area and is located in the southern part of the borough. A large new housing development and nearby proposed energy from waste plant and sewage treatment works provide a good opportunity for heat network development. For more information, please see Section 3.1.

Barking Town Centre is located in the west part of the borough where there are high concentrations of buildings potentially required to connect. Please refer to the latest studies being undertaken for the latest information on heat demands within the local area. For more information, please see Section 3.2.

Figure 5: Summary of Heat Demands in the Strategic HNZs Identified



3.1) Barking Riverside

3.1.1) Barking Riverside – HNZ Summary

Barking Riverside is the largest Strategic HNZ identified in LBBD in terms of both heat demand and area. It is located in the south of the borough and covers an area of approximately 8km^2. It is geographically bounded on all sides with the A13 to the north, the Beam and Thames Rivers to the east and south, and the Roding River to the west.

Barking Riverside is one of Europe's largest new neighbourhoods occupying a 443-acre brownfield site formerly occupied by Barking Power Station. The neighbourhood is delivered by Barking Riverside Limited (BRL), a joint venture between the GLA and L&Q. A new Energy from Waste (EfW) plant and the Beckton Sewage Treatment Works (STW) owned by Thames Water provide potential opportunities for low-carbon heat supply. It is understood the new EfW facility located to the north of the ReFood site is the primary decarbonisation option.

3.1.2) Barking Riverside - Existing Heat Networks

There is an operational heat network, shown in Appendix 1, Map D, which supplies 3,500 new homes built as part of the Barking Riverside new development. The network is supplied with heat from a temporary energy centre based on gas boilers and plans to decarbonise using local heat sources.

3.1.3) Barking Riverside - Initial Zone Opportunities

A single IZO was identified, the summary statistics for which is provided in Table 2. It is based around the Barking Riverside housing development[8], a new neighbourhood located along the bank of the River Thames, which is expected to deliver 18,500 new homes and 65,000m^2 new commercial space. The EfW plant has been selected as the preferred source of low carbon heat due to its proximity to the new development. It is proposed that the plant will initially operate with a capacity of 5MWe and a residual heat capacity of 12MW. Over time, it will increase to a full core capacity of 12.5MWe, with a residual heat capacity of 30MW.

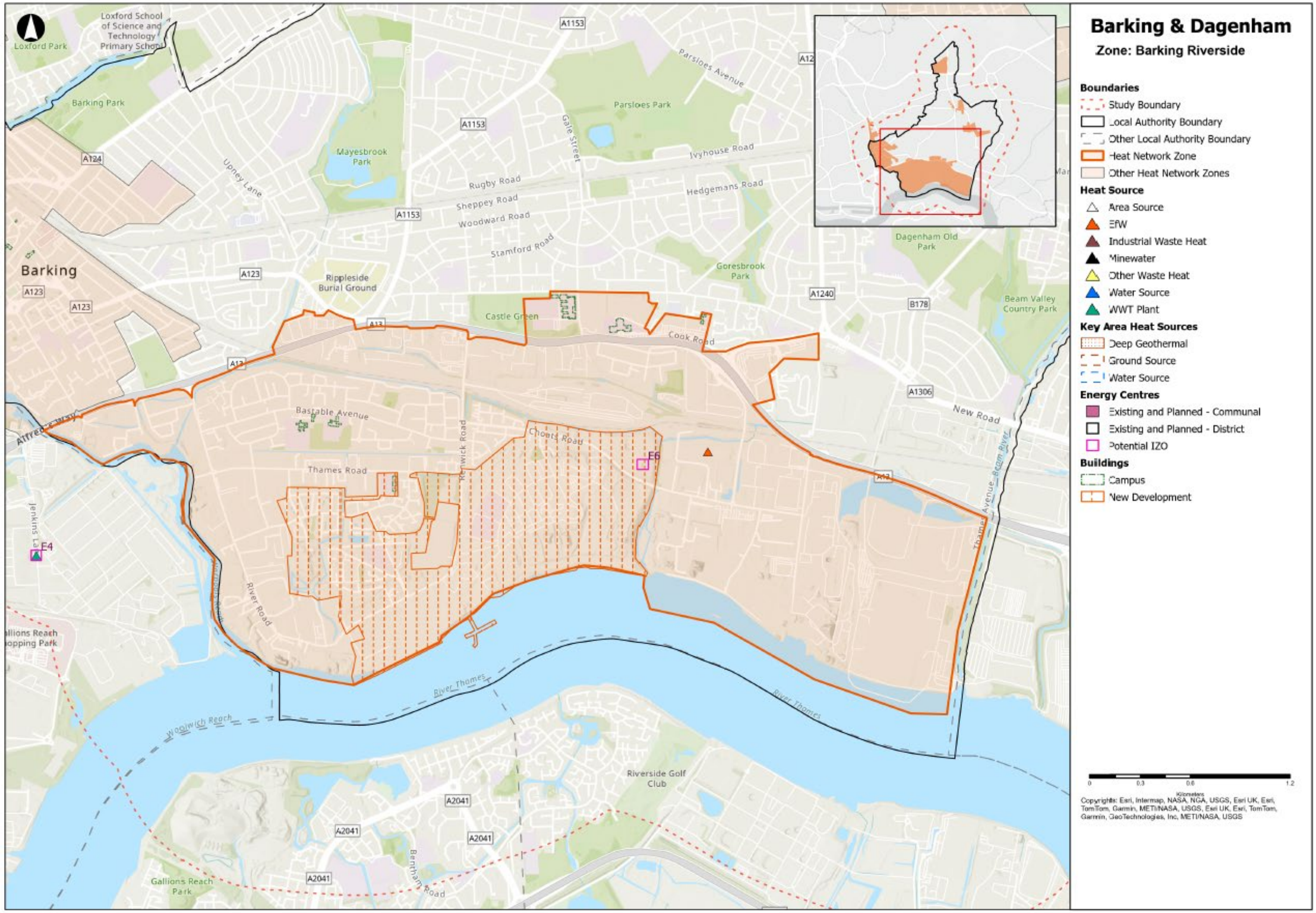
For the purposes of this study, it is estimated that the network length could be around 23km, however, this will be highly dependent on the massing and final development plans and therefore potential routing has not been considered or presented on the maps. A network is already partially built on the site, supplying the constructed properties. The information in Table 2 are estimates based on the HNZ Pilot Methodology applied at a national level.

Table 2: Barking Riverside - Summary Statistics for Initial Zone Opportunities[9]

CapEx	Heat	Network	CO_{2e} savings	Linear Heat Density	Heat Sources
~£100m	~70GWh/yr	~23km	~11ktCO_2e/yr	3.0MWh/m	EfW

[8] https://barkingriverside.london/
[9] Please see Appendix 3 – Glossary, "Specific definitions" of the main report for definitions related to this table.

Figure 6: Initial Zone Opportunity in Barking Riverside HNZ



3.1.4) Barking Riverside – IZO Heat Demands

The heat demands identified are described below. The Pilot programme used several sources including local data collected from building owners; national energy demand datasets; benchmarks applied via the National Zoning Model (NZM); and a standardised approach to estimate the potential heat demands of new development sites. More information is provided in Appendix 4.

Where there are different values between datasets, the methodology prioritised the use of the early prototype version of the National Zoning Model, for consistency. This has led to an overestimation of some commercial and light industrial heat demands presented in this report. Large anchor loads that are already connected to existing district-scale heat networks are not listed.

The IZO solely connects to the Barking Riverside new development, with an estimated heat demand of approximately 70GWh/yr as shown in Figure 7. Estimated heat demand for the new development assumes a full built out of 18,500 homes, based on 3.5MWh/yr heat demand per property and a full build out of 65,000m^2 of commercial space based on a benchmark of 55kWh/m^2/yr. As before, this provides an indication of the overall scale of the development but will likely differ from the actual plans of the site. Further detail is provided in Table 3.

