Heat Mapping Study

London Borough of Hillingdon

January 2011

PARSONS BRINCKERHOFF

PB 125 YEARS

Heat Mapping Study

PEL285481A

Prepared for
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1 INTRODUCTION

The London Borough of Hillingdon has commissioned Parsons Brinckerhoff to conduct a heat mapping study of the borough. This study forms part of a London-wide drive to identify opportunities for decentralised energy, and also is closely tied to the low-carbon agenda of national planning policy.

The UK has set out its intent to be a global leader in tackling climate change by imposing mandatory carbon reduction targets enshrined in law and policed by the Climate Change Committee. National targets are cascaded down with the result that regional agencies and local government will be required to deliver carbon reductions in their administrative areas. Planning policy has been re-drafted to encourage the deployment of renewable and low carbon energy sources and local planning authorities (LPA's) are required to produce development frameworks compatible with both the headline targets and national planning policy statements.

In this context the London Development Agency (LDA) and Greater London Authority (GLA) have prepared a heat map to facilitate the delivery of decentralised energy schemes within London. The London Heat Map project is part of the wider Decentralised Energy Master Planning (DeMAP) programme which aims to facilitate achieving the target of meeting 25% of London's energy supply from decentralised energy by 2025, and to provide LPA's with the evidence required to support policies favouring decentralised energy in their Local Development Framework documents.

2 POLICY BACKGROUND

The following short section does not aim to give a complete synopsis of relevant planning policy literature, but provides reference to some of the key documents pertinent to the implementation of decentralised energy schemes in London.

2.1 PPS 1 – revised draft – consultation document March 2010

The proposed revision to PPS 1 contained in the March 2010 consultation document contains the following policy that promotes the use of renewable and low carbon energy:

2.1.1 Paragraph 58 - local energy planning

The revised PPS requires LPAs to take a more proactive approach to local energy planning, with clearer requirements for the evidence base at local level, and an expectation that LDFs will provide a supportive framework for renewable and low carbon energy that specifies relevant opportunities. This approach to local energy planning should provide a clearer framework in which to bring forward decentralised and renewable energy and consequently make delivering this easier and more cost effective.

Local authorities are identified as having an important role in the implementation of decentralised energy systems. The risk to developers in utilising this technology is identified along with the requirement for schemes based upon anchor customers, namely large non-domestic buildings. The PPS expects LPAs to assess opportunities for decentralised energy, focusing on opportunities "*at a scale which could supply more than an individual building*".

2.2 The draft replacement London Plan – October 2009

The draft replacement plan provides a strong policy framework in support of using renewable and decentralised energy systems. The following policies in the draft replacement London plan pertain to the use of renewable and decentralised energy:

2.2.1 Policy 2.7: Outer London: Economy, paragraph F

The use of decentralised energy, amongst other mechanism, is seen as an essential constituent to ensuring high quality design for business districts, thus making a distinctive business offering.

2.2.2 Policy 3.7: Large residential developments, paragraph 3.37

Planning frameworks for these areas should take particular account of: (amongst other items) the opportunities large scale development provide for decentralised energy generation and provision

2.2.3 Policy 5.2: Minimising CO_2 emissions, paragraph C

Proposals to further reduce carbon dioxide emissions through the use of decentralised energy where feasible, such as district heating and cooling and combined heat and power (CHP)

2.2.4 Policy 5.5: Decentralised Energy networks

A. The Mayor expects 25% of the heat and power used in London to be generated through the use of localised decentralised energy systems by 2025. In order to achieve this target the Mayor prioritises the development of decentralised heating and cooling networks at the development and area wide level, as well as larger scale heat transmission networks. The Mayor has developed a London Heat Map tool to help boroughs and developers identify decentralised energy opportunities in London.

B. Within their LDFs boroughs should develop policies and proposals to identify and establish decentralised energy network opportunities. Boroughs may choose to develop this as a supplementary planning document and work jointly with neighbouring boroughs to realise wider decentralised energy network opportunities. As a minimum boroughs should:

a. Identify and safeguard existing heating and cooling networks

b. Identify opportunities for expanding existing networks and establishing new networks. Boroughs should use the London Heat Map tool and consider any new developments, planned major infrastructure works and energy supply opportunities which may arise

c. Develop energy master plans for specific decentralised energy opportunities which identify:

- *major heat loads (including anchor heat loads, with particular reference to sites such as universities, hospitals and social housing)*
- *major heat supply plant*
- *possible opportunities to utilise energy from waste*
- *possible heating and cooling network -routes*
- *implementation options for delivering -feasible projects, considering issues of procurement, funding and risk and the role of the public sector.*

d. Require developers to prioritise connection to existing or planned decentralised energy networks where feasible.

2.2.5 Policy 5.6: Decentralised energy in development proposals

A. Development proposals should evaluate the feasibility of Combined Heat and Power (CHP) systems, and where a new CHP system is appropriate also examine opportunities to extend the system beyond the site boundary to adjacent sites.

B. Major development proposals should select energy systems in accordance with the following hierarchy:

1. *Connection to existing heating or cooling networks*

2. *Site wide CHP network*

3. *Communal heating and cooling*

C. Potential opportunities to meet the first priority in this hierarchy are outlined in the London Heat Map tool. Where future network opportunities are identified, proposals should be designed to connect to these networks.

2.3 The Mayor's draft climate change mitigation and energy strategy for public consultation – October 2010

2.3.1 Low carbon London: The Mayor's vision for 2025

…buildings get their electricity and heat from on-site combined heat and power (CHP)…

2.3.2 The Mayor's 25% decentralised energy target

The Mayor has set a target to generate 25 per cent of London's energy from decentralised sources by 2025...

2.3.3 Box 4.2 Definition of decentralised energy schemes by scale

There are broadly four scales of decentralised energy system:

- ***Micro-generation*** *– i.e. single user*
- ***Single development*** *– up to around 3,000 domestic customers,*
- ***Multi-development*** *(medium scale) – up to 20,000 homes,*
- ***Area-wide*** *(large scale) – up to 100,000 homes, i.e. London Thames Gateway Heat Network*

2.3.4 The London Heat Map

The London Heat Map is an online interactive tool that provides spatial intelligence on decentralised energy, allowing users to identify opportunities for decentralised energy projects in London……

…The map will evolve over the next three years alongside the Decentralised Energy Masterplanning Programme (DEMaP), becoming more sophisticated and more accurate at higher resolutions and providing a hub for information of use to the decentralised energy market.

2.3.5 Policy 4 Delivering decentralised energy through the planning system

All new development will, where appropriate, either support the expansion of existing decentralised systems or include new systems on-site. Strategic planning documents will also identify priority areas for decentralised energy networks.

***Action 4.1**- Through the draft replacement London Plan, the Mayor will require new developments to support the implementation of decentralised energy systems and networks, making use of the Community Infrastructure Levy and offset mechanisms where appropriate.*

***Action 4.2** - Through the draft replacement London Plan, the Mayor will require that local authorities identify decentralised energy network opportunities in their Local Development Frameworks.*

***Action 4.3** - Through Opportunity Area Planning Frameworks, the Mayor will continue to work with the London boroughs to identify and develop strategic multi-site and area-wide decentralised energy networks.*

***Action 4.4** - The Mayor will work with boroughs to use Local Development Orders to enable deployment of district heat networks.*

2.3.6 Policy 5: Enabling the commercialisation of the decentralised energy market to deliver decentralised energy on a wide scale in London

The aim of this policy is to promote "Investment in, and facilitation and delivery of, exemplar decentralised projects will be underpinned by activity that develops a suitable market framework for decentralised energy."

***Action 5.10** - The Mayor will encourage government to establish a regulatory and commercial framework that supports decentralised energy and accessible heat and power markets.*

3 METHODOLOGY

3.1 Outline Approach

Parsons Brinckerhoff recognises that historically, the development of district heating in the UK has been based primarily around public sector anchor customers. This has led to the use of a two-stage methodology that focuses first on the public sector, and secondly on private customers in terms of identifying clusters of demands that represent opportunity areas for district energy.

3.2 Key Data Sources

LBH has provided considerable support when gathering data for the borough that has been analysed and filtered by PB.

3.2.1 Data has been gathered from the following sources:

- *LB Hillingdon council records* – this data contains recorded gas usage information for a wide range of council buildings, including many of the education facilities, public buildings, and council offices.

- RSLs – PB have requested information to the following RSLs regarding identifying existing social housing that is supplied from a communal heating system.

    - **A2 Dominion Housing Group**
    - **Catalyst Housing Group**
    - **Home Group**
    - **Network Housing Group**
    - **Notting Hill Housing Group**
    - **Paradigm Housing Group**
    - **Shepherds Bush Housing Group**
    - **Thames Valley Housing Association**
    - **YMCA**

- *Display Energy Certificate (DECs)* – PB requested Display Energy Certificates (DECs) for the entire LB Hillingdon under a freedom of information request. LBH has been instrumental in coercing the holders of this data to release it within the project timeframes.

- *Existing London Heat Map* – the LDA has sourced data relating to some residential properties, leisure facilities and fire/police stations (inter alia), and PB has corroborated this data through visual street-level mapping tools, and measured building areas and applied benchmarks where possible.

- *London Development Database* – The London Development Database (LDD) contains records of all the planning applications made within the Borough. This dataset contains duplicates with the Area Action Plan information noted above but also provided additional sites for inclusion in this study.

- *Strategic Land Assessment Study* – The Strategic Housing Land Assessment (SHLA) provides information about preferred development sites in Hillingdon. PB have used the (sometimes limited) spatial information provided in the SHLA to locate the development sites.

- *Heathrow Airport Ltd* – PB held a meeting with Richard Oakly, Graham Earl, Chris Thomas and Andy Kidd of Heathrow Airport Ltd (HAL). PB discussed the project and issued a request for the supply of annual gas demand for the entire HAL estate. PB was provided with the heating demand for the main airport boiler houses.

- *Brunel University* – PB met with Peter Berresford, the director of operations. PB discussed the role that Brunel could play in a decentralised energy scheme that could be formed of buildings in and around Uxbridge. The university supplied a significant amount of information about the existing energy demand and discussed their aspirations for decarbonising the campus going forward.

- *Health care trusts* – PB have directly contacted the energy managers at Hillingdon and Harefield hospitals regarding gas consumption data. Hillingdon hospital provided annual gas demand figures whereas Harefield declined to provide any data. Both hospitals have data contained in the DEC database, this has been used for this study.

- *Chimes shopping centre, Uxbridge* – the shopping centre has provided their annual gas consumption for the last 12 months. The majority of the heating demand for the shopping centre is fed from gas, with the remainder made up from electric door air curtains and internal gains from lighting and equipment.

- *Bath Road buildings* – the energy demand from buildings along the Bath Road have been calculated using footprints from the GIS map and Google street view to determine the number of storeys. Energy demand benchmarks derived from the TM46 energy benchmarks guide have been used to calculate fossil fuel demand. A fixed boiler efficiency of 70% has been used to convert the gas demand into heat demand. It has been assumed that these heat demands could be supplied from a low temperature hot water district heating system.

4 RESULTS – HEAT DEMANDS

4.1 Existing domestic

PB issued a request for information to the list of RSLs shown in section 3.2.1. The following information was received regarding multi-address dwellings supplied from existing district/communal heating systems:

Gas fired district heating

- Austin Road Hayes UB3 3DG: 7, 12, 58, 71, 74, 79, 87, 121 & 135
- Silverdale Road Hayes UB3 3BY: 12 & 33
- Skeffington Court Silverdale Road Hayes UB3 3BY: 3 & 38

Wood pellet biomass boiler

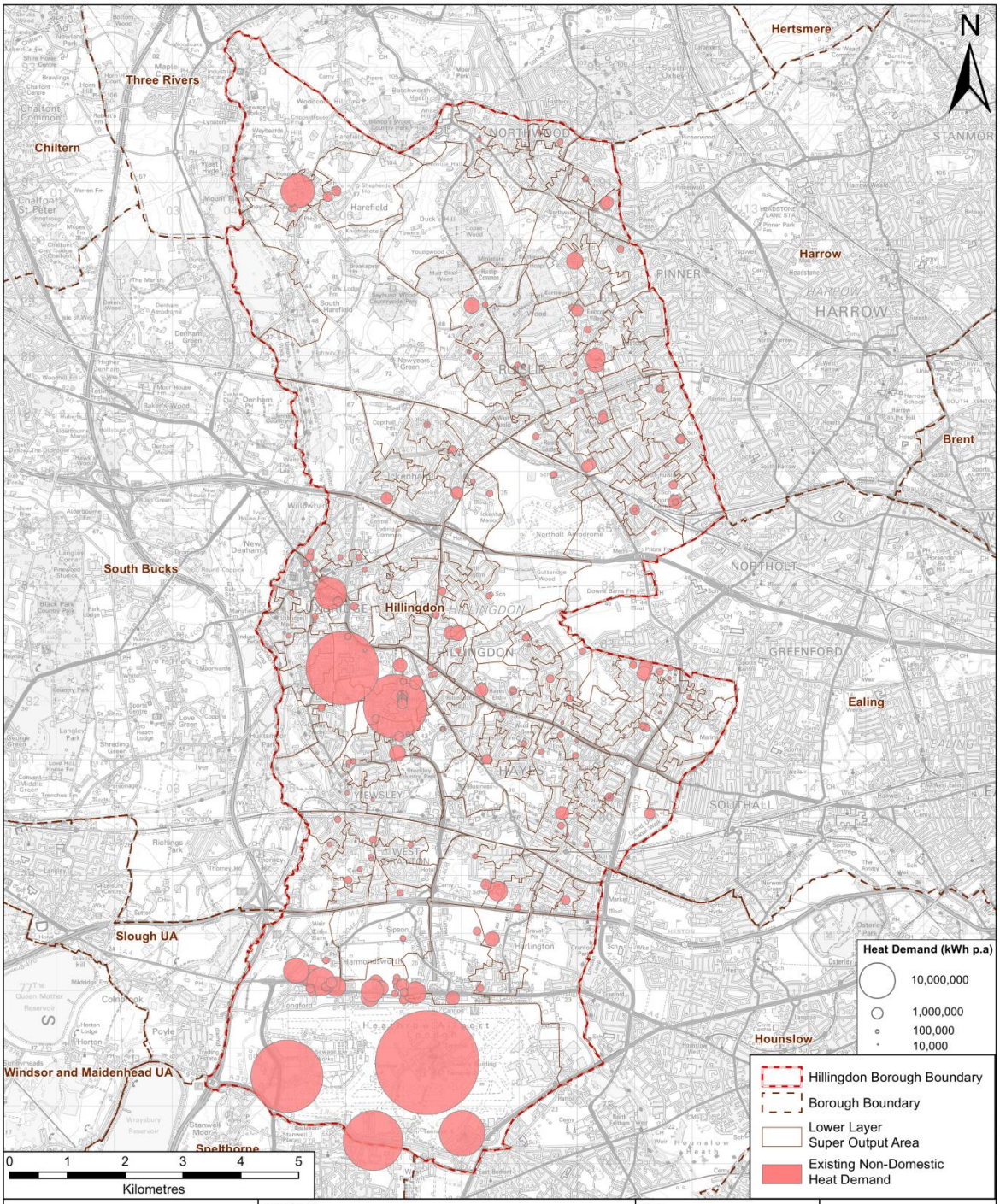
- 14x1-bed flats and 10x2-bed flats, Greenwood Close, Hayes, UB3 3PA

None of the above properties has sufficient heat demand to warrant inclusion on the heat map.

4.2 Existing Non-domestic

The following map shows the locations and magnitudes of non-domestic buildings for which energy information has been made available. These loads are of particular interest because they are almost exclusively public sector and could therefore potentially form the 'anchor' customers for emerging heat networks.

On all of the maps in this report that give an indication of the magnitude of the loads at the different node points, it is the area (not the diameter) of the circles on the map that reflects the magnitude of the heat demands.