Figure 7: Barking Riverside - Categorisation of Heat Demand for Buildings Potentially Required to Connect in the IZO

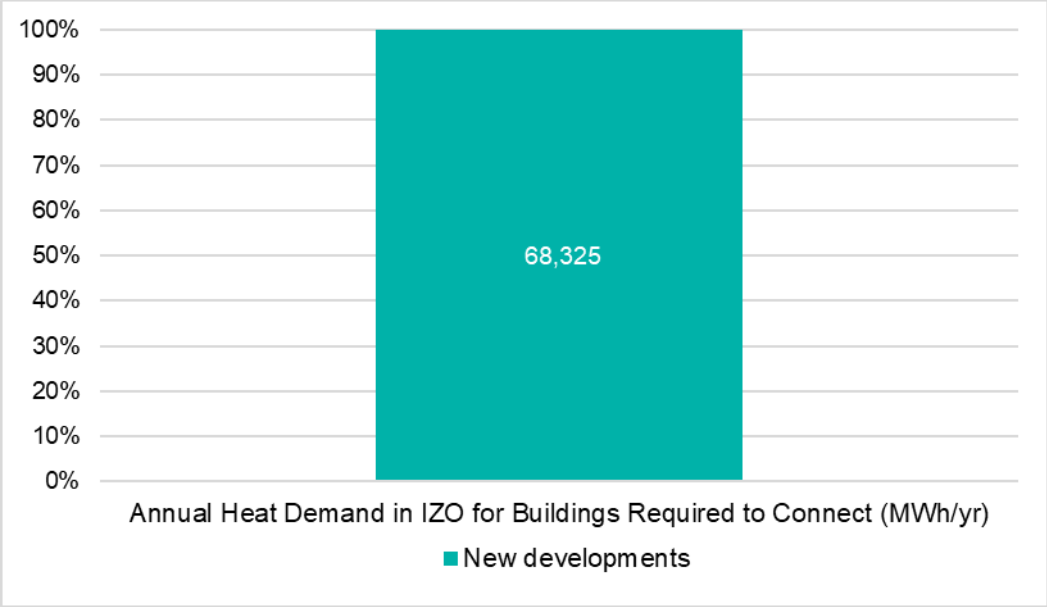


Table 3: Barking Riverside - Key Heat Demands Required to Connect in the IZO[10]

Building name	Building category	Number of connections	Annual heat demand (MWh)	Data source
Barking Riverside - Existing Network	New development (residential)	Unknown (3,500 homes)	12,250	Pilot methodology
Barking Riverside – Future Phases	New development (residential)	Unknown (15,000 homes)	52,500	Pilot methodology
Barking Riverside – Future Phases	New development (commercial)	Unknown (65,000m^2)	3,600	Pilot methodology

3.1.5) Barking Riverside – IZO Heat Sources

The IZO is proximal to a new EfW facility and the Beckton STW, which have both been identified as potential low carbon heat sources.

Waste heat from the EfW has been selected as the most suitable low carbon heat source due to its proximity to the Barking Riverside development. It is understood that the EfW is anticipated to have residual heat capacity of 12MW at the start of operations and will ramp up over time to 30MW.

A water source heat pump (WSHP) recovering heat from the Beckton STW, owned by Thames Water, provides an alternative or supplementary low carbon heat source. This heat source is capable of supplying 300MW heat but is also being explored as part of a much larger strategic heat network being jointly explored by London Borough of Newham & LBBD.

Table 4 and Table 5 summarise the key heat source and potential energy centre location identified. These are also shown in the zone-level map in Figure 6 in Section 3.1.3 above and on Map C in Appendix 1.

[10] Please refer to Appendix 3 for definitions related to building categories in this table.

Table 4: Barking Riverside - Key Heat Source Opportunities for the IZO

Heat source type	Full Opportunity Capacity (kWp)	Temperature (ºC)	Potential energy centre location
WSHP - Beckton STW	300,000	80-50 ºC[11]	E4
Waste Heat - EfW	30,000	90 ºC (assumed)	E6

Table 5: Barking Riverside - Potential IZO Energy Centre Locations

EC ref number	Site type	Size (m^2)	Ownership	Heat source
E4	Land	300	Private	WSHP – Beckton STW
E6	Land (nearby ReFood site)	Unknown	Private	Waste Heat - EfW

3.1.6) Barking Riverside – IZO Heat Distribution

The IZO has been estimated to require 23km of heat network trench following a standardised methodology using during the Pilot Programme detailed in Appendix 5. Table 6 shows the network statistics including the network length and associated cost. Please note this reflect the national methodology applied during the HNZ Pilot.

Potential routing has not been considered as it will be dependent on the build out of the new development. Further work will be required to undertake a more detailed route assessment to take account of the buried utilities, building connections and other local strategic and local planning considerations. The network is already partially built.

Table 6: Barking Riverside - Indicative Heat Network Statistics for the IZO

IZO description	Network length (km)	Network cost (£m)
Barking Riverside	23	40

3.1.7) Barking Riverside – IZO Key Constraints and Mitigations

There are no major constraints identified for the proposed IZO network route.

[11] The temperature at which heat will be distributed to heat off-takers, after upgrade processes

3.2) Barking Town Centre

3.2.1) Barking Town Centre – HNZ Summary

Barking Town Centre is the second largest Strategic HNZ in LBBD. However, when combined with cross-borough opportunities, such as those in Newham, it has the potential to be much larger. It is located in the dense urban environment of Barking town centre which predominantly includes high-rise residential flats and non-domestic buildings. The River Roding flows through the western portion of the proposed zone providing an opportunity for a WSHP. It stretches from the A13, which forms its southern border, to the A118 in the north near to Ilford town centre. East to west, it stretches from the Eastbury Comprehensive School to the A406, which forms the border for the majority of the zone's western face.

3.2.2) Barking Town Centre - Existing Heat Networks

The zone includes an existing heat network in Barking Town Centre. The network is operational with extensions planned. Please refer to Figure 8 and Appendix 1, Map D – Existing and Planned Heat Networks, to see where all the operational and planned heat networks are located.

Operational Heat Networks and Planned Expansions

Barking Town Centre

The Barking Town Centre scheme is the largest scheme run by B&D Energy. In 2019, LBBD gave approval to construct a district energy scheme which will initially connect nearly 8,000 homes and around 65,000m^2 of commercial floor area onto one low carbon district energy network in Barking Town Centre. The network was developed between December 2020 and May 2022 with over 4km of pipework installed to connect Barking Town Hall, Broadway Theatre, Abbey Leisure Centre and the Axe Street, Gascoigne West and Crown House Developments. Building connections are progressively being installed as the developments are built.

Barking and Dagenham Council has been awarded £13.5m by the Government's Heat Network Investment Project (HNIP) to co-fund the creation of a landmark low carbon UK district heating scheme in Barking Town Centre. It involves modification of the existing energy centre on the Gascoigne East Estate, Weavers Quarter, and the construction of a new strategic scale energy centre in the north-west of the Town Centre. The energy sources located within the new Strategy Energy Centre (SEC) will comprise 24MW gas fired boilers, 1.8MW Gas CHP and 1.75MW WSHP[12].

[12] LBBD Barking Town Centre Tender (2024) https://www.find-tender.service.gov.uk/Notice/016578-2024/PDF

Advanced Zoning Programme & related studies:

LBBD are participating in the Advanced Zoning Programme and undertaking studies to explore how heat networks may grow in the borough, and across neighbouring boroughs. A £50m+ heat network project had initially been identified as an expansion to the current Barking Town Centre scheme, focusing on the **densification** of heat network connections but solely within the Borough. This project proposed heat offtake from the neighbouring Beckton Sewage Treatment Works, which is the primary large-scale heat source in the local area, with additional gas boilers providing peak and back up heating.

Concurrently LBBD have recently signed an MoU with the London Borough of Newham to explore cross-borough heat network opportunities, to make better use of the significant heat potential from Beckton. This initiative, led by the boroughs expands on the initial scope identified above and work is ongoing. The opportunities consider how heat could be recovered and upgraded from Beckton Sewage Treatment Works for onward distribution to key sites and development loads, including the existing Barking Town Centre, Barking Riverside, and westwards towards the Royal Albert Docks and Queen Elizabeth Olympic Park. The development of this opportunity, estimated at over £400m, could connect approximately 50 key sites with a total heat demand of over 530GWh/yr. Consideration is also being given to how the integration of 'waste' heat from recently consented data centres could further improve the performance of a sub-regional system of this nature.

Much of this work followed the initial modelling undertaken for the HNZ Pilot programme and therefore is not reflected in detail here.

3.2.3) Barking Town Centre - Initial Zone Opportunities

A single IZO was identified in the Barking Town Centre zone. Potential routing[13] is shown in Figure 8 and summary statistics provided in Table 7.