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Tel: 020 7337 1700 Fax: 020 7337 1701

DRAWING TITLE: Existing Non-Domestic Heat Demands

JOB TITLE: London Borough of Hillingdon DEMaP

DATE: 27/01/2011
SCALE: 1:60,000
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CHECKED: NS
APPROVED: RG
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REV: C

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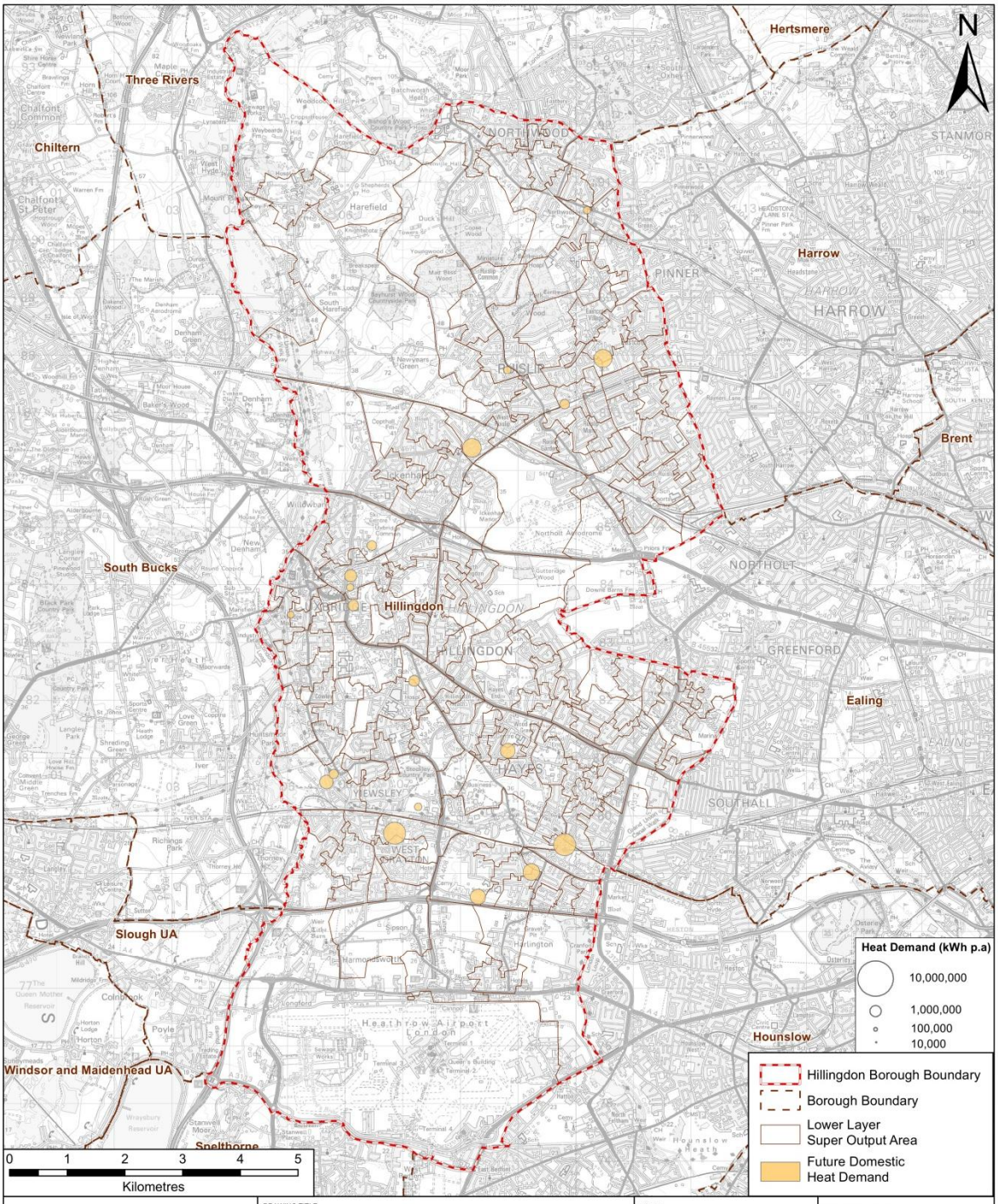
4.3 Future Domestic

The SHLA database was used to calculate future heat demand; for some sites multiple entries refer to different phases of development. In this case where each phase is in the same location the development has been plotted as a single circle, where the phases occupy different sites this has been indicated as separate circles. Only developments with a heat demand greater than 200MWh per year have been plotted for this study. The reason for this is to remove the smaller developments that are less likely to be of sufficient scale for economically viable connection to a DH network.



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DRAWING TITLE: Future Domestic Heat Demands

JOB TITLE: London Borough of Hillingdon DEMaP

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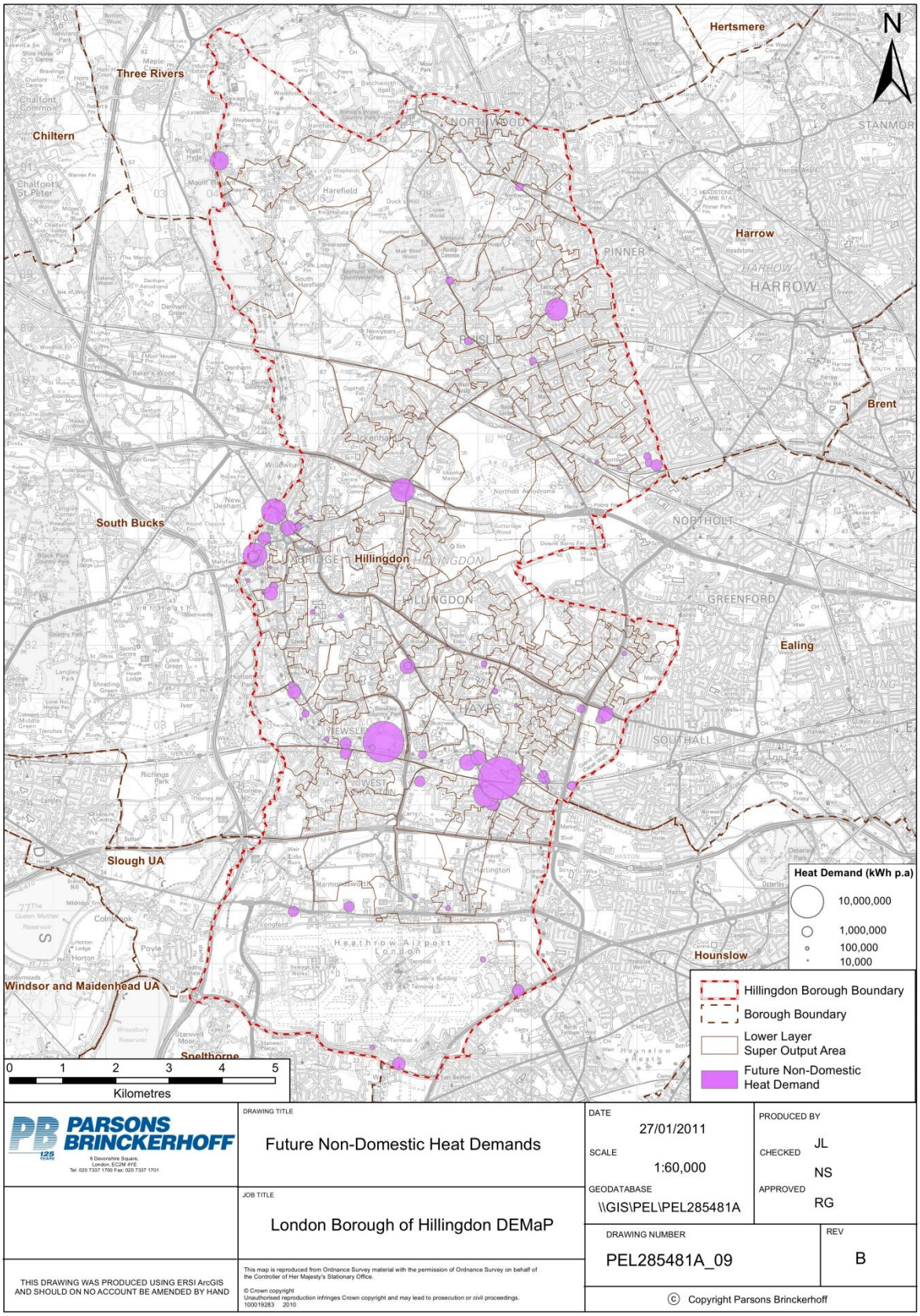
4.4 Future non-domestic development

The following map illustrates the identified future development in the Borough. These are also key loads as the increasing stringency of environmental standards encourages new development to adopt decentralised energy solutions.

In circumstances where the connection of a future development to a decentralised energy network displaces the need for on-site low carbon technologies, developers may be willing to provide a 'developer contribution' towards the cost of the decentralised energy solution, and this means of leveraging investment can significantly assist the realisation of networks.

Some key developments, for example Stockley park are identified as a single load, in reality they would be formed of several buildings that could form a small scale community heating network. This study has not considered such 'local' arrangements and has concentrated on the potential linking of sites; the existence of a local network would not prevent connection to a larger network in the future.


N
Hertsmere
Three Rivers
Chiltern
Harrow
Brent
South Bucks
Hillingdon
Ealing
Hounslow
Slough UA
Windsor and Maidenhead UA
Heat Demand (kWh p.a)
10,000,000
1,000,000
100,000
10,000
Hillingdon Borough Boundary
Borough Boundary
Lower Layer Super Output Area
Future Non-Domestic Heat Demand
0 1 2 3 4 5
Kilometres
PARSONS BRINCKERHOFF
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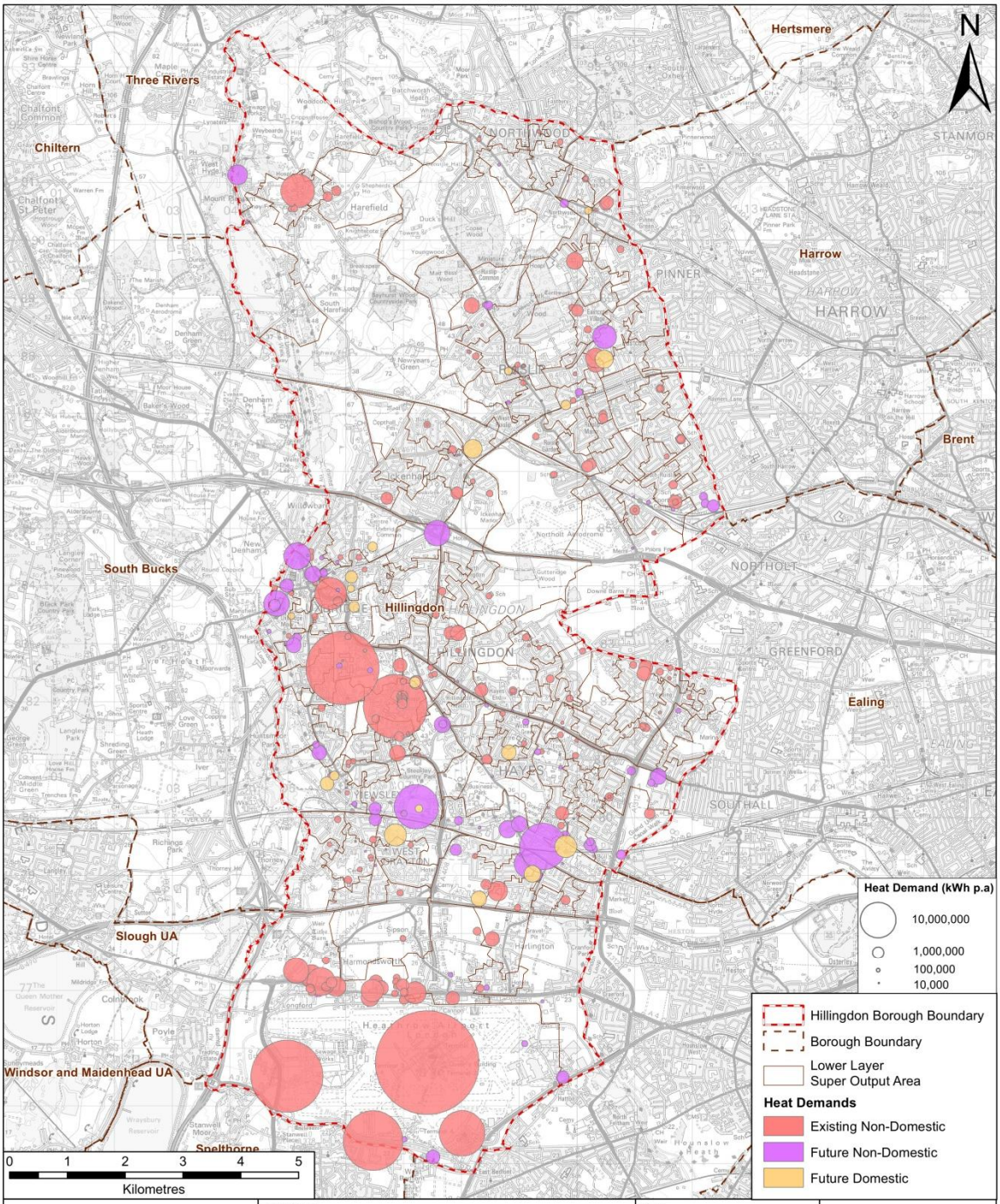
4.5 Combined Map

The following map shows the existing heat demand as well as the residential and non-residential heat demand layers on a single map.



PARSONS BRINCKERHOFF
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Tel: 020 7337 1700 Fax: 020 7337 1701

DRAWING TITLE: All Existing and Future Heat Demands

JOB TITLE: London Borough of Hillingdon DEMaP

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APPROVED: RG
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4.6 Cross-Borough Opportunities

PB has examined the boundary of the Borough, in order to assess if there are any relevant cross-boundary loads or sources of heat supply that could contribute to the formation of decentralised energy schemes.

The key cross-boundary opportunities identified are considered to be:

- LB Ealing – LB Ealing has previously had a study undertaken as part of the DEMaP programme. PB has reviewed the report and has identified cluster 4 a, b and c as having the potential to link with loads in and around Hayes. The clusters identified in Ealing are provided in appendix A

- The Colnbrooke Energy from Waste plant – this is a potential source of waste heat and is located in an industrial area to the West of the M25 in the Borough of Slough. PB has considered how this heat could be supplied to properties along the Bath Road as far as Heathrow Airport.

5 CLUSTER IDENTIFICATION

5.1 Selection criteria and weighting

A two-stage process has been adopted to select clusters for further analysis. This process allows additional weight to be given to 'anchor loads', given the role that local authorities have played historically in successful DH development.

Clusters have been selected through a quantitative process that analyses both the proximity of other loads to each node on the map displayed above, and also calculates the total heat load of the load cluster and the local authority proportion of this load. The following weighting has been applied to the relative importance of each these factors to give an overall score for clusters based around each individual load identified. The following weighting have been applied to the LB Hillingdon loads.

Weighting of Public Sector loads in Proximity and Total Heat Demand Analysis			
PROXIMITY		TOTAL HEAT DEMAND	
All	Public Sector	All	Public Sector
10.0%	**40.0%**	**5.0%**	**30.0%**

The second stage of analysis aims to refine further these initial scores, by introducing additional factors for consideration against each cluster of loads. The additional factors and their relative weighting are listed below:

Assessment criteria	Weighting factor	Additional Notes
Heat demand density / nearest neighbour analysis	34%	Weighted scoring based on the total distance to nearest neighbouring loads, and the average distance of Public Sector loads
Total heat demand	24%	Weighted score based on the total heat demand of the identified cluster, and the element of this demand that is related to Public Sector properties
Proportion of significant new development	15%	Score based on the proportion of the heat demand that is from new development
Diversity of heat demand	3%	Score based on the number of different building usage types within the cluster
Presence of constraints	0%	Score based on the presence or absence of significant physical constraints to the installation of DH mains
Colnbrook EfW proximity	10%	Distance of all cluster loads to EfW plant
Proximity of other top 20 clusters	15%	Gives an indication of potential for future expansion to wider area schemes

The means by which these criteria have been used to identify and quantitatively analyse the clusters of potential district heating loads is given below:

Nearest neighbour – This is an assessment of the proximity of potential loads to each other. The analysis of nearest neighbours has been carried out quantitatively, after eliminating all of the loads identified with a total annual heat demand of less than 200MWh. This ensures that only more significant loads contribute to the 'nearest neighbour' analysis. The coordinates recorded for the London Heat Map database were then used to identify the distance of each of the identified loads to all of the other loads in the database. The five closest neighbouring loads to each point were identified and the sum of these distances recorded. The total distances recorded on this basis provides the basis for the scoring in the 'nearest neighbours' analysis. On a linear basis, a total distance of less than 250m was given 10 points (e.g. maximum score), and distances of greater than 2,500m were given a zero score.