Table 7: Barking Town Centre - Summary Statistics for Initial Zone Opportunities[14]

CapEx	Heat	Network	CO_{2e} savings	Linear Heat Density	Heat Sources
~£15m	~10GWh/yr	>2km	1ktCO_2e /yr	4.1MWh/m	WSHP

The IZO is located in the centre of the potential zone. The area was identified due to the high concentration of buildings potentially required to connect, the presence of existing heat networks, alongside the potential for low carbon heat from a river WSHP. It is estimated to

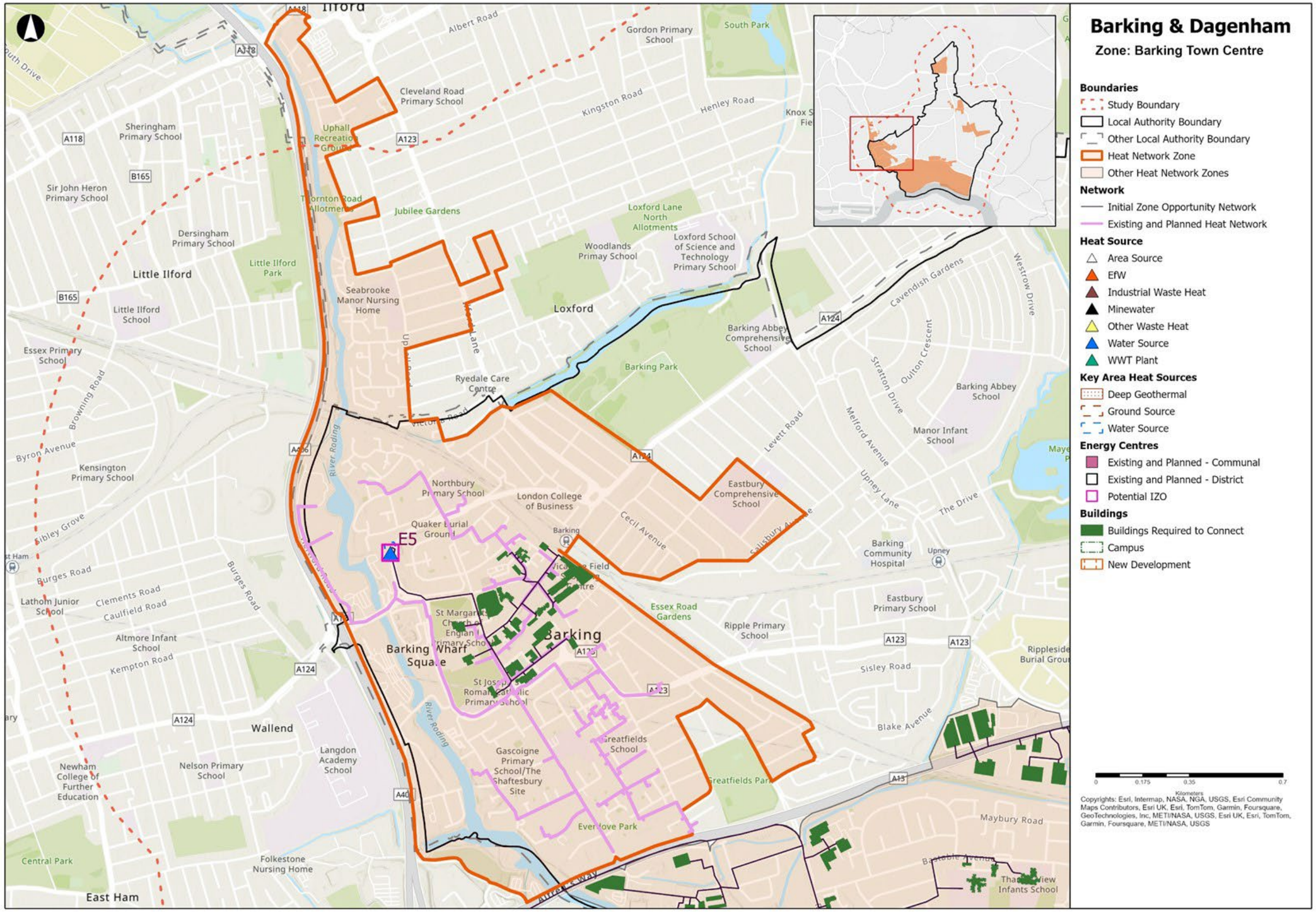
[13] Routes can be expected to change as a better understanding of local constraints is developed through design.
[14] Please see Appendix 3 – Glossary, "Specific definitions" of the main report for definitions related to this table.

supply almost 10GWh/yr of low carbon heat annually to 27 buildings potentially required to connect.

Please note that the IZO excludes buildings connected to the Barking Town Centre scheme and so represents the initial 'infill' opportunity which could be supplied with low-carbon heat. This is to align with the proposed heat network zoning policy which aims to respect existing or proposed connections where there is an incumbent/existing heat network provider.

The Barking Town Centre scheme is shown alongside the IZO in Figure 8: Initial Zone Opportunities in Barking Town Centre HNZ below.

Figure 8: Initial Zone Opportunities in Barking Town Centre HNZ

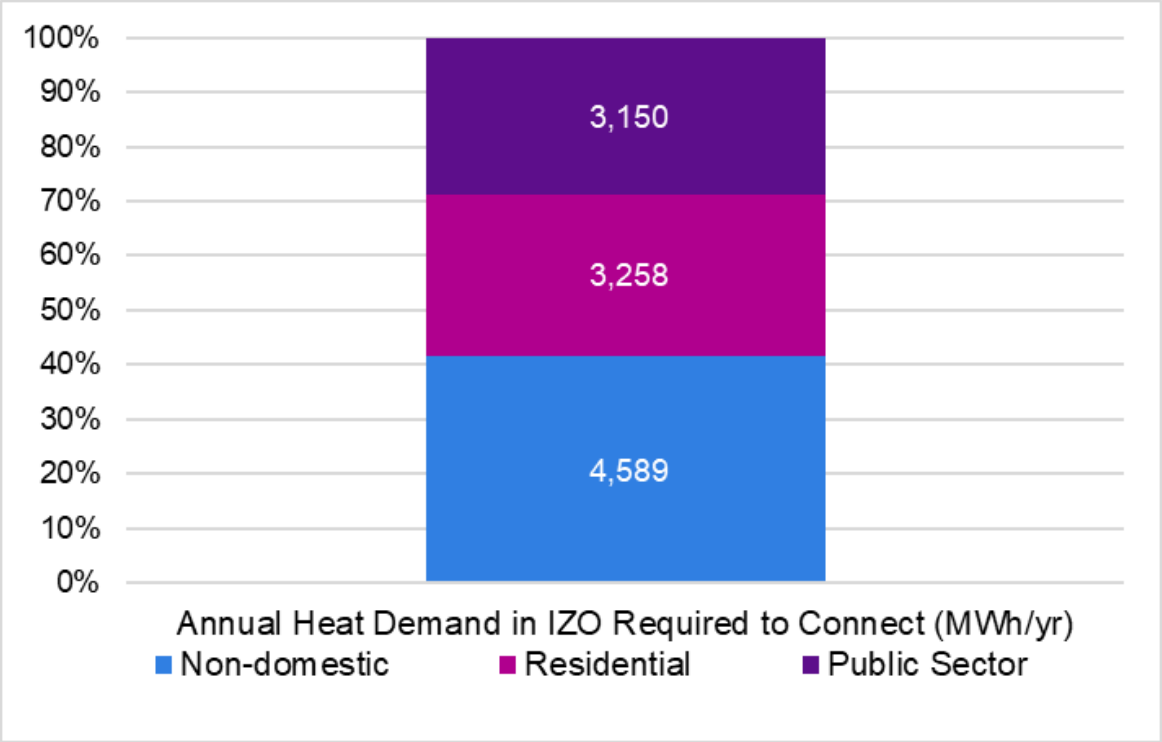


3.2.4) Barking Town Centre – IZO Heat Demands

It is estimated that there is nearly 30GWh/yr of heat demand from buildings potentially required to connect, of which approximately 10GWh/yr has been proposed to connect to the IZO.

Figure 9 provides a breakdown of heat demand connected to the IZO based on building type and Table 8 lists the ten highest heat demands identified.

Figure 9: Barking Town Centre - Categorisation of Heat Demand for Buildings Potentially Required to Connect in the IZO



Non-domestic (private sector) buildings are estimated to make up approximately 40% of the total heat demand, with public sector and residential buildings making up the remaining demand, both contributing approximately 30% of the heat demand each.

Current and proposed connections to the Barking Town Centre scheme include the Town Hall, Broadway Theatre, Abbey Leisure Centre and the Axe Street, Gascoigne West and Crown House Developments, with additional organisations and housing projects planned to connect in future phases.