Total Heat Demands – the total heat demand of each clusters of loads identified in the nearest neighbours analysis provides the numerical basis for the scoring of this criterion. Included within this score is an assessment of the element of the load that is related to Public Sector properties. Clusters with total heat demands greater than 20GWh score 10 points (maximum) and the loads of 1GWh or less score zero points. All loads in between these two extremes were extrapolated on a linear basis.

Proximity of significant new development – this criterion is scored by evaluating the proportion of the total heat demand that is related to future development..

Diversity of heat demands – PB has assessed this on the basis of the mix of different load types identified within a cluster. A wide mix of uses receives a higher score. The scoring method of multiplying by two the number of additional different uses after the key load use within a cluster was adopted. E.g. A selection of 5 different uses in addition to the core load use would score the maximum of 10 points.

Presence of constraints – PB has assessed this based on the routes identified to connect the loads of the cluster. No constraints would give a high score in this category. A maximum score would be given where the whole network route was substantially through 'soft dig' ground where there is unlikely to be other buried services. No scheme qualifies for a maximum score in this context. Examples of scoring ratings are as follows:

Free of constraints? (Constraints score)	Constraints notes / examples
0	Multiple railway lines and Motorway Road
5	A Road, Canal, Railway
10	No major constraints - normal London roads (hard dig)

Proximity to Colnbrook Energy from Waste plant - this has been analysed on the basis of the shortest linear distance between the clusters and this site. A short

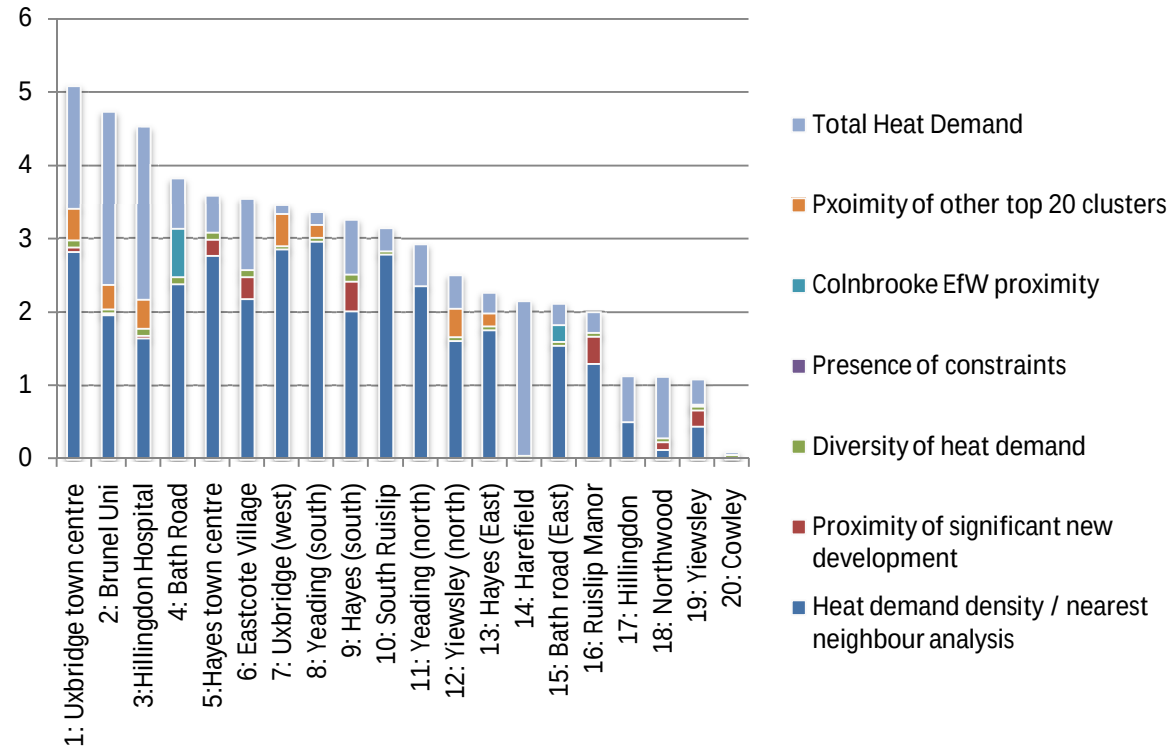
distance scores highly in this assessment. A linear scoring system has been adopted, where if the site is less than 250m distant, then it would gain the maximum score of 10. If the site is greater than 4000m distant, then it receives zero points. All other scores have been extrapolated between these two extremes.

Proximity of other top 20 clusters – assesses the proximity of the cluster in question to other clusters identified in this analysis. Clusters that are in close proximity to other clusters will score highly in this category.