For the purposes of this study, the building list in Table 8 reflects connections not made to the existing scheme at the time of writing. This is to align with the proposed heat network zoning policy which aims to respect existing or proposed connections where there is an incumbent/existing heat network provider. Other key buildings identified could include the Vicarage Shopping Centre, Badawa House Child Care Centre and a number of residential buildings.

Table 8: Barking Town Centre - Key Heat Demands Required to Connect in the IZO[15]

Building name	Building category	Number of connections	Annual heat demand (MWh)	Data source
The Vicarage	Non-Domestic (retail)	1	1,800	Benchmark (Stakeholder)
Cutmore & Schrier Ropeworks Arboretum	Residential	1	1,100	Benchmark (NZM)
Badawa House Child Care Centre	Public Sector	1	900	Benchmark (NZM)
Wellington Court	Residential	1	900	Benchmark (Stakeholder)
Abbeville Apartments	Residential	1	700	Benchmark (NZM)
Lemonade Building	Residential	1	500	Benchmark (NZM)
Technical Skills Academy	Public Sector	1	400	DEC
Wilkinson, 22-28, East Street	Non-Domestic (retail)	Unknown	275	Benchmark (NZM)
Maritime House	Non-Domestic	Unknown	150	Benchmark (NZM)

3.2.5) Barking Town Centre – IZO Heat Sources

A number of potential heat sources and existing energy centres have been identified. However, the preferred heat source which has been identified is a WSHP recovering heat from the River Roding which is to be installed in the SEC. As previously mentioned in Section 3.2.2 B&D Energy has received Government funding to co-fund the creation of a landmark low carbon district heating scheme. Part of this application is the deployment of a WSHP in the SEC.

Table 9 and Table 10 summarise the key heat sources identified. These are also shown in the zone-level map in Figure 8 in Section 3.2.3 above and on Map C in Appendix 1.

[15] Please refer to Appendix 3 for definitions related to building categories in this table.

Table 9: Barking Town Centre - Key Heat Source Opportunities for the IZO

Heat source type	Capacity (kWp)	Temperature (ºC)	Potential energy centre location
WSHP - River	1,750	75-50 ºC[16]	E5

Table 10: Barking Town Centre - Potential IZO Energy Centre Locations

EC ref number	Site type	Size (m^2)	Ownership	Heat source
E5	Land	200	B&D Energy	WSHP

3.2.6) Barking Town Centre – IZO Heat Distribution

The approach to developing the heat network route considered economic viability, investment scale and returns, decarbonisation impact and deliverability. These criteria were applied in a standardised manner across all opportunities identified in the Pilot programme and therefore may not reflect detailed designs or proposed routes identified in more detailed feasibility work. Routing within the site boundary of a building or campus may not have been included if insufficient information was available. The IZO routing was developed solely around buildings which could be required to connect and did not consider potential voluntary connections.

The purpose of the concept heat network route is to define the scale, potential routing and identified associated constraints within the zone. Further work will be required to undertake a more detailed route assessment to take account of the buried utilities, building connections and other local strategic and local planning considerations.

As seen in Figure 8, the Barking Town Centre IZO will cover only the central area of the HNZ. Table 11 shows the network statistics including the network length and associated costs. Please refer to Section 3.1.6 and Appendix 5 for the assumptions used.

The main spine of the network follows North St/Broadway with branches towards connections. Key anchor loads in this area include major retail centres such as The Vicarage shopping centre as well as a number of residential blocks including the Abbeville Apartments and the Lemonade Building. Note that the HNZ Pilot Programme trialled the use of automated routing software as an objective way of identifying the potential size and scale of network routes. Therefore, this will not exactly match what is installed currently, or future plans, which will have undergone further detailed design.

[16] *The temperature at which heat will be distributed to heat offtakers, after upgrade processes*

Table 11: Barking Town Centre - Indicative Heat Network Statistics for the IZO

IZO description	Network length (km)	Network cost (£m)
Barking Town Centre	2.4	7

3.2.7) Barking Town Centre – IZO Key Constraints and Mitigations

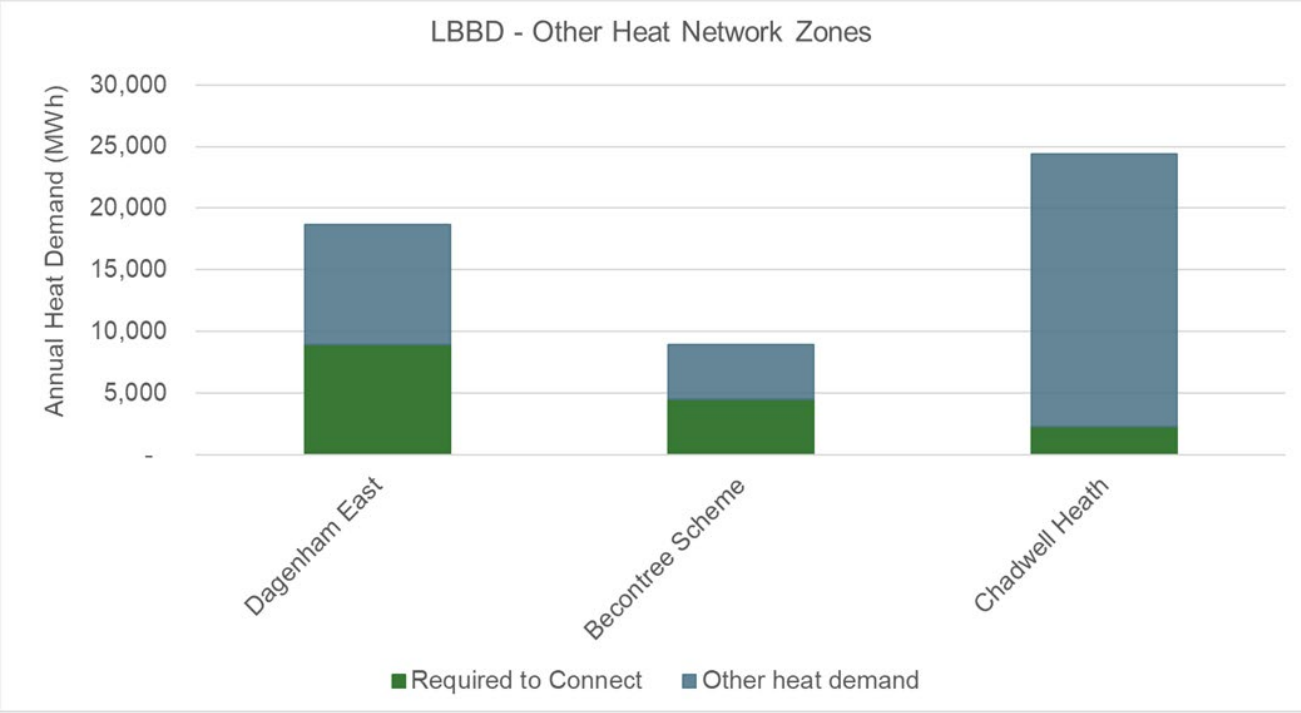
There are no major constraints identified for the proposed IZO network route.

4) Other Heat Network Zones

This section describes the 'Other' potential heat network zones that were identified in LBBD. These are areas where heat networks were deemed to offer the lowest carbon route to decarbonising heat but are often much smaller or discrete in nature than the 'Strategic' heat network zones identified. The approach taken in the Pilot programme did not apply a minimum threshold for zone identification and therefore future work will need to consider factors such as size and aggregation to ensure efficient and effective delivery of heat networks in the area.

Figure 10 illustrates the total annual heat demand, and the proportion of which is associated with buildings that may potentially be required to connect within each zone. A map of all zones can be found in Figure 4.

Figure 10: Total Heat Demand and Proportion Required to Connect in Other HNZs



Dagenham East: is located to the north-east of LBBD. The main building typology in this zone is non-domestic industrial units with one public sector building identified. A data centre development has been identified as a potential low carbon heat source to supply a heat network.

Becontree: is located to the north of the Dagenham East HNZ. It includes a number of public sector buildings with the education and leisure sector responsible for a large proportion of the heat demand Becontree

A heat network was installed in Becontree to serve the Gascoigne East Estate regeneration scheme. This network is fed with heat from the Gascoigne estate energy centre which includes 0.8MW combined heat and power (CHP) and 6MW gas fired boilers, as well as 60m^3 thermal

storage. The development connects ~230 homes and supplies heat and electricity to the existing Leisure Centre's new 50m Pool, and the Civic Centre.