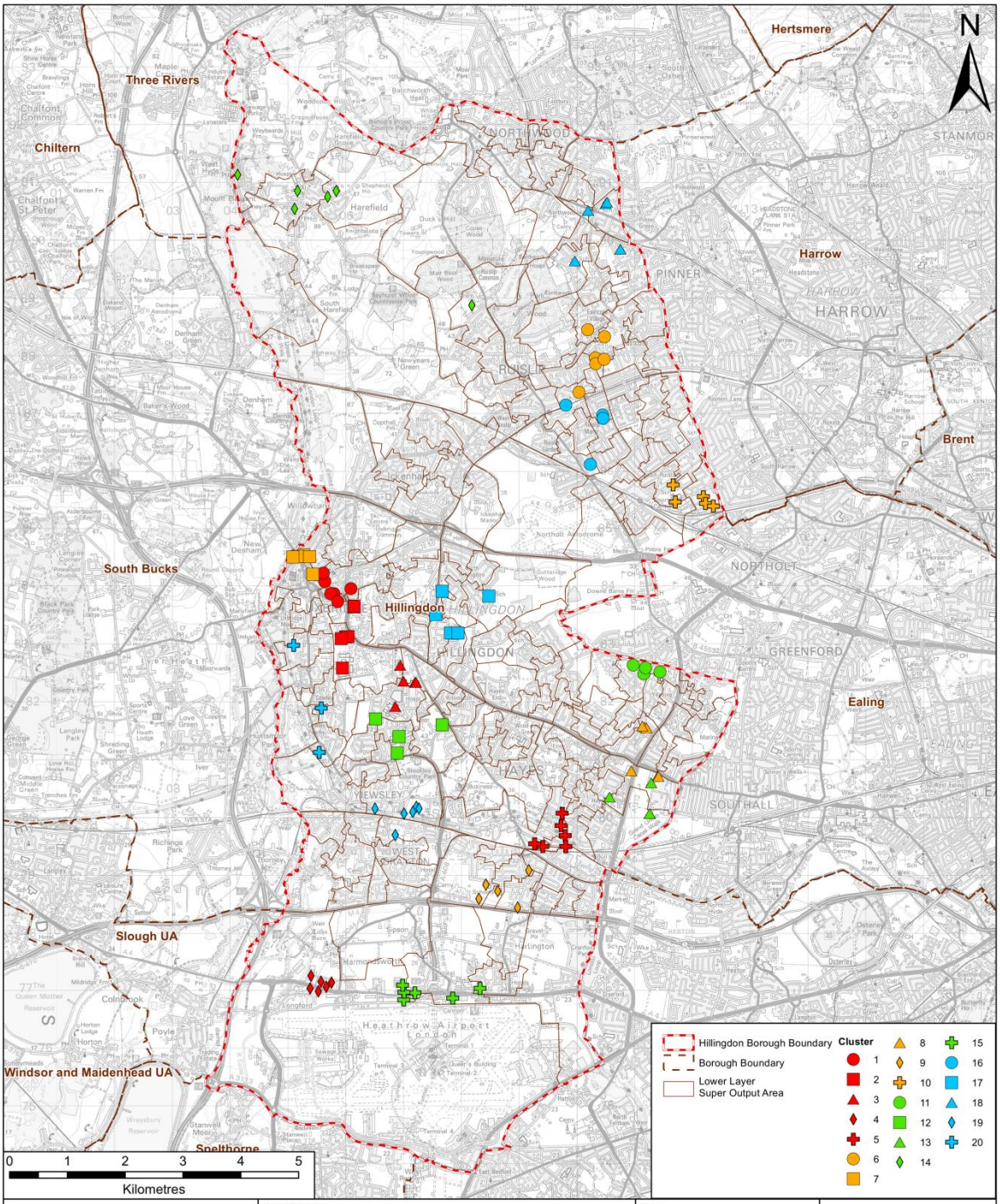
5.2 Cluster analysis results

The analysis reveals that the top 3 clusters have a significantly higher score than the remainder of the top 20; this is a result of high scores for the total heat demand and the heat demand density. Clusters 4 to 7 have similar scores, dominated by the high scores for heat demand density. Clusters 8 to 16 show a steady decrease in overall score, some being dominated by a high score in a single criterion. Clusters 17 to 20 have significantly lower scores than the remainder of the top 20.

5-1: top 20 clusters along with constraints scoring



On the map overleaf provides a visual representation of the spatial distribution of the top 20 clusters. Each cluster is marked by a unique colour and symbol, the 'hotter' the colour of the symbol the higher the ranking of the cluster. Colours are grouped into four sets of each containing five symbols.



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DRAWING TITLE
Heat Demand Clusters
- Greater than 200Mwh loads

JOB TITLE
London Borough of Hillingdon DEMaP

DATE 25/01/2011
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5.3 Pipeline model analysis of top clusters

Parsons Brinckerhoff has developed a 'pipeline' model that calculates indicative capital costs for a decentralised energy network. This is based only on distances between load points and an estimated peak load derived from assumed load factors at each load point. Further, pipework diameters and their costs are derived from a blanket assumption of allowable pressure drops per metre of pipework (rather than optimising pipework sizes on a lifecycle basis including capital costs, pumping energy and heat losses). The costs for the energy centre, CHP and ancillary plant are calculated based upon rules of thumb calculated from the magnitude of heat load to be supplied. This methodology is therefore only indicative, and is included here as a preliminary tool to show the magnitude of capital cost and potential CO_2 reduction for the schemes identified.

PB has undertaken high level preliminary modelling of the four schemes formed by the top 5 clusters. For each scheme an indicative gas engine CHP capacity, approximate capital cost and approximate annual CO_2 saving over business as usual have been calculated. Where appropriate additional clusters outside of the top 5 have been included, for example cluster 7 has been included alongside cluster 1 because the two are close to one another.

For each opportunity a map has been created using Google Earth. Each map illustrates the location of the individual heat loads within each cluster, the red line donates the approximate route of the district heating pipework 'spine'. The distance of each load from the spine has been measured and is used in the pipeline model to calculate a connection cost.

5.3.1 Opportunity 1: Uxbridge town centre and Brunel University

PB has examined a number of iterations of the clusters 1, 2 and 7 that are located in Uxbridge town centre leading up towards Brunel University. The opportunity encompasses a diverse selection of loads with an extensive district heating network. The following iterations have been examined:

a) Clusters 1, 2 and 7: Uxbridge town centre and Brunel University

b) Clusters 1&7: Uxbridge town centre plus RAF Uxbridge development

c) Cluster 1: Uxbridge town centre and RAF Uxbridge

d) Cluster 2: Brunel University

5.3.1.1 Clusters 1, 2 and 7: Uxbridge town centre and Brunel University

Scheme name	Indicative gas-fired CHP size	Approximate capital cost	Approximate emissions savings (tonnes CO_2 p.a.)
Uxbridge town centre and Brunel University (clusters 1,2 & 7)	4MW electrical	£12 million	10,000 tonnes CO_2 p.a.

5.3.1.2 Clusters 1&7: Uxbridge town centre plus RAF Uxbridge development

Scheme name	Indicative gas-fired CHP size	Approximate capital cost	Approximate emissions savings (tonnes CO_2 p.a.)
Uxbridge town centre plus RAF Uxbridge (cluster 1 and 7)	2.6MW electrical	£6.5 million	3,500 tonnes CO_2 p.a.

5.3.1.3 Cluster 1: Uxbridge town centre and RAF Uxbridge

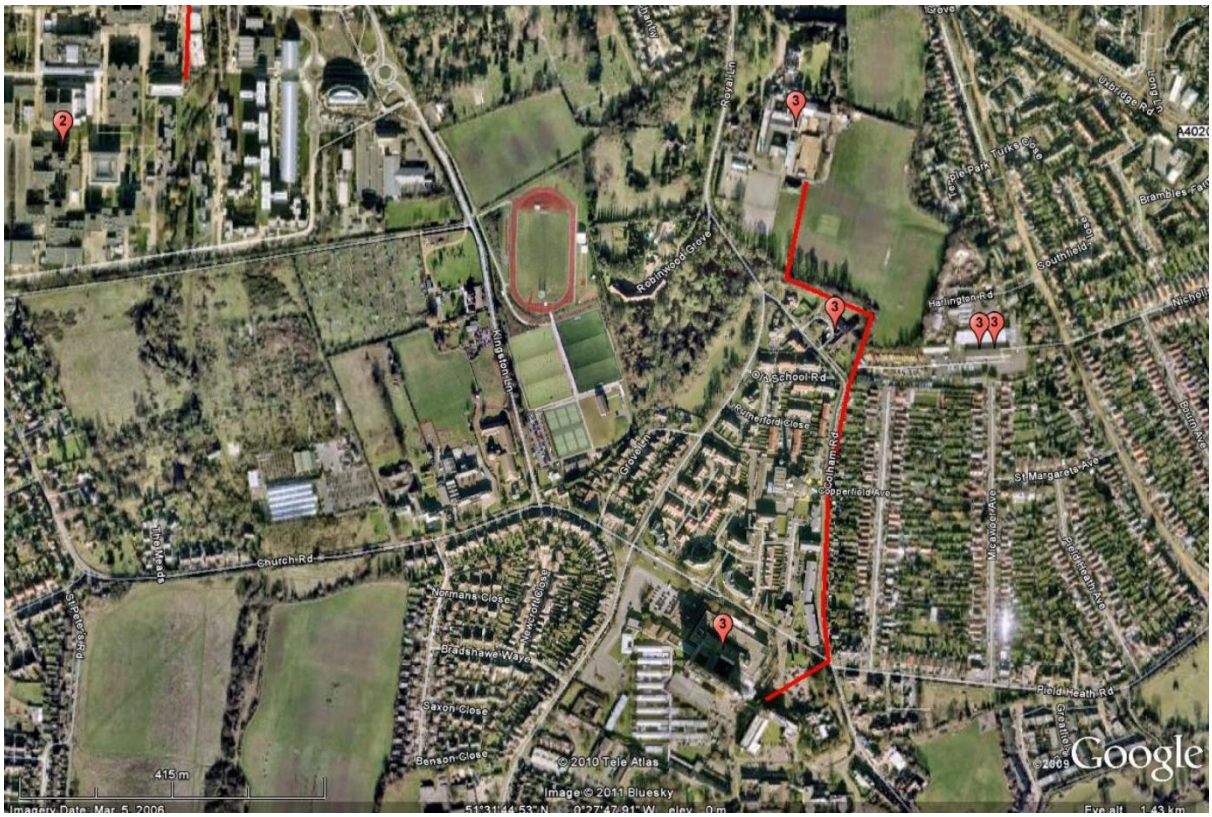
Scheme name	Indicative gas-fired CHP size	Approximate capital cost	Approximate emissions savings (tonnes CO_2 p.a.)
Uxbridge town centre (cluster 1 and RAF Uxbridge)	1.1MW electrical	£3.7 million	1,700 tonnes CO_2 p.a.

5.3.1.4 Cluster 2: Brunel University

Scheme name	Indicative gas-fired CHP size	Approximate capital cost	Approximate emissions savings (tonnes CO_2 p.a.)
Brunel University (cluster 1)	4MW electrical	£8 million	6,800 tonnes CO_2 p.a.

5.3.2 Cluster 3: Hillingdon hospital

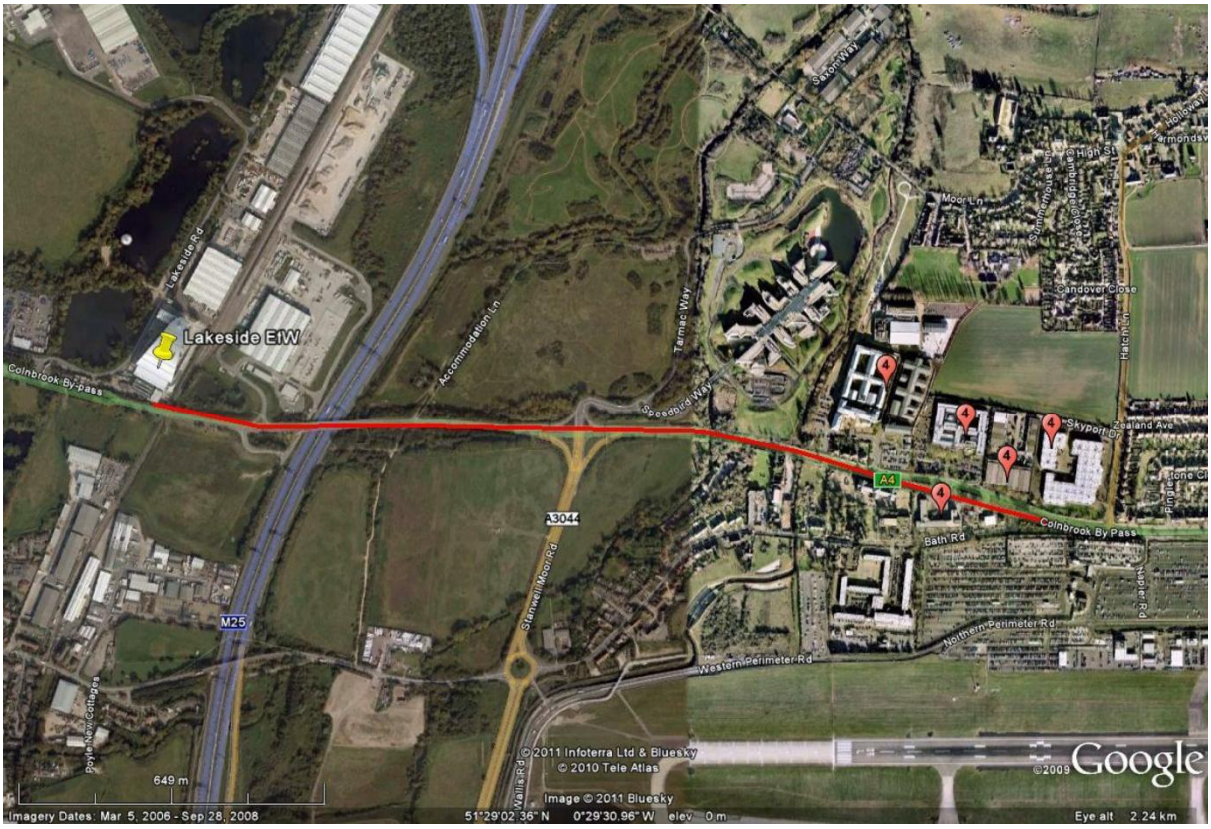
The following scheme has been examined to supply Hillingdon hospital and the other loads included in cluster 3



Scheme name	Heat supplied from EfW plant	Approximate capital cost	Approximate emissions savings (tonnes CO_2 p.a.)
Hillingdon Hospital (cluster 3)	4MW electrical	£6.2 million	5,800 tonnes CO_2 p.a.

5.3.3 Cluster 4: Bath Road properties

The following scheme has been examined to supply the loads included along the bath road, it is assumed for the purposes of this study that these would be supplied from the Lakeside Energy from Waste plant operated by Grundon Waste Management.



Scheme name	Heat supplied from EfW plant	Approximate capital cost	Approximate emissions savings (tonnes CO_2 p.a.)
Bath Road properties (cluster 4)	N/A	£5.1 million	1,800 tonnes CO_2 p.a.

5.3.4 Cluster 5: Hayes town centre and Station development area

The following scheme has been examined to supply the loads in and around Hayes town centre and the station area.

Hayes town centre	Heat supplied from EfW plant	Approximate capital cost	Approximate emissions savings (tonnes CO_2 p.a.)
Hayes town centre (cluster 5)	1.1MW electrical	£3.7 million	1,900 tonnes CO_2 p.a.

5.3.5 Limitations of the cluster identification technique

The quantitative cluster identification technique calculates the proximity of each potential heating load using linear distance as a proxy for infrastructure cost. In reality the district heating route cannot always take the most direct route. The routes used in the pipeline take into account a more realistic routing. These costs were used in the pipeline model to calculate an anticipated cost of implementing the district heating schemes included in the implementation plan. These costs have been used to calculate the lifetime cost of CO_2 reduction for each scheme. This is defined here as £ of capital investment per tonne of CO_2 saved over a 25 year period of operation. The clusters have been ranked in terms of their cost effectiveness

5-1: Ranked cost effectiveness of district heating opportunities

Scheme	(£ per tonne of CO_2 saved over 25 year lifespan of scheme
Hillingdon Hospital (cluster 3)	43
Brunel University (cluster 2)	47
Uxbridge town centre and Brunel University (clusters 1,2 & 7)	48
Hayes town centre (cluster 5)	78
Bath Road properties (cluster 4)	113

It is evident form this analysis that the top 3 clusters have the potential to represent better value for money in terms of capital investment per lifetime CO_2 avoidance. The analysis has been carried out using rules of thumb and approximate infrastructure routes. This information is intended to provide a guide as to the schemes that may represent better value and should therefore be progressed in preference to the other schemes. These costs should be re-visited at the next stage of the DEMaP process.

6 HIGH LEVEL IMPLEMENTATION PLAN

6.1 Scheme Scoping through to Delivery

There are a number of key stages that any emerging DE scheme must pass through in order to complete its passage from concept to delivery. These can be briefly summarised as follows, and are described in more detail in the 'DeMAP Support Package to Boroughs':

6.1.1 Concept Development and Support Framework (Capacity Building)

Initial actions at the conceptual stage include heat mapping (e.g. the output of this study), gaining support at senior political level, and generating a policy framework that is supportive of decentralised technologies.

6.1.2 Feasibility Study and Delivery Route

The feasibility stage of project development should seek to test a number of operational scenarios and technologies in order to optimise a scheme on an overall heat balance basis. Equally, attention should be given to the delivery and phasing of the project to ensure that heat loads and sources are matched through project growth. Outputs of this stage would include, capital and operational cost models, summaries of carbon savings, suggestions for procurement routes, and outline network routes, plant locations and other key infrastructure required to deliver a workable scheme.

6.2 Project Definition and Delivery

The delivery phase of a project is dependent up on the formulation of a workable business plan, and the identification of funding to support implementation. Project partners will require an evaluation of the risks associated with the project and mitigation strategies. A procurement strategy should be agreed, and the tendering process will confirm costs of installation.