Chadwell Heath: is situated to the north of the LBBD. The area predominantly consists of low-rise residential buildings, and a small cluster of public sector and LBBD owned buildings. Key loads include:

- Rose Lane Primary School
- Marks Gate Health Centre
- Wellgate Children Centre
- Kallar Lodge Residential Care Home
- Colin Pond Court residential building

In the HNZ there is an existing communal heating system supplying heat to a LBBD owned building.

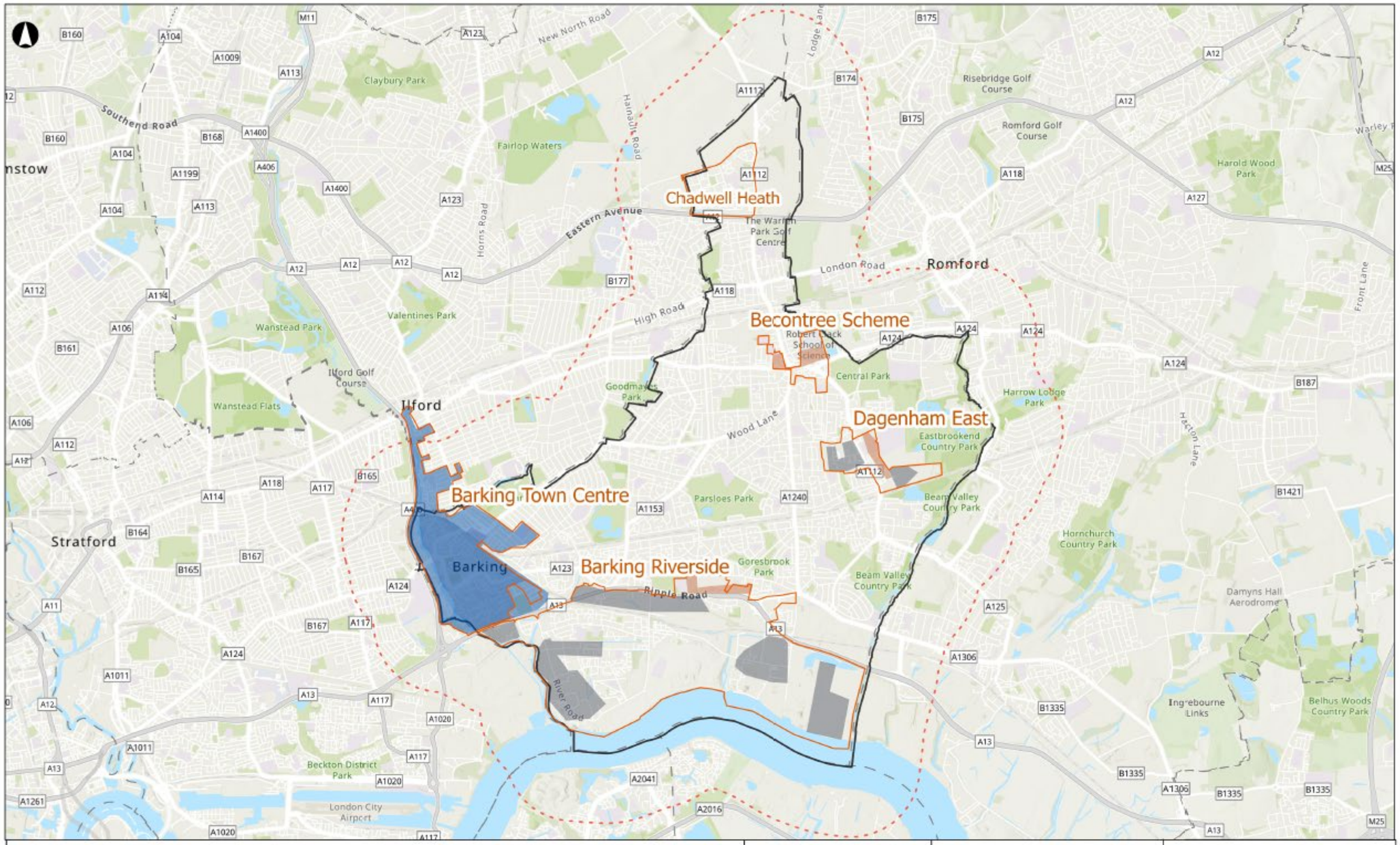
Appendix 1 – Maps and Legends

This section provides guidance on interpreting the icons and legends used throughout this report and Maps A-F that follow:

Legend / icon	Relevant map(s)	What this represents on the map	Comments on interpretation
	Report maps	Study boundary	Extends 1km beyond Local Authority boundary to include cross boundary opportunities
	Report maps	Local Authority boundary	
	Report maps	Other Local Authority boundary	
	Report maps	Heat network zones	This includes both Strategic HNZs and Other HNZs.
	Report maps	Other heat network zones	Smaller or discrete heat network zone opportunities
	Report maps	New developments	New development within heat network zones and IZOs that will still be in construction post-2025
Gates Hill	Report maps	Heat network zone name / reference number	‘Strategic’ zones are named; ‘Other’ zones are represented by a reference number
	Report maps	Buildings potentially required to connect	Buildings that could be required to connect (as described in the HNZ Consultation 2023)
	Report maps	Campuses	Multiple buildings owned and operated by the same organisation (e.g. Universities, Hospitals)
	Report maps	Initial Zone Opportunity concept network route	Conceptual heat network pipe routes between buildings that could be required to connect
	Report maps	Existing and Planned Heat Networks	Known existing or planned heat network pipe routes as provided by local stakeholders
	Report maps	Potential energy centre - IZO	Potential energy centre location for an IZO (see section 3)
	Report maps	Existing/planned energy centre - Communal HNs	‘Communal’ energy centres are those operated within a single building or across a campus
	Report maps	Existing/planned energy centre - District HNs	‘District’ energy centres supply multiple buildings across multiple sites
Appendix 1: A – Typology map			
	Appendix 1: Map A	Dense City Centre	Locally recognised as the City or Town centre, where buildings development is most dense
	Appendix 1: Map A	City Centre Fringe	Around the City or Town Centre or at its outskirts, where both building density reduces
	Appendix 1: Map A	Mixed Use District	A variety of building typologies, with no single typology prevailing in the area
	Appendix 1: Map A	Social Housing	Public, private and third sector social housing
	Appendix 1: Map A	Campus (health / education)	Buildings that are owned and operated together (e.g. Universities, Hospitals)

	Appendix 1: Map A	Commercial / business office	Public & private office space
	Appendix 1: Map A	Industrial areas	Primarily used for manufacturing, engineering, and warehousing
Appendix 1: B – Key heat demands			
	Appendix 1: Map B	Top 10 Heat Demands	The largest (anchor) heat loads within the Pilot programme study area (see Section 3)
	Appendix 1: Map B	Local Authority	Buildings owned or operated by the Local Authority
	Appendix 1: Map B	Other public sector	Other buildings owned or operated by the public sector (e.g. hospital, universities, Govt. estates)
	Appendix 1: Map B	Residential with existing communal heating	Residential buildings with existing communal heating systems installed
	Appendix 1: Map B	Non-domestic private	Non-domestic private buildings (e.g. commercial, offices)
	Appendix 1: Map B	Industrial	Mixed industrial sites (e.g. light or heavy industry, manufacturing, warehouses and distribution)
400 - 600	Appendix 1: Map B	Building heat demand (MWh/yr)	Circle size increases with size of heat demand
Appendix 1: C – Key Heat Sources and Potential Energy Centres			
	Appendix 1: Map C	EfW plant	**Point heat sources** have known or likely points of heat offtake/abstraction Mine water and water source ‘points’ indicate potential abstraction points. Other waste heat sources include sewers, electrical substations and other sources of heat. See section 3 for more detail on heat source capacities, where known. On the City-level Map C only, the heat waste symbol is sized according to its scale in GWh/yr
	Appendix 1: Map C	Industrial Waste Heat	
	Appendix 1: Map C	Mine water	
	Appendix 1: Map C	Other Waste Heat	
	Appendix 1: Map C	Water Source	
	Appendix 1: Map C	Waste Water Treatment	
	Appendix 1: Map C	Deep geothermal or mine water heat	**Area heat sources** differ from point-heat sources in that the exact location for extracting heat from the resource is not yet determined
	Appendix 1: Map C	Ground source	
	Appendix 1: Map C	Water source	
Appendix 1: D – Existing and planned heat networks			
	Appendix 1: Map D	Existing and planned heat networks	At this scale the route of an existing HN cannot be displayed, so an area outline is used instead
Appendix 1: E – Physical constraints			
	Appendix 1: Map E	Key constraints	Key heat network routing constraints as described in section 3

A. London Borough of Barking & Dagenham Typology Map



Boundaries
- Study Boundary
- Local Authority Boundary
- Other Local Authority Boundary
- Heat Network Zones

Key Typologies
- Dense city centre
- City centre fringe
- Mixed use district
- Social housing
- Campus (health/education)
- Commercial / business office district
- Industrial areas

Department for Energy Security & Net Zero

0 0.75 1.5 3
Kilometers
Scale: 1:52,000
Coordinate System: British National Grid

Barking & Dagenham

Map A

City Typologies

B. Key Heat Demands

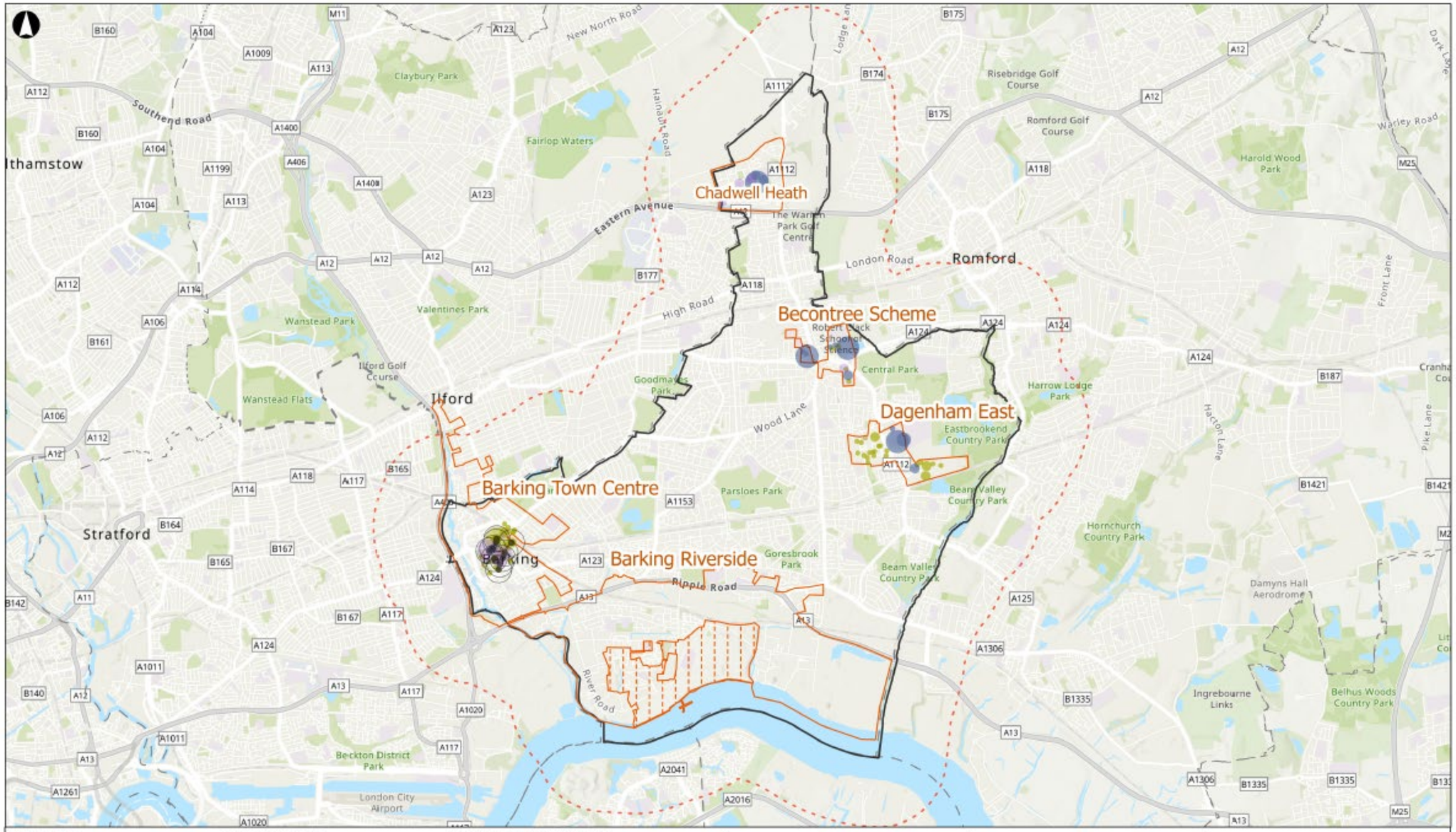
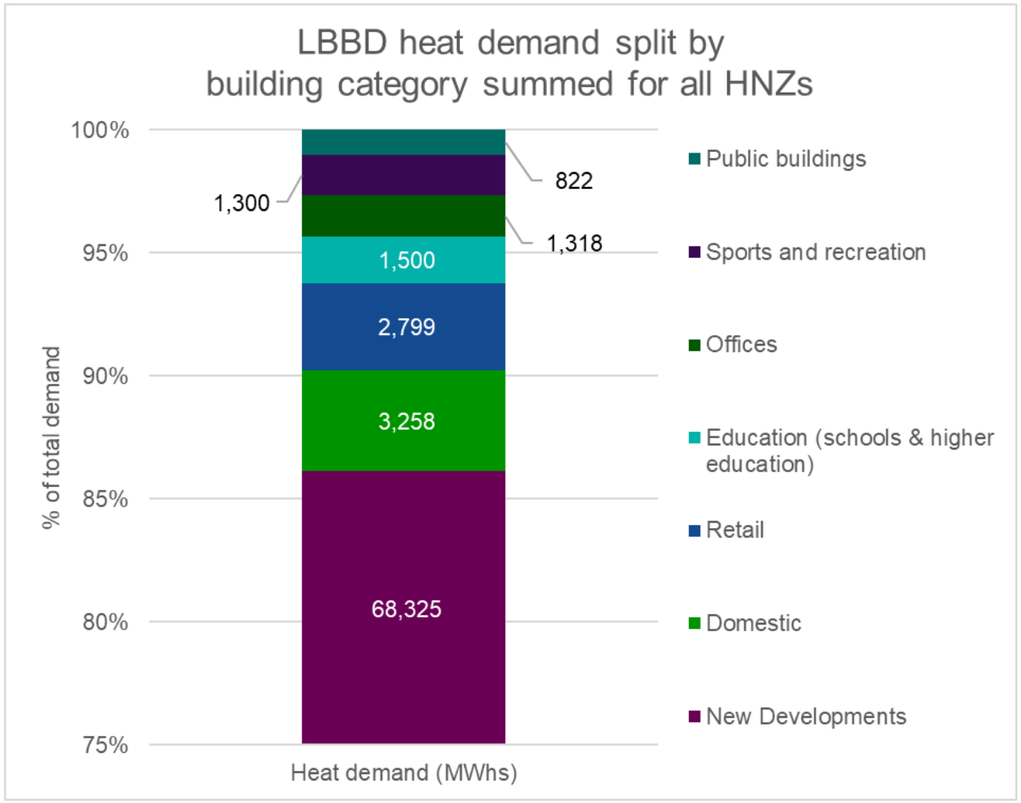