6.3 Identification of key opportunities

The table overleaf provides summary information relating to the four district heating opportunities that have been identified in this study. The cluster analysis undertaken in section 5 has been used to directly inform the implementation plan because the clusters were identified and ranked using a quantitative, evidence based methodology

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6-1: Key district heating opportunities in LB Hillingdon

Opportunity reference	DE Opportunity	Priority	Notes	Barriers	Next Steps	Key dates	Key contacts
		Low, medium, high	Outline description of scheme	Barriers to delivery	In terms of LA facilitation of progress	(if action is not taken will the project be delayed)	
1	Uxbridge town centre and Brunel University	High	Includes clusters ranked 1st and 2nd in quantitative analysis	Major roads making installation of DH problematic Large scale of scheme - high capital cost Development risk Uncertainty surrounding energy centre location	Open discussions between LB Hillingdon and the University Potential to form a heat supply steering group from interested parties.	Timing dictated primarily by development timeframes	Ian Thynne LB Hillingdon No information available for developers Brunel University
2	Hillingdon Hospital	Medium	Comprised from 3rd ranked cluster in quantitative analysis	Development risk High capital cost for scale of scheme Public / private sector involvement Energy Centre location	Open discussions between LB Hillingdon and Hillingdon hospital. Potential to form a heat supply steering group from interested parties.	Timing dictated primarily by development timeframes	No information available for developers Bishopshalt School, 01895 233 909

Opportunity reference	DE Opportunity	Priority	Notes	Barriers	Next Steps	Key dates	Key contacts
		Low, medium, high	Outline description of scheme	Barriers to delivery	In terms of LA facilitation of progress	(if action is not taken will the project be delayed)	
3	The Bath Road	Low	Comprised from 4rd ranked cluster in quantitative analysis	Entirely private sector Crossing M25 and along Bath road – difficult to install DH Involvement of Grundon for heat supply High capital cost for scale of scheme	Open discussions with Grundon (operator of EfW plant) and the potential heat customers on Bath road. Maybe chaired by LB Hillingdon, Potential to form a heat supply steering group from interested parties.	Timing dictated primarily by development timeframes	The Sheraton Heathrow Hotel +44 20 8759 2424 Colnbrook IRC Tel: 020 8607 5200 Grundon Waste Management
4	Hayes town centre	Medium	Comprised from 5th ranked cluster in quantitative analysis	Development risk Transport infrastructure, road, canal and rail crossings Energy centre location Limited public sector involvement	Arrange a meeting to discuss the potential to form a heat supply steering group from interested parties.	Timing dictated primarily by development timeframes	No information available for developers Hillingdon council responsible for Hayes Pool Botwell House Catholic Primary School Tel: 0208 573 2229 info@botwellhouseschool.co.uk

7 CONCLUSIONS AND RECOMMENDATIONS

7.1 Conclusions

7.1.1 PB have identified a moderate potential for the deployment of district heating in the London Borough of Hillingdon. The majority of the district heating opportunities that have been identified are centred around existing public sector buildings with a significant proportion of new development.

7.1.2 The top five clusters, as identified via the quantitative analysis of heating demands are

- Uxbridge Town Centre
- Brunel University, Uxbridge High School and the RAF Uxbridge development
- Hillingdon hospital and surrounding heat demands
- Properties along the bath road
- Hayes town centre

7.1.3 Existing public sector buildings have the ability to sign up to the long term heat supply agreements that provide the commercial foundations upon which decentralised energy networks can be established. As such these buildings are vital to the successful implementation of decentralised energy in LB Hillingdon.

7.1.4 There is a significant risk associated with implementing district heating schemes that are reliant on new development to provide sufficient heat demand to make them viable. Developers therefore play an integral role in the deployment of district heating schemes in Hillingdon. A case in point is the Hayes town centre scheme that is dominated by new development heat demand.

7.1.5 The supply of district heating from the Colnbrook EfW incinerator is accompanied by a significant risk in terms of:

- the ability to modify the existing plant to supply the heat to a DH network,
- the magnitude of heat sales required to make the modifications economically viable and
- the constraints associated with taking the heat pipework across the M25 motorway to supply the loads on the Bath Road.

7.2 Recommendations

7.2.1 LB Hillingdon should arrange a meeting to disseminate the findings of this report. Attendees should include at a minimum those organisations whose buildings have been identified in the study.

7.2.2 Where potential has been identified for the emergence of a standalone district energy system, key next steps will include a series of further levels of feasibility / viability investigations to increase confidence levels for all stakeholders in the realism of delivery.

7.2.3 It is recommended that, as per the Draft London Plan, LB Hillingdon adopt a policy that demands that major development in key cluster areas demonstrates adherence to an appropriate energy hierarchy that reflects the potential to connect to decentralised energy networks.

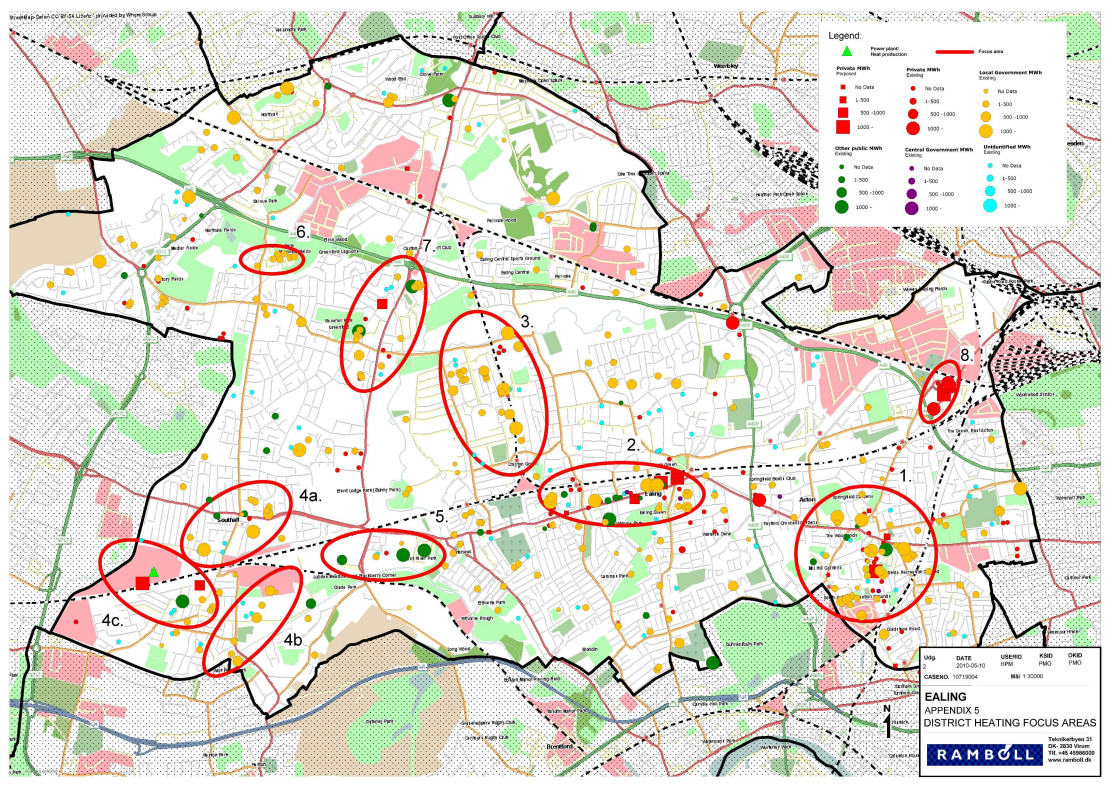
7.2.4 Most of the clusters identified here include future development; hence a key recommendation is that LB Hillingdon should actively maintain an ongoing dialogue between all potential Developers identified in the top 20 clusters to ensure at an early stage that all parties are aware of the benefits that a decentralised energy system can provide, and that Developers are aware that there are nascent schemes being developed.

7.2.5 Developers of schemes included in the top 20 clusters should be obligated to demonstrate why they cannot connect to, or help develop a decentralised energy scheme for their developments and the other buildings identified in this report.

7.2.6 PB recommends that a dialogue is opened with Grundon, the operator of the Colnbrook Energy from Waste plant. The potential for using heat from this plant is aligned with the aspirations of the Mayor's Energy strategy and should be fully explored.

8 APPENDICES

Appendix A – Extract from LB Ealing DEMaP report (appendix 5, District heating focus areas)



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EALING

APPENDIX 5

DISTRICT HEATING FOCUS AREAS

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