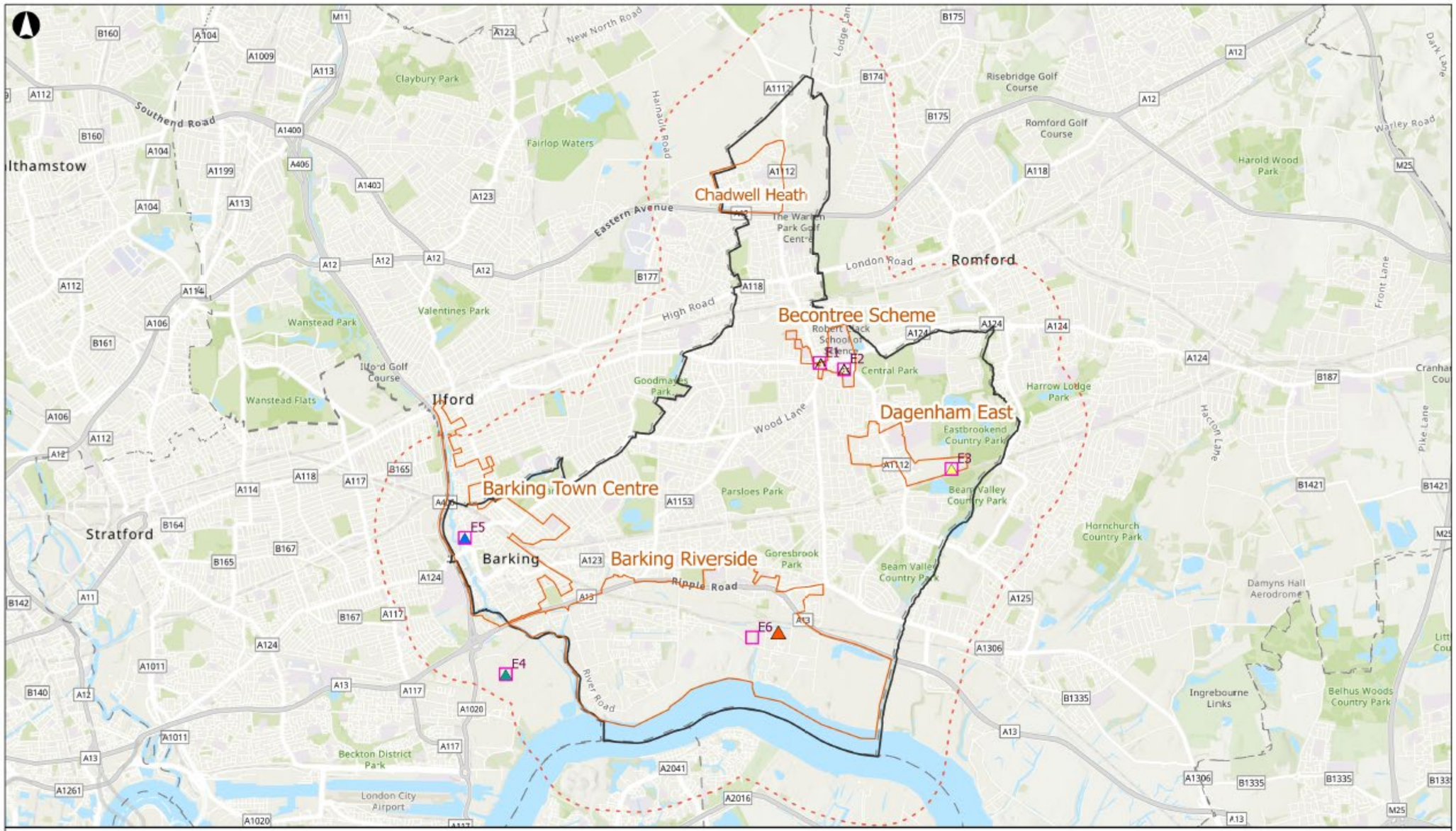
Table 12: Heat Demand split further by Building Categories across all Initial Zone Opportunities identified in Strategic HNZs in the Study Area

Building category	Annual Heat Demand of buildings required to connect across IZOs (MWh)
Domestic	3,258
Education (schools & higher education)	1,500
Entertainment	-
Hospitals and residential / nursing homes	-
Hotels	-
Industrial buildings	-
Offices	1,318
Public buildings	822
Retail	2,799
Sports and recreation	1,300
New Developments	68,325
Totals	**79,322**

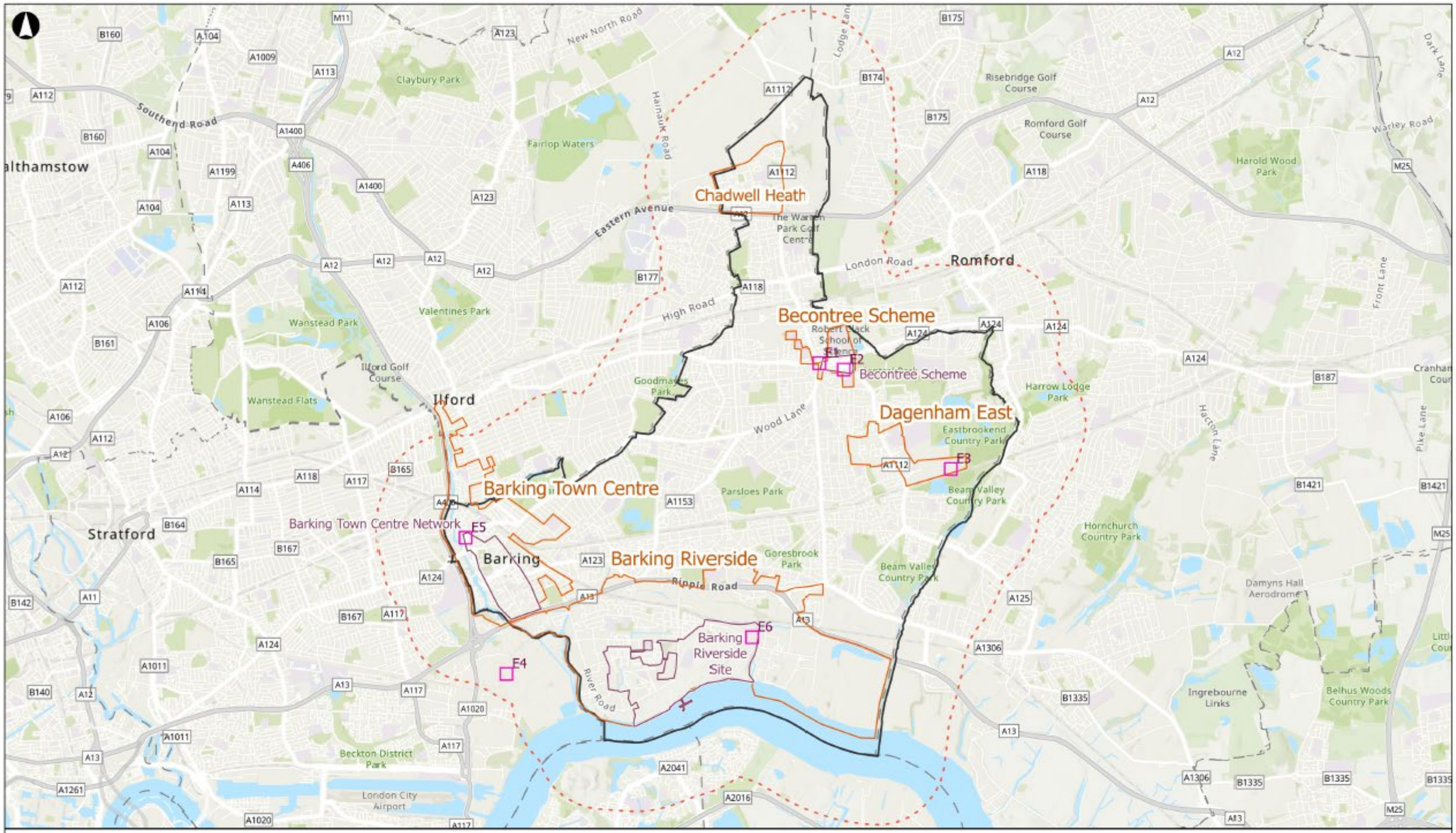


Note In LBBD there are five HNZs with a total of two IZOs identified across them. The table and graph above summarise the heat demand for buildings potentially required to connect to these IZOs.

C. Key Heat Sources and Potential Energy Centres



D. Existing and Planned Heat Networks



Boundaries
- Study Boundary
- Local Authority Boundary
- Other Local Authority Boundary
- Heat Network Zones

Existing and Planned Heat Networks

Energy Centres
- Potential IZO
- Barking_Dagenham_ACM_PotentialIZO_Pnt

0 0.75 1.5 3
Kilometers

Scale: 1:55,000

Coordinate System: British National Grid

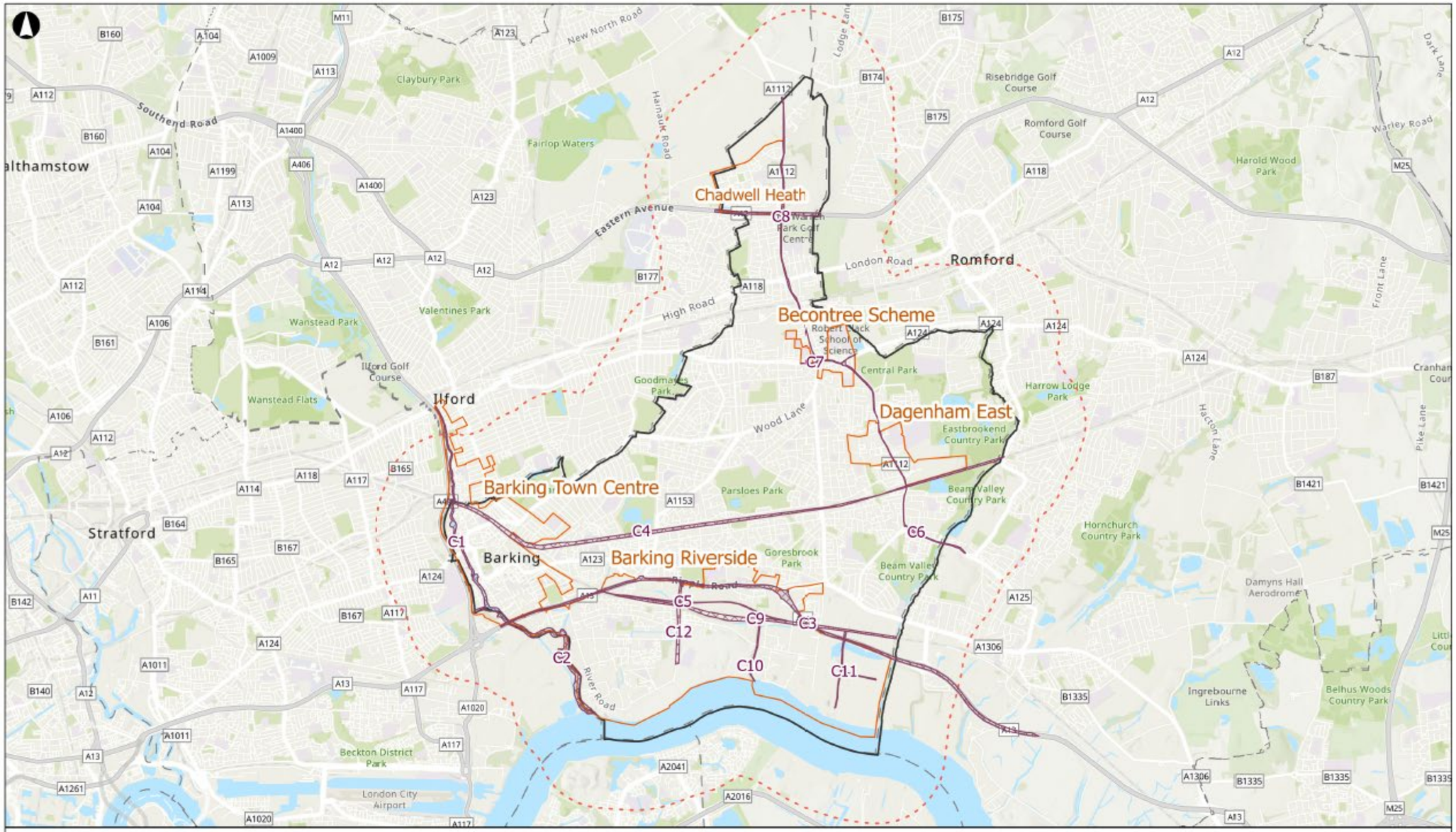
Department for Energy Security & Net Zero

Barking & Dagenham

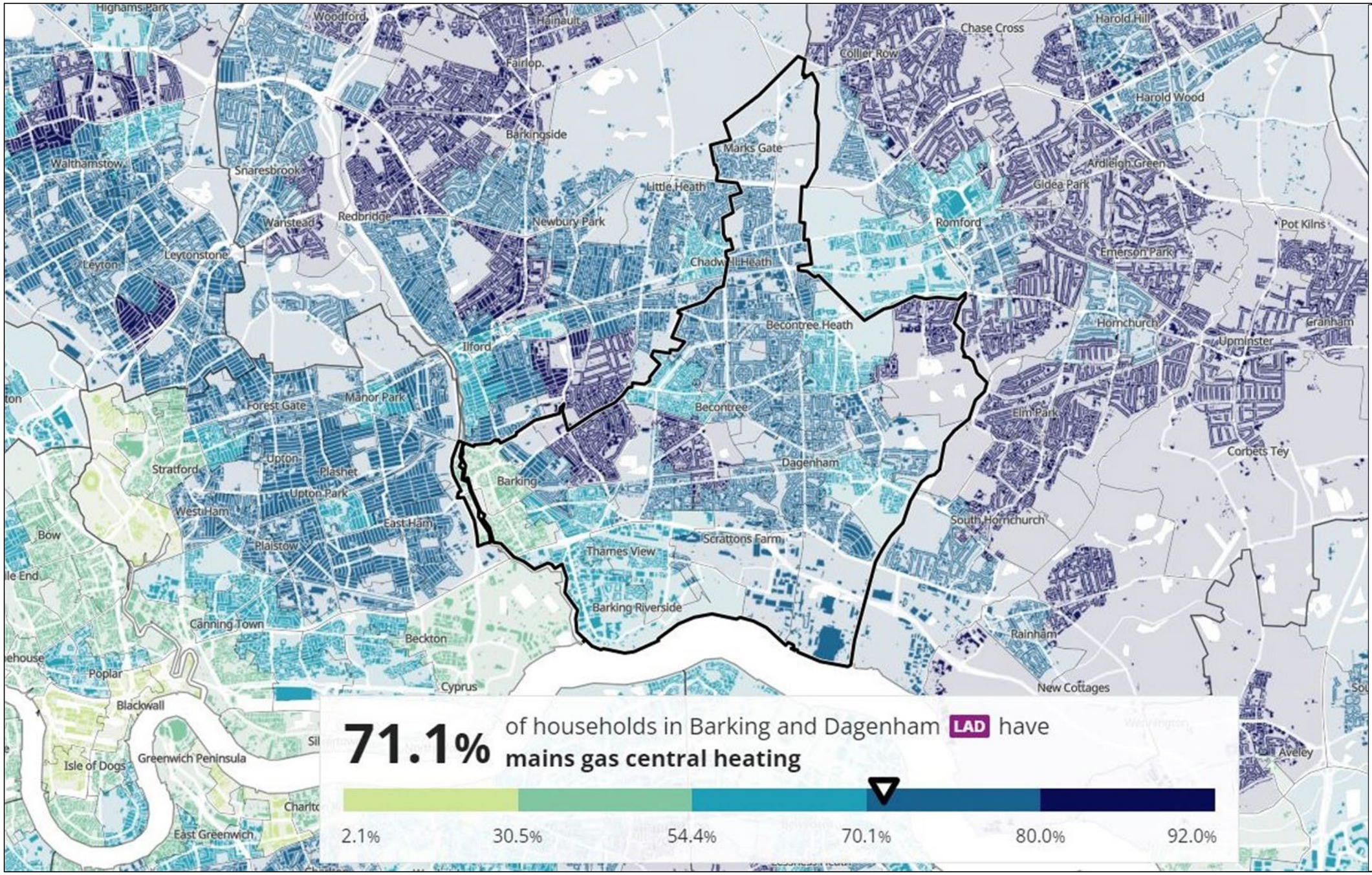
Map D

Existing Heat Networks

E. Physical Constraints



F. Off-Gas Grid Areas in LBBD



Appendix 2: Data Room Resources

Throughout the delivery of the Pilot programme, information resources have been compiled for future use in relation to the development of heat network zones.

These resources will remain restricted to DESNZ and the local authority. This is to ensure that the department remains within its Data Privacy Notice as shared with stakeholders providing the information. GIS outputs are not being published alongside the report as they are subject to change.

Table 13: Pilot Programme Standardised Information Resources

Information resource	Description of resource
Stakeholder Directory	A directory listing key stakeholders identified and approached during the Pilot programme, including organisation name, address, or website, contact names, work title and contact details.
Stakeholder meetings log and records	A log of key meetings held and related meeting records.
Datasets Directory	A list of datasets / reports shared by stakeholders cross-referencing who provided the item from the stakeholder directory and a description of the dataset.
Geospatial packages and related geo-coded datasets	Geo-coded datasets and descriptions related to maps produced in this report.

Table 14: Pilot Programme Study-Area-Specific Information Resources

Information resource	Description of resource
210924 BDE WP2 Docks report	A report that explores the opportunity for heat network development in the area that is covered by the Barking Riverside HNZ.
210924 BDE WP2 East	A report that explores the opportunity for heat network development in the area that is covered by the Dagenham East HNZ.
B&D Energy Borough Heat Map	Barking & Dagenham Energy Borough Heat Map
Area Heat Maps	Individual heat maps for identified areas

This publication is available from: https://www.gov.uk/government/collections/heat-networks

If you need a version of this document in a more accessible format, please email alt.formats@energysecurity.gov.uk. Please tell us what format you need. It will help us if you say what assistive technology you use.